

**STUDIES ON PLANTS OF ETHNOBOTANICAL
IMPORTANCE IN THE TROPICAL WET
EVERGREEN FORESTS OF MIZORAM**

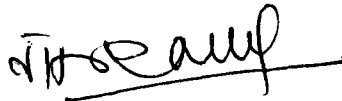
By
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submitted
in partial fulfilment of the requirement of the
Degree of Doctor of Philosophy in Forestry of
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The North-Eastern Hill University
January 1998

I J.H. Lalramnghinglova, hereby declare that the subject matter of thesis is the record of work done by me, that the contents of this thesis did not form basis of the award of any previous degree to me or to the best of my knowledge to anybody else, and that the thesis has not been submitted by me for any research degree in any other University/Institute.


This is being submitted to the North-Eastern Hill University for the degree of Doctor of Philosophy in "Studies on Plants of Ethnobotanical importance in the Tropical Wet Evergreen Forests of Mizoram."



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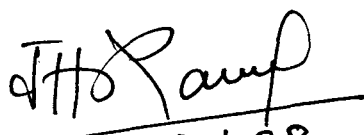

5.1.98
(J.H.LALRAMNGHINGLOVA)

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ABBREVIATIONS USED

ADPR	:	Ayurvedic Drugs and Their Plant Resources
al	:	<i>alii</i> : others; <i>aliorum</i> : of others
auct. non	:	<i>auctorum nonnullorum</i> : of some authors
BBO	:	Botany of Bihar & Orissa
BBSI	:	Bulletin of Botanical Survey of India
BP	:	Bengal Plants
c., ca.	:	<i>circa, circiter</i> : about
cf.	:	<i>confer</i> : compare
CGIMP	:	Companion to Glossary of Indian Medical Plants
cm.	:	<i>centimeterum</i> : centimetre
CSIR	:	Council of Scientific and Industrial Research
DEP	:	Dictionary of Economic Products of India
DIFME	:	Dictionary of Indian Folk Medicine & Ethnobotany
DIMP	:	Dictionary of Indian Medicinal Plants
dist.	:	<i>districtus</i> : district
Ed: ed(s)	:	Edition: editor(s) or edited
EFPN	:	Enumeration of Flowering Plants of Nepal
e.g.	:	<i>exempli gratia</i> : for example
et al.	:	<i>et alii</i> : and others
ex auct.	:	<i>ex auctoribus</i> : according to authors
<i>ex-situ.</i>	:	in an artificial condition, propagated
f.	:	(before a personal noun) <i>fide</i> : according to (after a personal noun) <i>filius</i> : son.
FA	:	Flora of Assam
FBI	:	Flora of British India
FC	:	Flora of Ceylon
FFBB	:	Forest Flora of British Burma
FFMS	:	Ferns and Fern - allies of Meghalaya State
FH	:	Flowers of the Himalaya
FI	:	Flora of India
fig.	:	<i>figura</i> : Figure, illustration
fl.	:	<i>floret</i> : flower
FN.	:	Ferns of Nagaland.
fr.	:	<i>fructus</i> : fruit
FTS	:	Flora of Tripura State
GIMP	:	Glossary of India Medicinal Plants
ib., ibid	:	<i>ibidem</i> : the same, in the same place.

i.e.	:	<i>id est</i> : that is
IED	:	Isthmian Ethnobotanical Dictionary
IFFWH	:	Illustrated Fern Flora of West Himalaya
IMP	:	Indian Medicinal Plants
HFBI	:	Handbook of Ferns of British India
<i>in-situ</i>	:	in natural condition
IT	:	Indian Trees
JETB	:	Journal of Economic Taxonomic Botany
m	:	<i>metrum</i> : meter, metre
masl	:	metre above sea-level
mm	:	<i>millimetrum</i> : millimetre
MMPI	:	Major Medicinal Plants of India
Monog. Bam.	:	Monograph of Bamboo
MPM	:	Medicinal Plants of Manipur
MPIP	:	Medicinal Plants of India and Pakistan
NISC	:	National Institute of Science Communication
NRMM	:	National Resource Management Mizoram.
no.	:	<i>numero</i> : number
op. cit.	:	<i>opera citato</i> : in the work cited
p., pp.	:	<i>pagina</i> : page, pages
P.	:	Photographs
Pl.	:	Plate
RBSI	:	Records of Botanical Survey of India
rev., rev.ed.	:	revised : revised edition.
ser.	:	<i>sercis</i> : series
SGIMP	:	Supplement to the Glossary of Indian Medicinal Plants
sp; spp.	:	species (singular); species (plural)
ssp.	:	sub-species
Syn	:	<i>Synonymia, Synonymis, Synonymy; Synonyms, Synonymon, Synonymia, Synonym, Synonymy;</i>
TFM	:	Tree Flora of Malaysia
TIMP	:	The Treatise of Indian Medicinal Plants
UPI	:	Useful Plants of India
var.	:	<i>varietas</i> : variety
vice-versa	:	inversely
viz.	:	<i>videlicet</i> : namely
vol (s)	:	<i>volumen</i> : volume, volumes
WI	:	Wealth of India.

INTRODUCTION

CHAPTER 1

INTRODUCTION

1.1. Location and Physiography

Mizoram is situated in the extreme end of the Himalayan ranges in the North-Eastern part of India. It is located between 21° 58' N and 24° 35' N latitudes and 92° 16' E and 93° 29' E longitudes and bounded by Cachar District of Assam in the North, Manipur state in the North-East, Myanmar in the East and South, and Bangladesh and the state of Tripura in the West. The tropic of cancer passes just through the southern periphery of Aizawl Town at 23° 30' N latitude (Anonymous, 1996).

The lengths of borders along the sides of Assam, Tripura and Manipur are 123,66 and 95 km, respectively. The strategic international boundary has the length of 404 km along the side of Myanmar and 318 km along the side of Bangladesh (Anonymous, 1996).

The state of Mizoram has predominantly mountainous terrain of tertiary origin. The mountain ranges run in north to south direction, intercepted by narrow deep valleys and criss-crossed by innumerable hillocks.

The slope gradients are very steep, and they leave only 59,197 ha of land arable for W.R.C.(Wet Rice Cultivation) which is 2.80% of the total geographical area of 21,081 km² (Anonymous, 1997).

The lowest portion at Tlabung is 20 m asl and the highest peak called **Phawngpui (Blue Mountain)** is 2157 m asl and the average height is about 1000 metres.

Some of the major mountains and their respective heights are : Phawngpui (Blue Mountain) 2157 m, Lengteng 2141 m, Sur tlang 1967 m, Chalfih tlang 1866 m, Hrangturzo tlang 1854 m, Zopui tlang 1850 m and Tawizo tlang 1857 m (Anonymous, 1991, 1994, 1996).

The major rivers in Mizoram flow either in northerly or southerly direction. The lengths of some of the major rivers are : Tlawng 185.15 km, Tiau 159.39 km, Chhingtui (Kolodyne) 138.46 km, Khawthlangtupui 128.08 km, Tuichang 120.75 km, Mat 90.16 km and Tuipui 86.94 km (Anonymous, 1992, 1996).

1.2. Population and Health Status

According to Census 1991, the total population of Mizoram is 6,89,756 persons, density being 33 km²; female sex ratio being 921; annual growth rate being 3.34%; urban population being 46.1%; literacy rate being 82.3% (second highest in India); work participation rate being 48.9%, in the primary sector being 66.0%; and the projected population in 2001 AD being 9,63,554 (Vijayanunni, 1996; Anonymous, 1996). The crude birth rate of Mizoram is 21.6 (national 30) while the crude death rate is 4.6 (national 10). The life expectancy is 53 years (national 56 years). A decadal growth of population since 1901 up to a projected population for 2001 is presented in **Fig.1**.

The status of health in Mizoram is poor and the availability of health facilities is not adequate. The distribution of medicare is also inreciprocal with the increase in population, the outbreak of epidemic diseases and the demand of the sick people. The basic requirements for health, *viz.*, safe drinking water and excreta disposal facilities are also not fulfilled in many areas. This could be one of the reasons that causes an increase in the population of mosquitoes which ultimately leads to the spread of malarial diseases which have always been ranked at the top of deadly diseases in the state.

The health facilities available at present are 7 Government Hospitals and 4 Non-Government Medical Institutions; 6 Community Health Centres (0.85%); 18 Subsidiary Health Centres (2.57%); 38 Primary Health Centres (5.43%) and 314 Sub-Centres (44.92%), out of 699 inhabited villages. The doctors' population till 1995 was 1:3600 (Anonymous, 1996).

The percentage distribution of death prevailing in the state till 1993 is :
(1) Malaria (34.8%); (2) Asthma (20.4%); (3) Fever (17.8%); (4) Pneumonia (11.1%); (5) Cancer (10.2%); (6) Gastroenteritis (7.9%); (7) Heart attack (7.4%); (8) T.B. of lungs (6.04%); (9) Anaemia (1.8%); (10) Typhoid - Nil (Ray, 1994).

Due to the inability of modern system of medicine to provide the pre-requisite health care, people in rural areas have to depend on herbal medicines which are derived from wild plant resources.

Since 80% of the world's population rely on herbal medicines, the WHO (World Health Organisation) has recognised and encouraged the use of traditional medicines which have been proven to be safe and effective (Akerle, 1988; WHO, 1993).

1.3. Geology

The geology of Mizoram has been studied by some workers recently. Mizoram consists of sandstone and shales of tertiary age thrown into long folds. The rocks of Mizoram are the continuation of those rocks forming Patkai Range and Cachar Hills (Pachau, 1994).

Geologically, Mizoram is a part of the Tripura Mizoram Miogeosyncline depression (Assam Gulf) formed in the post-ocean thrust of the Himalaya orogeny leading to regional uplift of Barail group of sediments (*in* Kumar, 1997).

The lithostratigraphic succession in Mizoram is divided into : (i) Barail Group, (ii) Surma Group and (iii) Tipam Group, which are briefly described and reported by Ganguli (1975); Ganju (1975); Nandi,*et al.* (1983); Pachuau (1994); Lallenmawia (1994); Tiwari,*et al.* (1996). The deposits of the Fourth Group, *i.e.*, Alluvial Group, is limited to only river beds comprising mainly loose sand and gravels as thin layers in the river valleys.

1.4. Soils

The soils of Mizoram in general are young, immature and moderate to highly acidic. The contents of potash and phosphorus are low, whereas the content of nitrogen is high, due to the accumulation of organic matter in the uneroded soils. The soils are generally fertile and responsive to the vigorous growth of vegetation as well as arable crops.

Soils of Mizoram are categorised into three orders : (i) Entisols, (ii) Inceptisols and (iii) Ultisols (USDA, 1988) followed by Hrahsel (1988), Singh & Datta (1989), Pachuau (1994) and Saithantluanga (1997).

According to Kumar (1997), the soils of Mizoram are broadly classified into Alluvial and Residual soils. The alluvial soils usually occur in the foot-hills of the north and west and in the intermontane plains and valleys, dominated by coarse sand. Residual soils which are further classified as lateritic, brown earth and podzolic occur in most parts of the state on steep slopes.

The soils of Mizoram are essentially derived from sedimentary rocks belonging to Barail, Surma and Tipam Groups of Miocene to Pleistocene periods (Kumar, 1997) or the product of slow dia-genetic changes of the parent materials comprising mica schist, ferruginous sandstone and shales giving the inherent acidic character (Saithantluanga, 1997).

1.5. Climate

Mizoram enjoys a pleasant and moderate climate. It is generally warm in summer, and it is not very cold in winter. The climatic condition accorded to Mizoram may be called humid tropical, sub-tropical and sub-temperate climates, characterised by short winter and long summer with heavy rainfall. The year may be divided into four seasons :

- (i) The winter lasts from December to February and the temperature varies from 10° C to 22° C, with little or no rain.

- (ii) The spring lasts from March to May and the temperature varies from 19° C to 29° C, characterised by bright sunshine and clear sky unless disrupted by the pre-monsoon rains.
- (iii) The summer lasts from June to August, characterised by violent storms and monsoon rains often causing landslides in some places and the temperature varies from 20° C to 32° C.
- (iv) The autumn season lasts from September to November, characterised by a pleasant climate during the daytime and at night. The temperature varies from 18° C to 25° C.

Simultaneously, the temperature is increasing probably due to increase in population, urbanisation and environmental degradation.

1.6. Rainfall

The entire state of Mizoram is under the direct influence of maritime tropical airmass brought in by South-West monsoon. The rainy season lasts from May to October with an average rainfall of 2500 mm per annum. July and August are the rainiest months, whereas December and January are the driest months of the year with almost no rainfall.

Humidity is relatively high nearly all the year round. The relative humidity is highest during monsoon rains. It is above 90%. The period from January to April is comparatively dry, whereas the relative humidity remains between 60 and 70% (Pachau, 1994). A decadal average rainfall (1986-1996) is shown in **Table 1**.

1.7. Forest Types and Wildlife Sanctuaries

1.7.1. Forest Cover

Out of the total geographical area (21,081 km²) of the state, the recorded forest area in 1992 was 15,935 km² or 75.5%, whereas the actual forest cover as per the State of Forest Report, 1995 was 18,576 km² or 88.1% and the growing stock volume per hectare in cubic metres is 35.3 (Anonymous, 1995) which, according to Forestry Statistics India (1995), are 18,697 km² or 88.7% and 30.3, respectively (Anonymous, 1995). On the basis of the 1995 assessment of Indian Remote Sensing Satellite Product (IRS-IB) the forest cover was found to be reduced by 156 km² in 1993 and 121 km² in 1995 (Anonymous, 1995). Decrease in forest area is mainly due to the continuous practices of *shifting* cultivation, and increase in forest cover is due to regeneration programmes and natural vegetation.

TABLE - I : A DECADAL MONTHLY RAINFALL DATA (1986 - 1996) MIZORAM (IN MM.)

Sl.No.	Month	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
1	Jan.	5.9	12.4	0.6	1.1	1.6	1.1	5.3	18.7	3.1	4.2	23.6
2	Feb.	8.9	27.4	28.2	29.7	23.8	30.0	8.2	129.6	16.4	10.1	34.0
3	Mar.	30.1	64.4	64.3	20.9	177.5	28.1	7.1	98.8	233.1	36.5	123.1
4	Apr.	200.6	2.3	136.8	131.3	259.9	137.0	50.3	108.3	159.5	40.1	106.4
5	May.	101.4	86.4	333.3	195.2	398.2	202.4	161.1	481.5	195.1	266.5	238.9
6	Jun.	297.5	387.4	497.1	335.1	317.3	402.3	277.1	641.0	302.0	448.8	283.4
7	Jul.	424.6	556.1	552.4	755.7	416.1	711.2	374.1	709.0	417.6	405.0	352.5
8	Aug.	435.5	552.8	518.8	460.6	552.4	452.9	382.1	462.0	434.3	474.4	308.4
9	Sept.	391.8	518.8	94.8	336.1	422.2	346.2	316.2	339.2	209.8	349.7	407.5
10	Oct.	170.0	94.8	119.9	351.0	97.5	302.1	265.1	217.1	109.9	171.4	166.3
11	Nov.	100.7	119.9	11.1	1.3	124.4	1.3	39.1	23.6	26.3	195.4	37.0
12	Dec.	4.8	11.1	1.0	0.4	37.1	1.1	10.1	NIL	0.2	0.5	5.9
TOTAL		2171.8	2743.8	2657.5	2619.4	2828.0	2615.7	1955.8	3228.8	2071.3	2502.6	2042.0

Sources : a) Statement of monthly rainfall, Directorate of Economics & Statistics, Mizoram, Aizawl.

b) Meteorological Data Register, HQ. C.E.(P) Puspak, Aizawl.

Table 2. The legal classification of Forests in Mizoram

Sl.No.	Forest category	Area (Km²)
1.	State Owned :	
a.	Protected forests	1300
b.	Reserved forests	5146
c.	Wildlife sanctuaries	681
		<hr/> 7,127 <hr/>
2.	District Council owned (Chhingtui District) :	
a.	Protected forests	347
b.	Reserved forests	363
c.	Wildlife sanctuaries	210
d.	Village safety and supply reserved forests	866
		<hr/> 1,786 <hr/>
3.	Village Council Controlled :	
a.	Village safety and Supply reserved forests	1782
b.	Unclassed state forests (Controlled by Revenue Department)	3240
		<hr/> 7,022 <hr/>
TOTAL :		<hr/> 15,935 <hr/>

Source : *Statistical Hand Book Mizoram 1992*, p.138.

From 1992 onwards, the forest area has been decreasing. It has decreased from 15,935 km² to 15,825 km² in 1994 and to 10,745 km² in 1995-96 (Anonymous, 1994, 1996). It reveals that the recorded forest area has been reduced to 50.97% in 1996. On the other hand, the area of wildlife sanctuaries has increased up to 941 km² (Anonymous, 1996).

1.7.2. Forest types

On the basis of Champion (1936) and Champion & Seth (1964), the forests of Mizoram have been broadly divided into 3 (three) categories :

- (a) Tropical Wet Evergreen Forests;
- (b) Tropical Semi-Evergreen Forests;
- (c) Montane Sub-Tropical Pine Forests.

The third category of the above classification (*i.e.*, **Montane Sub-tropical Pine Forests**) may require a revision on the ground that pine may not occupy dominancy over the vegetation of that area.

Based on Champion & Seth (1968), Negi (1989) and Subramanian & Sasidharan (1996), the forests of Mizoram can be divided as follows :

- (a) Tropical Wet Evergreen Forests (up to 900 m);
- (b) Tropical Semi-Evergreen Forests (900 - 1500 m);
- (c) Sub-tropical Hill Forests (1500 - 2158 m).

The common timber trees in each forest type and some economically important plants species are given below :

(a) Tropical Wet Evergreen Forests

The common important tree species are : - *Dipterocarpus turbinatus* Gaertn. f. (Lawngthing); *D.retusa* Bl. (Thingsen); *Terminalia myriocarpa* Heurck & Muell.-Arg. (Char); *T.chebula* Retz. (Reraw); *T.bellirica* (Gaertn.) Roxb. (Thingvandawt); *Aphanamixis wallichii* (King) Haridasan & Rao (Sahatah); *Michelia champaca* Linn. (Ngiau); *Haldina cordifolia* (Roxb.) Rids. (Lungkhup); *Mitragyna rotundifolia* (Roxb.) O.Ktz. (Lungkhup); *Lagerstroemia speciosa* (L.) Pers. (Thlahdo); *Chukrassia tabularis* A.Juss. (Zawngtei); *Artocarpus chama* Buch.-Ham. (Tatkawng); *Bombax ceiba* L. (Phunchawng); *B.insigne* Wall. (Pang); *Bischofia javanica* Bl. (Khuangthli); *Duabanga grandiflora* (Roxb.ex DC.) Walp. (Zuang); *Toona ciliata* M.Roem. (Teipui); *Dillenia indica* L. (Kawrthindeng); *Calophyllum polyanthum* Choisy (Sentezel); *Podocarpus neriifolia* D.Don. (Tufar, Thlangfar); *Stereospermum colais* (Dillow.) Mabb. (Zinghal); *Knema linifolia* (Roxb.) Warb. (Thingthi); *Garcinia* spp. (Chengkek, Vawmva); *Gmelina arborea* Roxb. (Thlanvawng); *Gynocardia odorata* R.Br. (Saithei); *Hydnocarpus kurzii* (King.) Warb. (Khawitur); *Baccaurea ramiflora* Lour. (Pangkai) etc.

Of cane species, *Calamus* spp. (Hruipui, Hruizik); *Zalaca baccarii* HK. f. (Thilthek); *Plectocarpia khasiana* Griff. (Mawt), etc. are common. Of palms, *Borassus flabellifera* L. (Siallu); *Licula peltata* Roxb. (Laisua) and *Typha elephantina* Roxb. (Sakuhlakhuih) are very common. *Melocanna baccifera* (Roxb.) Kurz. (Mautak) is predominant over the species of *Dendrocalamus longispathus* Kurz. (Rawnal); *Bambus tulda* Roxb. (Rawthing), etc.

A moderately sloped gradients of secondary forests are being utilized for large-scale plantations of the most valuable timber species, *Tectonia grandis* L. (Teak/Tlawr).

(b) Tropical Semi-Evergreen Forests

This type of forest covers the central biogeographic zone and the coverage is approximately 50% of the total geographical area.

The common important tree species are : *Gmelina arborea* Roxb. (Thlanvawng); *Phoebe attenuata* Nees. (Bulbawr); *Persia petiolaris* (Hook.f.) Deb. (Bulpui); *Syzygium cumini* (L.) Skeels (Hmuipui); *S. fruticosum* DC. (Hmuichawl); *Albizia chinensis* (Osb.) Merr. (Vang); *A. odoratissima* (L.f.) Benth. (Kangtekpa); *A. procera* (Roxb.) Benth. (Kangteknu); *A. thomsonii* Brandis (Thingri chi khat); *Sapium baccatum* Roxb. (Thingvawkpui); *S. eugeniaefolium* Ham.ex Hook.f. (Thingvawkpui); *Schima wallichii* (DC.) Korth. (Khiang); *Pterospermum acerifolium* Willd. (Siksil); *Castanopsis tribuloides* (Sm.) DC.var.*typica* King (Thingsia); *Cassia javanica* L.ssp.*nodosa* (Buch.-Ham.ex Roxb.) K.&S.Larsen (Makpazangkang); *Chisocheton paniculatus* (Roxb.) Hiern.(Sahatahpui); *Carallia brachiata* (Lour.) Merr. (Theiria); *Styrax polyspermum* Cl. (Theipalingkawh); *Alstonia scholaris* (L.) R.Br. (Thuamriat); *Erythrina stricta* Roxb. (Fartuah/Tuahpui); *Firmiana colorata* (Roxb.) R. Br. (Khaukhim); *Neolamarckia cadamba* (Roxb.) Bossue (Banphar); *Eurya acuminata* DC. (Sihneh); *Ficus* spp. (Theipui/Hmawng chi); *Dillenia pentagyna* Roxb. (Kaihzawl/Kawmkaw); *Emblica officinalis* Gaertn. (Sunhlu); *Quercus semi-serrata* Roxb. (Sehawrvar); *Litsea* spp. (Nauthak); *Mesua farrae* L.(Herhse); *Cinnamomum* spp. (Thakthing chi) etc.

Major bamboo species have been reported by Lalramnghinglova & Jha (1995); Lalramnghinglova (1995, 1997) in which *Melocanna baccifera* (Roxb.) Kurz. is predominant. *Dendrochalmus* spp. are common, whereas *Neohouzeaua dullooa* (Gamble) Camus (Rawthla) and *Pseudostachyum polymorphum* Munro (Chal/Chalte) are rare species.

Among the palm species, *Pandanus odoratissimus* (Lamk.) L. (Ramlakhuihthei); *Caryota mitis* Lour. (Meihle); *C.urens* L. (Tum); *Arenga saccharifera* Labill (Thangtung); *Wallichia densiflora* Mart. (Tawlhpahrit) and *W. disticha* T. Anders (Lem) are present in small populations. Cane population is gradually decreasing, whereas

epiphytic orchid population is emerging towards the eastern higher altitude above 1200 m asl.

(c) Sub-Tropical Hill Forests

This type of forests come under the major group **Montane Sub-tropical Forests** (Subramanian & Sasidharan, 1997) or **Sub-tropical Broadleaved Hill Forests** (Negi, 1989) in the eastern fringes bordering Myanmar and approximately extending from 1500-2158 m asl. The area constitutes about 24% of the total geographical area. It has a sub-temperate climate and the temperature varies from 9° C to 25° C.

The forests are characterised by *Rhododendron arboreum* Sm. (Chhawkhei); *Myrica esculenta* Buch.-Ham. ex D. Don. (Keifang); *Engelhardtia spicata* Leschn. ex Blume (Hnum); *Pinus kesiya* Royle ex Gordon. (Far); *Lithocarpus dealbata* (Miq.) Rehder. (Fah); *Quercus griffithii* Hk.f. & Th. ex DC (Sasawthing); *Quercus serrata* Thumb. (Sehawrdum) etc.

Arundinaria callosa Munro (Phar); *Chimonobambusa khasiana* (Munro) Nakai (Lik); *Dendrocalamus sikkimensis* Gamble (Rawmi) and *D. giganteus* Munro (Rawpui) are the characteristic bamboo species. *Melocalamus compactiflorus* Benth. (Sairil) are also present, whereas distribution of *Melocanna baccifera* (Roxb.) Kurz is restricted to the forests. *Trachycarpus martiana* H.Wendl. (Siallute) and few *Cycas* are also present.

This forest type is the natural abode of epiphytic orchids like *Renanthera inschootiana* Rolfe (Senhri); *Vanda coerulea* Griff. ex Lindl. (Lawhleng); *Mantisia saltoria* and *M. wengrii* Fischer (Ruala, 1985; Singh, *et al.*, 1990).

1.7.3. Wildlife Sanctuaries and National Parks

The Wildlife (Protection) Act, 1972 (as amended up to 1991) (Anonymous, 1972) has been brought out to the public notice in 1992, following the declaration of the “Year of Wildlife Conservation” in Mizoram, a joint venture of the Environment & Forest Department and Young Mizo Association (Y.M.A.), the largest single voluntary organisation in Mizoram. This led to the receipt of the Best Award on Wildlife Conservation programme from the Government of India in 1993. National parks and Wildlife sanctuaries (**Fig.2**) are briefly described below :

(i) Dampa Tiger Reserve

The Dampa Tiger Reserve is the largest sanctuary in Mizoram. It is located in the western part of Aizawl District covering an area of 500 km², and it extends between 200 and 1100 m asl. Tropical evergreen and semi-evergreen forests fall into the

area. Shankar Raman (1995) has listed out 215 species of birds from the sanctuary. It is 123 km away from Aizawl at Teirei.

(ii) Murlen National Park

Situated in the eastern part of Mizoram (bordering Myanmar) it has an area of 200 km² and the highest peak is 2075 m asl. Sub-tropical hill forests and tropical semi-evergreen forests prevail in the area. Pradhan (1995) has recorded 427 species of animals including 275 species of birds. The distance from Aizawl-via-Champhai is about 235 km.

(iii) Phawngpui National park

It is located in the eastern part of Lai Autonomous District Council in Chhimtuipui District of South Mizoram. The area is 100 km² and the park includes the highest peak in Mizoram, *i.e.*, **Phawngpui** or **Blue Mountain** (2157 m asl). The existence of a Sub-tropical hill forests is characterised by the natural growth of *Rhododendron arboreum* Sm. and is endowed with rich growth of epiphytic orchids. Robertson (1996) has reported birds, *viz.*, *Falco peregrinus*, *Garrulax virgatus*, *Ficedula superaciliaris*, etc. which were not seen anywhere in Mizoram.

(iv) Ngengpui Wildlife Sanctuary

This sanctuary lies within Lai Autonomous District Council in Chhimtuipui District of South Mizoram. The area is 150 km² and the distance from Lawngtlai at Ngengpui is 40 km. Tropical wet evergreen forest abounds in the sanctuary which extends from 100 to 500 m asl. Robertson (1996) has noted a number of interesting bird species which include *Vanellus cinereus*, *Glaucidium brodei*, *Pitta nipalensis*, etc. in this area.

(v) Khawnglung Wildlife Sanctuary

This is a proposed wildlife sanctuary and the legal approval from the Government of India is expected soon. It is located in Lunglei District and the area is 40 km² only. Tropical semi-evergreen forests prevail in the area.

The Mini-Zoo at Aizawl and the newly created Deer Park near Thenzawl are also linked with the management of wildlife sanctuary.

1.8. The People and Culture

The ethnology, status and culture of the Mizos have been thoroughly studied and well documented. The term “**Mizo**” is yet to be coined as a generic term (Sangkima, 1992) by which all tribes or sub-tribes are covered (Phukan, 1992; Burman, 1992).

The Kukis, the Lushais and the Chins in short, the MIZOS, are of Mongolian racial stock and resemble each other in appearance (Choudhury, 1992). They are characterised by short to medium stature, black hair, short legs, long arms, broad face, cheek bones high, eyes small and almond-shaped, nose short and flat with wide nostrils (Shakespeare, 1912).

1.8.1. Historical background

The Mizos believed that they came out from a cave called '*Chhinlung*' or '*Sinlung*', a '*closed-stone*' (Thanga, 1978). Chhinlung is said to be located at Szechwan Province in China or bordering the Shan - state in Eastern China (Sangkima, 1992). There are different views and ideas about the period in which the Mizos came into the present Mizoram. Some historians opined that they came from China-Burma border before the close of the 15th century (Siama, 1953; Zawla, 1964) while others think that they came at the close of the 18th century and at the beginning of the 19th century (Choudhury, 1992; Thanga, 1992).

1.8.2. Language

The Mizos speak Lushai (Mizo) language which belongs to the *Tibeto-Burman* branch of the *Sino-tibetan* language family (Grieson, 1908; Changli, 1992; Rui, 1992).

1.8.3. Religious beliefs, Festivals and Folk-dances

Formerly, the Lushais were animists. They believed in what they called '*Pathian*' the creator of everything. They also believed that the evil spirits lived in the hollows of big trees, streams, rivers, springs, mountains, cliffs, caves (Hluna, 1992) and other objects curiously shaped or deformed (Zairema, 1985). The evil spirits create disease, distress and even death. To avert such danger one has to sacrifice animals by way of propitiation through *Puithiam* (Priest). A detailed account is given by Parry (1928) and Zawla (1964).

The Mizos used to observe festivals, such as *Chapchar Kut* (February-March), *Mim Kut* (August - September) and *Pawl Kut* (December) in the past. Of these festivals, only *Chapchar Kut* is still observed these days. (plate 1, photo 1 & 2).

Folk-dances of the Mizos are : *Cheraw* (Popular bamboo dance), *Khual lam*, *Chheih lam*, *Chai lam*, *Rallu lam*, *Solakia*, *Sarlamkai*, *Par lam*, *Sakeihu lam* and *Tlang lam* (Vergheese & Thanzawna, 1997).

1.8.4. Occupation

Agriculture is the main occupation in Mizoram. More than 70% of the entire population of Mizoram live in rural areas and practice *shifting* agriculture or *jhum* farming. This method of cultivation no longer holds sustenance due to the shortening of *jhum* cycle to 3-5 years. Land tenure system is governed by the Mizo District (Land Revenue) Act of 1954, Jhuming Regulation Act of 1954 and the Mizo District (Forest) Act of 1955.

Paddy (*Oriza sativa* L.) is the principal crop in Mizoram. Other important crops are : *Zea mays* L. (Vaimim), *Glycine max* (L.) Mere (Bekang), *Sesamum orientale* L. (Chhawahchhi), *Brassica rapa* (L.) Elampham (Antam), *B. oleracea* L. var. *capitata* L. (Zikhlum), *Zingiber officinale* Rosc. (Sawhthing), *Areca catachu* L. (Kuhva), *Aleurites montana* E. H.Wils. (Tung), *Capsicum frutescence* L. var. *baccata* Irish (Hmarchate) etc.

Detailed account of the pattern of land use system and nature of *shifting* cultivation are given by Thangchungnunga (1996) and Jha (1997), respectively.

1.9. Ethnobotany and Its Scope for Research

1.9.1. What is Ethnobotany ?

Ethnobotanical study was first carried out by Edward L. Palmer in the South-West of the United States in 1869 and he found out plants used by the Indians for their food (Palmer 1871). Powers (1873-1875) used the term '*aboriginal botany*' which included all forms of vegetable used for medicine, food, cloth, ornament, etc.

The term "*ethnobotany*" was first coined by Dr. John W. Harshberger in 1895. He described ethnobotany as "the study of plants used by primitive and aboriginal people" (Harshberger, 1896). Since then, it has been amplified and defined in the following manner:

- (a) The study of the relationships which exist between people of a primitive society and their plant environment (Schultes, 1962).
- (b) The study of direct interrelations between humans and plants (Ford, 1978).
- (c) The study of the past and present interrelations of primitive or aboriginal human societies with the ambient vegetation (Maheshwari, 1987).
- (d) The study of the relationship between the inhabitants and the habitats (Sarin, 1989).
- (e) The study of useful plants prior to their commercial exploitation and eventually domestication, including the use of plants by both tribal and non-tribal communities without any implication of primitive or developed communities (Wickens, 1990).

- (f) The study of the total direct relationship between humans and plants (Jain, 1994).
- (g) The study of the interactions between people and plants (Martin, 1995).

Prance (1991) in his article entitled, “**What is ethnobotany today ?**” considers ethnobotany as a changing science. According to Balick (1996), the ‘new’ ethnobotany links diverse disciplines, such as anthropology, botany, nutrition, ecology, conservation, economics and pharmacology. The interdisciplinary nature of ethnobotany has been explained by Jain (1987, 1989), Maheswari (1987) etc.

1.9.2. Scope of Ethnobotanical Research

It has been found that most of the plant species having medicinal value grow in the forests. About 95% of medicinal plants used by herbal pharmaceuticals and for export are collected from the wild with no parallel regeneration programme to replenish medicinal plants’ stock (Anonymous, 1995). It is the general concept that 80 % of rural population in developing countries depend upon medicinal plants for their primary health care needs. A scientific survey of these medicinal plants and their ethnobotanical studies has been done by Botanical Survey of India, Research Institutions and Laboratories, Universities and Non-Government Organisations (NGO’s) in India. A number of detailed ethnobotanical exploitations were conducted in different tribal areas of the country.

Out of over 15,000 species of higher plants recorded so far in India, **All India Co-ordinated Research Project** has recorded over 9,500 wild plant species used by tribals for meeting their varied requirements. Of these, approximately 7,500 species are used for medicinal purposes, about 800 species for food, over 525 species for fibres and cordages, about 400 species for fodder, and about 300 species for piscicides and pesticides, of which at least 175 are promising for safe biopesticides (Anonymous, 1994).

It is reported that more than 800 plant species of ethnobotanical interest were collected at different centres (Anonymous, 1990). These plant species were over-exploited for a very long time and many of them have become endangered species. **Foundation for Revitalisation of Local Health Traditions (FRLHT)**, a Non-Governmental Organisation established in 1991 at Anandnagar, Bangalore has already housed 11,230 specimens accounting for about 2,250 species in its herbarium till June, 1997 (Anonymous, 1997).

On the basis of the new **IUCN (International Union for Conservation of Nature)** Red List Categories, a First Red Data List of Indian Medicinal Plants was brought out as per the assessment of Conservation Assessment and Management Plan (CAMP) workshops held during 1995-1997. A first Red Data List of Indian Medicinal Plants include

36 medicinal plant species of South India and about 75 species from rest of the country, including North-East India (Anonymous, 1995, 1997).

The state of Mizoram receives little attention as far as the survey of medicinal plants is concerned. Like other tribes, the tribes in Mizoram practice traditional herbal medicines, the local knowledge of which has been descending through generations since time immemorial. Ethnomedicinal plants are still widely used for curing different diseases both in urban and rural areas. There is a need for documentation of such valuable indigenous knowledge and domestication of economically important medicinal plants to decrease pressure over natural resources and to fulfil the requirements of national and local needs.

The present study is designed and structured to tackle the above mentioned problems and provide useful informations on plants of ethnobotanical importance based on local botanical and ecological knowledge for the benefit of the present and future generations. The aims and objectives of the study are :

1. Contribution of first-hand detailed report of ethnomedicinal plants' occurrence, delineation of maps to show their natural habitats, systematic description and uses, with special emphasis on the ethnobotanical importance;
2. Collection, identification and documentation of indigenous medicinal plants supported by voucher specimens to be incorporated into the herbarium for future reference and information;
3. Screening of economically important medicinal plant species to be introduced in farming systems as one of the alternative means of *shifting* cultivation;
4. Identification of rare and endangered medicinal plants for future conservation and multiplication;
5. To safeguard wild plant resources, to strengthen ethnocultural knowledge and to promote economic and cultural heritage of the local people;
6. Domestication of important medicinal plants in local agro-ecosystems, *ex-situ* conservation through herbal gardens or drug farms, for there is a great potential for commercial exploitation as a source of livelihood for many rural families;
7. Application of practical results recommended for community development and biodiversity conservation.

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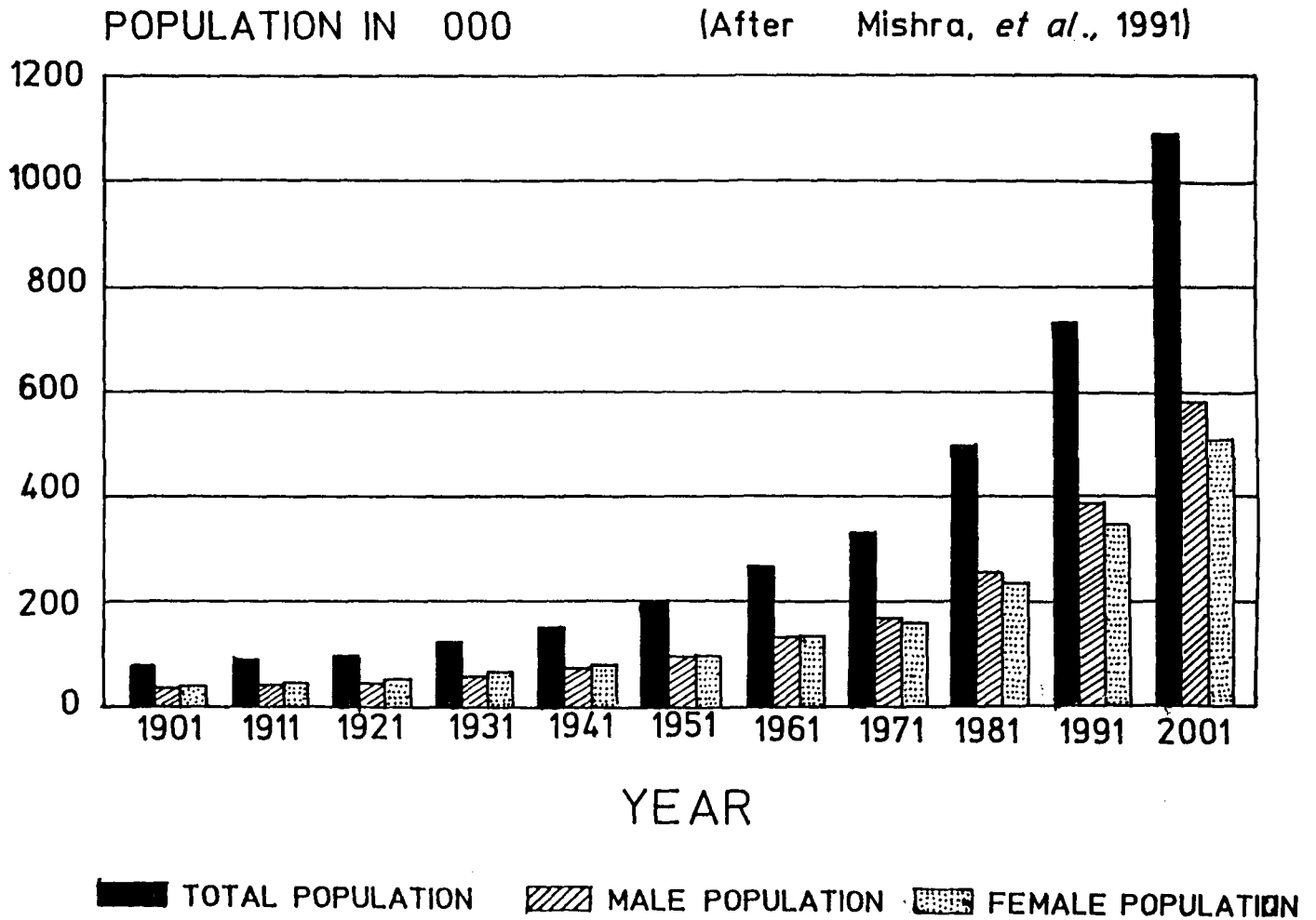
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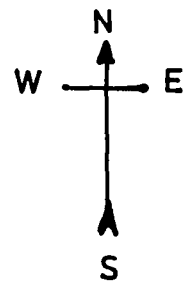
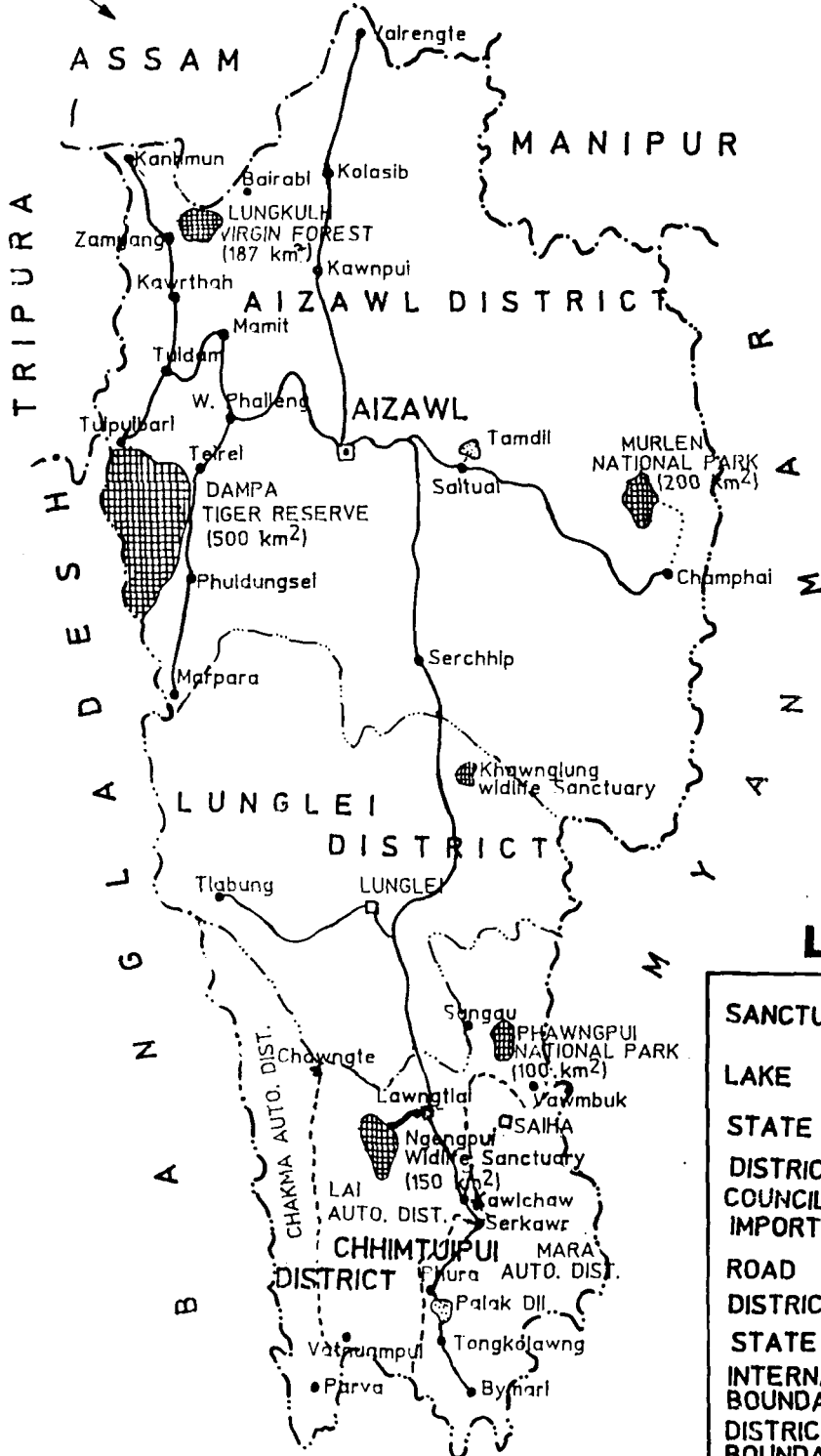
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Fig. 1. **POPULATION IN MIZORAM
(IN 000)**



MAP OF MIZORAM



LEGEND

SANCTUARY/PARK/ETC.	
LAKE	
STATE CAPITAL	
DISTRICT/DISTRICT COUNCIL H.Q.	
IMPORTANT PLACES	
ROAD	
DISTRICT BOUNDARY	
STATE BOUNDARY	
INTERNATIONAL BOUNDARY	
DISTRICT COUNCIL BOUNDARY	

Fig. 2. MAP SHOWING NATIONAL PARKS AND SANCTUARIES ETC.



1. Celebration of *Chapchar Kut* '97 at A.G. ground, Aizawl.

1



2. Modern man and woman with *Mizo Chief & Queen's dress*.

REVIEW OF LITERATURE

CHAPTER 2

REVIEW OF LITERATURE

2.1. An Overview

The familiarity with plant species producing medicine, essential oil, and insecticides dates back to the beginning of civilisation.

The tribal people and ethnic races throughout the world have developed their own cultures, customs, cults, religious rites, taboos, totems, legends and myths, folk tales and songs, foods, medicinal practices, etc. Numerous wild and cultivated plants play a very important and vital role among these cultures and this interrelationship has evolved over generations of experience and practices. The modern civilization is penetrating into most regions of the world still held by primitive societies. The consequent divorcement of aboriginal people from dependence upon their vegetal environment for the necessities of life has been set in motion, resulting in disintegration of knowledge of plants and their properties (Maheshwari, 1983). There is a steady decline in human expertise capable of recognising the various medicinal plants.

Advances in science, notably during the last two centuries, better understanding of human body, its physiology, pharmacology, led to the isolation of many of the active ingredients of these herbs in pure form and formulated synthetic compounds, with or without herbal extracts, obtaining the drugs mostly used in the control of diseases. Unfortunately, the continuous use of potent drugs is often associated with harmful side-effects of these medicines both in the affluent west as well as in the poor east. The WHO (World Health Organisation) has recognised the role of traditional systems of medicine and considers them a part of strategy to provide health care to the masses. The medicinal plants continue to receive attention of scientists from chemical, pharmacological and clinical angles in India and abroad. The studies on folk medicines through ethnobotanical surveys are gaining importance.

The accomplishment of forest dwellers in understanding plants and properties of their roots, bark, stem, leaves, flowers and fruits is simply a result of long and intimate association with their flora and their dependence on them. Since their knowledge is based on experimentation on human beings, though highly empirical, it warrants careful consideration. It behoves us to take advantages of their extensive knowledge that still exists in many

parts of the world, for scientific scrutiny and adoption for posterity, lest it be lost under the debris of modernism. There is need to chemically and pharmacologically analyse known biodynamic species and see their physiological effectiveness. A few may yield drugs for modern medicine to treat the same conditions for which they are used traditionally and may lead to the discovery of new chemical compounds, for it is now realised that unstudied flora of our country represents a vast emporium of unknown chemical compounds awaiting discovery (Alam, 1997).

There is a steady decline in human expertise capable of recognising various medicinal plants. Much of this wealth of knowledge is totally becoming lost as traditional culture gradually disappears (Hamilton, 1995).

Thus there is now an urgency for ethnobotanical research amongst aboriginal peoples (Maheshwari, 1983).

“ It is of importance therefore, to seek out these primitive races and ascertain the plants which they have found available in their economic life, in order that perchance the valuable properties they have utilized in their wild life may fill some niche in our own..... (Harshbeger) ”, cited by Schultes, 1962.

Schultes (1962) has stated that as scientists, we should strive to maintain an equilibrium between those on the one hand who would brush aside the superstition of ignorant people - all native uses of plants as medicine and narcotics, and those on the other hand who glorify primitive man as possessing some uncanny intuition concerning plant properties.

In discussing the role of ethnobotany in our search for new drug plants, we must constantly bear in mind the widespread exaggeration of the usefulness of ethnobotanical data. We cannot afford to pre-judge reports of aboriginal uses of plants simply because they seem to fall beyond our limits of credence. Nevertheless, we must ever keep in mind that there is no reason to presume that, because he does have some knowledge as yet unknown to us, man in primitive societies possesses anything more than a very limited intuition about the properties of plants. It therefore, behoves us to push forward, along with ethnobotanical investigation, studies on the flora in general.

According to Rao (1996), there is an urgent need to inventorise and record all ethnobiological information among the diverse ethnic communities before the traditional cultures are completely lost, who should make use of this knowledge and what part of knowledge should be used are certainly within the purview of the tribals. But the tribals hardly understand the intricacies of the so-called intellectual property rights and their implications. Often tribals are exploited by modern societies and they are forbidden to use the forest resources with which their lives are strongly interwoven. Ethnobotanists, therefore, have a greater responsibility not only in inventorising the traditionally used biological

resources but also in conserving and revitalising the traditional beliefs, so that the age old cultures are not lost. Ethnobiologists also have a responsibility to safeguard the traditional knowledge from misuse or overuse by modern societies and they should, on behalf of the tribals, decide who should share the benefits of new discoveries, such as medicines or food from plants (Boom, 1990, Cunningham, 1993 and Balick, 1996) and at what cost. Often, ethnobiologists, being a part of modern society, can also forge closer ties with government and private sector research groups working to develop new food, drug and energy resources (Balick 1996).

The work so far done in the field of ethnobotanical researches by different workers to help the modern world as well as local communities in rescuing disappearing knowledge and returning it to local communities in India and abroad are reviewed here.

2.2. Abroad

It is not possible to cover all ethnobotanical researches being carried abroad by ethnobotanists. A few significant contributions are mentioned below.

The modern approach to the science of ethnobotany evolved in U.S.A. and the foremost centre for the botanical aspects is the Botanical Museum of Harvard University in Massachusetts. Here, ethnobotanists like Richard Evans Schultes, Richard Gordon Wasson, Siri Von Reis Altschul, Timothy Plowman, E. Wade Davis etc. contributed in various fields of ethnobotany (Shah, 1987). The Southwest of U.S.A. is the best studied area in the world for ethnobotany (Ford, 1985).

The well-known ethnobotanist of the world, Dr. Richard Evan Schultes conducted ethnobotanical explorations in Oklahoma, Oaxaca, Mexico, Amazon and in other regions. He had to spend almost 12 years among the tribals and worked on hallucinogens, medicinal and toxic plants (Schultes, 1938, 1954, 1956, 1962 and 1963). Berlin, et al., during several years of field work at Maya-speaking group of the highlands of Chiapas, a state of Southern Mexico, collected and documented many hundreds of folk botanical categories (Berlin, et al., 1974).

George (1995) studied pharmacopoeia of 108 medicinal species from 52 families. Fifty per cent of the pharmacopoeia is composed of species indigenous to Tonga, 30 per cent are species introduced by Polynesian settlers, and 20 per cent are species of post-European introduction. The most commonly used plants in Tongan medicine are multipurpose plants. Plants used to treat several types of illness whereas other species are most commonly used to treat a single illness class.

Anderson (1985) investigated ethnobotany of Akha tribes of Thailand and reported 121 species and the medicinal use or uses attributed to them.

The pharmacological activities correlated with medicinal uses of 37 potential medicinal plants employed by the Laotian Hmong refugees in the twin cities of Minneapolis and St. Paul, Minnesota are reported. The ethno-pharmacological analysis revealed that 92 per cent of these cultivated medicinal plants were highly efficacious and are frequently used in their diet (81%) to medicinal against various ailments (Spring, 1989). Capitanio, *et al.* (1989) have reported 100 anti-leucodermic traditional herbal medicines consisting of 80 medicinal plant species being employed by Caucasians in the Mediteranean area. The possibility of the recorded plant species in stimulating physiological skin pigmentation is described in the light of present phytochemical and pharmacological knowledge. Some of these plants are reported to contain erythemogenic substance responsible for inducing light-mediated hypermalanogenesis for colouring epidermal keratin.

Ethnobotanical information on 150 plant species used by the Chumash Indians occupying the mainland and off-shore islands in the vicinity of Santa Barbara, California based on the collection made by John P. Harrington, is provided. Despite massive deculturation, a great deal of this ethnobotanical knowledge survived. The most valuable sources of Chumash ethnobotanical information is the extensive, unpublished field notes of John P. Harrington, based on interviews conducted from 1912 to 1950 (Timprook, 1990).

Bhat, *et al.* (1990) have reported 52 plants species collected during ethnobotanical survey of Kwara State, Central Nigeria. This first-hand information pertains to the importance of plants to the tribal and modernised people of Central Nigeria.

The traditional and modern uses of 48 native plants growing in the Fort Yukon region, Alaska, have been documented and the medicinal and edible material used by the Gwich' in Athabaskan and Caucasian residents have been identified. The present and past values of these plants in Gwich's culture, are discussed (Holloway & Alexander, 1990).

Bhattarai (1990) has reported medico-ethnobotanical information on 51 empirically accepted prescriptions involving 36 plant species belonging to 36 genera and 27 families, collected from the rural inhabitants of Kabhrepalanchock District of Central Nepal. The ethnobotanical survey revealed that these prescriptions are much employed for common ailments as the remedies are accepted by the majority of the masses over generations. Ethnobotanical information on 71 plants from Tharu tribe of Chitwan District, and 86 plant species from Makawanpur District of Nepal were reported by Dangol & Gurung (1991) and Bhattarai (1990), respectively. Joshi & Edington (1990) also reported medicinal plants of Central Region of Nepal.

Ethnobotanical information on 36 plants species of Rarotonga, Cook islands, used by the local healers in various ailments is provided (Holdsworth, 1990). John, *et al* (1990) who have gathered information from 45 herbalists of the Luo of Siaya District of

Kenya independently, have reported 1129 remedial measures from 330 plant species, of which 49 per cent of the remedies were recorded only once. Sixty six remedies from 49 species recorded in the paper were through independent reports collected from three or more herbalists to establish a criteria for evaluating the likely efficacies of particular remedies, a long-linear model was applied.

Mahunnah (1991) has investigated 44 medicinal plants, belonging to 39 genera and 21 families, used by the Hehe and Safawa tribes, inhabiting the Southern highlands of Tanzania.

Ethnobotanical information on 52 plant species of Sengkurong and 29 plant species of Bukit Udal of Darussalam were given by Haji Mohiddin, *et al.* (1991 & 1992) and Holdsworth (1991), respectively.

Abbas, *et al.* (1992) investigated 52 folk medicinal plants used in traditional medicine of Bahrain. Cunningham (1993) studied African medicinal plants with emphasis on conservation and primary health care.

Ethnobotanical information on the uses of bark of 21 species by the Gitksan, Wet'su, Wet'en and Haisla people of West Central British Columbia is reported. Out of these, 16 species are employed for medicinal purposes (Gottesfeld, 1992).

Yang, *et al.* (1992) compiled ethnobotanical information on the 157 species of cucurbits in China. Out of these, 63 species are of economic importance. Twenty six of these 63 species are under cultivation in China.

A brief account of herbal remedies prescribed for various ailments in Sudan is given with mode of application alongwith precautions, if any (El Rayah, 1993).

Gill, *et al.* (1993) documented 80 plant species belonging to 43 angiospermic families of Esan people of Nigeria. The chemical constituents detected in each plant are presented.

Ethnobotanical information on 152 plants used by the people of Nicaragua's Atlantic Coast for the treatment of various diseases, is provided. The diversity and prevalence of medical plant uses for this region has been reported for the first time (Barrett, 1994).

It appears from the above works that ethnobotanical investigations abroad have been undertaken in ethnobotanically rich human societies. Some other important contributions also may be mentioned, such as those of Medicinal plants of Samoa (George, 1974); West Africa and West Indies (Ayensu, 1978 & 1981); Colombia (Gonzalvez, 1980); Madagascar and Senegal (Bonati, 1980); Sudan (Ahmed, 1970); Taos of New Mexico (Belcove, 1976); Hawaiians (Beatrice, 1975); Western Washington (Gunther, 1945); Caribs Island of Dominica (Hodge & Taylor, 1957); Amazonian Brazil (Prance, 1972); Papua New Guinea Central Province (Holdsworth, 1991); Gazelle Peninsula (Holdsworth & Balun, 1992); East

and West Sepik Provinces (Holdsworth & Balun, 1992); Oro (Northern) Provinces (Holdsworth, 1993); Tambopata, Peru (Phillips & Gentry 1993a & 1993b); Arabia-Central Oman (Ghazanfar & Al-Sabahi, 1993); Turkey (Sezik, *et al.*, 1992); Central Mexico (Del Castilu & Trujillu, 1991) and Maroantsetra region of Madagascar (Quansah, 1988).

Bibliography of ethnobotany by Jain, *et al.* (1984) contains about 2000 references covering almost all the major publications on ethnobotany, Indian as well as foreign.

Some of the important foreign books on various aspects of ethnobotany are: *Ethnobotany of the Coahuilla Indians* (Barrows, 1900); *Notes on Jamaican Ethnobotany* (Beckwith, 1927); *Ethnobotany of the Thompson Indians of British Columbia* (Steedman, 1930); *Ethnobotany of Western Washington* (Gunther, 1945); *An introduction to Ethnobotany* (Faulks, 1958); *Ethnobotany of the Hawaiians* (Beatrice, 1975); *The nature and status of ethnobotany* (Ford, 1978); *Ethnobotanica Lengua Maskoy* (Arenas, 1981); *Palaeoethnobotany of the Kameda Peninsula Jomon* (Craford, 1983); *Huastec Mayan Ethnobotany* (Alcorn, 1984); *People of the Desert and Sea: Ethnobotany of the Seri Indians* (Felger and Moser, 1985); *Edible Wild Plants of the Prairie : An Ethnobotanical Guide* (Kindscher, 1987); *Thompson Ethnobotany* (Turner, *et al.*, 1990); *Ethnobotanical classification* (Berlin, 1992); *Ethics, Ethnological Research & Biodiversity* (Cunningham, 1993); *Ethnobotany : a methods manual* (Martin ,1995); *Ethnobotany - Principles and Applications* (Cotton, 1996); *Dariene Ethnobotanical Dictionary* (Duke, 1968); *Isthmian Ethnobotanical Dictionary* (Duke, 1986) and *Amazonian Ethnobotanical Dictionary* (Duke & Vasquez, 1994).

2.3. India

Vast ethnobotanical knowledge exists in India from ancient time. Written records of the use of plants for curing human or animal diseases in India can be traced back to the earliest (4500-1600 BC) scripture of the Hindus, the *Rigveda* (Jain, 1994). Ayurveda, the Indian indigenous system of medicine, dating back to the Vedic ages (1500-800 BC), has been an integral part of Indian culture (Weiss, 1987). The term comes from the Sanskrit root, *Ayu* = *life* and *veda* = *knowledge*. As the name imply, it is not only a science of treatment of illness but covers the whole gamut of happy human life involving the physical, meta-physical and the spiritual aspects (Sivarajan and Balachandran, 1994). The Vedic Aryans were familiar with medicinal plants. Several plants are described in the *Atharva Veda*. This was followed by monumental ancient treatise on the subject, like *Charak Samhita* (1000-800 BC), *Sushrut Samhita* (800-700 BC) and *Vaghatta's Astanga Hridaya*. The Yunani system which originated in Greece in about 400 BC, came to India through Arab Physicians, who accompanied Mogul invaders and came to be known as **Yunani-Tibb**. The Siddha system, with a recorded history from about 2000 BC is believed to have originated from

Lord Shiva and to have been passed on through his wife Parvati to a number of disciples. Its use became more common in Dravidian Civilization.

The texts of each of these three systems deal with herbs used in these systems only. Books in English, written between the 18th century and today, usually include plants from all three systems (Jain, 1994).

The Indian system of herbal medicine and its plant-drugs caught the attention of the West since the beginning of the colonial days. Garcia da Orta, the personal physician of the then Portuguese Governor in India published his *Colloquies on the Simples & Drugs of India* in 1563; and this was published a 12 volume work on Kerala Medicinal Plants (1678-1703) from Amsterdam. Other important earlier contributions are : *A Catalogue of Indian Medicinal Plants and Drugs* (Fleming, 1810), *Materia Media of Hindoostan* (Ainslie, 1813).

Ethnobotanical investigation has led to the documentation of a large number of wild plants used by tribals for meeting their multifarious requirements (Anonymous, 1990). In India, organised study of ethnobotany is of recent origin (middle of the century).

Studies on ethnobotany was initiated by Dr.E.K.Janaki Ammal as an official programme in the Economic Botany Section of Botanical Survey of India since its very inception in 1954 and published a paper on subsistence economy of India (Janaki Ammal, 1956). From 1960, Dr.S.K.Jain started intensive field studies among tribals of Central India (Jain, 1963 a-e; 1964 a-d, and 1965 a-b). The publication from his group in early sixties triggered ethnobotanical activities in many other centres, particularly among botanists, anthropologists and ayurvedic medical practitioners. During the last two decades, work has been initiated at *inter alia*, National Botanical Research Institute, Lucknow; National Bureau of Plant Genetic Resources, Delhi; Central Institute of Medicinal and Aromatic Plants, Lucknow; Council for Research in Ayurveda & Siddha and Central Council for Research in Unani Medicine. Several Universities have introduced ethnobotany in their syllabi. An AICRP on ethnobiology came into operation from 1982, at NBRI, Lucknow, four centres of Botanical Survey of India (Shillong, Howrah, Coimbatore & Port Blair) and some other institutions (Jain & Mitra, 1997). Mudgal (1987) gave a synoptic treatment on ethnobotanical works in India. Ethnobotanical research works carried in India are arranged statewise, alphabetically. Work carried in seven sister states of North East region are reviewed separately.

ANDHRA PRADESH

Survey of the less known plants used by tribals by Pal & Banerjee (1971) triggered the attention and ethnobotanical studies have been carried out in many institutions. Banerjee (1977) studied the ethnobotany of Araku Valley in Visakhapatnam. The

medicinal plant wealth of Karimnagar district was documented by Hemadri (1990 & 1991). Hemadri *et al.* (1987) reported 211 species of medicinal plants of the state. Reddy, *et al.* (1989) investigated plant based crude drugs of Anantapur and Chittoor districts. They reported 64 plant drugs. Chetty & Rao (1989) conducted ethnobotanical study of Sarakallu and some areas of Chittoor district. Arunee Kumar, *et al.* (1990) & Arunee Kumar & Nisteswar (1991) recorded 188 medicinal plant species of Kakinada district. Vedavathy, *et al.* (1991) reported 25 plant species from Rayalaseema, used for family planning and birth control. Goud & Pullaiah (1996) reported forty plants used in ethno-veterinary by the Chenchus, Sugalis and Yorukalas tribes. Rao, *et al.* (1996) recorded 27 plant species occurring in Tirumala Hills of Chittoor district used by local people for dental disorder. Vedavathy & Mrudula (1996) examined the traditional medicines practised by the Yanadi tribe.

BIHAR

Santhals taboos, medicines and folklore customs were of interest to the Europeans (Bodding, 1925, 1927). The worship of *Ficus religiosa* in North Bihar has also been reported. In 1970, Jain and Tarafder reviewed the contributions of Bodding. Pal and Srivastava (1976) conducted a preliminary survey on ethnobotany of Singhbhum district. Srivastava and Verma (1981) recorded uses of 110 species of Santhal Parganas. They reported 80 species having medicinal uses. Gupta (1981 a,b) made a survey of ethnobotany of Mundas of Chotanagpur and Asurs of Netarhat plateau. Ethnobotanical uses of some medicinal plants used by Santhals, Mundas, Oraons, Birhors, Bedia of Chotanagpur plateau are reported by Tarafder (1983 a-b; 1984 a-b). Ethnogynaecology of different tribals in the state has been reported by Tarafder (1983 c-e). Jain (1989) recorded 21 plant species used under various ailments by the tribals in the Saranda forest. Folk medicine of Mithila was reported by Jha, *et al.* (1989). Varma & Pandey (1990) reported 32 species from Maidanpat and adjoining area of Lohardaga district. Other important contributions are Ethnobotanical uses of plant species by the 'Paaharia' tribe of Godda District (Singh, *et al.*, 1992). Native medicinal uses of plants common among the Sauria Paharia tribe of Rajmahal Hill (Jha & Varma, 1996).

GUJARAT

Ethnobotanical uses of plants has been reported by various workers. Shah, *et al.* (1981) gave an account of 133 plant species used by tribals in Saurashtra. Joshi, *et al.* (1980) provided information on folk medicines of Dangs. Ethnobotanical profile of the Dangies was presented by Shah and Gopal (1982). They reported 145 plant species having medicinal uses. The plant species used by the Bhils, Rabaries, Dubias and Gharashias tribes

in Gujarat were recorded by Shah & Gopal (1985). Bhatt & Sabnis (1987) studied the ethnobotany of Khedbrahma and reported 41 plant species commonly used by Bhil, Dhank, Nayaka and Dubada tribes. Joshi (1988) provided information on 139 plants of medicinal value.

HARYANA

Jain (1984) studied ethnobotany of Morni and Kabsar hills in Ambala District and recorded 26 species used as medicine. Plants put into use for making huts, baskets and ropes were also enumerated. Lal and Yadav (1983) reported 69 species of medicinal plants and 66 prescriptions for therapeutic doses were also given. Medicinal application of each species was presented alongwith evaluation of chemical principles.

HIMACHAL PRADESH

Arora, *et al.* (1980) recorded the little known aromatic plant of Lahul Valley. Gupta (1964) and Uniyal & Chauhan (1971) recorded medicinal plants of Chamba Forest Division and Kangra Forest Division (Uhal Vally), respectively. Chauhan and Chauhan (1988) surveyed the ethnobotany of Trans Giri area of Sirmour district. Ethnobotanical information on 50 herbal medicines, alongwith parts of plants used and mode of administration of each species are enumerated (Kapahi, 1990).

JAMMU & KASHMIR

An account of medicinal plants used by the Amchis of Ladakh has been provided by Srivastava, *et al.* (1981). Pathak and Karnick (1980) made an investigation on folk medicine prevalent amongst the people of Sudh-Mahadeo region.

Phytochemical screening of ethnobotanically important high altitude plants from Ladakh was carried out by Gupta, *et al.*, cited by Binu, *et al.*, (1992). Plants used in the folklore medicine of the state were also subjected to investigation. Other important studies on medicinal plants are - survey on the ethnobotany of Kashmir Sind Valley (Dar, *et al.*, 1983); taxo-ethnobotanical studies of the rural areas in the Rajouri district (Virjee, *et al.*, 1984); herbal drugs traditionally used in Ladhak (Uniyal and Issar, 1988); ethnobotanical survey of North west Himalaya and Trans-Himalaya (Sharma & Singh, 1989); ethnobotany of Ladhak (Bhattercharya, 1991; Narchoo & Buth, 1992) and traditionally important medicinal plants of Dudu Valley (Kapur, 1991) ; ethnobotanical uses of plant species by the Gujjans, Bakerwals and Gaddhis inhabiting Bhadarwah hills in Jammu (Kapur & Nanda, 1992).

KARNATAKA

Important studies on ethnobotany are Tree Cult (Nayak, 1965. Cited by Binu, *et al.*, 1992); medicobotany of Mysore (Rao, 1977, 1978. Cited by Binu, *et al.*, 1992) medicobotany of Tumkur district (Yoganarasimhan, *et al.*, 1982), fold medicine of Bangalore district (Pushpalata, *et al.*, 1990).

KERALA

There are few important recent studies on ethnobotany of Kerela. Manilal (1981) reported 26 primitive varieties of rice used by tribals in Malabar. Many of them, they claimed, have medicinal values. Ramachandran and Nair (1981) made an ethnobotanical survey of Cannanore District and reported 93 plants species, used by different tribals in the district. Pushpangandan and Atal (1984) made ethnomedico-botanical investigation of seven primitive tribals living in the highlands of the Western Ghats in Kerela and recorded 79 plants species. Other prominent contributors are : Kolammal (1979); Mooss (1952,1976,1978); Nambiar, *et al.* (1986) and Sivarajan & Balalchandran (1994); Radhakrishnan *et al.* (1996).

MADHYA PRADESH

Jain (1963e) enumerated fifty common plants of the state. Medicinal plantlore of the tribes in the Baster district was also investigated by him (1965b). Saxena (1986) conducted ethnobotany of Madhya Pradesh and reported 88 plants. Pandey, *et al.* (1991) studied some unique folk medicine of Baiga tribes and mentioned medicinal uses of 25 species. Oommachan & Masih (1991) discussed the conservational aspects with reference to folk medicinal plants of the state and reported 233 flowering plants of high medicinal value, found wild in the state. Jain (1992) recorded ethnobotanical information with particular reference to medicinal uses of plant species used by 'Sahariya' tribe. A few other notable contributions are : *Ethnogyneacological use of plants* (Sikarwar, 1993) ; *Ethnomedicinal herbal legumes of Bundelkhand* (Bhalla, *et al.*,1992) and *Ethnobotanical informationon Baiga tribe, the most primitive tribe* (Lal,1993).

MAHARASTRA

Vartak (1959) investigated medicinal plants from the hilly region of Pune and Satara Districts. Janardhanan (1963) reported 165 species of medicinal plants from Khed Taluka. Malhotra and Moorthy (1973) recorded 126 useful as well as medicinal plants from Chandrapur District.

Vartak(1981) investigated 120 wild edible species from hilly regions of Maharashtra and Goa. He also reported medicinal plants of Karnala tribal area in Kolaba

District. Vartak further presented an account of his on ethnobotany of Maharashtra and Goa. Other prominent contributions are : medicinal plants of Dhanu forest division (Shah, *et al.* (1983) and Khandala (Vedprakash and Mehrotra, 1987); Dhule forests (Yadav and Bhamare, 1989) and plant species used by Mahadeokoli tribals for pest management (Kulkarni and Kumbhajoni, 1996).

ORISSA

Panigrahi (1963) conducted a botanical survey of Gandhamardan Parbat and identified the area as a potential source of indigenous drugs. Further, Brahmam and Saxena (1990) recorded 200 plant species having medicinal uses. Ethnobotanical uses of 38 species were reported from the state (Rai Chaudhuri, *et al.*, 1975). Saxena and Dutta (1975) recorded 81 plant species used as medicine for antifertility, fibre and food by the rural folk of the state.

Other relevant contributions are : survey of medicinal plants used by tribals in Mayurbhanj (Mudgal and Pal, 1980; Tribedi, *et al.*, 1982; Saxena, *et al.*, 1981); medicinal plants used by tribes of Koraput (Paul and Mudgal, 1985; Das and Mishra, 1987, 1988; Das and Kant, 1988) and medicinal plantlore of the tribals in Sundargarh district (Mukherjee and Namhata, 1990; Satapathy and Panda, 1992); Ethnobotanical information on plants used by tribals of 'Bhuinyas and Juangs' of Keonjhar District (Mandal and Mukherjee, 1992); Ethnobotanical uses of plant species employed by Kondh tribe of Dhenkanal District (Girach, *et al.*, 1994); Medico-ethnobotanical studies carried out in Ganjun and Phulbani Districts (Mohanty, Padhy and Dash, 1996); Medicinal plants used by Paudi Bhuinya of Bonai Hills (Aminuddin & Girach, 1996).

PUNJAB

The publications related to ethnobotany are : tree symbol worship in Punjab (Bhatnagar and Lal, 1965 cited by Binu, *et al.*, 1992); primitive folk and modern medicines (Kakar, 1973, *in et al.*, 1992); ethnobotany of Lahul (Koelz, 1979) and plants to regulate fertility used in Bhat community (Lal & Lata, 1980).

RAJASTHAN

Some of the notable works done in Rajasthan are : medicinal plants of Ajmer forest division (Dixit and Mishra, 1976); medicinal plantlore of the tribals of Eastern Rajasthan (Singh and Pandey, 1982); ethnobotanical survey of the Bhils (Joshi, 1982); medicoethnobotany of Mount Abu (Sebastian and Bhandari, 1984); ethnometeorology of 10 plant species (Sharma, 1990); ethnobotanical importance of *Solanum surattense* (Sharma,

1991); ethnobotanical uses of plant species used by the 'Kathodias' a monkey eating tribe (Joshi, 1993); ethnomedicinal uses of plants by the tribals of Makundara hills of Jhalawar District (Sharma,1990); common herbal drugs from Udaipur district - a review (Singh and Anwar,1993); remedies against Snakebites and Scorpion-stings and ethnomedicine of Kathodias (Joshi, 1993).

TAMIL NADU

Some of the important publications containing ethnobotanical studies are: medicinal flora of different tribal pockets in Nilgiri (Raghunathan, 1976); folk medicinal claims from North Arcot District (Anandan and Veluchamy, 1986); folklore medicine of Anaikhatty hills in Coimbatore (Lakhmanan and Narayanan, 1988); ethnobotany of the Malayalis in the Yelagiri Hills of North Arcot District (Viswanathan, 1989); ethnomedicinal uses of plants employed by the Gounder 'Malayali' and 'Veduvār' tribes of Salem District (Dwarkan and Ansari,1992).

UTTAR PRADESH

The important contributions related to ethnobotany are ; folklore pertaining to the medicinal plants of Bhagirathi valley (De,1962); ethnobotany of Kumaon region (Shaw and Joshi, 1971); plant species used by Kols, Gondas, Lodhas and Gujars of Banda District against various infections (Saxena and Vyas, 1981).They further documented 60 plants species having medicinal importance,used by the people of Dhasal valley (Saxena and Vyas, 1983); ethnobotany of Bhoja tribe of Bijnor and Pauri in Garhwal district (Maheshwari and Singh, 1984);ethnomedicinal plant of Terai in Gorakhpur (Singh, *et al.*, 1987) ; plant of various ethnobotanical value from alpine region of Kumaon (Rawat and Pangtey, 1987); medicinal plants of Mathura District (Singh and Dhakre, 1989); ethnobotany of Bundelkhand district (Saxena and Tripathi, 1989 & 1990); plants used in Jaunsar- Bawar area for the preparation of alcoholic beverages (Jain and Puri, 1990); phytotherapy in Varanasi District (Singh & Maheshwari, 1983) and plant species used by Tharus of Nainital District (Singh and Maheshwari, 1990); ethnobotany of Pokhari Block, Chumoli (Chauhan and Bhattacharya, 1992) ; role of Brahmrumal in the life and culture of Garhwalis (Saklani and Rao, 1996).

WEST BENGAL

Some of the notable works are : plants used for food by tribals in Purulia (Jain and De,1964): further, they recorded plants of ethnobotanical importance used by Santals, Bhumijis, Birhors and Kherias in Purulia (Jain and De,1966; Sur, *et al.*,1992); ferns of edible and medicinal value used by tribals of Darjeeling (Dixit, *et al.*, 1978); ethnobotanical

survey of Cooch Behar district (Ghosh, 1986); common herbal medicine practised in Bankura district (Namhata and Mukarjee, 1989); plants used in different herbal remedies of Lodha tribe in Midnapur District (Pal & Jain, 1989); ethnobotany of West Malda in Dinajpur District (Sur, *et al.*, 1990); herbal medicines used as folk remedies by the tribals (Bhumij, Koras, Mahali, Mech, Munda, Kora and Santhals) of Bankura District (Namhata and Ghosh, 1993).

ANDAMAN AND NICOBAR (U.T.)

Ethnobotanically, the flora of Andaman and Nicobar constitutes an interesting group as it consists of considerable percentage of Malaysian elements (Binu, *et al.*, 1992). Important contributions are : forest food of the tribal population in Andaman and Nicobar Islands (Sangal, 1971); ethnobotany of Onges (Bhargava, 1981); plants used by Nicobares for canoes (Dagar, 1986); ethnobotanical importance of Gymnosperm species (Dagar and Dagar, 1987); ethnobotany of Shompens of Great Nicobar (Chakrabarty and Rao, 1988); ethnobotany of Nicobarese (Dagar, 1989; Dagar and Chagthai, 1989); folk medicines of Nicobarese (Dagar and Dagar, 1991).

2.4. North-Eastern States

ASSAM

The contributions in the field of ethnobotany in Assam has started since 1958 onwards. Some notable contributions are : medicinal uses among Karbi Anglong of Mikir Hills (Borthakur, 1976); folklore claims from the Brahmaputra valley (Boissya & Majumdar, 1980); ethnobotanical survey of Miris (Hajra and Baishya, 1981); plants related with folklore and folklife of Karbi Hill tribes (Borthakur, 1981 a,b); medicinal plants from Tezpur district (Puri, 1987); ethnobotanical information on the plants associated with religio-cultural beliefs of the Tai khamti race of Assam and Arunachal Pradesh is reported by Gogoi and Borthakur (1991). Plants used by the Miris or Mishings of Assam and plants in the folklore and folklife of the Karbis (Mikirs) is reported by Borthakur (1996).

ARUNACHAL PRADESH

Medicinal plants of Arunachal Pradesh (Hajra, 1977); medicinal plants of Tirap district (Tiwari, *et al.*, 1978); ethnobotanical study of plants used by the Monpas tribes of Kameng District (Dam and Hajra, 1981); ethnobotanical survey of the tribals of Subansiri (Pal, 1984); medicinal folklore of Tirap District (Nath and Bordoloi, 1989). Ethnobiological information on 171 plant species used by the Nishis, the Hill Miris, the Sulungs and the Apatanis of Lower Subansiri District (Gangwar and Ramakrishnan, 1990); medicinal flora

of Lohit District with special reference to ethnobotany (Bhuyan, 1989); ethnobotany of wild edible plants (Haridasan, *et al.*, 1990) and ethnobotany of 'Nishis', 'Kabis', 'Kacharis' and 'Chakma' (Maikhuri and Ramakrishnan, 1992) are important contributions in the field of ethnobotany.

MANIPUR

Elangbam, *et al.* (1989) surveyed the Tangkhul Naga tribes of Ukhrul District and reported medicinal uses of 36 species. Ethnobotanical uses of 931 medicinal plants were recorded by Sinha (1987); Sinha (1990) reported ethnobotanical uses of 27 plant species employed by the Manipuris in their folk medicine against 25 diseases. Devi (1989, 1990) also contributed ethnobiological studies of Manipur Valley.

MEGHALAYA

Joseph and Kharkongor (1981) surveyed the Khasi and Jaintia tribes and recorded 100 plant species of ethnobotanical importance. Ethnobotany of Khasi and Garo tribes was also studied by Rao and Neogi (1980). Rao and Shampru (1981) investigated the Garos and reported 25 species used by them for food, 24 for medicine, 5 for fish poison, 7 for fibres, 3 for dyes, 4 for magico-religious beliefs and 10 miscellaneous purposes. Yogendra Kumar, *et al.* (1987) recorded 74 species used by the Khasi and Jaintia tribes. Rao (1989) investigated 30 interesting herbal medicines used by the Garo tribes in the state. The ethnobotanical uses of 65 weeds belonging to 26 families of angiosperm by the Khasis, Garos and Jaintias are reported by Neogi, *et al.* (1989). Ethnobotanical uses of 33 plants employed by the Khasis, Jaintias and Garos for ichthyotoxic purposes are documented by Chhetri, *et al.* (1992).

NAGALAND

Rao and Jamir (1982 a, b) recorded plant species used as medicine by the Nagas. Medicinal plant species used by the Angamis of Kohima District were reported by Megoneitso and Rao (1983). Jamir & Rao (1990) reported medicinal plants used by Zeliang sub-tribes. Rao and Jamir (1990) recorded the ethnobotany of the Ao and Angami Nagas. Ethnobotanical folk practices and beliefs of the Ao-Nagas have been reported by Sapu and Yogendra (1996).

SIKKIM

Plants used by tribals, Wild plants sold in Markets and a new source of food

have been reported by Bennet (1983), Hajra & Chakroborty (1982) and Uniyal (1980), respectively.

TRIPURA

Deb (1968) has reported medicinal plants of Tripura.

MIZORAM

Scientific research work on ethnobotany is in its infancy stage, inspite of the ethnobiocultural richness of the state. Lorrain (1940) mentioned a few traditional medicines used by the Lushais (Mizos). Irish (1975) enlisted 90 diseases/ ailments with treatment by ethnomedicines. Ninety three diseases alongwith medicines (Plant/animals) were recorded by Thangchuanga (1979). He also recorded some food plants of Mizoram.

Zoram Upa Pawl Thurawn Bu (Anonymous, 1984) may be treated as a milestone in documenting herbal medicine or local medicine. A total of 228 cases of human diseases and 27 diseases of animals alongwith ethnomedicine used by the different tribes of Mizoram has been documented. Darlianthanga (1989) reported 97 diseases alongwith herbal medicine. He also mentioned plants and mineral products to cure diseases of animals.

Saptawna (1990) reported 58 plants species used as medicine. This is based upon Burmese indigeneous medicine. Lallianthanga (1990) reported the local medicinal uses of 128 plant species. Vailinga (1991) also documented 165 diseases and ethnomedicine. Lalramnghinglova (1991) documented 437 plant species on the basis of field work and secondary information. The botanical names, local names, family, distribution, description of each species alongwith medicinal uses are presented. Mrs. Neeti Mohanta (1994) published the work of Lalramnghinglova in her name. She gave a different title, *i.e.*, “ *Tribal Ethnobotany of Mizoram* ”. She published the work in her name without permission of the Department of Environment and Forest, Govt. of Mizoram and the author. Lalramnghinglova (1992) also reported food plants, fruit plants and medicinal plants with respective uses.

Chawngkunga (1996) documented detailed information on about 85 plants, local classification of diseases (250 human and 17 veterinary diseases), information on herbal medicine based on Ayurveda, Siddha and use of wood charcoal, etc. Lalramnghinglova (1996) reported 238 plant species of 101 families, having ethnobotanical importance. Further, Lalramnghinglova and Jha (1996) investigated medicinal plants having ethnobotanical uses, the preparation, doses and mode of application are presented, disease-wise. Ethnobotanical flora in the humid sub-tropical semi-evergreen forests of Mizoram are reported by Lalnundanga, *et al.* (1997).

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STUDY AREA AND THE INHABITANTS

CHAPTER 3

STUDY AREA AND THE INHABITANTS

3.1. Study Area

The study area falls under the Tropical wet evergreen forests bordered by Assam in the north-west, Tripura and Bangladesh in the west, and part of Myanmar in the south (Fig. 3).

It is bounded by 21° 55' 54" - 24° 31' 45" N latitude and 92° 16' 00" - 93° 11' 28" E longitude, and forms parts of the Forest Survey of India Topo Sheets Nos : 83 D/8, D/11, D/12, D/14; 84 A/5, A/6, A/7, A/8, A/12; 84 B/5, B/9, B/10, B/11 and 84 C/9, 84 F/3 and F/4, and constitutes about 26% of the total geographical area, *i.e.*, 21,081 km². The elevation ranges from 20 m asl at Tlabung to 900 m asl at Kawrthah, Phuldungsei, Pukzing, Lungsen, Thorang, S. Bungtlang, Serkawr, Tongkolong, etc. A few collections were also made from the areas of Tuipang, Tuisih and Theiri.

3.2. Micro-environments

The tropical wet evergreen forest is the most important forest type in Mizoram. The natural forests, such as Lungkulh virgin forest (plate 2, photo 3 & 4 and plate 3, photo 5), Dampa Tiger Reserve, Bunghmun- Serhmun ranges, Ngengpui wildlife sanctuary (plate 3, photo 6), Chamdur reserved forest, Bymari forest (plate 4, photo 7), Palak (Lake) biodiversity (plate 4, photo 8), Phura-Maisa-Lohre forests, etc. are least disturbed by exogenous factors and the Palak biodiversity is the richest 'hot spot' in the study area. There are also a few pockets of teak (*Tectona grandis* L.f.) plantations which are more or less naturalised around Tuichawng, Tlabung, Zawlnuam and Kanhmun. Bamboo brakes also occur along the river valleys, chiefly of *Melocanna baccifera* (Roxb) Kurz. Two navigable rivers, *viz.*, R. Khawthlangtuipui and R. Tuichawng (plate 5, photo 9 & 10) and a non-navigable river, *i.e.*, R. Teirei flow in north-south directions within the study area.

The hill ranges also run from north-south direction and is criss-crossed by numerous small hillocks, streams and valleys. The catchment areas of the rivers are scrubby and devoid of good forests except the riverine reserved forests. Varied types of vegetation are distinguished and dense forests consist of trees, climbers, liane and pteridophytes. The top floristic component of the forest has been described in Chapter 1.

The secondary storey consists of *Macaranga indica* Wt., *M.denticulata* Muell.-Arg., *Callicarpa arborea* Roxb., *Aporosa octandra* (Buch.-Ham.ex D.Don.) Vick., *Trewia nudiflora* L., *Saraca asoca* (Roxb.) de Wilde, *Mallotus roxburghianus* Muell.-Arg., *Garcinia* spp., etc. Bamboo brakes also constitute the secondary storeyed component.

The ground flora is composed of *Hedychium* spp., *Phrynium capitatum* Wiild., *Lepidagathis incurva* F. Ham.ex D. Don, *Clerodendrum* spp., *Cyathula prostrata* (L.) Bl., *Ixora* spp., *Dracaena* spp. and ferns.

Among the climbers, *Butea superba* Roxb., *Cayratia japonica* (Thunb.) Gagnep., *Enteda purseatha* DC., *Combretum dasystachyum* Kurz., *Lasiobema scandens* (L.) de Wilde., *Willoughbeia edulis* Roxb., *Vitis* spp., *Smilax* spp., etc. are common.

Themeda caudata Dur., *Erianthus longisetus* Anders., *Saccharum spontaneum* L. are common along the river valleys and, *Imperata cylindrica* (L.) P. Beauv. is abundant among the grasses.

Distribution and frequency of species vary from one ecosystem to the other. For example, *Terminalia myriocarpa* Heurek. & Muell.-Arg, and *Chukrasia tabularis* A.Juss. are common in Ngengpui wildlife sanctuary; *Michelia champaca* L. is common in Dampa and Phuldungsei areas; *Dipterocarpus turbinatus* Gaertn. f. in Tuichawng area; *Knema linifolia* (Roxb.) Warb. in Maisa-Lohre forests; *Lagerstroemia speciosa* (L.) Pers. in Chamdur forest and *Garcinia* spp. in Lungkulh virgin forest.

Similarly, distribution of ethnomedicinal plants also varies from one place to the other. For instance, *Anacolosa crassipes* Kurz. is frequent in Bymari and Palak forests, *Jusminum nervosum* Lour. is common in Mampui forest, *Alpinia bracteata* Roxb. in Palak forest, *Murraya koenigii* (L.) Spreng is frequent in Tlabung forest, *Lepionurus sylvestris* Bl.in Lungkulh virgin forest, *Lasianthus wallichii* Wt. in Ngengpui wildlife sanctuary, and *Dracaena spicata* Roxb. in Serhmun-Chikha forests, and so on.

The study area has a tropical humid climate being enroute south-west monsoon rains in low depressions. The temperature varies from 11°C to 35°C with annual precipitation of 2000 mm to 3500 mm. The area is dry and cold during December to February; warm and moist in March and May; very wet and warm from June to September; and moderate in Ocotober and November. The period from June to August is not suitable for field work due to heavy rainfall at that time. The best season for field collection starts from October up to the month of May. In Mizoram, it is an usual phenomenon that the first monsoon or pre-monsoon rain comes in the middle part of May every year.

The soil of the study site is acidic in nature owing to the leaching out of organic matter in the soil. The acidity gradually decreases in the area occupied by the secondary forests as well as the valleys and embankment of rivers. The dense forests

(Primary origin) has a humus, dark-brown to blackish and sandy to loamy soil with good aeration. The soil under bamboos, scrubby vegetation and teak plantations is generally brown, compact and cleyey-loam, whereas the valleys and river banks accumulate deposits of sands and alluvial soils. Other areas which are covered with mixed vegetation are generally reddish-brown, coarse sandy and friable.

Soil description and taxonomy covering the study area in relation to elevation is presented in **Table 3**.

Plants like *Oroxylum indicum* (L.) Vent., *Albizia procera* Benth.etc. grow in different types of soil, while *Scoparia dulcis* L. grows near human settlements in open area. *Blumea lanceolaria* (Roxb.) Druce and *Desmos chinensis* Lour. prefer dense forests, whereas *Abelmoschus moschatus* Medic. and *Cassia tora* L. grow in wastelands, *Dillenia indica* L. grows mostly on river banks, while members of *Asteraceae* are colonisers of landslides and *Phyllanthus fraternus* Webs., *Trema orientalis* (L.) Bl. and bamboos are the invaders of post-harvest *jhums* or fallows, whereas *Woodfordia fruticosa* Kurz. prefers dry localities and *Lasia spinosa* (L.) Thw. love to grow on marshy places.

Table 3 : Soil Description, Taxonomy And Elevation Of Study Area (Up to 1000 m) and above.

Category	Description of Soil	Soil Taxonomy (USDA, 1988)	Elevation Above MSL	Area in H.% of Total
1	2	3	4	5
	Dark brown to dark yellowish brown in colour (surface to sub-surface) deep to very deep, well drained, fine loamy soils on sloping to very steep hill slopes with severe erosion.	Umbric Dystrochrepts, Humic Hapludults.	Less than 500 metres	10,60,488 50.47%
	Yellowish brown to light olive-brown (surface to sub-surface) very deep, moderately well drained, fine texture, alluvial and	Typic Udorthents & Fluventic Umbric Dystrochrepts.	- do -	- do -

1	2	3	4	5
	<p>colluvial soils on nearly level to sloping valley and foot slopes with slight to moderate erosion.</p> <p>Dark brown to dark reddish brown (surface to sub-surface) very deep, well drained, fine to fine loamy, alluvial soils on nearly level valley land to moderately steep slope of hills with severe erosion.</p> <p>Dark brown to yellowish brown (surface to sub-surface) very deep, moderately well drained, alluvial and colluvial soils on nearly level valley land to moderately steep slope of hills with severe erosion.</p> <p>Dark brown to yellowist brown (surface to sub-surface) very deep, well drained, fine loamy soils on moderately steep to very very steep hills with severe erosion.</p>	<p>Humic Hapludants & Typic Dystrochrepts.</p> <p>Typic Udorthents & Fluventic Dystrochrepts.</p> <p>Typic hapludults & Umbric</p>	<p>Between 500 - 1,000 metres.</p> <p>Less than 500-1,000 metres.</p> <p>Above 1,000 metres</p>	<p>7,05,462 33.33%</p> <p>7,05,462 33.3%</p> <p>3,42,750 6.20%</p>
	TOTAL			21,08,700

Source : Mr. C.Thansanga, Dy. Director, Soil Survey, Deptt. of Agriculture & Minor Irrigation, Govt. of Mizoram, 1997 (personal communication).

3.3. The inhabitants :

In Mizoram, 16 Schedule Castes, 14 Scheduled tribes and 37 Sub-tribes have been recognised (Anonymous, 1991). Shakespeare (1912) divided the Lushai (Mizo) into a number of sub-tribes or clans and sub-clans. Dutta (1992) so far traced fifteen ethnic groups or population in Mizoram, such as *Lusei, Paihte, Hualngo, Tlau, Thadou, Ralte, Hmar, Mara* (Lakher), *Pawi(Lai), Bawm, Pang, Chakma, Riang, Biate and Magh*.

Out of the above mentioned fifteen ethnic groups, eight minority ethnic groups or communities form the “inhabitants” of the study area, such as (i) *Mizo* (Lusei) (ii) *Mara* (Lakher), (iii) *Lai* (Pawi), (iv) *Chakma*, (v) *Bru* (Riang), (vi) *Pang*, (vii) *Bawm* and (viii) *Magh (Mog Rakhai)*.

These ethnic groups are a very distinctive people rich in old-age traditions, cultures and customs, and continue to retain their respective dialects and ethnic identity. Out of the eight people groups, the *Mizos, Maras, Lais* and *Pangs* are gradually losing their valuable indigenous knowledge of traditional medicines, particularly among young generations, whereas the *Chakmas*, the *Brus*, the *Bawms* and the *Mogs* are ethnobioculturally rich in their folklore knowledge. In most cases, older people have more knowledge in the field of ethnobotany and the indigenous knowledge is regarded as the property of older people. A brief account of the inhabitants of study area is presented below :

MIZO (*Lusei*) : The Mizos are formerly known as *Lushais* and their language (*i.e.*, *Lushai language* or *Duhlian*) has now become '*Mizo language*' (Phukan, 1992; Thanga, 1992). Their life and culture has been described under '*The People and Culture*' in Chapter 1. They are the dominant tribe in Aizawl and Lunglei Districts of the study area.

MARA : The true name and the name by which they call themselves is '*Mara*' but by the surrounding tribes they are known as “*Lakher*” (Lorrain, 1921). They are known as '*Shamtu*' in Myanmar, '*Shindu*' in Arakan and '*Lakher*' in Mizoram. They occupy the south-eastern corner of Mizoram and the population is 35,218 (Anonymous, 1996) and constitute 5.1% of the total population of Mizoram, *i.e.*, 6,89,756 (Anonymous, 1996). They came from Haka, the Chin Hills of Myanmar and they speak Mara language. They live in eastern high hills and the valleys of *Kolodyne* river (**plate 6, photo.11**). The principal Lakher clans have been classified into royal, patrician and plebeian clans (Parry, 1932). They are extremely sensitive to their peculiar identity (Chatterjee, 1990). Agriculture is the main occupation. The rural people have acquired the knowledge of indigenous medicines from Mog or Rakhai. The Maras are expert cotton growers and women are good weavers (**plate 6, photo 12**).

LAI : Lai people are known as *Pawi* or *Chin*, because most of their settlements were in the Chin Hills of Burma (Singh, 1995). According to tradition, they came from Haka and Klanglang Sub-division of the Chin Hills of Myanmar (Anonymous, 1994). According to Hengmanga (1992), Lai people came down from China in 200-100 B.C.

Lai people live around the Blue Mountain and in between Kolodyne river and Chakma Autonomous District in Chhimtuipui District of South Mizoram. The population is 47,675, *i.e.*, 7% of the total population (Anonymous, 1996). They speak their own language called, '**Lai Hawlh**' (Language of Lai). Their dialect belongs to the Tibeto-Burman type of Central-Chin Group along with Lushei, Lakher and Zahau tribes (Grieson, 1908).

There are over 160 clans and sub-clans among the Pawi tribe. The principal clans are *Hnialum*, *Chinzah*, *Hlawncehu*, *Hlawnhhing*, *Khenglawt* and *Fanai* (Anonymous, 1994). *Jhuming* agriculture is their main occupation (**plate 7, photo 13**).

CHAKMA : "*Chakma*" or '*Tsakma*' means people of *Tsak* or *Thek* clan who are the progenitors of the Burmese race, and the Arakanese word '*Khyeng-tha*' signifies people or nation living near water (Sen, 1992).

Chakmas inhabit the western part of Mizoram bordering Bangladesh and Tripura state. They are habitually and culturally nomadic, moving from one place to the other and live temporarily near or along rivers. The river valleys of *Khawthlangtuipui* and *Tuichawng* are dominated by Chakma villages. They speak Chakma language which has close affinities with Bengali language (Singh, 1995).

The population is 54,194, *i.e.*, 7.85% of the total population (Anonymous, 1991). Buddhism is their religion. Their dress is simple. Men wear turban with coat and *dhoti*, and women wear *pison*, khaki and silver earrings, necklaces, bracelets and anklets. Their houses are built chiefly of bamboos. Agriculture is their main occupation (**plate 7, photo. 14**).

Regarding the use of herbal medicines, Lianchhinga (1997) wrote, "Their traditional village doctor still influence the majority and apply different methods of using twigs and leaves with incantation".

BRU OR RIANG : The 'Riangs' of Tripura are called '*Tuikuk*' in Mizoram, and they called themselves '*Bru*' which means '*Man*'. They came to Mizoram from the Chittagong hill tract of Bangladesh.

They are distributed in the western part of Mizoram and live in the villages of *Uiphum*, *Dinthaar*, *Nghalimhui*, *Zehtet*, *Parva*, *Chamdur*, *Zawlpui*, *Zawlmam*, etc. They

speak 'Bru language' which belongs to the Non-Khamer family (Grieson, 1908).

Like *Chakmas*, they exhibit a nomadic way of life and live near the forests or rivers. Principally, they are animists (Chatterjee, 1978). Their main occupation is *Jhum* farming and their staple food is '*mairong*' which they eat three times a day.

Bru men wear a long loin cloth and *pawndri*, while the women put on silver ornaments, rupee necklaces and have their ornaments for the ears, neck, arms, wrists, waist and ankles (**plate 8, photo 15**).

They are experts in basketry and weaving. They make various kinds of baskets. They use bamboos as fuelwood. Their houses are built with bamboos, grasses and woods. They smoke cigarettes and '*dumda*' the nicotine water pipes.

By and large, they depend on the '*Bhuidans*' the medicinemen for their health care needs. The major population depends on the natural resources for food, drinks and medicines.

PANG : *Pang* people are scattered in the southern part of Mizoram. They are considered as one of the Mizo groups and entered into south Mizoram from the Chittagong hill tract of Bangladesh. Now, they have settled at Vathuampui as their headquarters. They speak 'Pang language' which belongs to the Kuki-Chin group of the Tibeto-Burman family of languages. Their dialect is akin to *Lai*, *Hmar* and *Mizo*. Pang population is estimated to be around 3,000 persons only.

Traditionally, *Pangs* worship spirits in rivers, mountains and big trees. Their dress is simple. Women wear two pieces of cloth to cover the upper and middle part of their body (**plate 8, photo 16**).

Practice of *jhum* cultivation is their main occupation. Basketry and weaving are practised as subsidiary occupations. They gather their requirements from the forest resources. Majority of them rely on indigenous medicines which are derived from the wild plant resources.

BAWM : *Bawms* are believed to be a composite sect of Mizo descendants. *Bawm* (basket carrier) are called '*Chin*' (basket carrier) in Myanmar, and '*Tlanglau*' in Chittagong hills of Bangladesh. Their origin is thought to be '*Chhinlung*' which the Bawm called '*Changkhal Lungpi*' meaning '*Mountain Rock*' (Anonymous, 1991). They entered into present Mizoram from the western part of Myanmar and first settled at *Uiphu* village in south Mizoram. Now, they are living in *Chawilung*, *Samang*, *Khawmawi*, *W. Saizawh*, *Ngharum*, *Hmunlai*, *Vathuampui*, *Parva*, *Mautlang*, *Chikhurlui*, etc.

Bawms have 18 clans (Anonymous,1991) of which *Hlawnhhing*, *Chinzah*, *Vandir*, *Bawitung*, *Aineh*, *Hlawnceu* are common. They speak 'Bawm language' as well as 'Mizo language'.

Forest is their major economic resource and their main occupation is *jhuming*. A few men are skilled in carpentry, basketry and caning, and women in weaving. Their houses are chiefly made of bamboos (**plate 9, photo 17**).

The population is very small and they are sporadically scattered and live side by side with the *Pangs*, the *Brus*, the *Chakmas* and the *Mizos*. They rely on herbal medicines prepared by the local doctors or medicinemen for their health care needs (**plate 9, photo 18**).

MOG OR MAGH : *Mog* people are of Arakanese origin. It is believed that they have migrated from Arakan (Myanmar) to Bangladesh and adjoining area including Mizoram and Tripura (Sen, 1992; Singh, 1995). They are known as '*Marma*' in Bangladesh, '*Mog*' or '*Magh*' in Mizoram. Mara people call them '*Rakhai*,' while Bawm people call them '*Zakhai*'. They reside in *Dumzautlang*, *Longmasu*, *Tuichawngtlang*, etc. and in a few other places among the *Chakmas*.

They have their own language which belongs to the Assam-Burmese group of Tibeto-Chinese family (Sen, 1992). Their religion is *Buddhism*, and they worship *Budda* as supreme god alongwith Hindu deities and local evil spirits (Singh, 1995).

Mog men wear a loin cloth '*dhoti*' in the style of Myanmar, a '*jenti*' and '*head gear*' which is a small piece of cloth. The men are experts in making cane and bamboo baskets. The women wear two pieces of cloth to cover the lower and upper parts of the body.

Their economic resource is land and their primary source of livelihood is *jhum* cultivation. Majority of *Mogs* depends upon indigenous herbal medicines.

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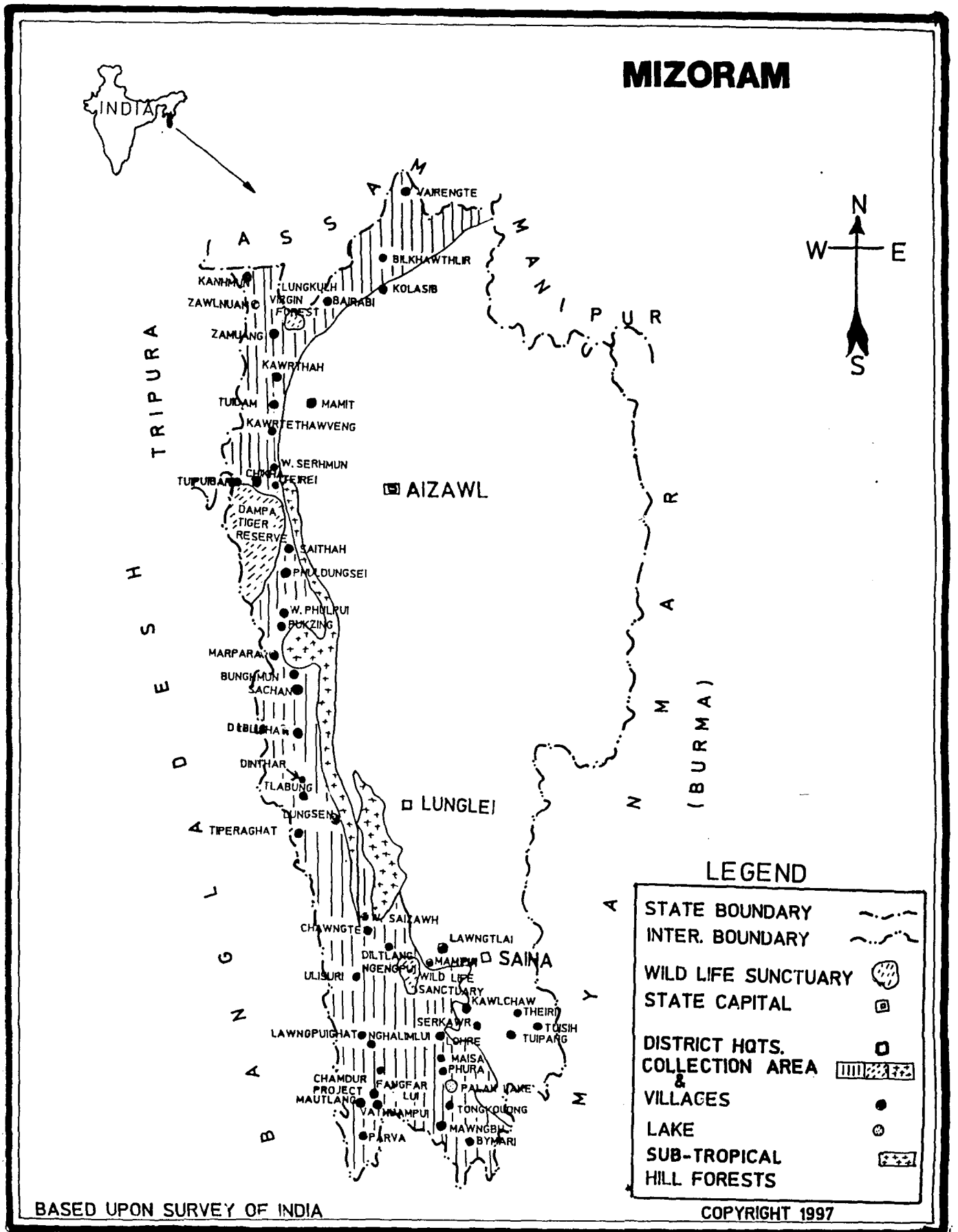


Fig. 3. : MAP SHOWING THE STUDY AREA AND SOME IMPORTANT PLACES OF ETHNOBOTANICAL COLLECTION



3. Rengdil Lake-I in Lungkulh virgin forest.

2



4. Rengdil Lake-II in Lungkulh virgin forest.



5. Lungkulh virgin forest.

3



6. Ngenpui wildlife sanctuary (Southern part, view from a distant)



7. Road to Bymari and the forest.

4

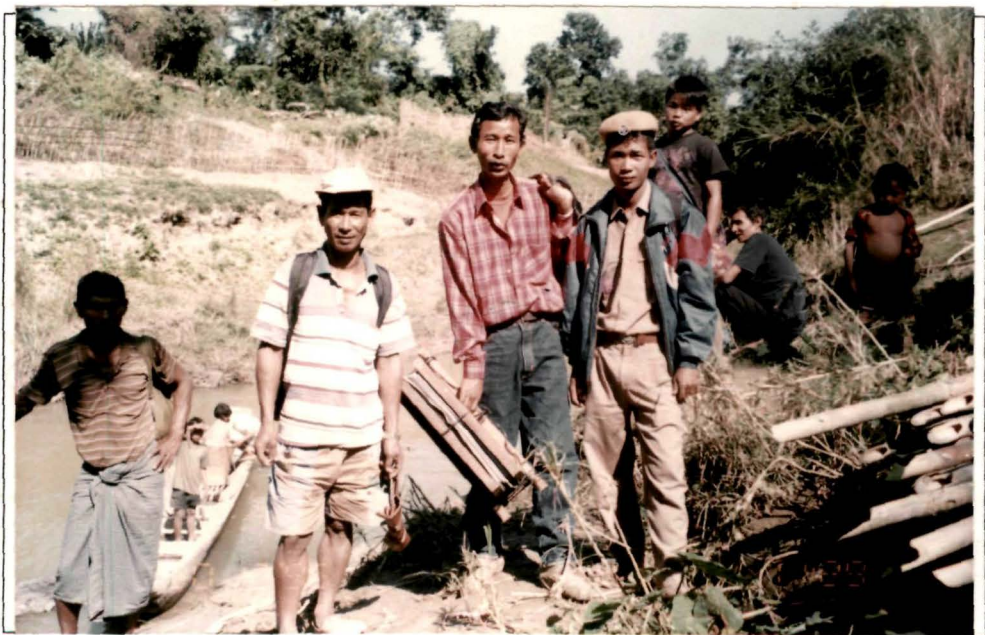


8. Palak Lake and its biodiversity.



9. R.Khawthlangtuipui and a speed-boat.

5



10. R.Tuichawng. Mr. Lungmuana (with rucksack), Mr. Mohanto, an interpreter (with plant press), Mr. Lianmawia (with uniform) and a boat-man (left), standing on the bank of R.Tuichawng near Bolisora.



11. R.Kolodyne (view from a distant)

6



12. A *Mara* woman weaving cotton at Bymari.



13. A modern woman with *Lai dress*.

7



14. A *Chakma* girl and a little boy with *Chakma dress*.

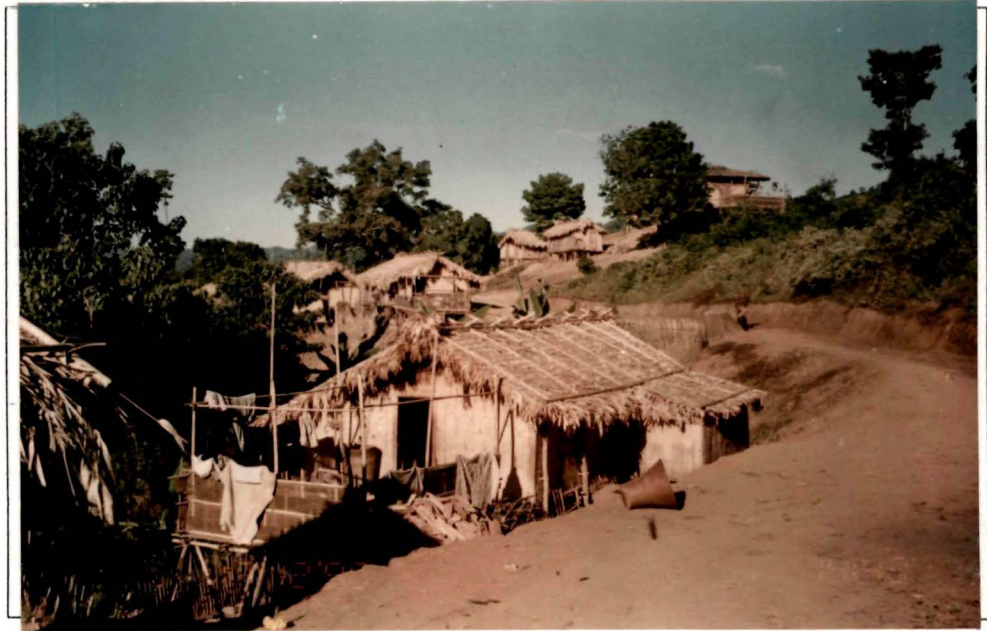


15. A *Bru* woman with *Bru* dress.

8



16. Modern *Pang* girls with *Pang* dress.



17. A new village of Vathuampui with Bamboo houses.

9



18. A *Bawm* 'doctor-pa' of Bymari village.

METHODOLOGY

CHAPTER 4

METHODOLOGY

The methodologies and techniques adopted for the study are as follows :

4.1. Scrutiny of locally available literature

Collection of information and scrutiny of locally available literature are the first step and pre-requisite method of the research. 'Locally available literature' means, any literature (printed or unprinted materials) pertaining to the traditional uses of medicines which are extracted from plants themselves or part(s) of animal origin or mineral products.

The literature collected and consulted are : (i) *Dictionary of the Lushai Language* (Lorrain, 1940); (ii) *Local Medicine-Tualchher Damdawi* (Irish, 1975); (iii) *Mizo Damdawi leh Fanau Enkawl Dan* (Thangchuanga, 1979); (iv) *Zoram Upa Pawl Thurawn Bu* (Anonymous, 1984); (v) *Fa Duhthlan Dan leh Mizo Damdawi* (Darlianthanga, 1989); (vi) *Tualchhuak Damdawi* (Saptawna, 1990); (vii) *Mizo Pipute Sulhnu leh Mizo Damdawi* (Vailinga, 1991); (viii) *Mizo Damdawi leh an hmante* (Lianhnuna, 1991); (ix) *Mizo Damdawi* (Sawithanga, 1993); (x) *Mizo Damdawi* (Lunghnema, 1995); (xi) *Mizo Damdawi* (Rozika, 1995) (xii) *Tualchhuak Damdawi* (Chawngkunga, 1996) and (xiii) *Mizo Damdawi Siam Dan leh A Hmamma* (Anonymous, 1996).

Every plant in the above cited literature are noted down against the diseases. They are sorted out, arranged, scrutinised and then compiled. The compiled manuscript facilitates the basic plant - disease state and also helps in field investigations.

4.2. Personal/Group Interview

Personal or group interview was held according to convenience on different occasions at different places. The contact group or people can be termed as '*knowledgeable persons*' or '*key informants*' or '*medicinemen*' or '*herbal practioners*' or '*local doctors*' or '*local specialists*'. Most of the '*key informants*' are men of old age group, a very few women and a negligible school children of middle school standard. The contact people or group also includes homeopathists, naturopathists, therapists and faith-healers.

There was no time specified for conduction of interviews. It was held whenever the chances occurred in and out of the field. Every opportunity was seized in public meetings, in conferences, in seminars, and even in the condolence meetings! Sometimes, interviews were focussed specifically on certain disease-states of special interest.

The information thus obtained through the interviews were recorded in a separate note-book. This kind of verbal correspondence was found to be fruitful among the *Mizo* communities. A key-informant interview combined with direct field observation is most advantageous.

4.3. Ethnobotanical Field Work

This is the most important method of ethnobotanical studies, where primary information is obtained from the real practitioners or local medicinemen. Not only the collection of local remedies is important, but authentication of voucher specimens and preservation of plant samples are necessary for proper identification.

In plant collecting and herbarium techniques, the principle guidelines given by Jain and Rao (1977), Womersley (1981), Mehrotra (1989), Lipp (1989), Martin (1995) and Cotton (1996) are followed.

4.3.1. Collection and processing of plant samples

In collection and processing of plant samples, the following equipments and chemicals were used:

(a) Field equipments :

(i) Field notebook (22 cm x 12 cm); (ii) Wooden plant press (50 cm x 34 cm x 3 cm); (iii) Portable plant press (48 cm x 32 cm x 1 cm); (iv) Camera; (v) Rucksack; (vi) Knife or dao; (vii) Secateur; (viii) Field shoes; (ix) Altimeter; (x) Old newspapers; (xi) Scale and pencils; (xii) Polythene bags and (xiii) Food stuff and medicine.

(b) Laboratory equipments and chemicals :

(i) Plastic/Enamel tray; (40 cm x 30 cm x 3 cm); (ii) Dissecting box; (iii) Cane-forceps; (iv) Fevicol/Dendrite; (v) Specimen jars; (vi) Ethyl alcohol (96%); (vii) Rectified Spirit; (viii) Formaldehyde; (ix) Mercuric Chloride; (x) Paraformaldehyde and (xi) Sodium Carbonate.

(c) Herbarium equipments :

(i) Genus cover (48 cm x 32 cm); (ii) Species cover (42 cm x 30 cm); (iii) Mounting boards (42 cm x 30 cm); (iv) Absorbers/blotters (46 cm x 30 cm);

(v) Corrugated cardboards (45 cm x 30 cm); (vi) Labels (11 cm x 9 cm); (vii) Straps and needles; (viii) Napthalene balls and (ix) Pigeon-hole herbarium cabinets (170 cm x 62 cm x 50 cm).

4.3.2. Pre-planned field trip programme

A field trip programme was planned before the start of actual field work. With the help of local maps, important places of collection were demarcated on the basis of centres of biodiversity and main centres of ethnic communities at random. Collection areas, routes and time were outlined, so that important areas of collection, centres of biodiversity and main centres of communities could be covered.

4.3.3. Actual field work

Actual Field collection was conducted throughout the study area. Due to the long stretch of the study area which started from the extreme north (Vairengte) to the extreme south (Parva & Bymari), sub-stations or camps were set-up at some important community centres, *viz.*, Vairengte, Bilkhawthlir, Kolosib, Kanhmun, Zamuang, Zawnuam, Kawrthah, Tuipuibari, Chikha, Teirei, Phuldungsei, Pukzing, Lungsen, Tlabung, Ngengpui, Mualbu Kawnpui, Vaseikai (Lampuighat), Chamdur Project, Vathuampui, Serkawr, Phura, Tongkolong, Bymari and Tuisih.

Some unique reservoirs of medicinal plants where collections were made are the natural forests of Bymari and Palak biodiversity, Phura-Maisa-Lohre forests, Tuipang-Zawngling forests, Chamdur Project, Serhmun-Chikha forests, Tlabung forest, Dampa Tiger Reserve, Lungkulh virgin forest and Ngengpui wildlife sanctuary.

In most villages, normally there are one or two local 'key informants' or 'medicinemen'. Precise location of such knowledgeable persons reduces the time required in getting information from them. These medicinemen are known as '*bawl-pu*' (*priest*) to the Mizos, '*doctor-pa*' to the Bawms, '*damkwi-thiam*' to the Pangs and '*bhuidaw*' or '*bhuidua*' to the Brus and *Chakmas*.

When local doctors are unavailable or can not be located, the alternative means is to approach the village '**head**' or '**chowdhury**' or '**president**' of the Village Council or government personnel. They are always helpful in providing useful or required information. In certain localities, they became the first contact people and the medicinemen, the second.

Interrogation with as many people as possible is helpful even within the same locality or community for cross-examination of what others say about the uses of a particular plant to cure diseases.

The most sensitive part of field investigation is an interrogation with the local specialists, how to open talk with them in an appeasing manner. With respect to this aspect of the technique, the suggestions made by Rao & Hajra (1987), Rao (1989) and Lipp (1989) are helpful.

The techniques employed varies from one culture to the other, depending upon the socio-ethnocultural background. The *Bawms*, the *Pangs* and the *Brus* are more or less equally shy people, whereas the *Chakmas* and the *Mogs (Rakhais)* are very conservative. Medicinemen of the first three groups are bilingual and the second two groups are monolingual. In order to communicate with the second group, an additional bilingual interpreter is required. A bilingual interpreter, equipped with ethnomedicinal background, is most desirable and effective.

For instance, Mr. Hiniaram, a '*bhuidaw*' and snake-catcher (Pl. 10, P.19) declined to disclose his secret knowledge about snake-bite remedies in the presence of his own people. But, he accepted the bilingual interpreter and took us to the jungle in search of the medicinal plants used for snake-bite remedies.

In general, local specialists were fully cooperative when asked in private, provided that a mutual trust has already existed between the researcher and the medicinemen. In fact, it is very important to establish a deep sense of mutual trust throughout the course of field investigations.

In order to gain the confidence of local specialists, a genuine sense of warmth, empathy and respect to their culture and customs is most important not by acting so, but by being so in actions and words. In other words, adaptability to the local environment, to their habits and taste is important.

Narration of plant names in their language can be of effective means of communication through which the local knowledge of medicine is obtained. Once some local names are narrated in their language, they themselves automatically spelled out the rest of names of plants we wanted to know for a particular disease or different diseases.

The local names (other than *Mizo*, *Lai* and *Mara*) are recorded exactly as they are spelt. In a few cases, plants are nomenclated for the first time in *Mizo* on the basis of distinctive characters, odour, taste or locality.

The part(s) of plants (trees, shrubs, herbs, climbers, twinners, vines, epiphytes, bamboos, palm, ferns, aroids and orchids) used as medicine consists of roots, tubers, rhizomes, root-bark, stem-bark, sap, latex, leaves, flowers, fruits and seeds. The ethnobotanical collection includes collection of plant part(s) used for medicines and the twigs of plants with the reproductive parts. The botanical characters of such plant species are recorded in the field note-book (Fig. 4).

ETHNOBOTANY OF MIZORAM			
Coll. No.....		Date	
Botanical Name :			
Family :			
Location :			
		Alt..... m	
Habit :			
Habitat :			
Description :			
Ethnobotanical uses :			
.....			
Collector :			
No.	No.	No.	No.

Fig.4. Field Notebook

4.4. Plant processing

Plant processing comprises the method of plant collection, herbarium techniques, identification of specimens and preservation of plant samples.

The collected plant materials are brought to the camps or sub-stations for proper plant press. They are kept inside the folders (absorbers) and treated them with 4% solution of Paraformaldehyde (100 gms of Paraformaldehyde + 5 gms of Sodium Carbonate + 1 litre of boiled water) to prevent the falling of leaves, flowers and fruits. While pressing, the leaves are placed upside-down in an alternate manner to show both the surfaces of the leaves. Double faced corrugated carboards are placed at some intervals in order to make the air pass through the spaces. Sometimes, an additional folded old newspapers are inserted to make the leaves evenly flat, especially when hard or woody - twigs or fruits are present.

The pressed plant is exposed to sunlight for drying. Period of dryness vary from one species to the other. Usually, it takes 3 to 6 days for proper drying during sunny days. A longer period (up to two weeks) is required on gloomy or cloudy days. An electric operated hot-oven is used at 60° C for 2 to 3 days during rainy seasons. Care is taken to avoid over-drying of the specimens or fungal infestation over the specimens. This is done by checking the plant materials every day or every alternate days till the plants get dried properly. Checking or rechecking is necessary especially for the first 2 to 3 days to prevent crumpling of leaves.

Properly dried specimens are poisoned by dipping into a plastic tray containing 'Kew Mixture' (115 gms of Mercuric Chloride dissolved in 4.5 litres of Ethyl alcohol or Rectified Spirit). Dried poisoned specimens are glued on mounting boards with the help of quick drying adhesive (fevicol/dendrite).

A printed label is pasted on the right bottom corner of the mounting board and it carries an ethnobotanical information as shown in **Fig. 5**.

In addition to this, an accessory documentation like colour plates and line drawings are prepared and sample drugs (part used) are preserved in 8% of formalin in specimen jars (Pl.10, P. 20) as an authentic evidence, apart from the voucher specimens

4.5. Identification and Matching of the Specimens

Fresh or semi-dried or mounted specimens are used for the purpose of identification. Identification of plants is done with the help of available floras, such as (i) *Flora of British India* (Hooker, 1872-1897); (ii) *Forest Flora of British Burma* (Kurz, 1877); (iii) *A Botanical Tour in the South Lushai Hills* (Gage, 1889); (iv) *Indian Trees* (Brandis, 1906); (v) *Botany of Bihar & Orissa* (Hainnes, 1921-1940); (vi) *The Lakhers (Appendix vii)*, (Parry, 1932); (vii) *Flora of Assam* (Kanjilal, *et al.*, 1934-1940; Bor, 1940); (viii) *Flora of the Lushai Hills* (Fischer, 1938); (ix) *Flora of Tripura State* (Deb, 1981

HERBARIUM OF FORESTRY DEPTT. N.E.H.U. MIZORAM CAMPUS, AIZAWL.	
Coll. No.....	Date.....
Family.....	
Bot. Name.....	
Local name.....	
Location.....	Alt m
Habit & Habitat.....	
.....	
Part used.....	
Ethnobotanical uses/notes.....	
.....	
J.H. Lalramnghinglova Collector	Determinator.

Fig. 5 Label.

& 1983); (x) *A Census of the Indian Pteridophytes* (Dixit,1984); (xi) *Forest Flora of Meghalaya* (Haridasan and Rao,1985 & 1987) and (xii) *Some Mizo Botanical and Zoological Names* (Sawmliana, 1988), etc.

In order to match the specimens (for confirmation) and to identify the unidentified species, plant specimens were taken to the established national herbaria, viz., Central National Herbarium, Howrah (CAL), Herbarium of National Botanical Research Institute, Lucknow (LWG) and Herbarium of Botanical Survey of India (Eastern Circle), Shillong (ASSAM). The local herbarium of Environment & Forest Department, Mizoram, Aizawl has also been consulted and the specimens were scrutinised for the search of medicinal plants.

4.6. Methods of preparation of herbal medicines

Herbal medicines are prepared from fresh part(s) of plants or dried part(s) of plants. Generally, the whole plant is used in the case of small herbs, and parts of plants

viz., roots, bark, heart-wood or pith, leaves, flowers, fruits and seeds are used in the case of trees.

The methods of medicinal preparations are infusion, decoction, fermentation, juice, paste, powder and poultice. Some herbal medicines are used in the form of pills, oils and inhalants. Fresh water is the main solvent used in the preparation of village medicines.

The quantity of medicine given at one time is usually high. An approximate metric equivalents are as follows : one teaspoonful = 5 gms or 5 ml; one tablespoonful = 10 ml and one village small cup = 100 ml. Mode of administration is oral or internal, external application, massage and drops.

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19. Mr.Haniaram (snake catcher) of Lalmon village with his valuable documents.

10



20. Plant samples and the ethnobotanist.

TAXONOMIC DESCRIPTION OF PLANTS

CHAPTER 5

TAXONOMIC DESCRIPTION OF PLANTS

5.1. Presentation of data

Description of plants under the study represents or comprises of Pteridophytes of Sub-kingdom Gryptogamia; Podocarpaceae of Gymnosperms and Angiosperms of Sub-kingdom Phanerogamia or Spermotophytes.

Names of plants are arranged alphabetically. Important morphological characters are described. Height of plants and size of plant organs or parts are measured in metric units of meters and centimeters, respectively. Taxa of each species is described in parenthesis and synonymous are given in most of the cases. An english names are also given where possible. Binomial nomenclatures are updated, as far as practicable, with the help of *Bennet's Name changes in Flowering Plants of India and Adjacent Regions*, 1987. Subsequent features follow in the sequences of family, local name, botanical description, phenology, location & altitude, associates and ecology, distribution (Global, India & Mizoram), part (s) used, extraction and uses (medicinal, material culture, food, poison, magico-religious belief, agro-farming or agroforestry, conservation) followed by notes, remarks and /or special opinoins and recommendations where necessary. The ethnomedicinal uses comprises of the dosage forms, doses and mode of administration against the deseases.

References and cross-references are selected on the lines of Medicinal Plants and related disciplines and regional Floras. On Medicinal Plants, following references are selected. *A Dictionary of the Economic Products of India* (Watt, 1872-1892); *Indian Medicinal Plants* (Kirtakar & Basu, 1935); *Wealth of India : Raw Materials* Vols. I-XI (Anonymous, 1948-1988); *Glossary of Indian Medicinal Plants* (Chopra, *et al.*, 1956); *Supplementary to the Glossary of Indian Medicinal Plants* (Chopra, *et al.*, 1969); *The Useful Plants of India* (Ambasta, 1986); *Companion to Chopra's Glossary of Indian Medicinal Plants of India* (Mehrotra, *et al.*, 1987); *Major Medicinal Plants of India* (Thakur, *et al.*, 1989); *The Treaties of Medicinal Plants*, Vols. 1-4 (Chatterjee & Pakrashi,

1991-1995); *Dictionary of Indian Medicinal Plants* (Husain, et al., 1992); *Cross-Cultural Ethnobotany of North East India* (Saklaini & Jain, 1994); *Ayurvedic Drugs and Their Plant*

Resources (Sivarajan & Balachandran, 1994); *Hand Book on Local Health Traditions in Meghalaya* (Rynjah, 1995); *Indian Medicinal Plants : a compendium of 500 species*, Vols.1-5 (Sala, 1994-1996) and *Medicinal Plants of Manipur* (Sinha, 1996).

Among the floras, *Flora of British India*, Vols.I-VII (Hooker, 1872-1892); *A Hand Book to the Flora of Ceylon*, Parts I-V (Trimen & Hooker, 1893); *Forest Flora of British Burma*, Vols.I-II (Kurz, 1877); *Indian Trees* (Brandis, 1906); *Botany of Bihar and Orissa*, Parts I-VI (Hainnes, 1921-1924); *Flora of Assam* (Kankilal, et al., 1934-1940); *Flora of the Lushai Hills* (Fisher, 1938); *Flora of Tripura State*, Vols. I-II (Deb, 1981-1983); *Ferns and Fern-allies of Meghalaya State, India* (Baishya & Rao, 1982); *Forest Flora of Meghalaya*, Vols. I-II (Haridasan and Rao, 1985 & 1987); *Ferns of Nagaland* (Jamir & Rao, 988); *Tree Flora of Malaya*, Vols. 1-4 (Whitemore & Ng, 1972-1989); *An illustrated Fern Flora of West Himalaya*, Vol. 1 (Khullar, 1994) are used. List of some trees and plants found in the Lushai Hills District with Lushai and Lakher names in *The Lakhers, Appendix-VII* (Parry, 1932) has also been consulted.

The important Journals and Bulletins, viz; *Journal of Economic Taxonomic Botany* (Jodhpur); *Journal of Ethnobotany* (Lucknow); and *Bulletin of Botanical Survey of India* (Calcutta) are used. Dictionaries like *Dictionary of Indian Folk Medicine and Ethnobotany* (Jain, 1991) and *Isthmian Ethnobotanical Dictionary* (Duke, 1986) have been referred.

A Glossary of Botanical Terms (Jackson, 1900, Reprint 1986) and *Botanical Latin* (Stearn, 1966) are used for terminological notations and abbreviations.

Abbreviations used for local names are : (M) for Mizo; (Ma) for Mara; (B) for Bru; (Bm) for Bawm; (C) for Chakma; (P) for Pang; (L) for Lai; (R) for Rakhai; LR. for Lalramnghinglova, J.H. who has nomenclated local (Mizo) names for the first time.

Altogether, 230 species belonging to 80 families and 172 genera have been documented. Out of which 20 plant species are exclusively cultivated and remaining 210 are wild and 64 medicinal plants are recorded for the first time.

5.2. Description of plants

Taxonomic description of plants follow successively.

Abelmoschus moschatus Medicus. FTS 1:297.1981; FFM 1:137.1985; WI 1-A:10.1985; IED 1:1986; UPI 1:1986; DIFME 1:1991; DIMP 1:1992; TIMP 2:172.1992; CCENEI 208.1994; IMP 1:4.1994. *Hibiscus abelmoschus* Linn. FBI 1:342.1874; DEP 4:229.1890; FA 1:143.1934; IMP 1:330.1935; GIMP 133.1956 (**Fig.6**).

AMBRETTE PLANT, MUSK MALLOW.

Family	Malvaceae.
Local name	Uichhuhlo (M); Bawrhaisaiabe-suak LR.; Ngah-liar (Bm).
Botanical description	An erect, hirsute herb to 1.5 m high; leaves polymorphous, lower ovate, acute, upper palmately 3-5 lobed; lobes spreading, lanceolate, coarsely toothed or serrate, acuminate; petiole long with deflexed hair; flowers large, yellow with a purple centre, solitary-axillary; fruits fulvous-hairy, oblong-lanceolate, acute; seeds reniform, black, striate.
	Fl.: September - October. Fr.: October - December
Location & altitude	On river bank of Kawrawng, Ngenpui wildlife sanctuary, fallow and <i>jhum</i> lands in Teirei-Dampa Rengpui area; between Rengtekawn and Govt.Godown, Kolosib etc. Alt. 220-600 m.
Associates & Ecology	<i>Trema orientalis</i> , <i>Byttneria villosa</i> , <i>Urena lobata</i> , <i>Mikania micrantha</i> , in river valleys and in fallow lands.
Distribution	Tropical America, S. China; throughout hilly areas and warmer parts of India and the North-East India; frequent in Mizoram, particularly in lower tropical secondary forests.
Part used	Roots, seeds and bark.
Extraction and uses	
Medicinal	<ol style="list-style-type: none"> 1) The roots and leaves are boiled and the water is taken for syphilis. The medicine is taken @ tablespoonful (10 ml) twice daily. 2) The crushed root is applied externally on wounds/ulcers to suck the pus out 3) The seeds are grinded to powder and the powder (5 gms) is taken with water (50 ml) for throat-pain twice daily.

Fibre The bark yields fibre which is used as cordage or tying purposes.

Achyranthes aspera Linn. FBI 4:730.1885 ; BBO 767.1924 ; IMP 3:2066.1935; FA 4:6.1940; GIMP 4:1956; MPIP 7.1962. FTS 2:162.1983; WI 1-A:55.1985; IED 2.1986; DIFME 10.1991; CCENEI 39.1994; ADPR 44.1994; IMP 1:39.1994; MPM 3.1996 (**Fig.7**).

PRICKLY CHAFF FLOWER.

Family Amaranthaceae.

Local Name **Buchhawl** (M); **Uipanhlo** (M).

Botanical description An erect or procumbent herb; stem and branches quadrangular, striate, greenish white, thickened above the nodes; leaves elliptic-obovate or ovate-oblong, abruptly acuminate, pubescent; base narrowed; petiole channelled above; flowers greenish-white, in elongate terminal spikes; bracts spinescent; utricle (1-seeded fruit) oblong-cylindric, membranous.

Fl.: October. **Fr.:** November-January

Location & altitude Samtlang, 20 km South of Aizawl, Vathuampui forest, etc. Alt. 240-1200 m.

Associates & ecology *Cyathula prostrata*, *Achyranthes bidentata*, *Cassia tora*, in dry soil along waysides and in waste places.

Distribution Tropical Asia, Pakistan, Sri Lanka; waste places throughout India and the North-East India: **common as weed plant in Mizoram in dry localities and also on waysides under secondary forests.**

Part used Whole plant.

Extraction and uses :

Medicinal 1) Infusion of the plant is taken for dysentery and colic @ tablespoonful (10 ml) twice daily.
2) Juice of crushed leaves is externally applied on boils, piles and cirrhosis

Veterinary Juice of crushed leaves is applied on wounds and ulcers of a dog, hence the local name, *Ui-pan-hlo*. (ui=dog; pan=ulcer; hlo=herb).

Aeginetia indica Linn. FBI 4:320.1884; BBO 642.1922; RBSI 12 (2):117.1938; FA 3:385.1939; GIMP 8.1956; FTS 2:303.1983.; WI 1-A:85.1985; UPI 16.1986; DIFME 14.1991; MPM 6.1996.

Family Orobanchaceae.

Local name **Zawhte-vaibel (M); Sanghar-vaibel (M); Soma-so-da-ruk (B)**

Botanical description A leafless parasitic herb; rootstock slender with fibrous roots; scapes solitary or several, up to 30 cm high, with few scales near the base; flowers solitary, terminal, pinkish-purple with short obtuse flat lobes; seeds like brown dust, dispersed by rotting of the thin capsule wall.

Fl. & Fr. : June-July.

Location Dampa Tiger Reserve, c 2 km from Teirei.

& altitude

Alt.450 m.

Associates & ecology *Phoebe lanceolata*, *Ostodes paniculata*, *Sapium baccatum*, *Musa* spp., intermixed with bamboos on humus loamy soil under primary forest.

Distribution Tropical Asia, Japan and Myanmar; from western Himalaya through North-East India; **rare in Mizoram, in moist tropical and sub-tropical hill forests.**

Part used Root:Bulb.

Extraction and uses :

Medicinal 1) Juice of rootstock or bulb is applied externally on mumps and inflammatory glands.

2) *Bru* specialist prescribed the pills for fertility. The medicine is prepared from the roots of *Aeginetia indica* Linn., *Millettia pachycarpa* Benth., *Musa* sp. (local variety), *Polygonum plebium* R.Br., *Ricinus communis* Linn., *Trichosanthes tricuspidata* Lour. and a small part of the stomach of *Hysterix indica*.

Extraction and uses :

Medicinal

The orange coloured sour pulp is pounded to paste and mixed with water. The mixture is taken to allay thirst and used as anti-dysenteric, stomachic and digestive.

Aeschynanthus sikkinensis Stapf. EFPN 3:133.1982; FJ 2:345.1983; FFM 2:652.1987; JETB Addl.ser.12.449.1996. *A.maculatus* Cl. FBI 4:339.1884; RBSI 12(12):117.1938; FA 3:389.1939.

Family Gesneriaceae.

Local name **Bawltehlantai** (M).

Botanical description An epiphytic undershrub; roostock creeping, as big as a hand; branches pendulous; leaves elliptic lanceolate, 1.5-2.5 x 5-10 cm, thick and glossy, exuding milky latex; base acute; flowers terminal clustered, capitate, pink red; fruits 20-30 cm long.

Fl.: August. Fr.: October-January.

Location Bualte, Hmuifang, Sailam etc.

& altitude

Alt. Above 900 m.

Associates & ecology They grow on tree trunk with *Schefflera venulosa*, (Wt. & Arn.) Hams, or *Helixanthera parasitica* Lour.; in dry and slopy areas.

Distribution Chittagong hill tracts of Bangladesh; temperate Himalaya from Nepal eastwards to Assam and Meghalaya. **frequent in Mizoram, particularly in tropical semi-evergreen forests.**

Part used Rootstock, leaves and flowers.

Extraction & uses :

Medicinal

1) Decoction of the root is taken for fever and as anodyne for all kinds of ailments @ teaspoonful (5 ml) for children, and tablespoonful (10 ml) twice daily for adults.

- 2) Juice of crushed leaves is applied and drunk for inflammatory glands.
- 3) Infusion of flowers is taken against tonsilitis.

Reported for the first time.

Ageratum conyzoides Linn. FBI 3:243.1881; BBO 462.1922; IMP 2:1330.1935; RBSI 12 (2):133.1938; GIMP 8.1956; MPIP 11.1962; FTS 2:203.1983; WI 1-A:108.1985; UPI 20:1986; FFM 2:516.1987; DIFME 15.1991; DIMP 18.1992; CCENEI 41.1994; IMP 1:74.1994; MPM 7.1996. -

GOAT WEED.

Family Asteraceae

Local name **Vaihlehlo** (Ni)

Botanical description An erect aromatic herb, all parts hispidous; leaves rhomboid-ovate triangular, 1.5-4.5x3-9 cm, crenate; flower heads in dense terminal corymbs; florets numerous, white or blue-purple with companulate involucre; fruit black; pappus with 5-awned scales.

Fl. & Fr.: Almost throughout the year.

Location Very common throughout Mizoram.

& altitude

Alt. Up to 2000 m.

Associates & ecology *Chromolaena odorata*, *Bidens biternata*, *Ageratum adenophora*, in moist shady and waste places.

Distribution Native of tropical America; naturalised throughour India and North-East India; **very common throughout Mizoram, in waste places and fallow lands.**

Part used Roots and leaves

Extraction and uses :

Medicinal 1) Decoction of the roots is taken internally for tuberculosis (@ tablespoon ful (10 ml) twice daily; fresh juice is taken on every alternate 3 days.
2) Juice of the leaves is applied on cuts as haemostatics.

Albizia chinensis (Osb.) Merr. RBSI 12(2): 92.1938; FTS 1:129.1981; FFM 1:333.1985; WI 1-A:125.1985; GIMP 10.1956; CCENEI 42:1994; MPM 8.1996.
A.stipulata (Roxb.) Boivin, FFBB 1:426.1877; FBI 2:300.1978; DEP 1:160.1889. IT 272.1906; BBO 334.1922; FA 2:167.1938; UPI 26.1986
(Pl. 11, P. 21).

Family Mimosaceae.

Local name **Vang** (M); **Pava** (Ma).

Botanical description A medium-sized to large-sized tree with flat top crown; bark dark grey; leaves bipinnate; rachis up to 45 cm long, pubescent, with a large gland above the base and smaller ones between the pinnae; pinnae 7-20 pairs; leaflets 20-40 pairs, sessile, falcate-oblong, acute; midrib close to the upper, acute; flowers dull-white, axillary and terminal paniced racemes; fruits (pods) pale brown, 1.5-2 x 8-15 cm glossy; seeds 8-10.

Fl.: May-June. **Fr.:** October-April.

Location Chikha-Tuipubari, Serkawr, etc.

& altitude

Alt. 200-1300 m.

Associates & ecology *Albizia procera*, *Schima wallichii*, *Acacia timorensis*, on dry sandy soil to loamy in shady places.

Distribution Bangladesh and Myanmar; Sub-Himalayans to Bihar, W.Bengal, S.India, Andamans and North-East India; **very common in Mizoram, both in tropical evergreen and semi-evergreen forests.**

Part used Gums, bark and wood.

Extraction and uses :

Medicinal 1) The gum is applied on the forehead to cure headache.
 2) Infusion of the bark is used as lotion for skin burn and scabies.

Material culture The wood is sometimes used as firewood and the tree is used in tea plantation as shade tree and nitrogen fixer.

Fish-poison The barks are crushed and dipped in rivers for stupifying fishes.

Recommendation The plant may be used in Agro=forestry system to improve soil fertility and as green manure.

Albizia procera (Roxb.) Benth. FFBB 1:428.1877; FBI 2:299.1878; DEP 1:159.1889; IT 271.1906; BBO 331.1922; IMP 2:942.1935; RBSI 12(2):92.1938; FA 2:163.1938; GIMP 11.1956; FTS 1:131.1981; FFM 1:336.1985; UPI 26.1986; WI 1-A:129.1985; DIFME 17.1991; CCENEI 213.1994; MPM 8.1996.

Family Mimosaceae.

Local name **Kangtek-nu** (M); **Vairu** (Ma).

Botanical description A fast-growing deciduous handsome tree; bark light brownish-grey, cut red; leaves bipinnate, with large gland near the base of the petiole; pinnae 3-5 pairs; leaflets 6-12 pairs, oblong-ovate or rhomboid-oblong, 1.5-2 x 2.5-4 cm, obtuse, mucronate; flowers yellowish-white, sessile in globular heads in terminal panicles; fruits (pods) brown 1.5-2.5 x 8.20 cm, glossy; seeds 6-12 flattened, pale brown.

Fl.: May-June. **Fr.:** July-February.

Location & altitude Between Lengpui and Tut, etc. Alt. 400-1200 m.

Associates & ecology *Albizia odoratissima*, *Albizia chinensis*, *Toona ciliata*, on sandy soil in primary and secondary forests.

Distribution Central China and Myanmar; Central and east Himalayas, S.India, Bihar and Orissa, North-East India; **very common throughout Mizoram except the sub-tropical hill forests.**

Part used Bark, leaves and wood.

Extraction and uses :

Medicinal Poultice of leaves is applied to ulcers.

Material culture	The brown and durable heartwood is used for house-posts, agriculture implements and as charcoal.
Fish-poison	The crushed bark is used for fish-poisoning.
Fodder	The leaves are chopped for cattle fodder.
Agro=forestry	The plant may be used in Silvi-horticultural system to improve soil fertility and nutrient status.
Notes	<i>Albizia odoratissima</i> (L.f.) Bent. (<i>Kangtek-pa</i>) is also frequently distributed in Mizoram. The uses are more or less same with <i>A.procera</i> .

Allophyllus cobbe (Linn.) Raeusch. FBI 1:673.1875; FFBB 1:299.1877; DEP 1:175.1889; IT 185.1906; FA 315.1936; FBSI 12 (2): 87.1938; FTS 1:445.1981; WI 1-A:187.1985; UPI 128.1986; DIFME 18.1991; MPM 10.1996 (**PI.11, P.22**).

Sapindaceae.

Family

Gendrama (C).

Local name

Botanical description

A shrub or small tree; bark dark brownish-grey; leaf rachis hairy, brown, striate, up to 13 cm long; leaflets 3-foliolate; lateral ones oblique, serrate-dentate; terminal one obovate-elliptic, acute, scabrous above, pubescent beneath; nerves 10-13; base oblique; flowers white, in fascicles of axillary 2-4 branched racemes; fruits globose, smooth, red when ripe.

Fl.: May-July. **Fr.:** August-November.

Location & altitude

Chamdur Project Reserved Forest (S.Mizoram).

Alt. 240 m.

Associates & ecology

Saprosma ternatum, *Hedychium* spp., *Ficus* spp., on dark-brown clayey-loam soil in dense primary forest.

Distribution

Bangladesh and Myanmar; throughout India and the north-east; **common in tropical wet evergreen forests of Mizoram.**

Part used

Roots and leaves.

Extraction & uses :

Medicinal Decoction of root is taken internally for chronic ulcer and the leaf paste is applied externally on the ulcer. Sometimes the medicine is used in combination with *Rauvolfia serpentina* (L.) Benth.

Alocasia fornicata (Roxb.) Schott. FBI 6:526.1893; BBO 870.1924; FST 2:396.1983.

Local name **Baibing** (M).

Botanical description Gregarious, perennial herb; rootstock fibrous, up to 80 cm high; leaves ovate-lanceolate, sagittate; inflorescence spatulate, erect, cymbiform enclosing the spadix; spadix or fruiting body is constricted at lower portion, whitish and irritating to tongue and throat.

Fl. & Fr.: June-August.

Location Sakawrtuichhun, Lungsun, etc.

& altitude

Alt. 500-800 m.

Associates & ecology *Aegeratum conyzoides*, *Musa* sp., *Eurya acuminata*, on sandy-loam soil in damp places. They appear in new *jhum* lands in June-August.

Distribution Bangladesh, W.Bengal, Tripura and Assam; **fairly common in Mizoram, often appearing in new jhums lands.**

Part used Spadix, fruiting body.

Extraction and uses :

Medicinal The sap or juice of plant is applied on snake-bite.

Food The Mizos are very fond of the spadix which is moderately irritating to the throat and eat it cooked or boiled with rice or roasted.

Notes The lower portion of the spadix (basal portion) is never taken as food for it is extremely irritating to the throat.

Reported for the first time.

Alpinia bracteata Roxb. Fl. 1:61.1820; FBI 6:255.1892; RBSI 12(2): 143.1938; BBSI 14(1-4): 139.1882; EFPN 1:59.1978; FST 2:368.1983.

Family Zingiberaceae.

Local name **Aichal** (M); **Lapo** (Ma).

Botanical description A tall herb to 6.2 m high, in clumps with inclined stem; leaves oblong-lanceolate, 5-10 x 30-45 cm woolly pubescent beneath; flowers pure white with dark and yellow markings, on woody erect spike; rachis densely pubescent; fruits large, globose; seeds many.

Fl.: April-May. **Fr.:** July-August.

Location & altitude Around Phura and Palak Lake; and between Zodin and Tlabung, etc. Alt.200-300 m.

Associates & ecology *Musa velutina*, *Phrynium capitatum*, *Amomum dealbatum*, on loamy-clay soil in dense forest.

Distribution Bangladesh, Myanmar and Malacca East Himalayas, Bengal, Assam and Meghalaya; **common between Phura and Palak Lake and elsewhere in Mizoram, in tropical wet evergreen forests.**

Part used Rhizome.

Extraction and uses

Medicinal 1) The rhizome is rubbed on grindstone and the paste is mixed with water in which rice has been washed, and given for dysuria.
2) An equal part of powdered rhizome with that of *Zingiber officinale* with little salt is used for stomatitis.

Notes The rhizome is pale yellow inside and faintly aromatic and slightly irritating to taste.

Recommendation Investigation of the oil content.

Reported for the first time.

Alstonia scholaris (Linn.) R.Br. FFBB 2:183.1877; FBI 3:642.1882; DEP 1:197.1889; IT 459.1906; BBO 539.1922; IMP 2:1565.1985; RBSI 12(2):111.1938; FA 3:253.1939; GIMP 13.1956; UPI 32.1986; FFM 2:589.1987; MMIP 53.1989; DIFME 19.1991; DIMP 27.1992; CCENEI 43.1994; IMP 1:111.1994; MPM 12.1996 (**Pl.12. P.23**).

DITA BARK.

Family Apocyanaceae.

Local name **Thuamriat** (M); **Kihlo** (M).

Botanical description A medium-sized to tall evergreen tree; branches whorled, bark ashy-grey, lenticellate; leaves 5-8, whorled, elliptic-lanceolate or elliptic-oblong, bluntly acuminate, 3-5 x 8-20 cm, cuneate, narrowed into a petiole; flowers greenish-white, in terminal umbellate cymes; fruits (follicle) often pendulous and paired, clustered, cylindric and linear up to 60 cm long; seeds with hairs.

Fl.: November-December. **Fr.:** January-March.

Location & altitude Zodin-Tlabung, Dampui forest, Mampui tlangnuam, etc. Both wild and cultivated. Alt. 200-1000 m.

Associates & ecology *Schinus molle*, *Bischofia javanica*, *Wendlandia grandis*, on sandy-loam soil in tropical evergreen and semi-evergreen forests.

Distribution Native of China, distributed to Myanmar and Australia; almost throughout the tropical regions of India, Andamans and North-East India; **very frequent in Mizoram in tropical evergreen and semi-evergreen forests.**

Part used Root, bark and latex.

Extraction and uses

- Medicinal
- 1) A decoction of the bark is taken for hypertension @ tablespoonful (10 ml) three times per day.
 - 2) Infusion of root-bark is mixed with the powdered fruit of *Lagerstroemia speciosa*. The mixture is taken internally for anthelmintic @ teaspoonful (5 ml) two times per day.
 - 3) The milky juice or latex is applied on cuts and wounds.
 - 4) The latex mixed with an equal proportion of mustard-oil is used as an eardrop against ear-ache (2-3 drops before bed).

Environmental conservation The tree being evergreen is suitable for shade and environmental conservation.

Amaranthus spinosus Linn. FBI 4:718.1885; DEP 1:215.1889; BBO 761.1924; IMP 3:2057.1935; FA 4:8.1940; GIMP 15.1956; FTS 2:165.1983; WI 1-A:219.1985; UPI 34.1986; TIMP 1:73.1991; DIFME 20.1991; DIMP 29.1992; CCENEI 44.1994; ADPR 472.1994; IMP 1: 121.1994; MPM 12.1996.

PRICKLY AMARANTH.

Family Amaranthaceae.

Local name **Lenhling (M); Hadamarik (C).**

Botanical name A much branched small herb, armed with sharp straight spines from green to red-purple, grooved; leaves ovate or lanceolate, acute at both ends, 1-3 x 3-7; petiole 1-2 cm long; flowers greenish-white, in dense clusters in axillary and terminal spikes; fruits ovoid with a thickened top; seeds small, black.

Fl. & Fr.: Nearly throughout the year.

Location & altitude On the bank of River Khawthlangtuipui, on roadsides of Chawngte, Kolasib, etc. Alt. 20-650 m.

Associates & ecology *Polygonum* spp., *Cassia tora*, *Achyranthes aspera*, on soils of river valleys and in waste places.

Distribution Sri Lanka; throughout the plains in India and the North-East India; **frequent in Mizoram, in tropical warmer parts of the state.**

Part used Whole plant.

Extraction and uses :

Medicinal

- 1) Juice of crushed plant is used as antidote in snake-bite.
- 2) The roots are rubbed on grindstone and dipped into a cup of water and then drunk twice a day against haemorrhage.
- 3) The leaves are boiled in water and the water is drunk, @ 1/2 cup (50 ml) twice daily for difficult urination.

- 4) Juice of crushed leaves is used to stop bleeding from the nose.
- 5) *Chakmas* use the juice of twigs in combination with that of *Bacopa monnieri* for headache in hemiparesis by external application, with help of cotton wool, thrice daily.

Food The twigs are boiled with meat and taken as food.

Amomum dealbatum Roxb. FI 1:43.1820; DEP 1:221.1889; FBI 6:239.1892; FBSI 12 (2):143.1938; BBSI 14(1-4):135.1972; EFPN 1:59.1976; WI 1-A:229.1985; JETB Add. Ser. 12:17-458.1996 (**Pl.12, P.24**).

Family Zingiberaceae.

Local name **Aidu** (M); **la-ta-bo-pa** (Ma).

Botanical description A clumped herb to 2 m high with leafy stem; leaves large, 10-15 x 60-180 cm, oblong-lanceolate, bright green above, pale and pubescent beneath; flowers white; bracts reddish; lip white with yellow-red veins on very short peduncled spike; fruits globose with 7-9 winged crenulate vertical ribs, arising from the bulb or rootstock.

Fl.: April-May. **Fr.:** April-August.

Location & altitude Near Chhimluang river, Bilkhawthlir, Dampa Tiger Reserve, etc. Also cultivated in gardens. Alt. 200-1500 m.

Associates & ecology *Diplazium maximum*, *Litsea cubeca*, *Homalomena* sp., on loamy and sandy-loam soils in moist shady places.

Distribution Bangladesh; tropical eastern Himalayas and Meghalaya; **very common throughout Mizoram in tropical evergreen and semi-evergreen forests.**

Part used Roots, leafy-shoot/stem and fruits.

Extraction and uses :

Medicinal Decoction of root suckers is taken against hypertension.

Food 1) The young shoots and buds of *Aidu* are eaten cooked or fried.

2) The seeds in the slimy fruit are sweet and edible.

Fibre The leafy stem is used for tying purposes.

Amorphophallus paeoniifolius (Dennst.) Nicolson, DIFME 21.1991; CCENEI 45.1994
A. paeoniifolius var. *campanulatus* (Decne) Sivad. ADPR 457.1994; IMP
1:132.1994 *A. campanulatus* (Roxb) Bl. ex Decne, FBI 6:513.1893; DEP
1:225.1889; BBO 861.1924; IMP 4:2609.1935; GIMP 17.1956; FTS
2:397.1983; WI 1:230.1985; UPI 36.1986; DIMP 30.1992; MPM 14.1996.

Family Araceae.

Local name **Telhawng chikhat** (M)

Botanical description A tuberous herb, very stout; leaves 3-partite, segments pinnatisect with oblong lobes; petiole 30-90 cm long with small tubercles; peduncle very short; spathe campanulate, pointed with recurved undulate and crisped margin, dark green and mottled with pale blotches; spadix dark purple, cone-like; fruiting spikes 7-10 cm long with red, ovoid 2-3 seeded berries.

Fl.: April-June. **Fr.:** October-November.

Location St. John's High School Compound, Kolosib.

& altitude

Alt. 650 m.

Associates & ecology *Maesa indica*, *Desmodium gyroides*, Fern spp., under *Schima wallichii*, *Anthocephalus chinensis*, etc. on moist sandy-loam soil in shady places.

Distribution Sri Lanka; almost throughout India and largely cultivated throughout the plains of India; **frequent in Mizoram, in tropical evergreen and moist secondary forests.**

Part used Whole plant.

Extraction and uses

Medicinal The tuber is sliced into pieces and boiled in water to remove the irritants. The boiled tuber is pounded with *sa-um* (preserved pork-fat) and salt and taken as curry; sometimes it is taken roasted with salt.

Pig's food The stem and leaves are cut into pieces and cooked with small pieces of broken rice for pig's food.

Ampelocissus latifolia (Roxb.) GIMP 16.1956; FFM 1:242.1985; UPI 35.1986; DIFME 21.1991; ADPR 33.1994. *Vitis latifolia* Roxb. FBI 1:652.1875; DEP 6(4):255.1892; IT 177.1906; BBO 203,1921; FA 1:293.1934; IMP 1:606.1935; WI 10:527.1976.

Family Vitaceae.

Local name **Hruipawl** (M).

Botanical description An extensive herbaceous climber with perennial rootstock; branches striate; stem terete smooth, tinged purple at the nodes, covered with thin glaucous (bluish) bloom; tendrils forked; leaves simple, broadly ovate-acute or shortly acuminate, 8-20 x 25 cm, 5-7 nerved at the base; base cordate; petiole slender to 14 cm long; flowers deep reddish-brown or dark-red, in pyramidal bifurcate panicles; fruit globose, black, succulent.

Fl.: May-July. **Fr.:** Aug-October.

Location & altitude The forests of W.Phulpui, Phuldungsei, W.Phaileng, etc.
Alt. 500-1200 m.

Associates & ecology *Tetrastigma serrulatum*, *Macaranga denticulata*, *Curculigo recurvata*, in moist shady places under primary and secondary forests.

Distribution Bangladesh and Myanmar; Sub-Himalayan tract to North-East India, Bihar and Bengal; **common in Mizoram in tropical dense forests and semi-evergreen forests.**

Part used Roots and leaves.

Extraction and uses :

Medicinal 1) Juice of crushed roots is taken internally to stop excess urination mixed with blood. The medicine is drunk 1 cup (100 ml) twice or thrice daily.
2) The leaves are chewed against teeth set on edge.

Food 1) The leaves or young twigs are boiled with the leaves of *Cucurbita maxima* Dutch. and taken as vegetable.

Notes The plant is characterised by the bluish (glaucous) stem and the leaves taste sour and can be used as a substitute for *Hibiscus sabdariffa* L.

Anacardium occidentale Linn. FBI 1:20.1876; DEP 1:232.1889; BBO 220.1921; IMP 1:657.1935; GIMP 17.1956; FTS 1:462.1981; FFM 1:271.1985; WI 1-A:236.1985; IED 9.1986; UPI 37.1986; DIFME 22.1991; DIMP 31.1992; IMP 1:137.1994; TIMP 3:147.1994; MPM 14.1996.

CASHEW NUT TREE.

Family Anacardiaceae.

Local name **Sazupumpui-thei** (M).

Botanical description A small to middle-sized semi-deciduous tree; stem crooked; bark grey-brown, thick, irregularly fissured; leaves crowded at the branch ends, obovate, coriaceous, 4-7 x 10-13 cm, rigid, emarginate; base cuneate, acute; flowers pale yellow, streaked with pink, in large terminal panicles; fruits reniform, seated on a fleshy pyriform receptacle.

Fl.: January-February. **Fr.:** March-May.

Part used Tlabung-Marpara roadsides.

Alt.45 m.

Associates & ecology *Gmelina arborea*, *Callicarpa arborea*, *Derris robusta*, on brown loamy soil in tropical secondary forest.

Distribution A native of tropical America; cultivated and naturalised in the hotter parts of India; **so also in Mizoram, very few and rare.**

Part used Bark.

Extraction and uses :

Medicinal 1) Juice of crushed bark is applied externally on ring-worm, leprosy, and warts.

- 2) The fruit is reputed for its anticorbutic property.
- 3) Decoction of leaves is used as a gargle for sore-throat.

Notes	Few plants are available in Tlabung area and also planted in Zodin Forest Complex. It is easily propagated by nursery seedlings or direct seed sowing.
Remarks	Juice of bark is used as indelible ink and the sap of fruit as fungicidal and repellent. (Duke, 1986).
Recommendation	The fruits being nutritious, and the plant highly medicinal is recommended for large-scale plantation in suitable environments.

Anacolosia crassipes Kurz. FFBB 1:236 (Fig.8).

Family	Olacaceae.	
Local name	Lushai-nautur (Bm).	
Botanical description	An aromatic shrub or small spreading tree to 2 m tall; stem dark-grey, rough; young parts pubescent; branchlets angled; leaves alternate, elliptic-ovate or oblong-lanceolate, caudate or acuminate, 3.5-6 x 9-16 cm, dark-green above, brownish beneath, pubescent on both the surfaces, more prominent on madrid beneath; base rounded, sometimes slightly oblique; petiole very short; flowers axillary, in sessile umbellate, small; fruits small, seated on enlarged disc; pedicel slender, 1- seeded.	
Location & altitude	Bymari & Palak forests, S. Mizoram.	Alt. 300 m.
Associates & ecology	<i>Piper diffusum</i> , <i>Meliosia pimata</i> , on dark-brown loamy soil in tropical dense forests as undergrowth.	
Distribution	Endemic to North-East India; fairly frequent in tropical wet evergreens in Mara Autonomous District, S. Mizoram.	
Part used	Leaves.	
Extraction and uses :		

Medicinal The leaves are boiled and the water is used for bathing children suffering from measles and skin eruptions. The gaseous steam is also used as a steam bath and the water is given @ teaspoonful (5 ml) once daily for 3 days. The disease is locally known as 'sengena' or 'tiabohong sengena' to the *Bawms*.

Notes Leaves are pleasantly aromatic when crushed.

Reported for the first time.

Angiopteris evecta (Forst.) Hoffm. HFBI 460.1883; FFMS 34.1982; FN 39.1988; IFFWH 32.1994. *Polypodium evectum* Forst. FTS 1:33.1981; CIP 25.1984 (**PL.13, P.25**).

Family Angiopteraceae.

Local name **Arthladawnpui** (M); **Skbahmamuidu** (B).

Botanical description A very large terrestrial fern with bulbous root-stock; root-stock blackish; rachis very large and long, up to 5 m, specked with white lenticels, bipinnate; pinnae 9-13 pairs, linear-lanceolate, serrate or crenulate; veins close-parallel; sori on both sides of edges beneath, brownish in colour.

Spore : November-March.

Location & altitude On the bank of Chikha river, etc.

Alt. 400 m.

Associates & ecology *Hedychium coccineum*, *Colysis hamiltoniidea*, etc. on sandy-rock soil in shady places.

Distribution China, Japan, Madagascar, Malaysia and tropical Australia; nearly throughout hilly regions of India and North-East India; **frequent in Mizoram, in damp places and near rivers in tropical evergreen forests.**

Part used Root stock

Extraction and uses

Medicinal The paste constitute one ingredient for the treatment of fracture of bone.

Reported for the first time.

Anogeisus acuminata (Roxb.) Wall. ex Guill. & Perr. FFBB 1: 466. 1877; FBI 2:450.1878; DEP 1:256.1889; IT 315-6.1906; BBO 355.1922; FA 2:248.1938; RBSI 12(2) : 94.1938; FTS 1:379.1981; WI 1-A : 296.1985; UPI 43.1986.

Family Combretaceae.

Local name **Zairum** (M); **Arao** (Ma)

Botanical description A medium sized to a large tree; branches pendulous; bark grey; branchlets and inflorescence tomentose; leaves sub-opposite, bifarous, 1.5-3 x 4-7.5 cm, oblong to ovate-lanceolate, acute, punctate; petiole short; flowers minute, in globose peduncled heads, yellow in colour; fruits samaroid, 2-winged, broader than long.

Fl.: February-March. **Fr.:** May - June.

Location & altitude Between Lengpui and Rawpuichhip, Lungen and Tuichawng; the Mini zoo, Aizawl, etc. Alt. 100-900 m.

Associates & altitude *Albizia chinensis*, *Albizia procera*, *Mitragyna diversifolia*, on sandy soil dry areas of secondary forests.

Distribution Chittagong hill tracts of Bangladesh and Myanmar; Andra Pradesh, Bihar, Orissa, Assam and Tripura; **frequent throughout Mizoram in tropical secondary forests and semi-evergreen forests.**

Part used Bark and wood.

Extraction and uses

Medicinal 1) Infusion of the bark is used for washing ulcers, skin burn and sprains.
2) Juice of bark is applied externally on cuts and wounds as haemostatics.

3) Decoction of the bark is taken against diarrhoea and beri-beri @ table spoonful (10 ml) twice daily.

Material The wood is yellowish-brown, moderately hard and used for house-posts and agricultural implements.

Reported for the first time.

Aporusa octandra (Buch Ham.ex D.Don) Vick. EFPN 3:193.1982; DIFME 25.1991; CCENEI 220.1994; *A. dioica* Muell.-Arg. DEP 1:278.1889; BBO 137,1922; FTS 1:319.1981; WI 1-A.327.1985; UPI 47.1986; FFM 2:773.1987; MPM 17.1996. *A. roxburghii* Baill. FFBB 2:362.1877; FBI 5:347-8.1888; IT 563.1906; FA 4:162.1940 (**Pl.13, P.26**).

Family Euphorbiaceae.

Local name Chhawntual (M).

Botanical description A small evergreen tree to 6-10 m tall; bark greyish-brown, reticulately fissured, thick; inside reddish, fibrous; leaves elliptic-oblong or oblong-lanceolate, acuminate, 2.5-6 x 8-12 cm, obscurely crenate; nerves 5-7 pairs, slender; base cuncate or rounded; flowers dense yellow, clustered on the axils and scars of fallen leaves on old branches, forming a yellow mat on the ground when fallen; fruits ovoid-oblong, c 1 cm long, beaked, yellowish when ripe.

Fl.: February-April. **Fr.:** June-August. (following year)

Location & Altitude Common throughout Mizoram up to 1500 m (e.g. Forest Training School Compound, Aizawl, etc).

Associates & ecology *Alseodaphne lanceolata*, *Quercus* spp. *Cassia nodosa*, on compact sandy-loam soil, in secondary and mixed bamboo forests.

Distribution South China, Bangladesh, Myanmar and Vietnam; from Sikkim eastwards to Orissa and North-East India; **common throughout Mizoram, particularly in tropical semi-evergreen forests and secondary mixed bamboo forest.**

Part used Bark and wood.

Extraction and uses :

Medicinal Infusion of the coat of inner bark is taken internally for colic and stomach-ache @ 1/2 cup (50 ml) twice or thrice daily. The medicine is commonly used by the *Mizos*.

Material culture 1) The hard, heavy and dark-brown heart-wood is used for house-posts, rafters, beams and wall-plates.
2) Also used as fuel.

Reported for the first time.

Aquilaria malaccensis Lamk. FBI 5:200.1886; FTS 1:238.1981; UPI 48.1986; TFM 2:385.1983; WI 1-A. 328.1985; DIFME 25.1991; CCENEI 47.1994; TIMP 3:181.1994; JETB Addl. Ser. 12. 457.1996. *A. agallocha* Roxb. FI 2: 422. 1832; FFBB 2:355-6.1877; FBI 5:199.1886; DEP 1:279.1889; IT 546.1906; IMP 3:2171.1935; GIMP 22.1956; FFM 2:748.1987; IMP 1:171.1994; IMP 1:171.1994; MPM 17.1996 (**Fig. 9**).

ALOE-WOOD, EAGLE WOOD

Family Thymelaeaceae.

Local Name **Thingrai** (M).

Botanical description Small to moderate-sized evergreen tree; bark greyish, warty; leaves elliptic-oblong, shortly caudate acuminate, 1.5-5 x 5.5-12 cm, dark green above, paler beneath; nerves many, faint; base sub-acute, sometimes slightly oblique; petiole very short; flowers greenish-white, 0.7 cm across, axillary umbels arising from branchlets, densely villous inside; fruits obovoid, 1.5-2.5 cm long, tomentose, 2-valved; seeds 2.

Fl.: April-May. **Fr.:** May-August.

Location & Altitude River bank of Tuivawl, the forests of Sihfa, Suangpuilawn, etc. Cultivated in Perhsang area by the State Environment & Forests Department.

Alt. 200-1200 m.

Associates & ecology *Dillenia pentagyna*, *Aporosa octandra*, *Wendlandia grandis*, in riverines and slopy areas in tropical semi-evergreen forests.

Distribution Myanmar, Malaysia and Philippines; endemic to North-East India, **frequent in Mizoram in tropical evergreen and semi-evergreen forests.**

Part used The agar/resinous substance and wood.

Extraction and uses :

Medicinal 1) The resinous substance is used in gout and rheumatism.
2) The agar extracted from the wood is used against vomiting.

Material culture Wood is yellow-white and used for ornamentals.

Notes The tree is commercially planted in some parts of Mizoram for the agar-agar.

Ardisia colorata Roxb. FBB:520.1882; DEP 1:290.1889; IT 419.1906; IMP 2:1483. 1935; RBSI 12(2):109.1938; FA 3:181. 1939; GIMP 22.1956; FTS 1:421.1981; WI 1-A:390.1985; UPI 50.1986; FEM 2:551.1987; TFM 4:276.1989; DIMP 43.1992; MPM 17:1996.

Family Myrsinaceae.

Local name **Hnunthlum** (M).

Botanical description A small tree; bark grey, warty; leaves oblong - lanceolate, 6-8 x 20-28 cm, acute; base acute; petiole channelled, 2-3 cm long; flowers pale pinkish in large terminal panicles, peduncles often flattened, sweet scented; fruits globose, bright pink to dark-purple, ribbed when dry.

Fl.: April-June. **Fr.:** December-January.

Location & altitude Serhuan forest (Tlabung), Mampui tlangnuam, etc.

Alt. 40-800 m

Associates & ecology *Baccaurea ramniflora*, *Hedychium* spp., *Chasalia* sp., *Leea crispa*, near streams and in moist shady places.

Distribution	Bangladesh, Myanmar and Malacca; Assam, Tripura, Meghalaya and Nilgiri Hills; common in Mizoram in tropical wet evergreen forests.
Part used	Bark.
Extraction and uses	
Medicinal	A poultice made of bark is used in ulcers.
Remarks	A decoction of the leaves is used for colic and the bark is used as a febrifuge in fever and in diarrhoea (Watt, 1889).

Ardisia elleptica Thunb. TFM 4:275.1989. *A. solanacea* Roxb. BBO 519.1922; RBSI 12(2):109.1938; FTS 1:423.1981; WI 1-A:390.1985; UPI 50.1986; FFM 2:554.1987; DIFME 26.1991; DIMP 43.1992; CCENEI 47.1994; MPM 17.1996. *A. humilis* Vahl. FBI 3:530.1882; DEP 1:290.1889; IT 418.1906; IMP 2:1484.1935; FA 3:175.1939; GIMP 22.1956. *A. littoralis* Andr. FFBB 2:110.1877 (**Fig.10**).

Family	Myrsinaceae.
Local name	Ngal-sun-te (Bm); Zernal (M).
Botanical description	A shrub or small tree; leaves distichous, obovate, obtuse or blunt, 3-6.5 x 8-13 cm; flowers umbelliform, 8-flowered cymes; fruits 1-2 together, with persistent calyx and style, sub-globose, 0.5-1 cm long. Fl.: April-May. Fr.: October-January.
Location & altitude	On river bank of Kawrawng, Ngengpui wildlife sanctuary. Alt. 230 m.
Associates & ecology	<i>Dipterocarpus turbinatus</i> , <i>Lasianthus hirsutus</i> , <i>Podocarpus neriifolia</i> , <i>Musa</i> spp., on clayey-loam soil in shady places.
Distribution	South-east China, Indonesia and Malaysia; sub-Himalayan tract from J & K eastwards to North-East India; rare in Mizoram, in tropical wet evergreen forests.

Part used Roots.

Extraction and uses :

Medicinal The roots with those of *Morinda angustifolia*, *Desmos chinensis* and *D.longiflora* are grounded into a paste. The paste is applied externally on chronic ulcer till it attains normalcy.

Ardisia paniculata Roxb. FI 1:580.1832; FBI 3:519.1882; DEP 1:291.1889; IT 419.1906; FA 3:181.1939; FTS 1:422.1981; FFM 2:553.1987 (**Fig.11**).

Family Myrsinaceae.

Local name **Naunuar** (M).

Botanical description A large shrub or small tree; branchlets angular; leaves crowded at branchends, whorled, oblanceolate, acuminate, 5-10 x 15-35 cm, shining above; base narrowed into a short stout petiole; flowers reddish in long terminal panicles; fruits globose, longitudinally ribbed.

Fl.: March-April. **Fr.:** October-December.

Location & altitude Dampui forest (eastward), Lungkawlh virgin forest, etc. Alt. 450-850 m.

Associates & ecology *Knema latifolia longifolia*, *Smilax ovalifolia*, *Dalbergia stipulacea*, in sandy-rocky hill slopes and on humus soil in tropical evergreen forest.

Distribution Bangladesh; confined to North-East India; **frequent in tropical evergreen forests of Mizoram.**

Part used Roots.

Extraction and uses :

Medicinal 1) Decoction of roots is used for rheumatism and pains in venereal diseases.
2) The roots in combination with those of *Smilax ovalifolia* and *Bridellia tomentosa* are crushed and boiled and the water is drunk @ 1 cup

(100 ml) twice daily for jaundice. The medicine is used by the *Chakmas*.

Reported for the first time.

Ardisia polycephala Wallex A.DC. FFBB 2:109.1877; FBI 3:529.1882; IT 418.1906; FA 3:176.1939.

Family Myrsinaceae.

Local name **Borsoilia** (Ch); **Sialtuai** (M).

Botanical description A small tree; bark brownish grey, warty; leaves obovate-lanceolate, acute, 5-6 x 15-22 cm; base narrowed to the petiole; flowers light pink, in axillary corymbose racemes; fruits globose, depressed, red when ripe.

Fl: April - May. Fr: Nov. - April.

Location Lalmon - II village, Chamdur Project, S.Mizoram.

& altitude

Alt. 240 m.

Associates & ecology *Dillenia indica*, *Garcinia* spp., *Clerodendrum villosum*, on brown compact soil in primary forest.

Distribution Myanmar, Assam and Manipur; **rare in Mizoram, in tropical wet evergreen forests.**

Part used Roots.

Extraction and uses :

Medicinal The roots with that of *Amaranthus caudata* Linn. (*Zoeng*) are rubbed on grindstone and the paste is collected in a cup of water. The water is drunk @ 1/2 cup (50 ml) thrice daily as an effective remedy against excess bleeding.

Notes Cold water is used for excess bleeding, and warm water for normal bleeding after childbirth.

Reported for the first time.

Artemisia indica Willd. CCENEI 221.1994; *A. nilagirica* (Cl.) Pamp. MPIP 27.1962; WI 1-A:438.1985; UPI 55.1986; FFM 2:518.1987; CCENEI 49.1994; IMP 1:202.1994; NIPM 19.1996. *A. vulgaris* (non Linn.) Hook.f. FBI 3:325.1876; DEP 1:327.1889; FF 402.1906; IMP 2:1395.1935; RBSI 12(2):1938; FA 3:119.1939; GIMP 26.1956 (**Pl.14, P.27**).

Family Asteraceae.

Local name Sai (M).

Botanical description An aromatic shrub like herb, up to 2 m high; young parts tomentose; stem leafy; leaves ovate in outline, deeply pinnatisect, irregularly serrate, pubescent above, tomentose beneath; petiole winged; flower heads greenish white, axillary - terminal, secunded, in wooly spikes; fruits minute, oblong - ellipsoid.

Fl: December - January. Fr: January - February.

Location & altitude On roadsides of Durtlang, Sihphir, etc.

Alt. Above 900 m.

Associates & ecology *Mussaenda roxburgii*, *Tithonia diversifolia*, *Chromolaena odorata*, in marginal lands and waste places.

Distribution Sri Lanka, Upper Myanmar and Java; West Himalaya to Sikkim, Manipur and Meghalaya; **not common in Mizoram, gregarious in sub-tropical hill forest and secondary open forests.**

Part used Leaves

Extraction & uses

Medicinal

- 1) The leaves are boiled and the water is taken against fever and stomachache. The medicine is taken @ 50 ml twice daily.
- 2) Infusion of the leaves is taken against whooping cough and as expectorant @ tablespoonful (5 ml) twice or thrice a day.
- 3) Juice of pressed leaves is used to stop bleeding from the nose and gum-boil.

Agro - Very recently, farmers used the leaves as composed manure in their farming farms. The ashes are also good manure to ward off moths and insectsb System (Watt, 1889).

Remarks The plant is often mentioned in the Bible, e.g. Jeremiah 9:15, Amos 5:7.

Artocarpus chama Butch.-Ham. DIFME 28.1991; CCENEI 50.1994; *A. chaplasi* Roxb. FFBB 2:432.1877; FBI 5:543.1888; DEP 1:329.1889; IT 611.1906; RBSI 12 (2):131.1938; FA 4:267.1940; FTS 1:208.1981; UPI 57.1986; FFM 2:812.1987.

Family Moraceae.

Local name **Tatkawng** (M); **Tlaby** (Ma)

Botanical description A large deciduous tree; young shoots clothed with dense stiff hairs; bark greyish-brown with white patches; leaves obovate or elliptic-oblong, rounded or caespitate, dentate-serrate, 8-20 x 12-30 cm, nerves 7-10 pairs; base rounded or sub-cordate; stipules large; flower heads globose, long-peduced; fruits spherical, nodding, tubercled, yellow when ripe; seeds ovoid, few.

Fl.: Feb-March. **Fr.:** April-August.

Location Lungkullh virgin forest.

& altitude

Alt. 500 m.

Associates & ecology *Knema latifolia*, *Sapindus pinnata*, *Ardisia paniculata*, on sandy or loam soils in slopy areas, in primary forests.

Distribution Bangladesh and Myanmar; from Nepal eastwards to North-East India and Andamans; **common in Mizoram in tropical evergreen forests.**

Part used Bark, leaves and fruits.

Extraction & Uses :

Medicinal 1) The inner coat of bark is chewed and the juice is swallowed against diarrhoea.

2) The bark is grounded to powder and mixed with little water and made into a paste. The paste is applied externally on sores and pimples.

Material culture	The wood is yellow-brown and light and used for internal work, cabinets, canoes and drums.
Fodder	The leaves are chopped for cattle fodder.
Fruits	Edible

Reported for the first time.

Averrhoa carambola Linn. FBI 1:439.1874; DEP 1:359.1889; IT 110.1906; BBO 157.1921; FA 1:192.1934; IMP 1:442.1935; GIMP 31.1956; FTS 1:444.1981; FFM 1:178.1985; WI 1-A:500.1985; UPI 63.1986; DIFME 31.1991; DIMP 61.1992; CCENEI 54.1994; IMP 1:224.1994; TIMP 3:120.1994; MPM 22.1996 (**Pl.14, P.28**).

CARAMBOLA.

Family	Averrhoaceae.
Local name	Theiherawt (M).
Botanical description	A small to 10 m high with drooping branches; bark dark-grey, rough; leaves imparipinnate up to 15 cm long; leaflets 3-5, subopposite, ovate or elliptic, acuminate, 2-3 x 3.5-6 cm, dark-green above and pubescent; base unequal; petiole very short; flowers variegated white and purple, in short axillary panicles; fruits yellow, sharply 5-angled, sweet and moderately sour. Fl. June-September Fr. September-October.
Location & altitude	Tiperaghat, Bilkhawthlir etc. Alt. 20-550 m.
Associates & ecology	Cultivated in gardens with those of <i>Prunus persica</i> , <i>Clerodendrum colebrookianum</i> , etc. on sandy loam or loamy soil in open or shady places.

Distribution

Native of Java (Indonesia), cultivated throughout Myanmar; cultivated throughout the hotter parts of India; **occasional in the hotter parts (western part) of Mizoram.**

Part used

Fruits and leaves.

Extraction and uses :

Medicinal

- 1) A poultice of fruits is used in piles and the fruits are also eaten raw for the same purpose.
- 2) 3-4 slices of the fruit is taken for jaundice or juice of crushed fruit is taken internally for jaundice @ 1/2-1 cup (50 ml - 100 ml) 3 times daily.
- 3) Infusion of leaves is taken against enlargement of liver as tea once a day.

Baccaurea ramniflora Lour. FTS 1:320.1981; TFM 2:65.1983; UPI 65.1986; FFM 2:774.1987; DIFME 31.1991; CCENEI 55.1994; MPM 23.1996. *B. sapida* (Roxb.) Muell.-Arg. FFBB 2:356.1877; FBI 5:371.1887; DEP 1:362.1889; IT 562.1906; BBO 139.1921; RBSI 12 (2):130.1938; WI 1:A-B:142.1988; DIMP 64.1992.

Family Euphorbiaceae.

Local name **Pangkai, Theipangkai (M); Theipawkiapa (Ma).**

Botanical description A small to medium-sized tree; bark greyish, lenticellate; young parts hairy; leaves obovate acuminate or oblanceolate, 4-8 x 8-20 cm; base narrowed into the petiole; petiole thick; flowers yellow, shortly pedicelled, in dense fasciated racemes, from branches and old trunk; fruits globular or globose-oblong, yellowish-brown, 1.5-3 cm across, terminated by dried stigmas, hanging down from the trunk and branches; seeds 3, orbicular, embedded in pale rose-coloured delicious pulp or with blood-red testa or aril.

Fl.: March - April. **Fr.:** May - August.

Location Ngengpui wildlife sanctuary, Lungkulh virgin forests, etc.

& altitude

Alt. 350-550 m.

Associates & ecology *Licula peltata*, *Lasiacanthus wallichii*, *Saraca asoca*, *Garcinia tamala*, on humus sandy-loam soil in dense primary forest.

Distribution S.China, Myanmar and Malaysia; Sub-Himalayan tracts and North-East India; **common in Mizoram, particularly in tropical wet evergreen forests.**

Part used Bark, leaves, wood and fruits.

Extraction & uses :

Medicinal 1) Infusion of bark is taken against stomachache. The bark is also chewed for the same purpose.
2) Juice of coat of inner bark is taken against food allergy, *e.g.* fish, etc. and as anthelmintic.
3) 2-3 young leaves are chewed 3 times a day for toothache.
4) *Brus* boil the root-bark and mixed with *Bru* local liquor (3:1) and drunk @ 1/2 cup (50 ml) twice daily for quick recovery of strength after childbirth.

Material culture 1) The wood is close-grained, hard and heavy and used for wooden pestle for ounding rice.
2) The wood is also used for house-posts.

Notes Fruits are sold in local markets from June-August.

Bauhinia variegata Linn. FFBB 1:397.1877; FBI 2:284.1878; DEP 1:d425.1889; IT 258.1906; BBO 309.1922; RBSI 12 (2):91.1938; FA 2:140.1938; IMP 2:898.1935; GIMP 35.1956; WI 2-B:56.1988; MMPI 103.1989; DIFME 33.1991; DIMP 70.1992; TIMP 1:256.1992; ADPR 207.1994; IMP 1:256.1994; MPM 26.1996

Family Caesalpiniaceae.

Local name **Vaube** (M); **Avyu** (Ma).

Botanical description A small to medium-sized tree, deciduous; bark grey; leaves ovate, 14 x 10-15 cm, divided into 2 lobes, rigidly subcoriaceous, deeply cordate; nerves 11-15; flowers variegated, white to pink or purple, axillary or

terminal racemes; fruits flat pods, dehiscent, slightly falcate, 2-3 x 15-13 cm; seeds 11-15.

Fl.: February.-March while nearly or leafless **Fr.:** April-May.

Location & altitude On roadsides between Vairengte and Bilkhawthlir; Dampui and Mamit, Thenzawl and Haulawng, Serkawr and Tuipang etc. Alt. 300-1200 m.

Associates & ecology *Erythrina stricta*, *Lagerstroemia speciosa*, *Sterculia coronata*, in dry and rocky places.

Distribution Native of China, distributed in Myanmar, Sub-Himalayan tract to low hills of India and North-East India; **very common throughout Mizoram, particularly in tropical semi evergreen forests.**

Part used Bark and wood.

Extraction and uses :

Medicinal 1) Decoction of roots is given in dyspepsia and flatulence.
2) Decoction of bark is taken internally for diarrhoea @ 1/2 cup (50 ml) once or twice daily.

Material culture The wood is used for firewood.

Notes A few population of the white variety with white flowers are noticed and found to be present in the northern part of Mizoram. The species of *Bauhinia purpurea* Linn. (*Vau-fayang*) is also present in the wild as well as cultivated.

Begonia inflata Cl. FBI 2:636.1879; CCENEI 225.1994.

Family Bigoniaceae

Local name **Sekhupthur hmul (M); Seimakhupa (Ma).**

Botanical description An erect, branched herb to 1 m high; stem sometimes streaked with red; leaves oblong-lanceolate, acuminate base obliquely cordate, sinuate-

dentate, c 12 cm long; stipules subulate; flowers axillary, dichotomous, pinkish-white; fruits trigonous, inflated; seeds ellipsoid or obovoid.

Fl.: April-May. Fr.: June-October.

Location & altitude	On river banks of Chikha and Mampui. Alt. 450-900 m.
Associates & ecology	<i>Dipteris wallichii</i> , <i>Costus speciosus</i> , <i>Ixora</i> spp., on sandy-rocky places and river banks under primary forest.
Distribution	Darjeeling; occasional in Mizoram, in moist rocky habitat near streams and rivers in primary forests.
Part used	Whole plant.

Extraction & Uses :

Medicinal	1) The plant is boiled with the bark of <i>Engelhardtia spicata</i> Leschn. ex Bl. and the water is drunk against pile disorder and dysentery. 2) The plant is eaten raw against food allergy, e.g. Fish etc. 3) The white roots are boiled in water and the water is taken as effective remedy against genito-urinary problems.
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Reported for the first time.

Berginia ciliata (Haw.) Sternb. UPI 72.1986; WI 2-B:119.1988; NPEI 41.1991; DIFME 35.1991; DIMP 73.1992; CCENEI 59.1994. *B.ligulata* (Wall.) Engl. IMP 2:993.1935; GIMP 37.1956. *Saxifraga lingulata* Wall. FBI 2:398.1979.

Family	Saxifragaceae.
Local name	Kham-damdawi, Pan-damdawi (M); Thual-thuap (L).

Botanical description	A perennial herb with thick rootstock; stem thick-fleshy, procumbent; leaves broadly ovate or sub-orbicular, 5-35 cm long, coarsely hairy, dotted on lower surface; margin ciliated; base cordate, with large sheath; flowers white pink-
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purple, corymbose on slender peduncles; fruits sub-globose; seeds subpyramical, smooth.

Fl.: March-April. **Fr.:** April-May.

Location & altitude North Chawngtui, Phawngpui (Blue Mountain), Maicham Project, etc.
Alt. Above 1000 m.

Associates & ecology *Pandanus* sp., *Engelhardtia spicata*, *Rhododendron* sp., on cliff and rocky places at higher altitudes.

Distribution Afghanistan to S.E. Tibet; temperate Himalayas from Kashmir to Bhutan and Meghalaya; **occasional in Mizoram, in sub-tropical hill forests above 1000 m asl.**

Part used Root.

Extraction & uses :

Medicinal 1) Infusion of root is taken internally for diarrhoea and dysentery @ 1/2 cup (50 ml) twice daily. Sometimes, the root is chewed.
2) Juice of stem is used for sores and ulcers by external application.

Notes The plant is named after its habitat, '*Khamdamdawi*' (*Kham* = cliff, *damdawi* = medicine).

Bidens biternata (Lour.) Merr. & Sheriff. FTS 2:204.1983; WI 2-B:149.1988; DIFME 35.1991; DIMP 75.1992. *B. filosa* auct.non.Linn. FBI 3:309.1881; BBO 483.1922; IPM 2:1373.1935; RBSI 12 (2):103.1938; GIMP 37.1953; MPM 28.1996. *B. chinensis* (Linn.) Willd. UPI 73.1986.

Family Asteraceae.

Local name **Vawkpuithal** (M).

Botanical description An annual herb; stem quadrangular, grooved; branches opposite; leaves variable, opposite, biternate, scattered hairy; leaflets deeply 3-lobbed, terminal one largest, serrate, acute; common petiole sheathing at the base;

flower heads white or yellow rays; lingules narrow; bracts biserrate; puppus 2-4 retrose hispid bristles; achenes linear, quadrangular, covered with recurved hooks.

Fl.: February-March. **Fr.:** April-August.

- Location & altitude** Zamuang, in clearings and waysides towards Lungkulh forest. Alt. 500 m.
- Associates & ecology** *Ageratum conyzoides*, *Gymura crepidioides*, *Clerodendrum viscosum*, on sandy-loam soil in clearings along roadsides in open forests.
- Distribution** Vietnam and Malaysia; throughout India and North-East India; **common in Mizoram, often as weeds in open forests.**
- Part used** Plant.
- Extraction and uses :**
- Medicinal** Aerial parts of plant is boiled and taken internally for diarrhoea and dysentery @ tablespoonful (10 ml) twice daily.

Bischofia javanica Bl. FFBB 2:355.1877; FBI 5:345.1887; DEP 1:454.1889; IT 558.1906; BBO 140.1921; IMP 3:2249.1935; FA 4:141.1940; GIMP 37.1956; TFM 1:447.1972; FTS 1:321.1981; UPI 74.1986; FFM 2:804.1987; WI 2-B:152-3.1988; DIFME 36.1991; CCENEI 60.1994; MPM 28.1996.

Family Bischofiaceae.

Local name **Khuangthli** (M).

Botanical description A moderate-sized deciduous tree; bark dark-brown; leaves alternate, 3-foliolate; leaflets 2.5-6 x 7-15 cm, elliptic-oblong, acuminate, crenate; nerves 6-8 pairs; flowers minute, greenish-white, in axillary paniculate racemes; fruits globose, baccate; seeds 3-4, shining, smooth.

Fl.: March-April. **Fr.:** October-February.

Location & altitude	Zamuang, Tuipuibari and Tawipui - Thingfal roadsides etc. Alt. 400-1200 m.
Associates & ecology	<i>Trema orientalis</i> , <i>Litsea cubeca</i> , <i>Schima wallichii</i> , on sandy-loam soil on river banks and moist shady places.
Distribution	China, Taiwan, Malaysia and tropical Australia; sub-Himalayan forests from Kumaon eastwards, eastern & western Ghats, Nilgiri Hills and Andamans, east Bengal, Bihar and North-East India; fairly frequent in Mizoram, in tropical evergreen and semi-evergreen forests.
Part used	Bark, young leaves, shoot and wood.
Extraction & uses :	
Medicinal	<ol style="list-style-type: none"> 1) Juice of young shoots and tender leaves is applied externally on throat-pain. 2) Infusion of young shoots and leaves is taken internally for diphtheria and pharyngitis @ tablespoonful (10 ml) twice daily. 3) Decoction of the bark is taken internally for cholera @ 1/2 cup (50 ml) twice daily.
Material culture	The wood is red, moderately hard and used for house-posts, firewood and rafters.
Food	The young shoots are boiled, mixed with salt or preserved pig-fat (<i>sa-um</i>) and eaten as food.
Environmental Conservation	The trees are planted on roadsides as an environmental conservation purpose. The fruits are devoured by birds.
Remarks	The wood is esteemed one of the best timbers in Assam (Watt, 1889).
	Blumea laciniata (Roxb.) DC. FBI 3:264.1881; BBO 470.1922; RBSI 12 (2):104.1938; DIFME 36.1991; DIMP 79.1992.
Family	Asteraceae.
Local name	Khuanglawi, Chemsei-an (M); Halamboisch (C).

Botanical description	An erect, stout herb with dark-reddish and leafy stem; leaves lyrate or sharply lobed with margins sinuate, up to 20 cm long; flower heads yellow, broadly corymbose; involucre bracts lanceolate, acuminate, villous; achenes ribbed, silky; pappus white. Fl.: February-March. Fr.: April-October.
Location & altitude	On river bank of Khawthlangtupui and its streamlets near Diblibagh etc. Alt. 50-1200m.
Associates & ecology	<i>Ardisia paniculata</i> , <i>Polygonum spp.</i> , <i>Dillenia indica</i> , in marshy moist shady places or on moist rocks on banks of rivers.
Distribution	China, Philippines and Malaya Islands; tropical Himalayas ascending up to Kunaon eastwards and the North-East India; frequent in Mizoram, in tropical evergreen and semi-evergreen forests, particularly in moist shady places and river banks.
Part used	Roots and leaves.
Extraction & uses :	
Medicinal	The roots are is used in combination with those of <i>Butea superba</i> Roxb., <i>Vitis bifurcata</i> Wall. and <i>Vitis repanda</i> Wt. in snake-bite. The roots are rubbed on grindstone and the paste is collected in a cup of water and drunk against snake-bite. At the same time, the leaves are also crushed and the juice is applied externally on the bitten part. The treatment is practised by the <i>Chakmas</i> .
Food	The leaves are boiled and taken as soup.
Notes	The leaves are sold in local markets during Jan-March.

Reported for the first time.

Blumea lanceolaria (Roxb.) Druce, FTS 2:207.1983; MPM 29.1996. *Conyza lanceolaria* Roxb. FI 3:432.1832. *Blumea myriocephala* DC. FBI 3:269.1881; GIMP 38.1956; WI 2-B:168.1988 (**Pl.15, P.29**).

Family	Asteraceae.
Local name	Buarze (M).
Botanical description	An erect, aromatic shrub; stem thick; leaves crowded at apex or distichous, oblanceolate or elliptic-lanceolate, acuminate, 2-6 x 10-24 cm, serrate or distantly serrulate; nerves many; base narrowed into a winged petiole; flower-heads yellowish or greenish-white to pale red, clustered on elongated tomentose panicle; bracts tomentose; achenes ribbed, hairy; pappus red.
	Fl.: April. Fr.: May.
Location & altitude	Dampa Tiger Reserve (Teirei) 90 m; Tlabung-Dinthar 45 m and Serkawr 700 m.
Associates & ecology	<i>Hedychium coccineum</i> , <i>Desmos chinensis</i> , <i>Curculigo recurvata</i> , <i>Saurauja pumdana</i> , on sandy loam soil in dense forests.
Part used	Leaves.
Extraction & uses :	
Medicinal	<ol style="list-style-type: none"> 1) Pressed juice of leaves is applied on wounds and chronic ulcers. 2) Infusion of leaves is taken against dysentery @ 1/2 cup (50 ml) once per day. 3) The leaves are boiled and the water is strained through clean cloth and taken internally against bronchitis, asthma, cancer and liver ailment. @ 1/2 cup (50 ml) twice daily.
Veterinary	Juice of leaves is applied on animal sores and ulcers and instantly kills the worms.
Notes	The plant is commonly known as ' <i>cancer medicine</i> ' among the <i>Mizos</i> . The leaves emit the smell of K.Oil and is faintly aromatic when crushed.

Reported for the first time.

Bombax ceiba Linn. Fl. 145.1768; IMP 1:354.1935; FTS 1:293.1981; UPI 76.1986; WI 2:B:177.1988; MMPI 120.1989; DIFME 37.1991; DIMP 81.1992; CCENEI 61.1994; IMP 1:289.1994; TIMP 3:10.1994; MPM 30.1996. *B.malabaricum* DC. FBI 1:349.1874; FFBB 1:130.1877; DEP 1:487. 1889; IT 77.1906; BBO 74.1921; FA 1:147.1934; RBSI 12(2):82.1938. *Salmalia malabarica* (DC.) Schott & Endl. GIMP 218.1956.

SILK COTTON TREE.

Family Bombacaceae.

Local name Phunchawng (M).

Botanical description A tall deciduous tree with straight bole; branches whorled, horizontally spreading; bark grey, with sharp conical prickles which disappear in mature trunk; leaves digitate, large; leaflets 5-7, lanceolate or abelanceolate, 6-10 x 15 - 24 cm, acuminate; stipules triangular, caducous; flowers conspicuous, scarlet-red, clustered at or near the ends of branches; fruits oblong-ovoid, 6-angled; seeds numerous, obovate, packed in white cotton.

Fl. : February. - March. Fr. : April - May. Leafless December till April.

Location & altitude Secondary forests of Lengpui, Tuichawng, Haulawng, etc. Alt. 300 - 700 m.

Associates & ecology *Hibiscus macrophyllus*, *Sterculia villosa*, *Vitex peduncularis*, in dry secondary forests near open streams.

Distribution Sri Lanka, S.China, Bangladesh, Myanmar and Java; throughout the hotter parts of India, including Andamans; **not common in Mizoram, in tropical mixed secondary forests.**

Part used Root-bark, stem-bark, leaves and cotton.

Extraction & uses :

Medicinal 1) The root-bark is crushed and boiled with the roots of *Firmiana colorata* (Roxb.) R.Br. and *Dracaena spicata* Roxb. and a teaspoonful (5 ml) of sugar is added to a cup of the solution.

Brus take the medicine for strangury (@) tablespoonful (10 ml) twice daily.

2) The bark is crushed with that of *Mangifera indica* and then boiled. The water is drunk 1/2 cup (50 ml) twice daily against dysentery.

Material culture The cotton is made into pillows.

Fodder Twigs and leaves are lopped for fodder.

Bombax insigne Wall. FBI 1:349.1874; FFBB 1:130.1877; DEP 1:486.1889; IT 77-78.1906; FA 1:148.1934; RBSI 12(2):82.1938; FTS 1:293-4.1981; UPI 77.1986; WI 2-B:185.1988; DIFME 37.1991; MPM 30.1996.

DIDU, SIMUL.

Family Bombacaceae.

Local name **Pang** (M); **Apha** (Ma).

Botanical description A large deciduous tree with clear bole; branches spreading; bark dark-grey, with or without prickles; leaves digitately 7-9 foliolate, 1-20 cm long, abovate-lanceolate, caespitate; flowers showy, scarlet or white on short thick pedicles; fruits oblong, woody, obtusely 5-angled, 16-25 cm long, curved at apex; seeds obovoid, many, covered with floccose silky hairs.

Fl. : December-February **Fr.** : March-April. **Leafless** : December - March.

Location & altitude Very common between New Latawh and Lohre, in Mara Autonomous District, S.Mizoram. Alt. 400 m.

Associates & ecology *Lannea coramandelica*, *Morus macroura*, *Sterculia hamiltonii*, *Tetrameles nudiflora*, in dry and rocky places.

Distribution Myanmar and Malay Peninsula ; Assam, Andamans and Manipur, very rare in Tripura; **very common in Mizoram, particularly in tropical mixed deciduous forests.**

Part used Bark and cotton.

Extraction and uses :

Medicinal The bark is peeled off and chewed and the juice is swallowed as an effective remedy against tonsillitis.

Material 1) The cotton is used for pillows.
culture 2) The wood is soft yellowish-white and *Chakmas* used the wood for canoes.

Fodder The leaves are lopped for fodder.

Borassus flabellifer Linn. FBI 6:482.1892; IT 657.1906; BBO 885.1924; IMP 4:2571.1935; RBSI 12(2):148.1938; GIMP 39.1956; FTS 2:429.1983; UPI 77.1986; WI 2-B:187.1988; DIFME 37.1991; DIMP 82.1992; CCENEI 228.1994; IMP 1:293.1994; MPM 30.1996. *B.flabelliformis* Linn. FFBB 2:529.1877; DEP 1:495.1889.

PALMYRA PALM

Family Arecaceae.

Local name **Siallu** (M); **Thia-hra** (Ma).

Botanical description A tall palm; stem cylindrical, greyish-black, swollen above the middle, old stem marked with black scars of petioles; leaves palmately fan-shaped or circular; margin split into 60-80 linear-lanceolate, spinosely serrated, acuminate; flowers yellow; male spadix simply branched, stout; female spadix sparingly branched; fruits subglobose drupes, seated on enlarged perianth.

Fl. : March-May. **Fr.** : August-November.

Location Eastern part of Mampui and eastern periphery of Ngengpui wildlife
& altitude sanctuary.

Alt.450 m.

Associates *Dipterocarpus turbinatus*, *Michelia champaca*, *Chikrassia tabularis*, on
& ecology sandy-loam soil in tropical ever-green forest.

Distribution Native of tropical Africa; distributed in Sri Lanka, Myanmar and Malaysia; nearly throughout hotter part of India and North-East India; **very frequent in tropical lower parts of Mizoram in an isolated patches.**

Part used	Roots, toddy and leaves.
Medicinal	1) The roots are rubbed on grindstone and made into a paste with rice water. The paste is applied on the navel. 2) The paste is mixed with water and drunk for diarrhoea and dysentery. 3) The toddy juice extracted from the spadices is taken internally against insanity @ 1/2 -1 cup (50=100 ml) thrice daily.
Material culture	The leaves are widely employed as thatch-roofs, baskets and hats. The <i>Maras</i> used the leaves of <i>Licula peltata</i> Roxb. (<i>Laisua</i>) for roofing as a substitute for <i>Borassus flabellifer</i> . Leaves of <i>Zalaca baccarii</i> Hx. f. (<i>Thilthek</i>) are also commonly used as thatch-roofs, where available.

Bridelia monoica (Lour.) Merr. FFM 2:777.1987. *B. tomentosa* Bl. FFBB 2:367.1877; FBI 5:271.1887; DEP 1:537.1889; IT 560.1906; BBO 120.1922; FA 4:146.1940; FTS 1:323.1981; UPI 87.1986; WI 2-B:296.1988.

Family Euphorbiaceae.

Local name **Phaktel** (M); **Hoi-thu-zum** (C).

Botanical description A large shrub or small tree; branches drooping, lenticellate; twigs rusty-tomentose; bark greyish-brown, warty; leaves obvate, shortly acute, 2-5 x 2.5-10 cm, scabrid above, having beneath; nerves 7-12; base rounded or sub-acute; flowers greenish-white, small, in axillary clusters with smaller leaves; fruits globose apiculate, reddish-green when young, bluish-black when ripe, c.1 cm long, 1-seeded, astringent.

Fl.: September-October. Fr.: November-January.

Location Tlabung-Marpara roadside, etc. Alt. 50-1300 m.

Associates & ecology *Derris robusta*, *Anogeisus acuminata*, *Albizia procera*, *Mussaenda roxburghii*, on sandy soil, dry and rocky places in secondary forest.

Distribution China, Myanmar and Australia; tropical Himalayas, Andamans, Bihar and Orissa, Andra Pradesh and North-East India; **common throughout Mizoram in tropical secondary forests.**

Part used Roots, leaves and wood.

Extraction and uses

Medicinal 1) The roots in combination with the roots of *Smilax ovalifolia* and *Ardisia paniculata* are rubbed on grindstone and the paste is collected in a cup of water. The mixture is boiled and taken internally for jaundice.
2) The leaves are boiled and the water is used for bathing.
3) Decoction of roots is used in rheumatism and body pains.

Material culture The wood is brown and close-grained and used for tool-handles.

Butea superba Roxb. FBI 2:195.1876; IMP 1:788.1935; FA 2:74.1938; GIMP 42.1956; UPI 92.1986; WI 2-B:347.1988; DIFME 40.1991; DIMP 89.1992; TIMP 2:75.1992.

Family Fabaceae.

Local name **Hruichun** (M); **Barengialudi** (C).

Botanical description A large woody climber; stem grey, glabrous; rachis up to 13 cm long; leaflets 3-foliolate, obovate, shortly acute, 9.5-11 x 15-18 cm; base swollen; flowers scarlet-orange, borne on peduncled cymes; pods flat, c. 12 cm long, rusty-tomentose; seed-1, located towards the apex.

Fl.: May-June. **Fr.:** October-January.

Location & altitude On road-side towards Marpara, c. 1.5 kms from Tlabung. Alt. 50 m.

Associates & ecology *Litsea* sp., *Albizia odoratissima*, *Bridellia tomentosa*, *Ficus hispida*, on sandy loam soil in forests.

Distribution Myanmar; throughout India; **common in Mizoram in tropical secondary and primary forests.**

Part used Root, leaves.

Extraction and uses :

- Medicinal 1) *Chakmas* used infusion of roots in combination with those of *Blumea laciniata*, *Vitis bifurcata* and *Cissus repanda* for snake-bite internally. Juice of crushed leaves is also applied externally on the part bitten.
- 2) Overlapped 7 leaves are effectively used to remove warts or verrucose, rubbing.

Callicarpa arborea Roxb. FI 1:405.1820; FFBB 2:244.1877; FBI 4:567.1885; DEP 2:26.1889; FF 511-2.1906; BBO 709.1992; IMP 3:1920.1935; RBSI 12(2):123.1938; FA 3:463.1939; WI 2-C:14.1950; GIMP 45.1956; TFM 3:301.1978; FTS 2:103.1983; UPI 96.1986; FFM 2:672.1987; DIFME 41.1991; DIMP 94.1992; CCENEI 66.1994; MPM 34.1996.
(Pl.16, P.31)

Family Verbenaceae.

Local name **Hnahkiah** (M); **Hlakih** (Ma).

Botanical description A small evergreen tree to 15 cm. high; bark grey-brown, soft; branches angled; leaves ovate-oblong or lanceolate, 5-15 x 15-30 cm. sub-acuminate, chartaceous, densely grey tomentose beneath; nerves 8-12 pairs; base cuneate; flowers lilac or reddish-purple on 2-chotomous corymbose cymes on stately tomentose peduncles; fruits globose, smooth, purple when ripe.

Fl.: April-June and October. **Fr.:** August-November and December-January.

Location & altitude Common throughout Mizoram.

Alt. Up to 1300 m

Associates & ecology *Macaranga indica*, *Aporus octandra*, *Syzygium fructicosa*, *Albizia chinensis*, on sandy-loam soil in secondary forests.

Distribution S.China, Upper Myanmar, Vietnam and Malaysia; Eastern Himalaya from Kumaon to E.Bengal, S India and North-East India; **fairly common throughout Mizoram, particularly in secondary semi-evergreen forests.**

Part used Bark and white powder or pruinose on young shoots.

Extraction and uses :

Medicinal 1) Juice of the inner coat of bark is effectively used as haemostatics on cuts.
2) Decoction of bark is taken for stomachache @ 1/2 cup (50 ml) twice daily.
3) The white pruinose is applied externally on cuts and wounds as an effective haemostatics.

Material culture 1) The leaves are commonly used for preparing fermented soyabeans [(*Glycine max* (L.) Merr.)]
2) The wood is used as firewood.

Food The fermented soyabeans are viscous and putrid and consumed by all tribes in Mizoram as a side-dish and food flavouring.

Calotropis gigantea (Linn.) R.Br.ex Alt. FFBB 2:200.1877; FBI 4:17.1883; DEP 2:34.1889; IT 471.1906; IMP 3:1606.1935; FA 3:282.1939; WI 2-C:20.1950; GIMP 46.1953; MPIP 43.1962; FTS 2:30.1983; UPI 98.1986; DIFME 41.1991; DIMP 97.1992; CCENEI 67.1994; IMP 1:341.1994; MPM 35.1996 (**Pl.16, P.32**).

Family Asclepiadaceae.

Local name **Rawldamdawi** I.R.

Botanical description A stout shrub with milky juice; young shoots, inflorescence and underside of leaves clothed with white floccose tomentum; stem blue in appearance; leaves sessile, obovate or obovate-oblong, 6-10 x 10-20 cm, shortly acute; nerves 6-7; base cordate with auricled lobes or amplexicaul; flowers lilac or bluish-purple in axillary and terminal sub-corymbose pedunculate cymes; fruits (follicles) 6-10 cm long, recurved, turgid; seeds black, flat, numerous.

Fl.: December-May. **Fr.:** February-June.

Location & altitude Fangfarlui, New Siatlai and Tongkolong. Introduced.

Alt. 200-850 m.

Associates & ecology Cultivated and grows well alongwith *Cassia hirsuta*, *Ageratum conyzoides* etc. on loamy dry soil in an open environment.

Distribution S.China, Sri Lanka and Malaya Islands; throughout the plains and low hills of India and North-East India; **rare and cultivated in Mizoram at few places only as home remedy.**

Part used Leaves.

Extraction and uses :

Medicinal 1) The leaves are crushed and the juice is applied on swellings, sprains, rheumatism and relief of painful joints.
2) The latex is applied externally on ulcers, leucoderma and other skin diseases.

Notes Local people never take the medicine internally.

Canarium stritum Roxb.FI 3:138.1832; FBI 1:534.1875; DEP 2:96.1889; IT 130.1906; IMP 1:531.1935; WI 2-C:13:54.1950; GIMP 48.1956; FTS 1:443.1981; UPI 100.1986; DIFME 42.1991; DIMP 99.1992; CCENEI 68.1994; MPM 36.1996. *C.resiniferum* Brace, ex King.FA 1:224.1934; UPI 100.1986.

BLACK DAMMAR TREE.

Family Burseraceae.

Local name **Berawthing (M).**

Botanical description A large straight tree, buttressed at the base; bark greenish-grey; young foliage crimson; leaves up to 45 cm long; leaflets 3-8 pairs, ovate-lanceolate, acuminate, finely serrate, 4-8 x 10-20 cm, shining above, ferruginous tomentose beneath; nerves 10-15 pairs; flowers axillary fascicles, few flowered; fruits ellipsoid or ovoid with a thick bony stone.

Fl. : May-July. **Fr.** November-January.

Location & altitude	Mampui tlangpui, Serte tlang, etc.	Alt. 600-1100 m.
Associates & ecology	<i>Drimycarpus racemosus</i> , <i>Cinnamomum bejolghota</i> , <i>Castanoposis tribuloides</i> , in moist shady forests.	
Distribution	Bangladesh; South India, Assam and Tripura; frequent in Mizoram, particularly in dense hill forests of tropical evergreens.	
Part used	Bark, fruits and resin.	
Extraction and uses :		

Medicinal	1) The bark is boiled in water and the water is used for bathing as an effective cure for skin eruptions(rash) caused by the touch of <i>Drimycarpus racemosus</i> (Roxb.) Hook.f. 2) Infusion of bark or fruit is taken internally for colic @ tablespoonful (10 ml) twice daily. 3) 2-5 fruits are eaten against water-brash.	
Material culture	1) The resin is used as an adhesive for fixing daos in the handles. 2) The burning smoke of resin ward off mosquitoes.	

Reported for the first time.

Cascabela thevetia (Linn.) Lippold, DIFME 45.1991; CCENEI 70.1994; ADPR 225.1994. *Thevetia peruviana* (Pers.) Merr. DEP 6(4):47.1892; WI 10:225.1976; FTS 2:23.1983; UPI 636.1986; FFM 2:612.1987; CGIMP 151.1987; TIMP 4:122.1995; MPM 185.1996. *T.nerifolia* Juss.ex Steud. IT 458.1906; BBO 535.1922; IMP 2:1554.1935; FA 3:257.1939 (**Pl.17, P.33**).

LUCKY NUT TREE, YELLOW OLEANDER.

Family	Apocyanaceae.	
Local name	Khum-ba-rang-zah (B). Rangkapar LR.	
Botanical description	A poisonous small evergreen tree to 4 m high; bark dark-grey, rough; branchlets 2-4 chotomous, exuding milky juice; leaves crowded at branchlet-	

ends, linear-lanceolate, sessile, 0.5-1 x 7-13 cm, falcate, shining above, with a strong midrib, acute at both the ends; margins slightly recurved; flowers axillary-terminal, golden yellow, campanulate, fragrant; fruits obtriangular, c.2-3 cm across, exocarp black when ripe, green when young; seeds 4, in 2-celled, with ridge middle partition.

Fl. & Fr.: Nearly throughout the year.

Location & altitude Planted in Tuipuibari, Tlabung and elsewhere in gardens or outskirts of villages. Alt. 50-200 m.

Associates & ecology They grow among the weeds of *Ageratum conyzoides*, *Solanum torvum*, on sandy-loam soils, in open environment.

Distribution Native of America and W.Indies; often planted in India; **so also in Mizoram, in few localities only, mainly in lower elevations.**

Part used Bark.

Extraction and uses :

Medicinal Decoction bark is said to be used in fever.

Notes The inhabitants of Tuipuibari are aware that Miss Remsangpuii (18) died of eating the kernels (2 or 3) in 1993; and Miss Rokat (16) of same locality also died in the same manner in 1992.

Remarks A case of poisoning is recorded by Dr.J.Balfour (cited by Watt, 1892). The kernel is powerful lacro-narcotic poison (thetevine) separated by Dr.Warden (cited by Watt, 1892). The seed is used as insecticidal (Sinha, 1996).

Cassia alata Linn. FBI 2:264.1878; DEP 2:210.1889; IT 271.1906; IMP 2:870.1935; FA 2:133.1938; GIMP 54.1956; MPIP 48.1962; TFM 1:247.1972; FTS 1:117.1981; FFM 1:319.1985; UPI 109.1986; IED 41.1986; DIFME 46.1991; TIMP 2:34.1992; CCENEI 71.1994; MPM 39.1996 (**Pl.17, P.34**).

Family Caesalpinaceae.

Local name **Tuihlo** (M); **Daw-daw-blai** (B); **Vai-hri-hlo** (P).

Botanical description A shrub to small tree; stem greenish; rachis furrowed, noddied; leaves large; leaflets 2.5-7.5 x 6.5-13 cm, 5-10 pairs, sessile, oblong-obtuse, oblanceolate, mucronate; base oblique; nerves 10-20 pairs, flowers bright yellow, terminal, in dense spikes; pods 15-20 cm long, compressed with crenulate broad-wing down the middle of each valve.

Fl.: November-December. Fr.: December-March.

Location & altitude Perhsang, Dinthar, S.Kawnpui, Hnahthial etc. Alt. 50-550 m

Associates & ecology *Datura stramonium*, *Mikania micrantha*, *Clerodendrum* spp., in moist areas and waste places.

Distribution Native of Central America, distributed in Myanmar and Malaysia; in lower Bengal; **occasionally distributed in lower parts of S.Mizoram, very often found near human settlements.**

Part used Leaves.

Extraction and uses :

Medical According to *Bru* medicineman, the leaves are crushed and then mixed with a pinch of salt and soot and made into a paste. The ringworm or related skin diseases are rubbed with half sliced brinjal [*Solanum melongena* L. (*Bawkbawn* (M))] and the paste is applied externally and then bandaged to cure ringworm and other skin diseases.

Remarks Danodaran & Venkataraman (1994) has reported the advantages of leaf-extract over the existing medicines that (i) leaf extract is simple, cheap and rapid method; (ii) single application prevents infected part throughout a year; (iii) reliable and cheap without side-effects and no changes on the skin character.

Recommendation Recommended for domestication in homestead gardens for household remedies. It is easily propagated by seed sowing.

Cassia floribunda Cav. FEM 1:320, 1985. *C. laevigata* Willd. FA 2:132, 1938; MPM 39, 1996 (PL.18, P.35).

Family	Caesalpiaceae.
Local name	Reng-an (M); Mui-ta-pi (B).
Botanical description	A shrub to 2 m high, branched; leaves paripinnate; leaflets 6-10 pairs, lanceolate, acuminate, 1-2 x 4-6 cm; flowers yellow, orange, axillary and terminal; pods elongate, sub-falcate, up to 10 cm long; seeds many. Fl.: July-August. Fr.: August-October.
Location & altitude	Cultivated in <i>jhum</i> lands and in gardens. Alt. 500-1200 m.
Associates & ecology	Intercropped with <i>Clerodendrum colebrookianum</i> , <i>Dysoxylum gobara</i> , <i>Hibiscus sabdariffa</i> , <i>Manihot esculenta</i> , etc. in <i>jhum</i> lands, paddy fields and gardens.
Distribution	Native of tropical America; naturalized in Meghalaya; cultivated and naturalized in Mizoram.
Part used	Roots, leaves.
Extraction and uses :	
Medicinal	The roots in combination with those of <i>Vitis repanda</i> , <i>Trichosanthes palmata</i> ; the seeds of <i>Abelmoschus moschatus</i> , <i>Vicia faba</i> , and 2-3 clones of <i>Allium sativa</i> are grounded to powder. A teaspoonful (5 gms) is taken with water for ulcerated tumor, as per the prescription of <i>Bru</i> medicineman of Tuipuibari-I.
Food	The leaves are strongly aromatic when boiled. The leaves are boiled with rice or alone mixed with salt and eaten.
Cassia hirsuta	Linn. FBI 2:263.1878; FA 2:131.1938; FFM 1:320.1985; MPM 39.1996 (Fig.12).
Family	Caesalpiaceae.

Local name **Subdaru (C).**

Description An erect shrub to 2 m high; all parts hirsute and pungent smell; stem grooved; leaf rachis 10-16 cm long, with solitary gland at the base, stipulate; leaflets 3-4 pairs, opposite, lower ones smaller, obovate, acute, covered with soft white hairs; flowers yellow, terminal, 5 cm across; fruits (pods) 7-15 cm long, slender, hirsute; seeds ovate.

Fl.: October-November. **Fr.:** December-January.

Location Lalmon-II village, Chamdud Project, S.Mizoram.
& altitude Alt. 210 m.

Associates Gregarious. Sometimes their growth is disturbed by *Mikania micrantha* Kunth.
& ecology They grow on loamy-cley soil in valley open areas.

Distribution Native of tropical America; distributed in Assam, Meghalaya and Manipur; **rare in Mizoram, in areas of low depressions in S. Mizoram.**

Part used Roots and leaves.

Extraction and uses :

Medicinal The roots are rubbed on grindstone and the paste is collected in a cup of water and drunk against snake-bite. The leaves are also crushed and the juice is applied externally on the part bitten.

Cassia tora Linn. FBI 2:263.1886; DEP 2:224-46.1899; BBO 304.1922; IMP 2:878.1935; FA 2:131.1938; WI 3:98.1950; GIMP 55.1956; FTS 1:120-1.1981; IED 42.1986; UPI 110.1986; MMPI 143-4.1989; DIFME 46.1991; DIMP 113.1992; TIMP 2:44.1992; CCENEI 72.1994; ADPR 105.1994; IMP 2:26.1994; MPM 40.1996 (**Pl.18, P.36**).

Family Caesalpiniaceae.

Local name **Kelbe-an (M).**

Botanical description A foetid undershrub; rachis grooved; leaves up to 8 cm long; leaflets 3 pairs, decreasing in size downwards, obovate-oblong, 1.5-2.5 x 2-4 cm; base oblique; flowers yellow, in axillary pairs; pods slender, falcate, c. 15 cm long, 4-sided, sharply pointed; seeds many, oblong, brown.

Fl.: August-September. Fr.: September-November.

Location & altitude St. John's High School Compound, Kolasib; Chamdur Project, etc. Alt. 200-700 m.

Associates & ecology *Amaranthus spinosa*, *Sida acuta*, *Ageratum conyzoides*, on roadsides and in waste places below 1000 m.

Distribution Cosmopolitan in the tropics; throughout India; **frequent in Mizoram, often found in patches, gregarious or scattered among weeds.**

Part used Roots, leaves and seeds.

Extraction and uses :

Medicinal 1) The roots are rubbed on grindstone and mixed with lime-juice and used effectively in ringworm by external application.
2) Decoction of leaves/seeds is applied externally on cutaneous diseases.

Food Tender leaves are boiled and taken as vegetable.

Catharanthus roseus (Linn.) G. Don. FTS 2:15.1981; UPI 111.1986; FFM 2:612.1987; MMPI 147.1989; DIEME 47.1991; DIMP 117.1992; IMP 2:33.1994; TIMP 4:105.1995. *Vinca rosea* Linn. DEP 6(4):244.1889; BBO 537.1922; FA 3:252.1939; GIMP 255.1956. *Lochnera rosea* (Linn.) Reichb. IMP 2:1559.1935; WI 6:163.1962 (**Pl.19, P.37**).

Family Apocyanaceae.

Local name **Kumluang** (M).

Botanical description A perennial undershrub; leaves opposite, obovate or oblong, mucronate, glossy, 2-3 x 2.5-6 cm; base narrowed to a short petiole with 2-glands at

the base; flowers white or pink to deep rose-coloured in axillary clusters; fruits 2, cylindrical follicles, many seeded.

Fl. & Fr.: All the year round.

Location & altitude Throughout Mizoram up to 2000 m; introduced and naturalised.

Associates & ecology It can grow anywhere but growth is better in drained water slopes in an open spaces.

Distribution A native of America, West Indies and Madagascar; cultivated and naturalised in Indian gardens; **introduced in Mizoram as an ornamental plant in gardens and grow in waste open places.**

Part used Leaves and flowers.

Extraction and uses :

Medicinal 1) The leaves or flowers are boiled and the water is taken internally against hypertension and diabetes @ tablespoonful (10 ml) twice or thrice daily. Some people chew the flowers for hypertension. White flowers are preferred to red ones.

Notes It is reported to have been used in the treatment of cancer.

Caulokaempferia linearis (Wall.) Larsen, BBSI 14:125.1982; JETB. Addl. Ser.12:14.1996.
Kaempferia linearis Wall.ex Roxb. Fl 1:20.1820; FBI 6:223.1894.

Family Zingiberaceae.

Local name **Lung-aithing** L.R.

Botanical description A gregarious annual herb; stem 10-20 cm, roots slender; tips swollen; leaves sessile, linear-acuminate, coriaceous, 5-10 cm long, puberulous beneath; flowers white, 1 or 2 - flowered spike; lip 1-2 cm, equally broad, white with yellow base; bracts 2, lanceolate, green; fruits c. 2 cm long.

Fl.: April-June. **Fr.:** July-August.

Location & altitude	On the wall of rocks along the river bank of Tuichawng between Fangfarlui and Nghalimlui, South-western Mizoram. Alt. 210 m.
Associates & ecology	Gregariously grow on the walls of moist rocks alongwith mosses etc.
Distribution	Bangladesh; Eastern Himalayas, Assam and Meghalaya; common on rocks of river banks in tropical S.western part of Mizoram.
Part used	Leaves.
Extraction and uses :	
Medicinal	<i>Chakmas</i> apply crushed leaves on the head in vertigo.

Reported for the first time.

Cautleya gracilis (Smith) Dandy, BBSI 14:121.1972; EFPN 1:59.1978; *C. lutea* (Royle) Hk. f. FBI 6:208.1890.

Family	Zingiberaceae.
Local name	Pa-le (B).
Botanical description	A ginger-like rhizomatous herb; leaves linear-lanceolate, acuminate, 3-4 x 10-22 cm; flowers yellow on terminal spikes; fruits globose, red, seeds conical, ridged. Fl.: June-July. Fr.: August-September.
Location & altitude	Perhsang, Tuipuibari, West Phulpui, etc. Alt. 200-800 m.
Associates & ecology	Intercropped with <i>Trevesia palmata</i> , <i>Cajanus cajan</i> , <i>Solanum indicum</i> , etc. in gardens of shady places.
Distribution	W.China; Kashmir to Bhutan, Assam, and Manipur; cultivated in Mizoram, particularly by the Brus in the western part of Mizoram.

Part used Rhizome.

Extraction and uses :

- Medicinal 1) Infusion of rhizome is taken for flatulence, colic and hepatomegaly @ tablespoonful (10 ml) twice daily.
2) The rhizome is eaten raw to relieve colic and hotness in the stomach.

Reported for the first time

Centella asiatica (Linn.) Urban, WI 2-C:116.1950; GIMP 58.1956; MPIP 53.1962; FTS 2:192.1983; UPI 115.1986; FTS 2:192.1983; MPIP 161.1989; DIFME 49.1991; DIMP 121.1992; CCENEI 74.1994; ADPR 290.1994; IMP 2:52.1994; TIMP 4:33.1995; MPM 40.1996. *Hydrocotyle asiatica* Linn. FBI 2:669.1879; DEP 4:311.1889; IMP 2:1193.1935. **(Pl.19, P.38)**

INDIAN PENNYWORTH.

Family Apiaceae (Umbelliferae)

Local name **Hnahbial, Lambak, Darbengbur (M).**

Botanical description A trailing or creeping herb; stem prostrate, sometimes reddish, rooting at the nodes; leaves orbicular, crenate, 2-8 cm across, palmately nerved, deeply cordate, long petioled, up to 30 cm; flowers pale pink, in clusters of umbels; fruits ovoid, rugose, crowned by persistent petals; seeds compressed.

Fl. : March-June. Fr. : August-October.

Location & altitude Veterinary Farm, Zembawak; scattered throughout Mizoram.
Alt. Up to 1000 m.

Associates & ecology *Scoporia dulcis*, *Ageratum conyzoides*, *Sida acuta* and grasses, in moist and damp places.

Distribution Sri Lanka, Malaca and tropical regions; throughout India and the North-East; frequent but scattered at different localities throughout Mizoram.

Part used Whole plant.

Extraction and uses :

Medicinal 1) 5-7 fresh leaves are chewed and swallowed daily for 7 days as an effective remedy against hypertension, water brash or heartburn.
2) The juice of crushed leaves is applied on itches, cuts and wounds and dropped into the eye (2-3 drops) for eyesore.
3) Cold infusion of leaves is taken as tea for gastroenteritis, cholera and children's cough and cold.

Food The plant is boiled with little rice and taken as vegetable.

Chassalia ophioxyloides (Wall.) Craib. BBSI 3:108.1961; FFM 2:469.1987. *C. curviflora* (Wall.) Thw. FFBB 2:14.1877; FBI 3:176.1880; IT 395.1906; BBO 441.1922. *C. curviflora* (Wall.) Thw. var. *ophioxyloides* (Wall.) Deb, FTS 2:44.1983. *C. chartacea* Craib. WI 2-C:126.1950; GIMP 60.1956; UPI 119.1986; DIFME 50.1991. *C. ambigua* Wall. FA 3:86.1939.

Family Rubiaceae.

Local name **Khummurmu** (B).

Botanical description A shrub to 2 m high; stem shining green; leaves oblong or elliptic to oblanceolate, shortly caespitate, 5-9 x 14-24 cm, shining; base acute, cuneate; petiole up to 8 cm long; flowers white streaked with pinkish in trichotomous paniced cymes; fruits globose, bluish or purplish-black; seeds orbicular, smooth.

Fl.: April-May. **Fr.:** July-August.

Location & altitude On river bank of Sailui, near Dinthar.

Alt. 200 m.

Associates & ecology *Trevesia palmata*, *Musa* sp., *Mussaenda macrophylla*, *Leea* sp., on sandy soil in shady places near streams.

Distribution Sri Lanka, Myanmar and Malayan Peninsula; Eastern tropical Himalayas, Andamans, Western Ghats and North-East India; **frequent in Mizoram, in tropical evergreen forests near rivers and streams.**

Part used Roots.

Extraction and uses :

Medicinal The roots are made into plaste with those of *Mussaenda macrophylla*, *Trevesia palmata*, *Ardisia paniculata*, *Clerodendrum wallichii*, and applied externally to chronic ulcers, tumors and sores.

Chonemorpha fragrans (Moon.) Alston, FJ 2:308.1981; FFM 2:601.1987; UPI 121.1986; DIFME 51.1991; CCENEI 237.1994; ADPR 311.1994; IMP 2:67.1994. *C. macrophylla* Hook. f. FBI 3:661.1882; DEP 2:271.1889; IT 463.1906; BBO 544.1922; RBSI 12(2):111.1938; FA 3:265.1939 (**Pl.20, P.39**).

Family Apocynaceae.

Local name **Phungtheikelki** (L).

Botanical description A large climber; stem dark-grey, exuding white latex, lenticellate, rough; leaves broadly-ovate, bi forked, shortly acute, 18 x 26 cm, dark-green above, pale beneath, pubescent; base shallowly cordate, fimbriate; flowers white, fragrant, axillary peduncled cymes; follicles in pairs, up to 30 cm long; beak curved; seeds pale brown, flat, surrounded by parachute-like white silky coma, up to 8 cm long.

Fl: June-July. **Fr:** November-January.

Location & altitude Mampui tlangnuam, Paithar, Lungkulh virgin forest, etc. Alt. 500-1000 m.

Associates & ecology *Acacia intsia*, *Tabernaemontana divericata*, *Hedychium coccineum*, on reddish-brown loamy soil in primary forest.

Distribution Sri Lanka, Myanmar and Java; nearly throughout India; **frequent in Mizoram, in tropical evergreen forest.**

Part used	Roots.
Extraction and uses :	
Medicinal	Infusion of root is taken internally as an effective medicine for easy labour as well as for the removal of retained placenta. The medicine is taken @ 1/2 cup (50 ml) twice daily.
Note	The medicine is claimed by <i>Lai</i> medicineman as best herbal remedy against retained placenta, and considered <i>Elaeagnus caudata</i> Schlecht. ex Mom. the second, which the <i>Mizos</i> considered best.
Remarks	The leaves dipped in rice water are applied to carbuncles; and the roots are used in fever with dried ginger and coriander seed. (Watt, 1889).

Chromolaena odorata (Linn.) King & Robinson in Phytologia 20:204.1970; DIFME 51.1991; CCENEI 76.1994; *Eupatorium odoratum* Linn. FBI 3:244.1881; RBSI 12(2):105.1938; FA 3:108.1939; WI 3:223.1952; GIMP 113.1956; MPM 73.1996.

Family Asteraceae.

Local name **Tlamsam** (M); **Tlasapa** (Ma).

Botanical description A staggling shrub, pungent smell when bruised; stem pubescent when young, soft, terete, filled with spongy pith; leaves ovate-lanceolate or triangular, acuminate, dentate-serrate, 3-nerved, up to the apex, intramarginalm, pubescent on nerves beneath; base oblique, cuneate, petiole to 4.5 cm long; stipules large, lanceolate; flowers terminal and supra-axillary corymbose heads, white in colour; bracts lanceolate, fruits minute, light and dispersed by wind.

Fl.: November-December **Fr.:** December-January.

Location & altitude Very common throughout Mizoram.

Associates & ecology *Lantana camera*, *Tithonia diversifolia*, *Mussaenda glabra*, in waste places, clearings and outskirts of villages.

Distribution Native of America; the foot-hills of sub-Himalayas, Bengal, Assam and Nagaland; **very common throughout Mizoram, in fallow lands, clearings, waste places and immediate surroundings of villages and towns.**

Part used Leaves.

Extraction and uses :

Medicinal The juice of crushed leaves is applied externally on fresh wounds as haemostatics.

Notes Very recently, the farmers realised to utilize the plant as composed manure in their farming systems since 1996 onwards.

Chukrasia tabularis A. Juss. IT 144.1906; IMP 1:560-1.1935; WI 2-C:152.1950; GIMP 63.1956; UPI 123.1986; TFM 4:256.1989; DIMP 129.1992; TIMP 3:79.1994; MPM 42.1996. *Chickrassia tabularis* (A.Juss.) Wt.& Arn. FBI 1:568.1875; FFBB 1:227.1877; DEP 2:268.1889; FA 1:241.1934.

CHITTAGONG WOOD.

Family Meliaceae.

Local name **Zawngtei** (M).

Botanical description A lofty deciduous tree with straight trunk and spreading crown; bark dark-brown, cracked; leaves pinnate, pubescent when young; leaflets 10-16, alternate, unequal-sided, ovate or elliptic-lanceolate, 3.5-6 x 5-12 cm, acuminate, pubescent or velvety; nerves 10 pairs; base oblique; flowers greenish-white, large in terminal peduncle; fruits ellipsoidal, c. 3.5 cm long, very hard, blackish, speckled with lenticels outside; valves usually 3; seeds flat, dark-brown, broadly winged.

Fl.: May-September. **Fr.:** November-March.

Location Mampui forest and Ngengpui wildlife sanctuary.

& altitude

Alt. 200 - 450 m.

Associates & ecology *Toona ciliata*, *Chisocheton paniculatus*, *Dillenia indica*, *Callophyllum imophyllum*, in moist loamy-cley soil in dense forest.

Distribution Sri Lanka, Myanmar and Malaysia; Hills of Sikkim, Assam, East Bengal, South India, Andamans; **common in Mizoram, particularly in tropical wet evergreen forests.**

Part used Bark, seed-coat and wood.

Extraction and uses :

Medicinal 1) Infusion of bark is taken internally against gastric problem and flatulence. The medicine is taken @ teaspoonful (5 ml) twice daily.
2) Decoction of seed-coat is taken internally for diarrhoea @ teaspoonful (5 ml) twice or thrice a day. The seed-coat is also eaten raw.

Material culture The heart-wood is yellowish-brown to brick-red and very hard, and used for house-pillars and other constructional work.

Cinnamonum bejolghota (Buch. Ham.) Sweet, FFM 2:720.1987; MPM 42.1996. *C. obtusifolium* Roxb. ex Nees, FFBB 2:287.1877; FBI 5:128.1886; DEP 2:318.1889; IT 533.1906; RBSI 12(2):128.1938; FA 4:56.1940; IMP 2:2147.1935; WI 2-C:178.1950; GIMP 65.1956; FTS 1:92.1981; UPI 125.1986; DIFME 52.1991; DIMP 133.1922; CCENEI 76.1994 (**Fig.13**).

Family Lauraceae.

Local name **Thakthingsuak** (M); **Simth** (Bm); **Pa-hei** (Ma).

Botanical description Medium-sized to large tree, evergreen; bark dark grey, warty in old trunk, branches dark-green; leaves sub-opposite, elliptic-oblong, acute, 5-7 x 20-25 cm; glossy above, pale beneath; 3-nerved; secondary nerves lateral; base acute or rounded; petiole robust, short; flowers terminal panicles, greenish-white, more or less pubescent; fruits oblong or ellipsoid, succulent, faintly aromatic, seated on slightly enlarged perianth.

Fl.: December-February. **Fr.:** March-September.

Location & altitude	Bymari forest, Serkawr marginal forest, etc. Alt. 500 - 1000 m.
Associates & ecology	<i>Macaranga indica</i> , <i>Ficus hispida</i> , <i>Baccaurea ramniflora</i> , on dark-brown loamy soil in tropical evergreen and semi-evergreen forests.
Distribution	China, Bangladesh and Myanmar: Eastern Himalayas, Andamans and North-East India; common in Mizoram, and more common in tropical semi-evergreen forests.
Part used	Bark, leaves and wood.

Extraction and uses .

Medicinal 1) Decoction of the bark is used in dyspepsia and hepatomegaly.
2) The bark and the leaves are boiled with the leaves of *Anacolosia crassipes*. The water is used for bathing, the steam inhaled and the water taken internally for fever/malarial fever. The medicine is taken @ 2 tablespoon fuls (20 ml) twice daily.

Food *Maras* use dried leaves as a substitute for *C.tamala* as condiment/spice.

Material culture The dull-white moderately hard wood is used for charcoal making and planking.

Cinnamomum tamala (Buch.-Ham.) Nees & Eberm. FBI 5:128.1886; DEP 2:324.1889; IT 533.1906; IMP 3:2146.1935; RSBI 12(2):128.1938; FA 4:56.1940; WI 2-C : 178-9.1950; GIMP 65.1956; FTS 1:92.1981; UPI 126.1986; FFM 2:723.1987; DIFME 52.1991; TIMP 1:104.1991; DIMP 133.1992; CCENEI 77.1994; IMP 2:84.1994; MPM 43.1996 (**Pl.20, P.40**).

INDIAN CASSIA LIGNEA

Family Lauraceae.

Local name **Tespata**, **Hnahrintui** (M); **Kespa** (B).

Botanical description A medium-sized evergreen tree; bark dark-brown or grey; leaves sub-opposite, 3-5 x 10-15 cm, elliptic-lanceolate, acuminate, glossy above; base 3-nerved; tertiary lateral; flowers pale yellowish, in terminal and axillary panicles, appearing with leaves; fruits a drupe, ovoid, black when ripe.

Fl.: January-March. Fr.: May-July.

Location & altitude Forests of Chikha, Kawnpui, Mampui, etc.

Alt. 450 - 1200m.

Associates & ecology *Artocarpus lakoocha*, *Litsea monopetala*, *Syzygium cumini*, *Piper diffusum*, on sandy-loam soil in primary forest.

Distribution Sri Lanka, Bangladesh and Myanmar; tropical Himalayas from Kashmir to North-East India; **fairly frequent in Mizoram, in tropical evergreen and semi-evergreen forests.**

Part used Root-bark.

Extraction and uses :

Medicinal The root-bark is grinded to powder in combination with 3-5 clones of *Allium sativa*, 2-3 grains of *Piper nigrum*, 3-5 cloves of *Cinnamomum aromaticum* and the rhizome of *Curcuma longa*. The powder (5 gms) is mixed with water (100 ml) and the medicine is taken internally for hepatomegaly @ tablespoonful (10 ml) twice daily for 5 days.

Food The leaves are used as spice, flavour, condiment and culinary purposes.

Cinnamomum verum Presl. DIFME 52.1991; DIMP 134.1992; CCENEI 77.1994; IMP 2:87.1994. *C. zeylanicum* Breyn. FFBB 2:287.1877; FBI 5:131.1886; DEP 2:324.1889; IF 533.1906; IMP 3:2149.1935; RBSI 12(2):128.1938; WI 2-C:179.1950; GIMP 66.1956; MPIP 55.1962; FC 3:440.1984; UPI 126.1986; TIMP 1:105.1991; MPM 43.1996.

CINNAMON, CEYLON CINNAMON.

Family Lauraceae.

Local name **Thakthing** (M); **Longiasangpa** (Ma).

Botanical description A moderate-sized tree, evergreen; all parts aromatic; bark dark brown, rough and thick; leaves sub-opposite, ovate-lanceolate, acute or shortly acuminate, 2.5-4 x 6-12 cm, shining above; base acute or rounded; flowers greenish or pale yellow, in silky pubescent lax panicles usually longer than leaves; pedicels slender; fruits ellipsoid, dark purple when ripe, up to 1.5 cm long, epiculate, supported by enlarged perianth.

Fl.: March-April. **Fr.:** June-August.

Location & altitude Mampui tlangpuim, Lungrang forest, Thenzawl, etc. Alt. 500-1300 m.

Associates & ecology *Cinnamomum glaucescenes*, *Artocarpus gomezianus*, *Litsea* spp., on sandy soil in primary forest.

Distribution Native of Sri Lanka; Western Ghats at low levels, North-East India; **fairly frequent in Mizoram, particularly in the tropical semi-evergreen forests.**

Part used Root-bark, stem-bark, leaves and wood.

Extraction and uses :

- Medicinal**
- 1) The root-bark and stem-bark are grounded to powder. The powder alone or mixed with powdered rhizome of *Curcumorpha longiflora* is taken with water for colic, flatulence and hiccup. The medicine (5 gm) is taken with water twice daily.
 - 2) Hot infusion of leaves is taken against cough @ tablespoonful (10 ml) twice daily.
 - 3) The root bark is eaten raw against nausea and vomiting.

Food The powdered bark is used as flavour and spice.

Material culture The wood is used as fuel.

Notes The roots are extracted from the wild and sold in the local market @ Rs.10.00 per 250 grams.

Recommendation Extraction of roots from the wild should be controlled, and *in-situ* and *ex-situ* conservation should be taken up immediately. Silvicultural techniques or field level techniques may be developed for further multiplication.

Cissus repanda Vahl. FTS 1:413.1981; DIFME 54.1991. *Vitis repanda* Wt.& Arn. FBI 1:648.1875; BBO 202.1921; FA 1:292.1934.

Family Vitaceae.

Local name **Vawmdawng** (M); **Hoit-chiang** (C).

Botanical description A climber; stem ribbed, hairy; leaves 11-16 x 13-18 cm, broadly ovate or orbicular, repand, crenate-dentate, hairy beneath; base deeply cordate, 5-7 nerved; flowers whitish, in umbellate cymes; fruits and seeds pyriform.

Fl. & Fr.: not seen at the time of collection (January, 1996).

Location Serhuan area near Tlabung.

& altitude

Alt. 25 m.

Associates & ecology *Leca crispa*, *Clerodendrum bracteatum*, *Hedychium coccineum*, near the stream in moist shady places.

Distribution Sri Lanka and Bangladesh; throughout India; **common in secondary forests near rivers and streams in Mizoram.**

Part used Root.

Extraction and uses :

Medicinal 1) The root is rubbed on grindstone with the root of *Murraya koenigii* and the paste is collected in a cup of water. A red-hot iron is dipped into the water and the water is drunk as tea for heartburn.

2) The leaves are used for snake-bite in combination with others (cf. *Butea superba* Roxb.)

Claoxyton khasianum Hook. f. FBI 3:411.1882; FA 4:210.1940.

Family Euphorbiaceae.

Local name **Nagabang** (B).

Botanical description A shrub or small tree to 3 m high; bark grey, scars on leaf axils; leaves oblong-lanceolate, acuminate, toothed or crenate, scabrous, 5-7 x 15-24 cm; nerves 12 pairs; flowers minute, in spikes; fruits globose.

Fl.: April-May. Fr.: June-August.

Location & altitude On river side of Sailui, near Dinthar. Alt. 150 m.

Associates & ecology *Mallotus roxburghiana*, *Trevesia palmata*, *Macaranga pedunculata*, on sandy soil in dense forest.

Distribution Endemic to North-East India; **rare in Mizoram, in tropical evergreen forests as an undergrowth.**

Part used Roots.

Extraction and uses :

Medicinal The roots constitute one important ingredient for the treatment of abdominal tumor, in combination with others, viz., *Ardisia paniculata*, *Clerodendrum wallichii*, *Mussaenda macrophylla* and *Trevesia palmata*. The roots are rubbed on grindstone and made into a paste. The paste is applied gently on the abdominal tumor (cancer) anticlockwise once daily for 7 days.

Reported for the first time.

***Clerodendrum colebrookianum* Walp. FBI 4:594.1885; DEP 2:372.1889; IT 507.1906; FA 3:488.1939; FFM 2:676.1987; NPEI 72.1991; DIFME 56.1991; CCENEI 79.1994; JETB Addl. Ser. 12:458.1996; MPM 46.1996. *C.glandulosum* Coleb.ex Walp. FTS 2:107.1983 (Pl.21, P.41).**

Family Verbenaceae.

Local name **Phuihnam** (M).

Botanical description	A large shrub or small tree; bark dark-grey, warty; branchlets quadrangular, green, lenticellate; leaves foetid smell, broadly-ovate, 10-12 x 15-25 cm, acuminate; nerves 6-8, anastomosing; base cordate; petiole to 16 cm long; flowers white, terminal, corymbose cymes; drupes globose, compressed above, green when young, bluish-black when ripe; seeds-4. Fl.: September-October. Fr.: October-January (next year).
Location & altitude	Both wild and cultivated throughout Mizoram. Alt. Up to 1600 m.
Associates & ecology	<i>Solanum torvum</i> , <i>Zanthoxylum rhetsa</i> , <i>Trema orientalis</i> , <i>Dysoxylum gobara</i> , in fallow lands and secondary forests.
Distribution	W.China, Singapore, Vietnam and Myanmar; endemic to North-East India; common throughout Mizoram.
Part used	Leaves.
Extraction and uses :	
Medicinal	1) Cold infusion of leaves is drunk against hypertension and distended breast milk @ 1 cup (100 ml) twice daily. Mature leaves during rainy season are preferred. 2) The roots are rubbed on grindstone and dipped them into a cup of water and the water is drunk against uteritis once per day.
Food	Young leaves and shoots are boiled and eaten as pot-herb.
Notes	Some farmers reported that mulched leaves can suppress weed population.
Remarks	Nath & Bordoloi (1991) has reported the efficacy for hypertension.

Clerodendrum viscosum Vent. FTS 2:109.1983; FFM 2:678.1987; BBSI 3:14.1961; DIMP 143.1992; CCENEI 81.1994; IMP 2:124.1994; TIMP 4:225.1995; MPM 47.1996. *C.infortunatum* auct. non Linn. WL2-C:232.1988; GIMP 71.1935. *Clerodendron infortunatum* Gaertn. FFBB 2:267.1877; FBI 4:594.1885; DEP 2:373.1889; IF 507.1906; IMP 3:1950.1935; RBSI 12(2):123.1938; FA 3:487.1939; UPI 132.1986.

Family	Verbenaceae.
Local name	Phuihnamchhia (M).
Botanical description	Gregarious shrub with foetid smell; stem with lenticular warts; leaves large, 9-18 x 10-25 cm, ovate, acuminate, denticulate; nerves 6-9; base cordate; petiole long, up to 12 cm long; flowers white, tinged with pink, in terminal trichotomous corymbose thyrsus; fruits obscurely 4-lobed, bluish black when ripe. Fl.: March-April. Fr.: May-July.
Location & altitude	Pukzing, W.Phaileng, Teirei, Zawlnuam, etc. Alt. 200 - 1000 m.
Associates & ecology	<i>Lantana camera</i> , <i>Embelia spicata</i> , <i>Ageratum conyzoides</i> , on sandy-loamy cley soil as undergrowth in tropical secondary forests.
Distribution	S.China, Sri Lanka, Myanmar and Malaysia; throughout India; frequent in Mizoram in tropical secondary forests.
Part used	Roots and leaves.

Extraction and uses :

- Medicinal
- 1) The roots and twigs are boiled. The water is drunk for diarrhoea and dysentery associated with fever and vomiting/nausea.
 - 2) Infusion of leaves is said to be used for washing hairs against dandruff.

Clerodendrum wallichii Merr. FEM 2:678.1987; DIFME 57.1991; *C. mutans* Wall. FFBB 2:268.1877; FBI 4:591.1885; IT 508.1906; RBSI 12(2):123.1938; FA 3:491.1939; TFM 3:304.1978; MPM 47.1996 (**PI.21, P.42**).

Family Verbenaceae.

Local name **Tratuba (B).**

Description A tall shrub to 3 m high; bark grey; branches quadrangular; leaves opposite, elliptic-oblong or ovate-oblong, 5-6 x 15-25 cm, acuminate; base acute; flowers white, pendent, peduncles horizontal and slender; drupe succulent, deep purple; drupelets 1-4.

Fl.: November-January. Fr.: February-March.

Location & altitude On river bank of Sailui, near Dinthar, Lungkulh virgin forest and Hmawngbu forest.

Associates & ecology *Trevesia palmata*, *Ardisia paniculata*, *Smilax ovalifolia*, *Clerodendrum bracteatum*, near streams on sandy-soil in primary forest as an undergrowth.

Part used Roots.

Extraction and uses :

Medicinal The paste made of roots with those of *Ardisia paniculata*, *Claoxylon khasianum* and *Phogacanthus thyrsiformis* is applied externally on abdominal tumor once every day for 7 days. Fresh paste is used each day.

Notes There are two varieties - with red flowers and white flowers. The red flowered variety is preferred to white.

Colysis hemionitidea (Wall.ex Mett.) Presl. *Polypodium hemionitidium* Wall.ex Mett. FFMS 56.1982; FN 128.1988; IFFWH 73.1994; CIP 36.1984.

Family Polypodiaceae.

Local name **Kawkte-bet** LR.; **Ua-ma-kal** (B).

Botanical description A small fern with dark-brown rhizome and black roots creeping on the tree trunk or on rocks; fronds simple, 5-7 x 25-30 cm long, elliptic-lanceolate, sub-falcate; veins anastomosing; sori linear on lower surface. Spore : not seen at the time of collection (December 1995).

Location & altitude Mountain forest of Chikha and the river bank of Chikha.
Alt. 400 - 450 m.

Associates & ecology *Costus speciosus*, *Globa* spp., *Cinnamomum tamala* etc. on tree trunks or on rocks in shady places.

Distribution China, Nepal, Vietnam, Phillipines and Malaysia; eastern Himalayas and North-East India; **common in river banks, uncommon in mountain forests of tropical evergreens.**

Part used Rhizome.

Extraction and uses :

Medicinal The rhizome constitute one ingredient for the treatment of fracture of bone.

Reported for the first time.

Congea tomentosa Roxb. FBI 4:603.1885; DEP 2:517.1889; IT 513.1906; RBSI 12(2):123.1938.

Family Verbenaceae.

Local name **Sahuaihruai (M); Huaibawkhruai (L); Pamipaw (Ma).**

Botanical description A large climbing shrub; stem dark-green, grooved, deciduous; leaves ovate, acute, 4.5 x 8 cm, pubescent beneath; base cordate, flowers white to lilac-blue; bracts purple.

Fl.: February. **Fr.:** not seen.

Location & altitude Hangso mual, Mampuui; Bymari forest etc.

Alt. 350500 m.

Associates & ecology *Callicarpa arborea*, *Schima wallichii*, *Melocanna baccifera*, on loamy soil in shady areas.

Distribution Bangladesh and Myanmar; **in S. Mizoram, not common.**

Part used Stem

Extraction and uses :

Medicinal The stem is made into a ring and put on the ring of domestic animals (e.g. cattle, pig and goat) to get rid of sore-worms.

Notes The *Lais* considered this plant as best veterinary medicine for expelling sore-worms, whereas the *Maras* claimed that the bark of "*Bei-tlo-chai-chi*" (unidentified for want of reproductive organs) is best, while the Mizos used the woods of *Erythrina stricta* Roxb. for the same purpose.

Reported for the first time.

Cordia dichotoma Forst.f. FA 3:330.1939; WI 2-C:346.1950; GIMP 77.1956; FTS 2:99.1983; UPI 140.1986; FEM 2:630.1987; DIFME 60.1991; DIMP 153.1992; TIMP 4:212.1995; MPM 50.1996. *C.myxa* auct. non Linn. FFBB 2:208.1877; FBI 4:136.1883; DEP 2:563.1889; IT 478.1906;

Family Cordiaceae.

Local name **Muk** (M); **Tlahmo** (Ma).

Botanical description A moderate-sized deciduous tree with drooping branches; bark ashy-grey, wrinkled; leaves broadly ovate or nearly orbicular, 8 x 12 cm, bluntish or acute, coarsely crenate, basal nerves - 3; base cuneate; rounded or cordate; flowers white, in lax terminal corymbose cymes, fragrant; fruits ovoid, translucent and pale yellow when ripe, filled with viscid pulp, 1-seeded.

Fl. March-April. **Fr.** May-July.

Location & altitude Mini-Zoo, Aizawl, Tuithumhnar, Dampa Tiger Reserve, etc.
Alt. 220 - 900 m.

Associates & ecology *Litsea monopetala*, *Anogeisus acutifolia*, *Toona ciliata*, on sandy to loamy soil in primary and secondary forests.

Distribution S.China, Myanmar and Malaysia; Sub-Himalayan tracts to Central India and North-East India; **not unfrequent in Mizoram, in tropical evergreen and semi-evergreen forests.**

Part used Bark, pulp and wood.

Extraction and uses :

Medicinal 1) *Bru* medicineman prescribes infusion of bark for cholera. The medicine is taken internally @ 1 cup (50 ml) twice daily.
2) Decoction of bark is taken for strengthening the function of uterus and used for *Zu-hri*, the blood-poison caused by rat-bite.

Material culture 1) The grey and moderately hard wood is used for house-pillars and agricultural implements.
2) The viscid pulp of fruit is used as gum in villages.

Food The young leaves and shoots are cooked as vegetable especially with rat's meat (Lorrain, 1940).

Note The allied species, *i.e.*, *Cordia fragrantissima* Kurz.(Mukchal) is common in sub-tropical hill forests of Mizoram, and the heartwood is used for house-pillars.

Costus speciosus (Koenig) Smith. DEP 2:579.1889; FBI 6:249.1892; BBO 1145.1924; IMP 4:2440.1935; RBSI 12(2):144.1938; WI 2-C:361.1950; GIMP 78.1956; BBSI 14(1-4) : 138.1972; EFPN 1:59.1978; FTS 2:371.1983; UPI 143.1986; DIFME 61.1991; DIMP 155.1992; CCENEI 83.1994; ADPR 108.1994; IMP 2:201.1994; MPM 50.1996. *C.speciosus* L.**var** *nepalensis* (Rosc.)Baker, FBI 6:250.1892. **(Pl.22, P.43)**

Family Costaceae.

Local name **Sumbul** (M); **Sumbul-sen** LR; **Tar-pi-sung-khrol** (P).

Botanical description A stout herbaceous erect plant with tuberous rhizome; stem reddish, sub-woody at the base, spirally twisted at apex; leaves elliptic-oblong, spirally arranged; cuspidate acute, 3-5 x 10-22 cm, silky pubescent beneath; base acute, sheath coriaceous; flowers white, on terminal oblong spike, dense flowered; bracts ovate, reddish; fruits globosely 3-gonous, red; seeds black or dark-brown.

Fl.: June-October. **Fr.**: October-March.

Location & altitude Dampa sanctuary near Teirei, Chamdun Project, Bilkhawthlir etc.
Alt. 200 - 1200 m.

Associates & ecology *Clerodendrum bracteata*, *Mussaenda roxburgii*, *Albizia procera*, on varied types of soil from dry sandy to moist loamy soil in damp places.

Distribution S.China, Sri Lanka, Nepal and Malaysia; nearly throughout India and North-East India; **common throughout Mizoram, usually in clearings and damp places or river banks, in both tropical evergreen and semi-evergreen forests.**

Part used Rhizome and seeds.

Extraction and uses

Medicinal 1) Cold infusion of the rhizome is taken internally for kidney trouble and leprosy. The medicine taken @ tablespoonful (10 ml) thrice daily.
2) Juice of rootstock is taken for stomatitis.
3) Juice of crushed rhizome is taken for catarrhal fevers. *Chakmas* take the medicine for reduction of breast-milk.
4) *Pang* medicineman prescribes the powdered seeds (3,5,7) mixed with local liquor against malaria p.f. @ 2 teaspoonfuls (20 ml) once per day.

Food Young shoots are boiled and salted and taken as vegetable.

Notes *Costus speciosus* Koenig var. *argyrophyllus* Wall. FBI 6:250.1892 (**Pl.22, P.44**) is locally classified as white variety. The plant is more densely silky-leaved than the former, and distinguished by the white stem, white flowers, globose spike and pubescent bracts. They grow in damp places and river sides.

The crushed juice of roots is taken internally for the removal of stones in the kidney/gall-bladder. The medicine is taken @ 1/4 cup (25 ml) twice daily for 7 days.

Curculigo capitulata (Lour.) O.Kuntze. WI 2-C:400.1950; UPI 151.1986; DIFME 64.1991; CCENEI 86.1994. *Curcuvata* Dryand, FBI 6:278.1892. *Molineria recurvata* (Dryand) Hebbert. FTS 2:444.1983.

Family	Hypoxidaceae.
Local name	Phaiphek (M).
Botanical description	A tufted herb with stout rootstock; leaves long, recurved, lanceolate, plicate, 8-16 x 60-90 cm, nerves hairy beneath, narrowed into the petiole, channelled; flowers star-like yellow, in clusters, arising from the base on a slender villous scapes; fruits globose, hairy. Fl.: May-August. Fr.: August-October.
Location & altitude	The forests of Maisa, Lohre, Mampui, Lungmuat, etc. in moist shady places. Alt. 200 - 700 m.
Associates & ecology	<i>Clerodendrum bracteata</i> , <i>Hedychium gracilis</i> , <i>Amomum dealbatum</i> in moist shady places and near the streams as an undergrowth.
Distribution	Sri Lanka, Bangladesh, Myanmar and Malaysia; tropical Himalayas from Nepal to Bihar, Bengal and North-East India; very common throughout Mizoram in tropical evergreen semi-evergreen forests.
Part used	Root and immature stem.
Extraction and uses :	
Medicinal	1) Juice of the root is taken internally for stomachache and headache. 2) The immature tender shoot is grounded into a paste. The paste is applied externally on cuts (deep cut) and wounds as an effective haemostatics; it readily relieves the pain and gradually heals the wounds.
Notes	It is considered as one of the best herbal medicines as antiseptic by <i>Lais</i> .

Curculigo orchioides Gaerth. DEP 2:650.1889; FBI 6:279.1892; BBO 1112.1924; IMP 4:2469.1935; WI 2-C:400.1950; GIMP 84.1956; MPIP 68.1962; EFPN 11:66.1978; UPI 151.1986; MMPI 229.1989; DIFME 65.1991; DIMP 161.1992; ADPR 314.1994; IMP 2:245.1994; MPM 54.1996.

Family Hypoidaceae.

Local name	Kauphek (M).
Botanical description	Slender herb with elongated or stout rootstock and fleshy fibres; leaves radial, 15-45 cm long, linear lanceolate, plicate, channelled, sparsely softly hairy; base sheathing; flowers bright yellow, upper few are male and lower ones are female; bracts lanceolate; fruits baccate, 1-2 cm long with a short beak; seeds 1-4, with spongy septa. Fl.: May-August. Fr.: September-October.
Location & altitude	W.Phulpui, c.2 km eastward; Lohre-Maisa forests, S.Mizoram. Alt. 200 - 600 m.
Associates & ecology	<i>Piper diffusum</i> , <i>Hedychium coccineum</i> , <i>Leea crispa</i> , on humus sandy soil in shady places.
Distribution	Sri Lanka, Nepal, Malaysia, E.Japan and Australia; Sub-tropical Himalayas, western Ghats and North-East India; less frequent than other species of <i>Cureligo</i> in Mizoram, in tropical wet evergreen forests.
Part used	Rhizome or tuber.
Extraction and uses	
Medicinal	1) <i>Brus</i> take the juice of rhizome or tuber as an antipyretic and diuretic. 2) The root is sweet at first and bitter later. It can be eaten raw against stomachache and colic.

Curcuma amada Roxb. DEP 2:652.1889; FBI 6:213.1890; BBO 1135.1924; IMP 4:2420.1935; WI 3:401.1950; GIMP 84.1056; FTS 2:372.1983; UPI 151.1986; DIFME 65.1991; DIMP 161.1992; Ethnobotany 7:84.1995; MPM 54.1996

Family Zingiberaceae.

Local name **Sitalung** (Bm).

Botanical description Rootstock ellipsoid, large; sessile tubers pale-yellow inside; leaves oblong elliptic or oblanceolate, in tufts, with long petioles; flowers bracts pale-green

or greenish-white, those of coma tinged with pink or red; flowers pale yellow or creamy; lips 3-lobed, throat and centre deep yellow, middle lobe emarginate; very villous.

Fl: August-September. **Fr:** not seen.

Location & altitude	Bymari	Alt 450 m.
Associates & ecology	Domesticated in homestead garden with other <i>Curcuma</i> spp. in open space.	
Distribution	Malayan peninsula; wild in parts of W.Bengal, Uttar Pradesh, Karnataka, Tamil Nadu and, cultivated in Gujarat; domesticated in S.Mizoram at Bymari.	
Part used	Rhizome.	
Extraction and uses		
Medicinal	The poultice made of rhizome in combination with <i>Dioscorea</i> sp. (pale-yellow bulb) is used for chronic ulcer developed within and outside the body.	
Notes	The plant is seen at Bymari only.	
Recommendation	<i>Ex-situ</i> germplasm conservation and propagation.	
Curcuma longa	Linn. DEP 2:659.1889; FBI 6:214.1890; BBO 1135.1924; IMP 4:2423.1935; WI 3:402.1950; GIMP 85.1956; DIFME 65.1991; CCENEI 87.1994; ADPR 169.1994; IMP 2:259.1994; Ethnobotany 7:84.1995; JETB Addl. Ser. 12:15.1996. <i>C.domestica</i> Veleton FTS 2:373.1983; UPI 152.1986; DIMP 163.1992	
Family	Zingiberaceae.	
Local name	Aieng (NI)	

Botanical description A perennial herb to 90 cm high; rhizome cylindrical, ovoid, branched, yellow to deep orange yellow inside, strongly aromatic; leaves large, 10-25 x 30-70 cm, oblong-lanceolate, caudate-acuminate; base tapering; flowers pale yellow in bracteate in an erect spike, bracts pouched, pale green; calyx short; corolla bright yellow; fertile stamen 1; staminodes 2; ovary inferior, 3-celled; stigma 2-lipped.

Fl: September-October, with leaves.

Location & altitude Cultivated throughout Mizoram.

Alt Up to 1200 m.

Associates & ecology Monocultured in paddy fields and in jhum lands or intercropped with *Cassia laevigata*, *Manihot esculentus* and *Oryza sativa*, in open spaces.

Distribution Cochin-China; cultivated throughout India; **so also in Mizoram, for the rhizome.**

Part used Rhizome.

Extraction and uses :

Medicinal 1) Fresh rhizome is crushed and applied externally on sprains, wounds and swellings, and then bandaged.
2) Fresh rhizome in combination with *Centella asiatica* and 5-10 clones of *Allium sativa* are grinded and taken with water against asthma.

Food Turmeric powder is an indispensable ingredient in curries and used for colouring.

Curcuma zedoaria (Christo) Rose DEP. 2:669-70.1889; FBI 6:210.1890; BBO 1134.1924; IMP 4:2420.1935; WI 3:405.1950; GIMP 85.1956; BBSI 14 (1-4):122.1972; FTS 2:373.1983; UPI 152.1986; DIFME 66.1991; DIMP 163.1992; CCENEI 88.1994; ADPR 228.1994. Ethnobotany 7:84.1995; JETB Addl. Ser. 12:16.1996; MPM 55.1996

Family Zingiberaceae.

Local name **Ai-dizung** (M).

Botanical description Perennial herb; rhizomes with cylindric annulate tubers, brownish outside, pale yellow and faintly aromatic inside; some roots ending in tubers; leaves 4-6 with long petioles, 10-15 x 20-45 cm, finely acuminate and curled, upper side often blotched with purple flush on either side of the midrib, lower with narrower purple; flowers pale yellow in spikes; calyx pinkish; corolla-lobes white with pinks; lip pale yellow, emarginate, 3-lobed; ovary villous.

FL: May-August (before and after the leaves appear).

Location Both wild and cultivated.

& altitude

Alt. Above 900 m.

Associates & ecology *Eurya acuminata*, *Curculigo* spp., in moist shady places in mixed secondary forests. Occasionally found in new *jhum* lands.

Distribution Native of Bangladesh and distributed in Malayan Islands; wild in eastern Himalayas and cultivated throughout India; **very rare in Mizoram, in tropical secondary forests.**

Part used Rhizome.

Extraction and uses :

Medicinal The rhizome is crushed and mixed with water and taken internally for piles and epileptic seizure. The medicine is taken in dilute solution @ teaspoonful (5 ml) once per day.

Notes The plant is very rare, critically endangered and cultivated as home remedy in Aizawl in small quantity only.

Cucumorpha longiflora (Wall.) Rao & Verma, BBSI 14:123.1972. *Boesenbergia longiflora* (Wall.) O.Kuntze, FTS 2:371.1983. *Gastrochilus longiflora* Wall. FBI 6:217.1890; BBO 1136.1924; RBSI 12(2):144.1938. **(Pl.23, P.45)**

Family Zingiberaceae.

Local name **Ai-tur** (M).

Botanical description	A stemless rhizomatous small herb; leaves ovate oblong, acute, 4-8 x 8-15cm; base oblique; petiole channelled; flower stalk slender, erect; calyx tubular; corolla bi-lipped, upper three white, lower lip largest, tinged with pink or red. Fl.: June-August. Fr.: not seen.
Location & altitude	Seling, Mautlang, Cultivated, in homestead gardens. Alt. 300-1000 m.
Associates & ecology	Intercropped with <i>Curcuma longa</i> , <i>Prunus persica</i> , <i>Clerodendrum colobrokiannum</i> , in moist shady places.
Distribution	Upper Myanmar, Malacca & Bangladesh; Sikkim, Himalaya to North-East India; very rare in Mizoram and domesticated as home remedy.
Part used	Rhizome.
Extraction and uses	
Medicinal	Infusion of rhizome is taken as an effective medicine against dysentery & diarrhoea.
Notes	The species had been reported by Parry (1932).
Remarks	This is one of the most effective herbal medicine I ever come across for the cure of dysentery and diarrhoea. Recommended for cultivation.

Reported for the first time.

Curcumorpha Wall. var. **minor** King. **Gastrochilus minor** King. FBI 6:217.1890.

Local name	Ailaidum (M).
Botanical description	A stemless perennial herb, similar to <i>C. longiflora</i> in appearance but the rootstock is slender creeping; leaves oblanceolate, or ovate-acute, 5-8 x 10-12 cm, white; lip oblong, streaked with red, with recurved tip and incurved margins. Fl.: June-July Fr.: not seen.

Location & altitude	Cultivated in Aizawl, Seling, Lawngtlai, etc.	Alt. 400-1000 m.
Associates & ecology	Intercropped with <i>Amomum dealbatum</i> , <i>Coffea arabica</i> , etc. in moist shady places.	
Distribution	Myanmar, Bangladesh, Malacca; Assam; cultivated in small quantity in homestead gardens as household medicine in Mizoram.	
Part used	Rhizome	
Extraction and uses:		
Medicinal	Infusion of rhizome is used as an effective cure for diarrhoea and dysentery.	
Remark	Safety and efficacy is more or less same with <i>C. longiflora</i> .	

Reported for the first time.

Cyathula prostrata FBI 4:723.1885; FA 4:4.1940; WI 2-C:409.1950; GIMP 86.1956; UPI 153.1986; DIFME 66.1991; ADPR 45.1994; IMP 2:268.1994; MPM 56.1996. **(Pl.23, P.46)**

Family	Amaranthaceae	
Local name	Buchhawlsen LR.	
Botanical description	A slender procumbent herb with swollen nodes and rooting at the nodes; stem reddish, scaberulous; leaves opposite, ovate-oblong, acute, 2-3.5 x 5-8 cm, hispidous; flowers pinkish-purple, terminal elongated spike in small clusters; seeds ovoid-oblong, very minute.	
	Fl.: September-November. Fr.: November-January.	
Location & altitude	Samtlang, Bymari, Vathuampui, etc.	Alt. 200-1300 m.
Associates & ecology	<i>Achyranthes aspera</i> , <i>Hedyotes scandens</i> , <i>Phyllanthus fraternus</i> , in shady places along waysides and near streams.	

Distribution Sri Lanka, Bangladesh, Myanmar and Tropical regions; Bengal, Sikkim, Assam, Tripura and Meghalaya; **gregarious and fairly frequent in Mizoram, in tropical evergreen and semi-evergreen forests.**

Part used Leaves.

Extraction and uses :

Medicinal 1) The crushed leaf is applied on boils and then bandaged in order to suck the pus out.
2) *Bawms* use an infusion of the leaves mixed with sugar (in equal proportion) as an effective remedy against dysuria. The medicine is taken internally @ 2 tablespoonfuls (20 ml) twice daily.

Cyclea peltata (Lamk.) Hook.f. & Thoms. FBI 1:104.1872; FA 1:53.1934; WI 2-C:410.1950; DIFME 67.1991; CCENEI 246.1994; ADPR 366.1994; IMP 2:277.1994. *C.barbata* Miers. FTS 2:129.1983. *C.arnottii* Miers. UPI 154.1986.

Family Menispermaceae.

Local name **Khauchhim** (M); **Bithikakhama** (B).

Botanical description A slender climber; branches longitudinally ribbed; all parts hirsutous; leaves broadly ovate or deltoid, mucronate, 8 x 11 cm; base dorsifixed; petiole hairy, 5 cm; nerves 9, radiating from base; flowers greenish, axillary, hispid panicles; fruits globose or obovoid drupes.

Fl.: August-September. **Fr.:** November-January.

Location The forest of W.Phulpui (eastward).

& altitude

Alt. 750 m.

Associates & ecology *Dracaena spicata*, *Enteda pursaetha*, *Hedychium* spp., on loamy soil under dense primary forest.

Distribution Sri Lanka, Java, throughout eastern and western coasts of India, Assam and Tripura; **rather rare in Mizoram, found in tropical evergreen forest.**

Part used Roots

Extraction and uses

Medicinal The root is bitter. Decoction of the root is taken internally for colic, fever and diarrhoea @ teaspoonful (5 ml) 2 times per day. Sugar may be added for children.

Dalbergia pinnata (Lour.) Prain. **var. acaciaefolia** (Dalz.) Thoth. in Enum. of Legumes in India, 25:1990. *D. tamarindifolia* Roxb. **var. acaceifolia** (Dalz.) Baker. FBI 2:235 1879; RBSI 12(2) 89, 1938

Family Fabaceae.

Local name **Hruitengtere** LR.

Local name A scandent shrub, twining left; roots yellowish-brown; stem greyish; leaves imparipinnate, pubescent; leaflets 8-15 pairs, sub-opposite, oblong, rhomboid, mucronate, 0.5 x 1.5-2 cm; base oblique; flowers greenish-white, in corymbose panicleed racemes, tomentose; pods strap-shaped, 4-8 cm long; seeds 1-3.

Fl. March-April **Fr.** May-October.

Location Mampui hmuntha ram, c.3 km west of Mampui, and Teak plantation (1958) near
& altitude Tlabung Alt. 40 m & 600 m

Associates *Ardisia colorata*, *Leea crispa*, *Aporosa octandra*, *Tabernaemontana*
& ecology *divericata*, on sandy-loam to compact clayey-loam soil in evergreen forests.

Distribution Malacca and Malaysia; **very rare in Mizoram, in tropical evergreen forest.**

Part used Root-bark.

Extraction and uses

Medicinal 1) The root-bark is scraped off and boiled in water for 1-2 minutes. The solution is strained through a clean soft cloth or filter paper and used as an effective cure for stomatitis, toothache and gum-boil. The medicine is retained in the mouth for sometime, twice or thrice daily.

2) The root-bark is scraped off and grounded to powder. The powder (5 gms) is mixed with a cup of milk (100 ml). The medicine is taken internally @ 1/2 cup (50 ml) twice daily for 3-7 days as an effective remedy against hepatitis and jaundice.

Notes My specimen has a distinctive character with '*micronate*' apex which is '*emarginate*' in case of *D.pinnata* (Lour.) Prain.

Reported for the first time.

Dalbergia stipulacea Roxb.FBI 2:237.1876; FFBB 1:346.1877; DEP 3:16.1890; IT 238 1906; FA 2:107-108.1938; GIMP 90.1956; FTS 1:157.1981; UPI 162.1986; MPM 58 1996.

Family Fabaceae.

Local name **Chingchingdit** (M)

Botanical description A large scandent shrub; bark greyish; leaves oblong, alternate; leaflets 8-12, 1 x 2.5-4 cm, emarginate; base acute, slightly oblique; flowers reddish purple, axillary paniced racemes; pedicel slender; pods oblong, obtuse, 2.5 x 5-10 cm, pendulous, flat, deep-brown; seeds flat, brown.

Fl. March-April Fr. November-February (next year)

Location Ngengpui wildlife sanctuary.

& altitude

Alt. 380 m.

Associates & ecology *Podocarpus neriifolia*, *Embelia mutans*, *Lasianthes wallichii*, on compact brown soil as undergrowth in dense forest.

Distribution Bangladesh, Myanmar and Malayan Islands; North-East India; **very frequent in tropical evergreen forest of Mizoram.**

Part used Bark and roots.

Extraction and uses

Medicinal The roots can be used as a substitute for *Dalbergia pinnata* var. *acaciaefolia*.

Fish poison The barks and roots are used for fish-poisoning.

Dendrobium denundans D. Don. FBI 5:715.1889; J.Orchid Soc. India 4(1,2):56.1990
(**Pl.25, P.49**).

Family Orchidaceae.

Local name **Naubanhlo-sen** LR

Botanical description A small epiphytic orchid; stem suberect up to 15 cm high, clothed with broad sheaths; leaves linear-oblong, obtuse or notched, caducous; flowers usually white with red veins; racemes elongate and drooping on a slender rachis; fruits white, 0.5 cm x 2 cm, acute at both ends, crowned by persistent lobes.

Fl.: February-March. **Fr.:** April.

Associates & ecology It grows mainly on soft wooded trees, e.g. *Erythrina stricta* Roxb., *Bombax ceiba* Linn., *Mitragyna diversifolia* (Wall. ex G Don.) Havil., among mosses and *D.ariaeflorum* Griff.

Distribution Sub-tropical and temperate Himalayas and the North-East India; **rare in Mizoram and confined to the eastern part boarding Myanmar.**

Part used Whole plant

Extraction and uses

Medicinal Infusion of the plant has anaesthetic or narcotic or hallucinogenic effect when drunk a few drops of plant extract.

Notes Based on local classification of efficacy, the red variety is superior to the white variety, i.e. *D.ariaeflorum* Griff. (**Pl.25, P.48**).

Dendrobium ariaeflorum Griff. is locally classified as white variety. The sepals and petals are white, margins toothed and upcurved on terminal or axillary rachis, which is wiry, and seen on the same or different host trees.

Remarks It is reported that the two varieties are being sold outside Mizoram at a relatively high cost. It is speculated that the plants have been used for extraction of drugs.

Precaution	The plants' extract being very strong should in no way misused.
Recommendations	Legal or illegal exploitation of the orchids should be prohibited and protected.
Dendrobium fimbriatum	Hook.FBI 5:745.1889; J.Orchid.Soc.India 4(1,2):56.1990.
Family	Orchidaceae.
Local name	Chhungdum (M); Nauban-chhungdum LsR.
Botanical description	Epiphytic; pseudobulb up to 100 cm long, swollen at the middle, grooved or striate, fleshy; leaves alternate, sessile, lanceolate, acuminate, 2-4 x 10-15 cm; flowers orange-yellow, numerous, c. 5 cm across, in racemes, usually pendulous leafy stem; sepals and petals subequal; lip orbicular; base orbicular, margin fringed, deep-purple at the base inside; follicle 6-10 cm long, acute at both ends, filled with fibrous-cottons with many pollens. Fl.: March-April. Fr.: August-October.
Location & altitude	Very common throughout Mizoram, e.g. Phawngpui, Hmuifang, Biate, Mualpheng, etc. Alt. Above 1000 m.
Associates & ecology	Grow on tree trunk alongwith mosses.
Distribution	Bangladesh and Myanmar; sub-tropical Himalaya from Kumaon to Arunachal Pradesh, Assam, Manipur, Tripura and Nagaland; very common throughout Mizoram above 1000 m, in sub-tropical hill forests and tropical semi-evergreen forests.
Part used	Pseudostem.
Extraction and uses	
Medicinal	Juice of the stem is used as an effective remedy for cuts and wounds by external application.
Ornamental	The species are reared as an ornamental plants.

- Remarks 1) This is one of the finest and most beautiful and most showy among the yellow dendroobiums (Ruala, 1985).
2) One village woman comments, "Every household ought to keep the living plant for home remedy, especially for cuts and wounds, apart from its beautiful blossoms and fragrance."

Dendrocnide sinuata (Bl.) Chew. FTS 1:226.1981; FFM 2:843.1987; DIFME 72.1991; CCENEI 92.1994. *Laportea crenulata* Wedd. FFBB 2:421.1877; FBI 5:550.1888; DEP 4:587.1890; IT 616.1906; FA 2:281.1938; GIMP 150.1956; WI 6:34.1962; UPI 316.1986; *Urtica crenulata* Roxb. FI 3:591.1832 (PI.26, P.50).

Family Urticaceae.

Local name Thakpui (M).

Botanical description A large stout evergreen shrub, young parts clothed with minute and long stinging hairs; leaves broadly elliptic to ovate-oblong, acuminate, 7-15 x 15-30 cm, crenulate in the upper half, nerves 12-16 pairs; base rounded or cordate; petiole stout, up to 8 cm long; flowers greenish-white, in axillary paniced dichotomously branched; fruit (achene) obliquely ovoid.

Fl.: December -March. Fr.: May-June.

Location & altitude Ngengpui wildlife sanctuary; Dampa Tiger Reserve, near Teirei. Alt. 200-500 m.

Associates & ecology *Phrynum capitatum*, *Hedychium coccinium*, etc. in moist shady places.

Distribution Sri Lanka, Myanmar and Malaysia; tropical Himalayas from Nepal eastwards to North-East India and South India; **common in Mizoram as undergrowth in tropical wet evergreen forests, particularly on the banks of rivers and streams.**

Part used Roots.

Extraction and uses

Medicinal

- 1) The roots are crushed with crabs and mixed with water and the water is drunk against diarrhoea and dysentery @ 1/2 cup (50 ml) thrice daily.
- 2) The roots are boiled with crabs and the spadix of *Musa* spp. and then boiled. The water is taken internally for liver ailment @ 2 tablespoonfuls (20 ml) twice daily.
- 3) The same solution is given to drug - addicts and alcoholics as a relief.
- 4) Juice of crushed roots is applied on the burning pains caused by the irritating hairs.

Food Schorched leaves are boiled with rice and eaten as vegetable.

Notes The plant is said to have been inactive when the leaf of *Phrynium capitum* is banded on the body.

Remarks The burning sensation is more severe while flowering. The burning pain lasts for quite sometime and is greatly intensified by the application of water.

Desmodium gyroides DC. FFBB 1:388.1877; FBI 2:175.1879; BBO 267.1922; GIMP 94.1956; RBSI 12(2) : 89.1938; FA 2:59.1938; UPI 168.1986; NPEI 95.1991; DIFME 72.1991; MPM 61.1996.

Family Fabaceae.

Local name **Kerangkana** (B).

Botanical description Procumbent undershrub or shrub with hairy branches; leaflets 3, oblong-ovate or obovate, emarginate, 2-5 cm, often pubescent beneath; nerves 5-7; flowers pink purple, in axillary and terminal racemes; pods hairy, 2-4 cm long; joints 4-6; seeds reniform, black.

Fl.: August-November. Fr.: November-January.

Location & altitude On roadsides from Perhsang to Dampa Tiger Reserve.

Alt. 450 m.

Associates & ecology *Desmodium triquetrum*, *D.gyrans*, *Derris robusta*, on dark-brown sandy-loam soil in mixed bamboo secondary forests and waste lands.

Distribution Sri Lanka, Myanmar and Malayan Islands; central and eastern Himalayas, Asam, Meghalaya. **frequently scattered in Mizoram, in tropical mixed secondary forests.**

Part used Roots.

Extraction and uses

Medicinal The roots in combination with the roots of *Abelmoschus moschatus*, *Desmodium triquetrum* and the bark of *Plumeria acuminata* are grounded into a paste and mixed with *golmori* (3,5,7 globes) and *Allium sativa* (1-2 clones). The paste is made into pills. One pill is taken three times per day for a week as an effective remedy against inflammatory glands (*Hrilawn*).

Notes The allied species, viz., *Desmodium gangeticum* DC. and *D.motorium* (Houtt.) Meer. = *D.gyrans* (L.)DC. can be used in combination with *D.triquetrum* (L.)DC. for the same purpose.

Desmodium triflorum (Linn.) DC.FBI 2:173.1876; DEP 3:84.1890; BBO 266.1922; IMP 1:760.1935; FA 2:60.1938; GIMP 94.1956; WI 3:42.1953; FTS 1:164.1981; UPI 168.1986; DIMP 175.1992; ADPR 163.1994; IMP 2:323.1994; MPM 61.1996.

Family Fabaceae.

Local name **Bawngek-hlo** LR

Botanical description A small caespitose trailing herb, rooting at the nodes; stem covered with fine hairs forming a close mat over the ground; leaves 3-foliolate, obovate, emarginate, 0.5 cm across; base acute; flowers minute, white or pink, 1-3 together, axillary; pods small, brown, curved, 3-5 joints, pubescent.

Fl. August-November **Fr.** December-January.

Location & altitude On roadsides near Mualbu Kawnpui.

Alt. 450 m.

Associates & ecology *Chromolaena odorata, Mikania micrantha, Osbeckia chinensis*, on dry sandy soil in open waste places.

Distribution Cosmopolitan in the tropics; Kumaon and Kashmir, throughout the plains of India, Assam and Tripura; **frequent in Mizoram in waste places and on roadsides.**

Part used Whole plant.

Extraction and uses

Medicinal 1) The plants are boiled and the water is taken for kidney trouble and urinal problems.
2) Juice of fresh leaves is applied on wounds and abscesses.

Notes It is a good soil binder as well as fodder.

Desmodium triquetrum (Linn.) DC. FBI 2:163.1876; FFBB 1:384.1877; IT 224.1906; FA 2:56.1938; GIMP 95.1956; WI 3:42.1953; FTS 1:165.1981; UPI 168.1986; FFM 1:299.1985; DIEME 72.1991; MPM 61.1996 (**Pl.27, P.53**).

Family Fabaceae.

Local name **Arhrikreh** (M); **Taumsatha** (B).

Botanical description Sub-erect undershrub to 2.5 m; branches triquetrous; leaves 1-foliolate; leaflets ovate-lanceolate, 10-12 cm long, acute; base rounded or cordate; petiole broadly winged, cuneate, narrowed to the base; nerves 12-18; stipels adnate; flowers purplish-pink, in terminal panicles; pods small, 2.5 cm long, flat, 6-8 joints, densely hairy, nearly square.

Fl.: August-September. **Fr.:** December-March.

Location & altitude Perhsang, near Tuipuibari.

Associates & ecology *Desmodium gyroides, Erythrina stricta, Callicarpa arborea*, on sandy soil in mixed bamboo forests.

Alt. 450 m.

Distribution China, Sri Lanka, Bangladesh, Myanmar, Malaysia and N.Australia; North-East India; **fairly common in Mizoram in wastelands and secondary bamboo forests**

Part used Roots and leaves.

Extraction and uses :

- Medicinal
- 1) The roots in combination with that of *Desmodium gangeticum* are used as ingredients for the treatment of inflammation and fever in the form of decoction.
 - 2) The leaves are boiled with rice and taken for flatulence, dysentery, intestinal worms and as stomachic.
 - 3) The leaves are cooked with chicken and the soup is prescribed to stop intoxication.
 - 4) The leaves with that of *Costus speciosus* are crushed and mixed with fatty oil and applied on skin diseases and otorrhoea.
 - 5) Dry leaves are grounded to powder and applied on animal-sore to kill worms.

Desmos chinensis Lour. RBSI 12(2):78.1938; WI 3:43.1952; GIMP 95.1956; FJ 1:63.1981; FTS 1:83.1981; FFM 1:66.1985; UPI 169.1986. *Unona discolor* Hook.f.& Thoms. FBI 1:56.1872; FA 1:35.1934.

Family Annonaceae.

Local name **Minzekchet** (Bm).

Botanical description An erect shrub with scandent branches or sub-scandent; shoots pubescent; leaves 3-4 x 9-12 cm, oblong-lanceolate, acuminate; base rounded; 10-12 pairs; flowers greenish-yellow, axillary, often solitary; fruits constricted or joints; seeds 2-6.

Fl. : May-June. **Fr.** : July-November.

Location & altitude Chikha forest; Nengpui wildlife sanctuary, etc.

Associates & ecology *Baccaurea ramiflora*, *Chasalia* sp., *Hedychium* spp., on sandy-loam soil in dense primary forests as undergrowth.

Alt. 200-500 m.

Distribution Bangladesh and Malaysia; west and south India and North-East India; **common in Mizoram, in tropical wet evergreen forests.**

Part used Roots.

Extraction and uses

- Medicinal
- 1) The roots with those of *Morinda angustifolia*, *Ardisia paniculata* and the leaves of *Desmos longiflora* are grinded on grindstone and the paste is collected in a splitted bamboo-culm. The paste is made warm in the fire and gently applied externally on chronic-sore.
 - 2) Poultice of leaves is used for sore, and at the same time, infusion of leaves is taken internally @ 1/2 cup (50 ml) once daily.

Desmos dumosus (Roxb.) Safford, RBSI 12(2):78.1938; FTS 1:84.1981; FFM 1:67.1985; UPI 169.1986. *Unona desmos* Roxb. Fl 2:670.1832; FBI 1:59.1872; IT 16.1906; FA 1.35.1934.

Family Annonaceae.

Local name **Sama** (B); **Zunin-damdawi** LR.

Botanical description A scandent shrub; young parts rufous-pubescent; bark dark, rough; leaves alternate, elliptic-oblong or lanceolate, 3-6 x 10-22 cm, acuminate; midrib and petiole covered with brownish hairs; nerves 15-22 pairs, arcuate, parallel; petiole c. 1 cm long; flowers yellow, solitary, pendulous, axillary; fruits constricted between joints, up to 12 cm long, warty.

Fl.: August-September. **Fr.:** October-February.

Location & altitude Forests of W.Phulpui, Chikha, etc.

Alt. 350-700 m.

Associates & ecology *Desmos chinensis*, *Castanopsis* spp., *Spondias pinnata*, *Hedychium* spp., on sandy-loam soil in dense forests as an undergrowth.

Distribution South China, Singapore, Bangladesh, Myanmar and Thailand; north-west India and North-East India; **frequent in Mizoram in tropical wet evergreen forests.**

Part used Root-bark

Extraction and uses :

Medicinal The root-bark is grinded on grindstone and the paste is collected in a cup of water. Two teaspoonfuls (10 gms) of sugar is added to the solution and drunk @1/2 cup (50 ml) 2 times per day*as an effective remedy against dysuria and stranguary.

Reported for the first time.

Desmos longiflorus (Roxb.) Safford, FJ 1:63.1981; FTS 1:84.1981; FFM 1:67.1985. *Unona longiflora* Fl 2:668.1832; FA 1:34.1934 (**Pl.28, P.54**).

Family Annonaceae.

Local name **Chi-ri-pu** (Bm).

Botanical description A small tree to 4 m high; bark dark and glabrous; leaf - buds golden silky; leaves elliptic-oblong, 4-5 x 15-22 cm, acuminate, glossy above, pale blue beneath; flowers red, axillary, drooping; fruits moniliform, reddish below, up to 10 cm long, elongate, acuminate, curved at the apex.

Fl.: November-January. **Fr.:** March-April.

Location & altitude On river bank of Kawrawng, Ngengpui Wildlife Sanctuary.

Alt. 225 m.

Associates & ecology *Terminalia myriocarpus*, *Pithecellobium heterophyllum*, *Phrynium capitatum*, on cleyey-loam soil in marshy places.

Distribution Bangladesh, North-East India; **rare in Mizoram, in tropical wet evergren forests.**

Part used Roots, leaves.

Extraction and uses

Medicinal 1) It constitutes one ingredient for the treatment of chronic-ulcer.
2) (same as *Desmos chinensis* Lour)

3) *Bawm* medicineman prescribes decoction of leaves for asthma.

Reported for the first time.

Dillenia indica Linn. FBI 1:36.1872; FFBB 1:19.1877; DEP 3:113.1890; IT 3.1906; BBO 6.1921; IMP 1:53.1935; FA 1:10.1934; RBSI 12(2) : 77.1938; WI 3:64.1952; GIMP 97.1956; TFM 1:188.1972; FTS 1:101.1981; FFM 1:52.1985; UPI 173.1986; DIFME 73.1991; DIMP 176.1992; TIMP 2:140.1992; CCENEI 94.1994; MPM 62.1996.

DILLENIA.

Family Dilleniaceae

Local name **Kawrthindeng** (M); **Ai-tlang** (P).

Botanical description A medium-sized evergreen tree with crooked stem and dense oval crown; bark dark-brown; blaze reddish-brown, peeling off in flakes; leaves crowded at branchends, oblong-lanceolate, 5-12 x 14-30 cm, acute, serrate; nerves close set, 30-40 pairs, ending in serratures; base acute; petiole winged; flowers white, fragrant, appearing with the leaves; fruits spherical, 8-12 cm across, fleshy within; seeds many, compressed.

Fl.: May-July. **Fr.:** October- March.

Location & altitude River banks of Teirei, Tuichawng, Khawthlangtuipui, etc.

Alt. 20-900 m.

Associates & ecology *Terminalia myriocarpas*, *Dipterocarpus pillosa*, *Lagerstroemia speciosa*, in moist shady places along river banks in dense forests.

Distribution S.China, Sri Lanka, Bangladesh, Myanmar, Thailand, Laos Vietnam and Malaysia; throughout India; **very common in Mizoram in tropical wet evergreen forests, particularly along river banks.**

Part used Bark, blaze.

Extraction and uses

Medicinal 1) Decoction of the bark is taken internally for diarrhoea and dysentery @1/2

cup (50 ml) twice daily. The medicine is also effectively used in the case of animals (eg. dogs).

2) The blaze is ground to powder and the powder is applied externally on ulcers and sores.

3) The mucilaginous substance of the fruit is mixed with that of the spadix of *Musa* spp. and the mixture is taken with water for cholera.

Material culture 1) The wood is brown and sometimes used for building houses.
2) The wood is good for firewood and charcoal-making.

Dillenia pentagyna Roxb. FBI 1:38.1872; FFBB 1:21.1877; DEP 3:114.1890; IT 4.1906; BBO 7.1921; FA 1:11.1934; RBSI 12(2):77.1938; WI 3:65.1952; FTS 1:102.1981; FFM 1:53.1985; UPI 173.1986; DIFME 74.1991; CCENEI 94.1994. **DILLENIA.**

Family Dilleniaceae.

Local name **Kaihawl, Kawmkaw (M); Hnahkhauh (L).**

Botanical description A large deciduous tree with straight bole; bark greyish-white; leaves very large in young plant, up to 120 cm long, crowded at branchends, oblanceolate or obovate, acute, 1-20 x 20-60 cm, sharply dentate; base attenuate; flowers in fascicles of 5-8, bright yellow; fruits sub-globose c. 1.5 cm across; seeds ovoid.

Fl.: March-April. **Fr.:** May-June.

Location & altitude Between Zodin and Tlabung; on roadside to Marpara c. 1 km from Tlabung; also in Saitual, Biate, etc.

Associates & ecology *Picrasma javanica*, *Sapindus pinnata*, *Artocarpus lakoocha*, in both dry-compact soil and moist loamy soil in primary forests.

Distribution China and Malaysia, almost throughout India; **quite frequent in Mizoram, in tropical evergreen and semi-evergreen forests.**

Part used Bark and wood.

Extraction and uses

Medicinal 1) Decoction of the bark is taken internally for diabetes and also given to cancer patients @ 2-4 tablespoonfuls (20-50 ml) twice daily.
 2) Decoction of the bark is taken as an effective cure for colic and stomach-ulcer @ 1/4 cup (25 ml) twice daily.
 3) The paste made of bark is applied externally on rheumatic pains.
 4) The leaves are boiled and the water is
 (i) used for washing hair against dandruff;
 (ii) taken internally as an effective remedy against pile trouble. The medicine is taken 1/2 cup (50 ml) twice daily in morning and evening for 7 days.

Material culture The wood is reddish-grey and moderately hard and used for construction purposes.

Veterinary The bark is grounded to powder and the powder is mixed with pig's food for the cure of pig's mange and illnesses.

Dinochloa compactiflora (Kurz.) Mc Clure. FA 5:23.19940; WI 3:67.1953; FTS 2:507.1983; UPI 173.1986. *Meleocalamus compactiflorus* Benth. FBI 7:409.1897; Mon : Bam : 82.1992. *Pseudostachyum compactiflorum* Kurz. F. FBB 2:567.1877.

Family Poaceae

Local name Sairil (M)

Botanical description A tufted staggling evergreen bamboo, arching over tall trees; nodes thickened; internodes up to 60 cm long; culm sheaths 7 x 15 cm, truncate at throat, dilated at the base, covered with adpressed hairs; leaves oblong or lanceolate, acuminate, scabrous, 2.5-5 x 15-25 cm; base rounded; flowers small dense heads on large panicles; fruits (caryopsis) ovoid, 2-3.5 cm across.

Fl. & Fr.: Not seen.

Location & altitude Dampa Tiger Reserve; Palak forest, etc.

Alt. up to 2000 m.

Associates & ecology *Trachycarpus martiana*, *Calamus erectus*, *Pallaquium polyanthum*, *Engelhartia spicata*, in moist dense forests.

Distribution Bangladesh and Myanmar: east Bengal to Bhutan, Assam and Tripura; **frequent in Mizoram in tropical wet evergreen forests and sub-tropical dense forests.**

Part used Stem.

Extraction and uses :

Medicinal 1) The outer skin is scraped off and applied externally on cuts and bandaged to stop bleeding.
2) The sap oozing out of the cut-stem is given to children for influenza, cough and chest complaints.

Material culture 1) The fibres are very flexible and lasting and used for tying purposes.
2) The fibres are widely employed in cane & bamboo works for furniture, decorative articles, handles, hats, baskets, etc.

Notes Cane population has been reduced to a great extent due to heavy extraction for cane works in cottage industries.

Diplazium maximum (D. Don.) C. Chatt. FTS 1:53.1981; FN 312.1988. *D. latifolium* Moore, HFBI 187.1883. *Athyrium dilatatum* (Bl.) Holt. FFMS 138.1982; CIP 132.1984.

Family Athyriaceae.

Local name **Chakawk-ei-chi** (M).

Botanical description A large terrestrial fern with stout stock, erect; scales black; fronds erect; leaves up to 2 m high, furrowed above, dark-brown hairs on dorsal side; pinnae bipinnatifid, 7-10 pairs, lanceolate, dentate, segments half way down the rachis; base truncate; sori along acroscopic veinlets.

Fr. (Spore) - May-August

Location Dampa Tiger Reserves, near Teirei.

& altitude

Alt. 80 m.

Associates & ecology *Alpinia bracteata*, *Dendrocnide simata*, *Macaranga indica* in moist shady place on loamy-clay soil, as an undergrowth.

Distribution	China, Malaysia, Taiwan, Myanmar, Indonesia, Philipines and North Australia; south India and North-East India; very common throughout Mizoram in moist tropical evergreen forests.
Part used	Root-stock.
Extraction and uses	
Medicinal	The root-stock is crushed with that of <i>Angiosteris evecta</i> , <i>Colysis hemionitides</i> , and stems of <i>Rhaphidophora decursiva</i> and <i>R.hookerii</i> and made into a paste. The mixture (paste) is applied externally on fracture of bone and then bandaged. The medicine is changed every alternate day. Three to four bamboo splints are provided to support the fracture. Fractured bones are set to the original position by pulling and pushing mechanism, in the same way that an orthopaedic surgeon does and the medicine is bandaged.
Food	The young leaves are eaten fried or cooked or boiled with meat.

Reported for the first time.

Dipterocarpus turbinatus Gaertn.f. FBI 1:295.1874; FFBB 1:139.1877; DEP 3:161.1890; FA 1:134.1934; IMP 1:283.1935; RBSI 12(2):82.1938; WI 3:94.1952; GIMP 100.1956; FTS 1:360.1981; UPI 180.1986; MPM 64.1996.

COMMON GURJUN TREE.

Family	Dipterocarpaceae.
Local name	Lawngthing (M).
Botanical description	A lofty handsome tree with a clean cylindrical bole; bark grey, rough; leaves ovate-lanceolate 6-14 x 12-30 cm, acute or acuminate; base rounded or slightly cordate, flowers white or pink coloured, more or less one-sided, in few flowered (3-5) on short racemes arising from the axils of fallen leaves; fruits ovoid, c. 2 cm long; wings 2.5-3.5 x 10-12 cm, acute; veins like a tree, with one prominent nerve and two basal smaller nerves.
	Fl. April. Fr. May.

Location & altitude Near Palak Lake, Tuichawng forest, Pukzing-Marpara forests, etc. Alt. 300-600 m.

Associates & ecology *Dipterocarpus pillosa*, *Terminalia* spp. *Duabanga grandiflora*, *Amoora wallichii*, in dense tropical moist forests.

Distribution Chittagong hill tracts of Bangladesh, Myanmar and Singapore; eastern Bengal, Asam, Tripura and Andamans; **fairly frequent in Mizoram in tropical wet evergreen forests.**

Part used Oleo-resin and wood.

Extraction and uses:

Medicinal *Chakmas* use the Oleo-resin in ulcers and skin diseases.

Material culture 1) The wood is pale-brown, water resistant and preferred for window frames.
2) The wood is used for canoes, boats, hence the name (Lawng boat; thing=tree).

Dracaena spicata Roxb. FFBB 2:515.1877; DEP 3:193.1890; FBI 6:328.1892; RBSI 12(2):147.1938; FFM 2:868.1987. *Pleomale spicata* (Roxb.) N.E.Brown FTS 2:425.1983 (**Pl.29, P.56**).

Family Dracaenaceae.

Local name **Phunhring** (M); **Chamthing** (B)

Botanical description An erect shrub to 1 m high; root fusiform, white and fleshy; stem annular; leaves crowded at apex, elliptic-lanceolate, finely acuminate, shining above, 3-5 x 14-25 cm; petiole 4-6 cm long; flowers greenish-yellow, in strong peduncled erect raceme, c. 25 cm long, fragrant, fascicled on short pedicelled; fruits pasiform, 1-3 lobed, fleshy, crimson, 1-seeded.

Fl.: March **Fr.:** April-June

Location & altitude Lungkulh virgin forest, Chikha forest, etc. Alt. 200-850 m.

Associates & ecology *Clerodendrum bracteata*, *Cinnamomum verum*, *Garcinia* sp. in moist shady places and river banks in dense forest as undergrowth.

Distribution Bangladesh, Myanmar; Andamans and Nilgiri hills and North-East India; **very common in Mizoram in tropical evergreen forests.**

Part used Roots.

Extraction and uses

Medicinal 1) The fleshy white root is sweetish; it is chewed and the juice is swallowed for stomachache.
2) The root is ground to powder with the barks of *Bombax ceiba* and *Sterculia villosa*. A teaspoonful (5 gms) of the powder is mixed with 5 gms of sugar in 2-3 cups of water (200-300 ml) and stirred thoroughly. The medicine is taken internally for micturation @ 1/2 cup (50 ml) 3 times per day.

Notes The plant is cultivated as house-plants.

Reported for the first time.

Dysoxylum gobara (Buch. - Ham.) Merr. FJ 1:123.1981; FFM 1:209.1985. *D. procerum* Hiern. FBI 1:507.1875; FFBB 1:214.1877; DEP 3:199.1890; IT 138.1906; FA 1:231.1934; RBSI 12(2):86.1938; WI 3:121.1953; CCENEI 254.1994.

Family Meliaceae.

Local name **Thingthupui (M)**

Botanical description A medium-sized evergreen tree; bark grey; young shoots slightly pubescent; leaves paripinnate or imparipinnate; leaflets 5-12, alternate or opposite, elliptic-oblong, abruptly acute or acuminate, 7-10 x 15-25 cm; base rounded; flowers creamy-white, fragrant, on short bracteolate pedicels, in ample panicle, as long as leaves; fruits pyriform-globose, 5 cm across; seeds 2-3, black.

Fl: June-July. **Fr:** August-December.

Location & altitude Both wild and cultivated. Dampui forest near Mamit, W.Rotlang, Champhai roadside, etc. Alt. Above 800 m.

Associates & ecology *Micromelum minuta*, *Macaranga paniculata*, *Styrax polyspermum*, on slopes of hill forests.

Distribution	Myanmar, endemic to North-East India: common throughout Mizoram, in sub-tropical hill forests and tropical semi-evergreen forests.
Part used	Tender twigs, leaves, flowers and wood.
Extraction and uses :	
Medicinal	The tender twigs and leaves are boiled and the water is taken internally for diarrhoea and dysentery @ 1/4 cup (25 ml) twice daily for 2-3 days.
Food	Tender twigs, leaves and flowers are boiled and the water is discarded. It is eaten either boiled or fried.
Material culture	Wood is used for firewood.
Notes	The edible parts emit strong foetid smell while fresh or cooked.
Remarks	The wood is bright red, moderately hard and used for canoes (Watt, 1890); house building and boats (Kanjilal, <i>et al.</i> , 1934).

Reported for the first time.

Elaeagnus caudata Schlecht ex Momyyama, CCENEI 100.1994. *E.conferta* Roxb. FI 1:460.1820; FFBB 2:331.1877; FTS 1:404.1981; FFM 2:752.1987. MPM 67.1996; *E. latifolia* Linn. FBI 5:202.1886; DEP 3:205.1890; IT 547.1906; IMP 3:2175.1935; FA 4:114.1940; RBSI 12(2) :129.1938; WI 3:135.1953; GINIP 105.1956; UPI 191.1986; DIMP 184.1992; TIMP 3:183.1994.

BASTARD OLEASTER

Family	Elaeagnaceae.
Local name	Sarzukpui (M); Chara (Ma).
Botanical description	A staggling or scandent shrub with blunt spines; bark greyish and rough; leaves alternate, elliptic, acute, undulate, 2-4 x 5.5-12 cm, glossy above, silvery beneath; flowers straw coloured, few to many flowered in axillary pedunculate, scented; fruits elliptic-oblong, 2.5 - 4 cm long, succulent, red or yellow when ripe, edible.

Fl.: November-December. **Fr.:** March-May.

Location & altitude Cultivated throughout Mizoram, rare in the wild. Bunglemun, Diltlang, Khawhai, etc. Alt. Up to 1500 m.

Associates & ecology *Lonicera japonica*, *Ixora* sp., near streams in shady places.

Distribution China, Sri Lanka and Myanmar; Sub-tropical and temperate Himalaya from Kumoan to North-East India; **cultivated throughout Mizoram; rare in the wild near streams in secondary forests.**

Medicinal 1) Infusion of root is taken internally against retained placenta. The medicine is drunk 1/2 - 1 cup (50-100 ml) twice daily for 1-2 days.
2) Juice of crushed root is also taken for easy labour and a cure after childbirth.
3) Infusion of leaves is taken internally for strengthening the function of uterus. The medicine is taken as tea after childbirth as tea.

Notes The fruit is edible and sold in local markets during April-May.

Elaeagnus pyriformis Hook. f. FBI 5:202.1886; IT 547.1906; FA 4:115.1940; FTS 1:404.1981; UPI 191.1986; FFM 2:752.1987; CCENEI 100.1994.

Family Elaeagnaceae.

Local name **Ramsarzuk (M); Zut (P).**

Botanical description A scandent or staggling shrub; branches spreading, brown; leaves elliptic, acute, 2-3 x 3-7 cm, shining above silvery beneath; base cuneate; flowers pale or greenish-yellow in axillary clusters; fruits pyriform, smaller than *E. caudata*, narrowed at both ends, yellowish when ripe.

Fl. November-January. **Fr.** January-April.

Location & altitude On river bank of Amsuri, Tuipuibari; between Chamdun Project-I and Chamdun village, S.Mizoram. Alt. 100-250 m.

Associates & ecology *Leea crispa*, *Lagerstroemia speciosa*, *Amomum dealbatum*, *Morinda* sp., on loamy soil near rivers in moist shady places.

Distribution Myanmar; North-East India; **rare in Mizoram, in tropical evergreen forests.**

Extraction and uses :

Medicinal 1) The roots are grinded on grindstone and the paste is collected and the roots dipped into a cup of water. The water is drunk against appendicitis.

A slightly scorched single leaf is also banded on the waist of the patient.

Notes *Pang* medicineman claims that the medicine is effective and requires no clinical operation.

Elsholtzia blanda (Benth.) Benth. FBI 4:643.1885; FA 3:516.1939; EFPN 3:152.1982; FTS 2:321.1983; UPI 194.1986; FFM 2:696.1987; DIFME 82.1991; DIMP 186.1992; CCENEI 102.1994; MPM 68.1996 **(Fig.14)**.

Family Lamiaceae.

Local name **Nauhri** (Ma).

Botanical description An aromatic undershrub, gregarious; branches quadrangular, greenish; leaves opposite, peltate, elliptic-lanceolate, serrate, acuminate, 1-3 x 3-10 cm; base narrowed to the petiole; flowers greenish-white, in axillary-terminal spikes up to 8 cm long; fruits ellipsoid.

Fl.: September-October. **Fr.:** October-January.

Location Evergreen forest between Tuipang and Zawngling, S.Mizoram.

& altitude

Alt. 1500 m.

Associates & ecology *Phlogacanthus tubiflorus*, *Piper* sp., *Clerodendrum* sp., *Quercus* spp., etc. as an undergrowth near streamlets in primary forest

Distribution Myanmar, Ava and Sumatra; Central and eastern Himalayas from Nepal to Sikkim, Orissa and North-East India; **not common in Mizoram, restricted to high altitude in sub-tropical hill forests.**

Part used Aerial part

Extraction and uses :

- Medicinal 1) Infusion of aerial part of plant is used for children's disease, called '*Nau-hri*', a combination of fever, cholera, skin diseases and inflammation. The medicine is taken @ 10 ml twice daily.
2) Poultice of leaves is also llused for inflammatory glands.

Elsholtzia ciliata (Thunb.) Hyland, DIMP 187.1992. *E. cristata* Willd. FBI 4:645.1885; GIMP 106.1956; UPI 194.1086 (Fig.15).

Family Lamiaceae

Local name **Ram-lengser** LR.

Botanical description An erect fragrant herb; stem and brached quadrangular, hispidous; leaves peltate, lanceolate, serrated on upper half, acuminate, 1.5-2.5. x 3-6 cm, base cuneate; petiole up to 4 cm long, flowers villous purplish-brown on terminal oblong spikes; fruits in numerous millets, brown, oblong, very small.

Fl.: February-March. Fr.: April

Location Theiri, Tuisih.
& altitude

Alt. 1320 m.

Associates & ecology *Maesa montana*, A.DC., *Laggera alata* Schult.-Bip., *Flemingia macrophylla* (Willd.) O.Ktze., on sandy soil in wastelands and in one year old *jhums*.

Distribution China, Japan and western Tibet; throughout Himalayas and Assam; **common in wastelands in sub-tropical montane forests around Tuipang, Theiri and Tuisih in South-eastern part of Mizoram.**

Part used Whole plant.

Extraction and uses :

Medicinal Juice of leaves is used in diuretic, cough and cold.

Notes The fruiting spike looks like that of *Elsholtzia communis* Diels. (*Lengmaser/Lengser*) which is cultivated in *jhums*. *E.ciliata* being occurred in the wild, it is called '*Ram-lengser*' (ram = forest).

Embelia nutans Wall. Fl 2:291.1824; FBI 3:577.1882; IT 1417.1906; FA 3:171.1939; UPI 194.1986; FFM 2:557.1987.

Family Myrsinaceae.

Local name **Nisarihthing** (Bm).

Botanical description An woody climber; stem lenticellate; leaves ovate-lanceolate, 2-3 x 4-7 cm, serrate above middle portion, bluntly acuminate; base rounded or acute; petiole short; flowers small, 5-merous; fruits globose, small.

Fl.: February. Fr.: April-May.

Location & altitude Mampui tlangnuam, Ngengpui wildlife sanctuary, etc.

Alt. 300-1000 m.

Associates & ecology *Lasianthus wallichii*, *Parabarium micrantha*, *Globa* spp., *Hedychium* spp., on sandy-loam soil in primary forests as an undergrowth.

Distribution Bangladesh and Myanmar; North-East India; **very common in Mizoram, in tropical evergreen forests.**

Part used Leaves.

Extraction and uses :

Medicinal *Bawms* crushed the leaves and make it into a paste, and the paste is applied on fresh cuts and wounds. The medicine is freshly applied everyday for 7 days, hence the name (ni = day; sarih = 7; thing = plant).

Liquorice The leaf tastes liquoric and is used for brewing local liquor.

Embelia subcoriacea (Cl.) Mez. FFM 2:558.1987; DIFME 83.1991; *E.nagushia* D. Don. var. *subcoriacea* FBI 3:516. 1882; IT 417,1906; FA 3:172-3.1939; UPI 194.1986 (Pl.29, P.57).

Family	Myrsinaceae.	
Local name	Tling (M); Theima-tling (P).	
Botanical description	A large scandent shrub; stem rough, grey; leaves elliptic oblong, 8-10 x 22-24 cm, shortly acute, nerves obscured, anastomosing; base acute, petiole up to 3 cm long; flowers axillary, usually from old wood, greenish-white; fruits depressed globose.	
	Fl.: May-June. Fr.: November-December.	
Location & altitude	Vathuampui forest (towards Chamdur village).	Alt. 300 m.
Associates & ecology	<i>Garcinia pedunculata</i> , <i>Cyathula prostrata</i> , etc. on shady loose soil in primary forest.	
Distribution	Nepal, Sikkim and North-East India; sparsely distributed in Mizoram, in tropical evergreen forests.	
Part used	Leaves	
Extraction and uses :		
Medicinal	The leaves are boiled and the water is drunk as tea and the water is also used for bathing a woman's injury on childbirth.	
Notes	The leaves taste sour and the fruits are edible.	

Entada pursaetha DC. FFM 1:338.1985; DIFME 83.1991; DIMP 189.1992; TIMP 2:62.1992; CCENEI 105.1994; *E. pursaetha* DC. ssp. *sinohimalyensis* Grierson & Long. NPEI 105.991. *E. phaseoloides* (Linn.) Merr. WI 174.1953; GIMP 107.1956; FTS 1:132.1981; UPI 196.1986; MPM 70.1996. *E. scandens* Benth. FFB 1:416.1877; FBI 2:287.1878; DEP 3:245.1890; IT 26.1906; BBO 319.1922; FA 2:149.1938; IMP 2:906.1935; RBSI 12 (2) : 92.1938.

ELEPHANT CREEPER, MACKEY BEAN, GARBEE-BEAN.

Family	Mimosaceae.
Local name	Kawi (M); Senlen (Ma).
Botanical description	Large woody climber; stem gnarled; branches terete; bark greyish-brown; leaves bipinnate; main rachis grooved; leaflets 4-6 pairs, oblong-obtuse or acute, 2-3 x 4-6 cm, shining above; flowers creamy-white to pale yellow, fragrant, in axillary or terminal paniced spikes; pods woody, up to 130 cm long (largest fruit in India), falcate or curved, constricted between the seeds; seeds compressed, discoidal, shining on edge, brownish-orange powder on the centre, very fragrant. Fl.: March-April. Fr.: March-May (next year).
Location & altitude	Between Kawrthah and Rengdil below roadside, etc. Alt. 700 m.
Associates & ecology	<i>Duabanga grandiflora</i> , <i>Ficus</i> sp., <i>Toona ciliata</i> , <i>Chisocheton paniculata</i> , etc. in primary forest.
Distribution	Nepal, Sri Lanka and Myanmar; Central and eastern Himalayas, Western Ghats, S.India, Andamas and North-East India; common throughout Mizoram, particularly in tropical semi-evergreen forests.
Part used	Seeds, twings.
Extraction and uses :	
Medicinal	1) The seeds are ground into a paste and mixed with egg-yolk very mildly and made into poultice. The poultice is used for hernia. 2) The seeds are soaked in water and the water is dropped into the nostril against water-leech. 3) The young shoots and leaves are boiled and the water is used for bathing against convulsions.
Food	The young twigs are boiled with meat and taken as food.
Folk-game	The <i>Kawi</i> bean is used for playing an indigenous folk game. The game played by girls is called " <i>Inkawi-bah</i> " and played by boys is known as " <i>Inkawi-hmawk</i> ".

Notes Department of Arts and Culture, Govt. of Mizoram organised this kind of game in 1996 to revive traditional folk-games in modern times.

Eryngium foetidum Linn.FA 2:340.1938; RBSI 12(2):99.1938; WI 3:194.1952; GIMP 110.1956; FTS 2:194.1983; UPI 203.1986; DIFME 84.1991; CCENEI 106.1994.

Family Apiaceae.

Local name **Bahkhawr** (M).

Botanical description A small diffuse herb, strongly aromatic; roots fusiform; stem green; leaves simple, 1-2 x 5-10 cm, spatulate, spinous-toothed; flowers white, in heads; bracts spinulose; fruits ellipsoid; seeds semi-ternate.

Fl.: April-May. **Fr.:** November-January.

Location & altitude They occur chiefly near human settlements as that of *Scorpioidia dulcia*, in waste places at Aizawl, Durtlang, Samtlang etc. and sometimes cultivated in gardens.
Alt. 600-1200 m.

Associates & ecology *Lindernia ruelloides*, *Achyranthes aspera*; in dry soil and in moist shady places.

Distribution Native of tropical America and West Indies; Assam and Tripura; **frequent in Mizoram, in private gardens and in waste places.**

Part used Whole plant.

Extraction and uses :

Medicinal

- 1) The roots are eaten against dog-bite and snake-bite.
- 2) The plant is crushed and the juice is taken internally for inflammatory glands.
- 3) The leaves are crushed and applied to the head in vertigo and in swollen glands.
- 4) The leaves are eaten raw against pinworms.

Food

- 1) The leaves are used as flavour in boiled meat or fish.
- 2) The leaves are ground with chicken liver as curry or chutney.

Erythrina stricta Roxb. FI 3:251.1832; FBI 2:189.1876; FFBB 1:369.1877; DEP 3:270.1890; IT 227.1906; BBO 285.1922; FA 2:70.1938; WI 3:196.1952; GIMP 111.1956; FFM 1:301.1985; UPI 204.1986; DIFME 84.1991; DIMP 195-6.1992; CCENEI 106.1994 (**Pl.30, P.58**).

Family Fabaceae.

Local name **Fartuahpui (M)**.

Botanical description A medium-sized to large deciduous tree with conical prickles; bark yellow, corky, deeply furrowed; leaves large; leaflets 3-nate, deltoid, broader than long, 7-20 x 5-18 cm; base rhomboid-oblique, cuneate; flowers scarlet-red, secunded, crowded at branchends; fruits spindle-shaped pods, narrowed at both ends; seeds 2-3, reniform.

Fl.: February-March (while leafless). **Fr.:** March-May.

Location & altitude Dampui forest near Mamit, Thingfal-Lawngtlai, etc.

Alt. 500-1000 m.

Associates & ecology *Ficus semi-cordata*, *Bauhinia indica*, *Sterculia colorata*, in dry sandy soil in slopy secondary forest.

Distribution Chittagong hill tracts of Bangladesh, Myanmar; South India, West Bengal and North-East India; **common throughout Mizoram, most frequent in tropical semi-evergreen forests and less frequent in tropical evergreen forests.**

Part used Bark and wood.

Extraction and uses :

Medicinal 1) Decoction of coat of inner bark is taken internally for stomach ulcer @ tablespoonful (10 ml) twice or thrice daily.

Veterinary The wood or small branches are cut into c 3 cm long and made into a necklace and put on the ring of domestic animals (e.g., cattle, goat, pig) to get rid of sore-worms.

Notes Other species of *Erythrina* are identified as *E.arborescens* Roxb., *E.fusa* Lour. *E.indica* Lamk. var. *albas* Blatter & Millard; *E.subumbrans* (Hassk.) Merr and *E.variegata* Linn. *E.variegata* L. can be used as a substitute for *E.stricta*.

Ficus hispida Linn. f. FFBB 2:460.1877; DEP 3:354.1890; IT 606.1906; BBO 837.1924; IMP 3:2322.1935; RBSI 12(2):132.1938; FA 4:252.1940; GIMP 119.1956; WI 4:36.1956; TFM 3:149.1978; FTS 1:215.1981; UPI 222.1986; FFM 2:827.1987; DIFME 90.1991; TIMP 1:53.1991; DIMP 212.1992; CCENEI 112.1994; MPM 77.1996.

Family Moraceae.

Local name **Paihte-maian** (M)

Botanical description A small tree to 12 m high; all parts hispid; branchlets hairy; bark greenish-grey, warty or wrinkled; leaves ovate-oblong or sub-obovate, acute or cuspidate, 5-15 x 12-22 cm, hispid above, stiff hairs beneath, dentate; base rounded; nerves 5-10 pairs; petiole hispid; receptacles (fruits) numerous, fascicled on both the trunk and branches, in axillary pairs, obovoid, yellowish hispid when ripe, c 2 cm across, supported by 3 basal bracts.

Fl.: & Fr.: January-February.

Location & altitude On roadsides between Tlabung and Marpara; Zamuang and Bairabi; Aizawl, etc. Alt. 20-1300 m.

Associates & ecology *Callicarpa arborea*, *Macaranga indica*, *Albizia chinensis*, in dry sandy to moist loamy soils in secondary forests.

Distribution S.China, Sri Lanka, Bangladesh, Myanmar, Malaysia and N.Australia; throughout India including Andamans and the North-Eastern India; **frequent in Mizoram, in tropical secondary forests and semi-evergreen forests.**

Part used Leaves

Extraction and uses :

Medicinal 1) Seven leaves are overlapped and twisted to a conical-shape. Cold or warm water is poured in and the water that drips off from cone is used in opacities

Medicinal (1-2 drops) per day.
2) Juice of scorched leaves is dropped into the eye (1-2 drops) for ophthalmia.

Ficus semicordata Buch.-Ham. ex Smith. TFM 3:156.1978; FTS 1:219.1981; DIFME 91.1991; DIMP 214.1992; CCENEI 113.1994. *Fecunia* Buch.-Ham. ex Roxb. FI 3:561.1832; FFBB 2:461.1877; FBI 5:523.1888; DEP 3:349.1890; IT 606.1906; BBO 836.1924; IMP 3:2324.1935; FA 4:253.1940; RBSI 12(2):131.1938; GIMP 118.1956; WI 4:32.1956; UPI 221.1986; TIMP 1:40.1991; MPM 76.1996. *E. elmeri* Merr. FFM 2:832.1987.

Family Moraceae.

Local name **Theitit** (M).

Botanical description A small tree; twigs hirsute; bark red, brown; leaves elliptic to oblong-lanceolate, 4-8 x 12-30 cm. acuminate, repand-serrate, scabrid above, less pubescent beneath base very unequal, semi-cordate or semi-sagittate, with a broad round lobe on one side with 3-4 nerved; lateral nerves 8-15 pairs; male sepals 3; female sepals 4; receptacles (fruits) globose or pyriform, hispid, in pairs or clusters; fruiting branches running on the ground or arising from the trunk and main branches, often ripening underground, dark red when ripe.

Fl. & Fr.: most of the year, usually ripening in May-September.

Location & altitude Dampa wildlife sanctuary; Mini-Zoo, Aizawl etc.

Alt. 500-1000 m.

Associates & ecology *Hibiscus macrophyllus*, *Ficus hispida*, *Hedychium* spp., on sandy soil in moist shady places near streams.

Distribution S.China, Bangladesh, Myanmar, Thailand and Malaysia; Sub-Himalayan tract, Central India and North-East India; **frequent in Mizoram, in tropical evergreen and semi-evergreen forests.**

Part used Root-bark.

Extraction and uses :

Medicinal Decoction of root-bark is drunk for snake-bite.

Food Fruits are sweetish, relished and devoured by men and squirrels.

Fodder The leaves are lopped for goat's fodder.

Ficus semicordata Buch.-Ham. var. *conglomerata* (Roxb.) Kurz, FFBB 2:461.1877 (Pl.30, P.59).

Family Moraceae.

Local name Theipui (M).

Botanical description A small tree to 15 m. tall; bark dark-grey, rough and warty; leaves ovate, acuminate, 8-14 x 12-20 cm; base cordate, oblique; receptacles (fruits) pyriform, 2-3 cm diameter, sessile, tubercled, orange-red when ripe; fruiting branches hanging down from the trunk and also arising from near the base running on the ground.

Fl. & Fr.: Most of the year, ripening from May-July.

Location & altitude On roadsides between Lungrang and Chawngte; Lunglei and Buarpui; Tuirial and Seling, etc. Alt. 700 - 1200 m.

Associates & ecology *Erythrina stricta*, *Bauhinia variegata*, *Aporosa octandra*, in dry and slopy localities on sandy-rocky soils.

Distribution Chittagong hill tracts of Bangladesh, Myanmar and Vietnam; Central India and the North-East; **very common in Mizoram, particularly in tropical semi-ever-green and secondary forests mixed with bamboos.**

Part used Leaves and fruits.

Extraction and uses :

Medicinal Decoction of the leaves (in combination with that of *Byttneria pilosa* Roxb. and *Phyllanthus fraternus* Webs. and the bark of *Callicarpa arborea* Roxb.) is taken internally for jaundice and hepatitis.

The medicine is practised by *Rakhais* and *Maras* and taken @ tablespoon-ful (10 ml) twice daily.

Food Young fruits are astringent; semi-mature fruits are sour and acrid; and ripe fruits are sweet and devoured by men and squirrels.

Fodder The leaves are lopped for cattle fodder.

Reported for the first time.

Flemingea macrophylla (Willd.) Prain, WI 4:46.1956; GIMP 120.1956; FFM 1:302.1985; DIFME 91.1991. *F. congesta* Roxb. FBI 2:228.1876; FFBB 1:374.1877; DEP 3:400.1890; IT 232.1906; BBO 270.1922; IMP 1:815.1935; FA 2:90.1938. *Moghania macrophylla* Kuntze, UPI 377.1986; MPM 118.1996.

Family Fabaceae.

Local name **Tuisithing** LR.

Botanical description An erect shrub to 2 m high; stem rough, lenticellate, striate; branches angular, sulcate; leaves 3-foliolate; petiole 3-quetrous, winged, 5 cm long; leaflets ovate-acuminate, 3 x 8 cm, 3-nerved; stipules large, hispid above, pubescent along nerves beneath; flowers white, streaked with pink, sessite, branched, terminal; pods oblong, apiculate, 2 cm long, finely pubescent; seeds round, black, small.

Fl.: January-March. **Fr.:** March-April.

Location & altitude On roadsides between Theiri and Tuisih. Alt. 1600 m.

Associates & ecology *Melastoma malabathricum*, *Engelhardtia spicata*, *Chromolaena odorata*, on compact sandy loam soil in secondary open forest.

Distribution China, Sri Lanka, Myanmar, Phillipines and Malayan Island; throughout the hotter parts of India, Bihar, Asam and Meghalaya; **rare in Mizoram, found in subtropical secondary hill forests.**

Part used Roots.

Extraction and uses :

Medicinal Decoction of the root is used as external application in swellings and pain in the body.

Notes The plant is capable of fixing atmospheric nitrogen and can be used as hedgerow in farming system as botanical barrier for soil erosion control.

Remarks The plant has been used in Sloping Agricultural Land Technology (SALT) in Phillipines (Pratap & Watson, 1994).

Garcinia cowa Roxb.ex DC. FBI 1:262.1874; FFBB 1:90.1877; DEP 3:465.1890; IT 52.1906; BBO 53.1921; FA 1:105.1934; IMP 1:267.1935; RBSI 12(2) : 81.1938; GIMP 122.1956; WI 4:100.1972; FTS 1:363.1981; TFM 2:208.1983; FFM 1:106.1985; UPI 229.1986; DIFME 92.1991; CCENEI 116.1994; MPM 79.1996 (**Pl.31, P.60**).

Family Clusiaceae.

Local name **Chengkek** (M).

Botanical description A small to medium-sized tree with drooping branches; bark brownish-grey, nearly smooth; leaves elliptic-lanceolate, 2.5 - 4.5 x 7-12 cm, acute, dark green above; nerves slender, intramarginal; base cuneate; flowers yellowish, fleshy, axillary clustered. fruits globose, depressed above, yellow, 4-6 grooved, 2.5-3 cm across, crowned by persistent stigma.

Fl.: March-April. **Fr.:** May-June.

Location & altitude Forests of Tlungvel, Kawnpui, Tuirial, etc. Both wild and cultivated.
Alt. 500-1250 m.

Associates & ecology *Macaranga indica*, *Semecarpus anacardium*, *Albizia procera*, on sandy soil in tropical forests.

Distribution Bangladesh and Myanmar; Andaman Islands, W.Bengal, Bihar and North-East India; **common in Mizoram in tropical evergreen and semi-evergreen forests.**

Part used Leaves, fruits and wood.

Extraction and uses :

Medicinal 1) The leaves are boiled and the water is taken @ 1/2 cup (50 ml) twice daily

for diarrhoea and dysentery.

2) Infusion of the leaves is taken against putrid smell of the anus due to flatulence or gastritis @ three teaspoonfuls (15 ml) twice daily.

Material culture 1) The yellow gum obtained from the bark can be used as varnish for metallic surfaces.
2) The wood is greyish-white and moderately hard but perishable. It can be used as firewood.

Garcinia lanceaefolia (G. Don) Roxb. FI 2:623.1832; FBI 1:263.1874; FFBB 1:91.1877; DEP 3:470.1890; IT 52.1906; FA 1:106.1934; RBSI 12(2) : 81.1938; WI 4:103.1972; FTS 1:363.1981; FEM 1:106.1985; UPI 230.1986.

Family Clusiaceae.

Local name **Pelh, Pelh-te** (M).

Botanical description A shrub or small tree, decussately branched; leaves lanceolate, acuminate, 2-3 x 5-10 cm. glossy above, paler beneath; flowers bright-red or reddish-yellow, axillary, 2-3 together; fruits obovoid, orange-yellow, up to 2 cm long.

Fl.: February-March. Fr.: June-July.

Location Lunglei-Vanhne forests.

& altitude

Alt. 500-900 m.

Associates & ecology *Garcinia anomala*, *Litsea glutinosa*, *Psychotria calocarpa*, on humus sandy soil in primary forest as an undergrowth.

Distribution Chittagong hill tracts of Bangladesh; North-East India; **rare in Mizoram, in tropical evergreen forests confined to Lunglei District only.**

Part used Leaves and fruits.

Extraction and uses :

Medicinal Infusion of the leaves is taken as stomachic and diuretic.

Food The leaves and fruits are boiled with rice or fried and taken as vegetable.

Notes The young leaves and fruits are sold in Lunglei local market from April-July.

Reported for the first time.

Garcinia pedunculata G.Don FBI 1:264.1874; FFBB 1:92.1877; DEP 3:476.1890; IT 50.1906; FA 1:107.1934; GIMP 123.1956; BBSI 6(2-4) : 119.1964; WI 4:107.1972; FJ 1:89.1981; FFM 1:108.1985; UPI 231.1986; CCENEI 116.1994; ADPR 35.1994; MPM 79.1996.

Family Clusiaceae.

Local name **Theipumlian (M); Vawmvapui I.R.**

Botanical description A middle-sized evergreen tree with short spreading branches; bark dark-grey; leaves obovate or oblanceolate, acute, rigid, 5-10 x 15-30 cm; base narrowed to the petiole; petiole up to 3.5 cm long; nerves 10-15 pairs, anastomosing; flowers pale green, in few flowered panicles; fruits large, sub-globose, yellow when ripe, 6-10 cm across; seeds 8-10, reniform, embeded in fleshy pulp.

Fl.: January-March. **Fr.:** April-June.

Location 3-5 km east of Vairengte in the wild.

& altitude

Alt. 200 m.

Associates & ecology *Michelia champaca*, *Chukrasia tabularis*, *Tetrameles nudiflora*, on clayey-loamy soil in dense forests.

Distribution Bangladesh and Myanmar; W.Bengal and North-East India; **not common in Mizoram, in tropical wet evergreen forests of N.Mizoram.**

Part used Fruits.

Extraction and uses :

Medicinal The acidic pericarp is taken out and mixed thoroughly with water and strained through tea-strainer or clean cloth. The solution is mixed with sugar and taken internally as an allay, against dysentery and diarrhoea. The medicine is taken @ 1/2 cup (50 ml) 2 times per day.

Garcinia sopsopia (Buch-Ham.) Mabb. DIFME 92.1991. *G. paniculata* (G. Don) Roxb., Fl 2:626.1832; FBI 1:266.1874; FFBB 1:92.1877; DEP 3:476.1890; IT 51.1906; FA 1:108.1934; WI 4:107.1972; FTS 1:364.1981; FFM 1:108.1985; UPI 231.1986.

Family Clusiaceae.

Local name **Vawmva** (M); **Thei-sakei** (P).

Botanical description Medium-sized evergreen tree with decussate drooping branches; bark dark-grey, smooth; leaves opposite, elliptic-oblong, shortly acute, 8-15 x 15-30 cm, shining above, paler beneath; nerves 7-10 pairs; periole 3 cm long; flowers dull white, fragrant, borne on angled branches; fruits axillary, globose, green when young, yellow when ripe, 2.5-4 cm across; seeds 3-5, immersed in pulp.

Fl.: August-September. **Fr.:** November-March.

Location Vathuampui forest, c. 1 km west of Vathuampui.

& altitude

Alt. 300 m.

Associates & ecology *Palaquim polyanthum*, *Magnolia pterocarpa*, *Saprosma ternatum*, on slopy sandy soil in dense forest.

Distribution Bhutan and Bangladesh; eastern Himalayas and North-East India; **frequent throughout Mizoram, in tropical evergreen forests.**

Part used Bark, fruits and wood

Extraction and uses :

Medicinal 1) The powdered bark is applied on snakebite and a twig is used as snake repellent, according to *Pang* medicineman of Vathuampui (S.Mizoram).
2) The fruit is sour and eaten with relish.

Material culture The wood is greyish-brown, moderately hard and used for construction purposes.

Reported for the first time.

Gardenia coronaria Ham. FFBB 2:43.1877; FBI 3:117.1980; RBSI 12(2) : 100.1938; FA 3:55.1939; WI 4:112.1956; FTS 2:48.1983; UPI 231.1986. **(Pl.31, P.61)**

Family Rubiaceae.

Local name **Rul-hlah** LR; **Ragoit-phul-gait** (C).

Botanical description A tree to 10 m high with oval or spherical crown; bark grey, rough, leaves elliptic-ovate, acuminate, 4-8 x 8-20 cm, undulate; nerves 15-20; base attenuate; flowers white changing to yellow, fragrant; fruits ovoid or ellipsoid, 3-4 x 6-8 cm, 5 ribbed or angled, woody, yellow when ripe.

Fl.: August-September. **Fr.:** December.

Location Forest edge in Chamdur project-II, S.Mizoram.

& altitude

Alt. 210 m.

Associates & ecology *Lagerstroemia speciosa*, *Stereospermum colais*, *Musa* spp., on brown loamy-soil in primary forests.

Distribution Andaman Islands and Assam, cultivated in Tripura; **wild but rare in Mizoram in tropical evergreen forests.**

Part used Roots and leaves.

Extraction and uses :

Medicinal 1) Infusion of roots and leaves are taken internally against snake-bite @ (50 ml) twice daily.
2) The roots taken on Tuesday or Saturday only can be used as snake repellent, according to *Chakma* snake-catcher.

Gelsemium elegans Benth. FFBB 2:249.1877; IT 476.1906; RBSI 12(2) : 112.1938; FA 3:314.1939; WI 4:123.1972; UPI 233.1986; FFM 2:627.1987; MPM 80.1996 **(Pl.32, P.62).**

CHINESE GELSEMIUM.

Family Longaniaceae.

Local name	Hnamtur (M); Chamai (Ma)	
Botanical description	An evergreen scandent shrub; bark thick, warty and grey; wood vessels numerous, fibrous; leaves opposite, ovate-acuminate, 4-8 x 9-12 cm, thin, membranous; lateral nerves 5-6, distant; base rounded or oblique; flowers golden yellow, in axillary trichotomous cymes; fruits inflated, 2 celled; seeds oblong, numerous.	
Location & altitude	Biate, Vantlang, Mampui, etc.	Alt. Above 800 m.
Associates & ecology	<i>Quercus</i> spp., <i>Eurya serasifolia</i> , <i>Measa indica</i> , on sandy-loamy soil under shady forests as an undergrowth.	
Distribution	S.China and Myanmar; confined to North-East India; frequent in Mizoram at higher altitudes above 800 m in sub-tropical and tropical hill forests.	
Part used	Root-bark.	
Extraction and uses :		
Medicinal (Veterinary)	1) The root-bark is dried and ground to powder and the powder is added to the pigfed for pig's cough, fever and mange. 2) Juice of root-bark is applied to tiger-bite.	
Notes	The roots and leaves are deadly poisonous to human beings. The root-bark has a very strong odour (hallucinogenic) that some collectors used to fall down on the spot. Incidences of death were reported during field work.	
Remarks	1) The American drugs contain gelsemine and gelseminine, which in small doses, are used medicinally (Brandis, 1906). 2) The American and Chinese drugs act chiefly upon central nervous system, especially, the spinal cord (Sinha, 1996). 3) So far in India, there is no such report as drugs. Plant sample has been sent to Homoeopathic Pharmacopoeia Laboratory, Ghaziabad in 1997 for phytochemical and pharmacological test.	

Reported for the first time.

Gmelina arborea Roxb. Fl 3:84.1832; FFBB 2:264.1877; FBI 4:581.1885; DEP 3:514.1890; IT 509.1906; BBO 719.1924; IMP 3:1932.1935; RBSI 12(2):123.1938; FA 3:466.1939; GIMP 126.1956; WI 4:154.1956; FTS 2:110.1983; UPI 240.1986; FFM 2:679.1987; DIFME 95.1991; DIMP 225.1992; CCENEI 120.1994; ADPR 240.1994; IMP 3:91.1995; TIMP 4:226.1995; MPM 82.1996 (**Pl.32, P.63**).

Family Verbanaceae.

Local name **Thlanvawng** (M); **Aveu** (Ma).

Botanical description A moderate-sized deciduous tree to 30 m tall; bark light grey or whitish-grey, warty; branchlets and young parts tomentose, quadrangular, foetid smell; leaves broad ovate-acuminate, 8-15 x 10-20 cm; base cordate or truncate and shortly acute; petiole up to 7 cm long, puberulous, glandular at the top; flowers brownish-yellow, in terminal tomentose panicles; fruits ovoid, c 2.5 cm long, pulpy inside, yellow when ripe; seeds 1-2.

Fl.: March. **Fr.**: May-June.

Location & altitude Common throughout Mizoram (e.g., Lungkulh virgin forest, Diblibagh, Bilkhawthlir, etc). Alt. 50-1500 m.

Associates & ecology *Duabanga grandiflora*, *Albizia procera*, *Toona ciliata*, *Callicarpa arborea*, on sandy to clayey-loam soil in dry and moist environments.

Distribution Sri Lanka, Bangladesh, Myanmar and Phillipines; throughout India, Andaman and North-East India; **fairly common throughout Mizoram.**

Part used Flowers and fruits.

Extraction and uses :

Medicinal 1) *Pangs* use decoction of flowers internally for hypertension. The medicine is taken @ tablespoonful (10 ml) twice daily.
2) The pulp of roasted fruit is applied or rubbed on itching sores.

Material culture 1) The reddish-white heartwood has been widely or extensively used for building construction, preferably for window-frames and house-posts.
2) The wood is used for furniture, drum, and internal articles.

Notes The Environment & Forest Deptt. has taken up large-scale plantations owing to the timber value in tropical warmer parts of Mizoram.

Gynocardia odorata R.Br. FBI 1:195.1872; FFBB 1:76.1877; DEP 4:192.1890; IT 40.1906; FA 1:87.1934; IMP 1:223.1935; RBSI 12(2) : 80.1938; GIMP 129.1956; WI 4:280.1956; FTS 1:234.1981; FFM 1:92.1985; UPI 253.1986; DIFME 97.1991; DIMP 232.1992; CCENEI 121.1994; MPM 84.1996. *Chaulmoogra odorata* Roxb. FI 3:835.1832.

Family Flacourtiaceae.

Local name **Saithei** (M, L).

Botanical description A small to medium-sized tree, evergreen; branches flexuous; bark ashy-grey, warty; leaves oblong, abruptly acuminate, 3-7 x 14-24 cm, coriaceous; nerves 7-10 pairs, prominent beneath, base sub-acute or rounded; flowers pale yellow, fragrant, in large fascicles on trunk or few flowered in leaf axils; fruits globose but broader than long, ash-coloured, hard, lenticellate outside, 6-8 cm across; seeds many, obovoid, embedded in pulp.

Fl.: March-April. **Fr.:** January-March.

Location & altitude Ngengpui wildlife sanctuary, Mampui tlangnuam, Sihphir Rescue Centre, etc
Alt. 220-1200 m.

Associates & ecology *Terminalia myriocarpa*, *Talauma rabanica*, *Syzygium* spp., *Mallotus tetraococcus*, *Castanopsis* spp., on sandy-loam soil in tropical foests.

Distribution Bangladesh and Myanmar; eastern Himalaya, Sikkim and North-East India; **rare in Mizoram, but seen here and there in tropical wet evergreen and semi-evergreen forests.**

Part used Seed-oil.

Extraction and uses

Medicinal The fruits are crushed and the seeds are extracted manually. The extracted seed-oil is used as lotion in leprosy and other skin diseases.

- Poison 1) The fruit and leaves are poisonous to pigs, goats and cattle.
 2) The fruits and bark are used for fish-poisoning.
- Special
 opinions 1) Used both internally and externally in leprosy, scrofula, skin-diseases, and
 chronic rheumatism (Civil surgeon J.H.Thornton, cited by Watt, 1890).
 2) Useful in skin diseases. It proved efficient in a case of psoriasis where
 other applications failed (Asst. Surgeon Shib Chunder Bhattacharji,
 Chanda, Central Province, *Ibid*).
 3) I have frequently used *Chalmugra* seed-pulp, as well as the oil, in lep-
 rosy and ostinate skin diseases externally and internally, with consider-
 able success (Asst. Surgeon, Nanda Lall Ghose, Bankipore, *Ibid*).
 4) The seeds are used to be sold, alongwith those of *Khawitür* tree,
 Hydnocarpus kurzii (King) Warb. by the Lushais to the shopkeepers for
 sale in the plains (Lorrain, 1940).

Hedychium villosum Wall. FBI 6:228-29; RBSI 12(2):144.1938; BBSI 14(1-4):131.1972;
 EFPN 1:61.1978; JETB Addl. Ser. 12:16.1996 (**Pl.33, P.64**).

Family Zingiberaceae.

Local name **Thing-sawhthing** LR.

Botanical Epiphytic herbaceous annual, ginger like rihizomatous stock on tree trunk,
 description to 30 cm high; leaves elliptic-ovate, acuminate, villous above, 5-7 x 18.24
 cm; flowers white, terminal erect, rather lax, fragrant; fruits not seen.

Fl.: January-February.

Location On tree trunk near Pawizawh river of Mampui.

Alt. 850 m.

Associates *Rhaphidophora* sp., mosses etc.
 & ecology

Distribution Nepal and Bangladesh; North-East India; **frequent in Mizoram, in tropical
 evergreen and semi-evergreen forests.**

Part used Rhizome.

Extraction and uses :

Medicinal Juice of the crushed rhizome is taken as an effective remedy against asthma, cough and colic.

Notes The rhizome is slightly aromatic and ginger-like. It grows on *Schima wallichii* and *Michelia champaca*.

Reported for the first time.

Hedyotes scandens Roxb. FI 1:364.1820; FBI 3:57.1880; IT 375.1906; BBO 444.1922; RBSI 12(2):100.1938; FA 3:37.1939; WI 5:16.1959; FTS 2:57.1983; UPI 259.1986; FFM 2:475.1987; CGIMP 74.1987; NPEI 122.126.1991; DIFME 100.1991; CCENEI 123.1994; MPM 86.1996 (**Pl.33, P.64**).

Family Rubiaceae.

Local name **Kelhnamtur, Laikingtuibur (M)**

Botanical description A scandent or scrambling shrub, climbing over low bushes; branches terete, thickened at the nodes, angled; stem often purplish-tinged when young, dark-green when old; leaves elliptic-oblong or lanceolate, caudate or acuminate, rather thick, nerves obscure; base narrowed to channelled petiole; flowers white or creamy-white, in axillary and terminal paniced cyrmbose cymes; pedicels horizontal, slender; fruits obovoid or globose; seeds minute, numerous.

Fl.: October-November. **Fr.:** December-January.

Location & altitude On roadsides to Dampa Rengpui; between Pangzawl and Thiltlang; Kolasib and Bairabi etc. Alt. 250-1200 m.

Associates & ecology *Phyllanthus fraternus*, *Scleria sumatrensis*, *Ageratum conyzoides*, *Osbeckia peduncularis*, *Mussaenda glabra*; in moist shady areas and waste places and on roadsides.

Distribution Bangladesh, upper Myanmar, Thailand and Vietnam; tropical and sub-tropical Himalayas from Nepal to North-East India; **common throughout Mizoram particularly in waste places in tropical secondary forests.**

Part used Roots and leaves

Extraction and uses :

- Medicinal
- 1) Infusion of the roots and leaves is taken as an effective remedy against malarial fever. The medicine is taken @ tablespoonful (10 ml) twice daily.
 - 2) The leaves in combination with the leaves of *Passiflora nepalensis* Wall. (Sapthei-lian) in equal proportion are boiled and the water is taken internally against fever @ tablespoonful (10 ml) 2 times per day.
 - 3) Infusion of the leaves is commonly employed to cure jaundice, kidney trouble and removal of stones in the kidney/gall-bladder.
 - 4) The juice of crushed leaves is taken for dysuria.

Helicia excelsa (Roxb.) Bl. FFBB 2:312.1877; FBI 5:191.1886; IT 543.1906; RBSI 12(2):129.1938; FA 4:107.1940; TFM 2:315.1972; FFM 2:746.1987.

Family Proteaceae.

Local name **Sialhma** (M).

Botanical description A moderate-sized evergreen tree; young shoots rusty-tomentose; bark dark-grey, warty; leaves oblong or oblanceolate, 3.5-10 x 5-15 cm, acuminate, coarsely serrate; nerves 7-10 pairs; anastomosing; base cuneate, narrowed into the petiole; petiole 1-2.5 cm long; flowers yellowish-brown, by pairs, on rusty-villous peduncle, as long as the leaves; fruit ellipsoid or obliquely ovoid, c.1 cm across, bluish-black, smooth.

Fl.: March-April. Fr.: November-February.

Location & altitude Mini-zoo, Aizawl, Tuipang-Zawngling roadsides, etc.

Alt. 700-1400 m.

Associates & ecology *Lithocarpus floribunda*, *Ostodes paniculata*, *Schima wallichii*, *Sapium baccatum*, in moist shady forest.

Distribution Bangladesh, Myanmar and Malaysia; Assam, Meghalaya and Andamans; **rare in Mizoram, in tropical and sub-tropical hill forests.**

Part used Bark

Extraction and uses :

Medicinal Decoction of bark is taken internally for colic, stomachache and for strengthening the function of uterus.

Reported for the first time.

Hodgsonia macrocarpa (Bl.) Cogn. RBSI 17(1):27.1959; WI 5:103.1959; FJ 1:212.1981; FTS 1:259.1981; FFM 1:420.1985; DIFME 103.1991; CCENEI 128.1994; *H.heteroclita* (Roxb.) Hk. f. & Thoms. FBI 2:606.1879; RBSI 12(2):97.1938; FA 2:326.1938; UPI 270.1986 (**Pl.34, P.66**).

Family Cucurbitaceae.

Local name **Kha-um** (M); **Lengru-pai** (P).

Botanical description A large climber; stem light grey, very warty; leaves alternate, deeply 3-lobed; lobes acute or acuminate, 24 x 25 cm; nerves prominent beneath, anastomosing; tendril pinkish, coiled at apex; petiole 6 cm long, grooved, glandular; flowers large, white, tinged with yellow within; fruits large, globose, depressed, 8-14 cm across, 12-grooved; seeds ellipsoid, flat, extremely bitter.

Fl.: April-May. **Fr.:** July-October.

Location & altitude Vathuampui forest (westward) near the stream

Alt. 145 m.

Associates & ecology *Wallichia densiflora*, *Embelia nutans*, *Dracaena spicata*, climbing on *Bambusa tulda* Roxb. in mixed moist shady forest.

Distribution China, Bangladesh, Myanmar and Malaysia; east Himalayas and the North-East India; **frequent in Mizoram, in tropical moist forests and secondary mixed bamboo forests.**

Part used Leaves.

Extraction and uses :

Medicinal Juice of crushed leaves and/ or the paste is applied on fresh cuts as haemostatics and cure the wounds. *Pang* people use the powdered leaves for chronic ulcer by external application.

Hydnocarpus kurzii (King) Warb. FA 1:87.1934; RBSI 12(2):80.1938; GIMP 137.1956; WI 5:141.1959; FTS 1:235.1981; UPI 276.1986; MMPI 314.1989; DIMP 250.1992; CCENEI 128.1994; MPM 90.1996. *H.heterophyllus* Kurz, non Bl. FFBB 1:77.1877; DEP 4:308.1890. *Taraktogenos kurzii* (King); IT 42.1906; IMP 1:227.1935.

Family Flacourtiaceae.

Local name **Khawitur** (M).

Botanical An evergreen tree to 20 m tall with hanging branches; young leaves and inflorescence tawny puberulous; bark greenish-grey, rusty-lenticellate; leaves ovate-oblong or elliptic-oblong, shortly acuminate, 6-16 x 11-22 cm; base cuneate; flowers pale yellow in axillary cymes, dioecious; fruits globose, chocolate-brown, the size of orange, rather longer than broad, on branches, tawny-velvety with stout beak; seeds many, grooved, embedded in pulp.

Fl: April. Fr: February-March.

Location & altitude Opposite to Ngengpui wildlife sanctuary c. 1 km away from Khawmawi towards Diltlang. Alt. 225 m.

Associates & ecology *Dipterocarpus macrocarpus*, *Gmelina arborea*, on clay-loamy soil in evergreen forests.

Distribution Chittagong hill tracts of Bangladesh, Myanmar and Sri Lanka; confined to North-East India; **very rare in Mizoram, occasionally found to be present in tropical wet evergreen forests.**

Part used Bark and fruits.

Extraction and uses :

Medicinal 1) The smoke of burning bark is used for stupefying bees, especially honey-bees (*Apis mellifica*) hence the name. (Khawi or Khuai=bee; tur=poison).
2) The fruits can be used for poisoning fish.

Remarks The seeds are sold by the Lushais to the shop-keepers for export along with those of the *Saithei* (*Gynocardia odorata* R.Br.) for making *Chaulmugra-oil* as a remedy for leprosy (Lorrain, 1940).

Hydrocotyle javanice Thub. FBI 2:667.1879; IMP 2:1195.1935; GIMP 137.1956; WI 5:147.1959; FTS 2:196.1983; UPI 278.1986; DIFME 104.1991; DIMP 159.1992; CCENEI 268.1994; MPM 91.1996.

Family Apiaceae.

Local name **Hlovoidawr** (M).

Botanical description A small creeping herb; leaves 6-8 cm across, reniform, crenulate; base cordate; flowers greenish-white, in globular umbels; fruits minute, obovoid, compressed.

Fl.: March. Fr.: May-August.

Associates & ecology *Osbeckia stellata*, *Oxalis corniculata*, etc. on sandy-loam soil in damp places, clearings, and on the walls of roads.

Distribution Sri Lanka, Philippines, Malaysia, Australia and tropical Africa; Himalayas, Karnataka, Assam, Tripura and Meghalaya; **sparingly dispersed in Mizoram, in moist areas and wasteplaces in tropical secondary forests.**

Part used Leaves.

Extraction and uses :

Medicinal The leaves are crushed and the juice is given to children for stomachache @ teaspoonful (5 ml) twice daily. The medicine is also used as eye-drops.

Agroforestry The plant has been used in Rubber/Coffee plantations as soil binder and moisture container.

Imperata cylindrica (Linn.) P.Beauv. RBSI 12(2):151.1938; FA 5:310.1990; WI 5:169.1959; UPI 286.1986; DUFME 106.1991; CCENEI 129.1994; ADPR 127.1994; MPM 94.1996. *I. cylindrica* var. *major* (Nees) C.E.Hubb. ex Hubb. FTS 2:517.1983; *Larundinacea* Cyrill. DEP 4:336.1890; FBI 7:106.187; BBO 1015.1924; GIMP 140.1956.

Family Poaceae.

Local name Di (M)

Botanical description Caespitose, perennial herb; rootstock creeping, stoloniferous; culms solid; leaves flat, linear-lanceolate, acuminate, up to 2 m long, margins scabrid; base narrowed; petiole channelled; flowers silvery-white; spikelets to 45 cm long, very dense; panicles purplish when young; fruits (caryopsis) small, elliptic-oblong, brown, light and loose.

Fl. & Fr.: April-May.

Location & altitude Throughout Mizoram in fallow lands and *jhum* lands, up to 1500 m.

Associates & ecology *Wendlandia grandis*, *Schima wallichii*, *Eurya acuminata*, *Sterculia colorata*, on loamy-clay soil in open areas, particularly in fallows, newly burnt *jhums* and old *jhum* lands.

Distribution Parts of Pakistan, Australia and Africa; the plains and hills of Punjab, hotter parts of India, Bengal and North-East India; **very common or abundant throughout Mizoram.**

Part used Roots and plant.

Extraction and uses :

Medicinal 1) The roots are washed and crushed and the juice is taken internally against round-worms and pin-worms.

2) The roots are used for temporary tying purposes.

- Material culture The leaves are extensively used for thatching roofs in villages.
- Notes
- 1) The spear grass is a pest to the farmers, farm. Iradication programme has been carried out by some farmers with the help of weedicides.
 - 2) The young panicles are collected and eaten by children.
 - 3) The gregarious habitats have been used as grazing ground for domestic livestock.

Inula cappa (F.Ham. ex. D.Don) DC. FBI 3:295.1881; BBO 476.1922; FA 3:115.1939; FJ 1:268.1981; FTS 2:223.1983; FFM 2:521-2.1987; CCENEI 270.1994. (*Conyza cappa* F.Ham. ex D.Don. FTS 2:223.1983 (**Pl.34, P.66**).

Family Asteraceae.

Local name **Buarthau** (M).

Botanical description A stout aromatic shrub; young parts wooly; leaves elliptic-lanceolate, brownish silky or white on both surfaces, coarsely toothed, denticulate, 4 x 16 cm, wooly beneath; nerves 8-12 pairs; flowers yellow terminal heads, corymbose; fruits pubescent; papus dirty-white, feathery.

Fl.: September-October. Fr.: November-February.

Location & altitude *Jhum* lands, Ngengpui wildlife sanctuary (landslide area (1995) within the sanctuary), etc. - Alt. 320 m.

Associates & ecology *Ageratum conyzoides*, *Bocica filiformis*, *Trema orientalis*; *Musa* sp., in open landslided area *jhum* lands and other eroded areas.

Distribution China, Java and Myanmar; eastern Himalaya, Bihar, Assam, Tripura and Meghalaya; **frequent in Mizoram, in tropical open forests and *jhum* lands.**

Part used Leaves.

Extraction and uses :

Medicinal 1) The leaves are crushed with those of *Plantago asiatica* and *Lobelia angulata* and the juice is taken internally for diabets and jaundice @ tablespoonful (10 ml) twice or thrice daily.

Ixora nigricans R.Br. ex Wt. & Arn. FFBB 2:23.1877; FBI 3:148.1880; IT 389.1905; IMP 2:1290.1935; FA 3:70.1939; GIMP 143.1956; WI 5:277.1959; UPI 298.1986; FFM 2:480.1987. *I.nigricans* Wt & Arn.**var.nigricans** Corners, TFM 4:359.1989 (PL35, P.68).

Family Rubiaceae.

Local name **Thainurual** (M).

Botanical description A shrub or small tree; bark greyish, lenticellate; branchlets white, but with the leaves turning black when dry; leaves elliptic-ovate, acute or shortly acuminate, 3-6 x 7-15 cm; nerves 10-15; base acuted or rounded; petiole up to 3 cm long; flowers white, fragrant, on terminal brachiate cymes; fruits globose or didymous, green when young, red when old, black when dry, c.0.5 cm across with persistent styler at apex.

Fl.: February-March. **Fr.:** April-June.

Location & altitude Serkawr supply reserved forest below the village (northward) c.1 km away down the village Alt. 380 m.

Associates & ecology *Musa* sp., *Callicarpa arborea*, on sandy-loam soil in mixed bamboo forest.

Distribution Indo-China, Myanmar, Java and Malaysia; South India and North-East India; **uncommon in Mizoram, in tropical evergreen and semi-evergreen forests mixed with bamboos.**

Part used Leaves.

Extraction and uses :

Medicinal Infusion of the leaves is prescribed for dysentery and colic. The medicine is taken @ 1/2 cup (50 ml) twice daily.

Jasminum nervosum Lour. FJ 1:303.1981; FFM 2:587.1987; MPM 97.1996. *J.anastomosans* Wall. ex DC. FFBB 2:152.1877; FBI 3:596.1882; IT 450.1906; RBSI 12(2):110.1938; FA 3:228.1939; FTS 2:4.1983. **(Fig.16)**

Family Oleaceae.

Local name **Hruikha, Hruikhang** (M).

Botanical description A scandent shrub, glabrous; stem green and smooth; leaves ovate-lanceolate, acuminate, chartaceous, glossy above, 3-nerved; 2-4 x 3.5-12 cm, a pair of basal nerves extending up to the apex and anastomosing with secondary nerves; base rounded or sub-cordate; flowers white, in axillary 2-5 flowered cymes; lobes 7-10; fruit ellipsoid, small.

Fl.: January-March. **Fr.:** March-May.

Location & altitude The forests of Mampui tlangnuam, Tongkolong, Lohre etc. Alt. 250-1000 m.

Associates & ecology *Zingiber gracile*, *Embelia nitans*, *Globo* spp. *Psychotria* sp., on sandy-loam soil in primary forest as an undergrowth.

Distribution Bhutan, Bangladesh and Myanmar; North-East India; **very common in Mizoram, in tropical dense evergreen forests.**

Part used Leaves.

Extraction and uses :

Medicinal Infusion of the leaves is taken internally for stomachache and diarrhoea. The medicine is taken @ tablespoonful (10 ml) thrice daily.

Reported for the first time

Justicia zeylanica Medicus, ADPR 503.1994. *J. adhatoda* Linn. MMPI 325.1989; DIFME 110.1991; CCENEI 131.1994. *Adhatoda zeylanica* Medicus, FTS 2:284.1983; WI 1-A:76.1985; FFM 2:661.1987; DIMP 12.1992. *Adhatoda vasica* Nees, FBI 4:540.1885; DEP 1:109.1889; IT 498.1906; BBO 694.1922; IMP 3:1899; RBSI 12(2):119.1938; FA 3:455.1939; GIMP 7:1956; UPI 14.1986; MPM 5.1996.

Family Acanthaceae.

Local name **Kawldai** (M); **Keltebengbeh** (L); **Kodia** (Ma).

Botanical description An evergreen, perennial shrub to 2 m high; bark grey; leaves ovate-lanceolate, acuminate, 4-6 x 12-20 cm; dark-green above, pale beneath; base attenuate; flowers pure white, with pink dots, clustered towards the ends of branchlets in axillary spikes; bracts large, ovate, mucronate; fruits clavate, c. 2 cm long, pubescent, channelled; seeds-4, orbicular, tubercled.

Fl.: January-March. **Fr.:** December-August.

Location & altitude Biate, Serkawr, Teirei, etc as hedges or near villages. Alt. Up to 1200 m.

Associates & ecology *Terminalia bellerica*, *Gloha* sp., *Morinda* sp., on sandy loam soil in edged of marginal forests in open environment.

Distribution China, Sri Lanka, upper Myanmar and Malaysia; Sub-Himalayas, throughout the plains of India, Bihar and North-East India; **frequent in Mizoram, usually planted as hedges plants throughout Mizoram.**

Part used Leaves.

Extraction and uses :

Medicinal 1) Juice of crushed leaves is applied externally on cuts and wounds as haemostatics
2) The leaves are boiled and the water is used for bathing and the leaf paste is applied on the whole body as an effective cure for chronic fever/malarial fever. The water is also taken internally @ tablespoonful

(10 ml) twice daily for 3 days. This routine is followed for 3 consecutive days.

3) Juice of young leaves mixed with honey is taken for whooping cough.

Notes There are two varieties with red and white flowers. The white flowered variety only is available in Mizoram.

Special opinions 1) Leaves dried are smoked in cases of asthma; they produce very useful effects (Asst. Surgeon, Anund Chunder Mukherji, Noakhally);
2) It is useful refrigerant in fever, given as decoction (Surgeon-Major John Lancaster, Chittore); (Cited by Watt, 1889).

Kalanchoe pinnata (Lamk.) Pers. IMP 2:999.1935; GIMP 147.1956; FTS 2:187.1983; DIFME 111.1991; DIMP 267.1992; CCENEI 132.1994; IMP 3:282.1995.
Bryophyllum pinnatum (Lamk.) Kurz, UPI 89.1986; MPM 33.1996;
B.pinnatum (Lamk.) Oken, TIMP 2:7.1992. *B.calycinum* Salsb. FBI 2:413.1878

Family Crassulaceae.

Local name **Zihor** (B).

Botanical description A succulent herb; leaves thick and fleshy, ovate-oblong, obtuse, dentate, 2-4 x 4.5-8 cm; petiole 1.5 cm long; flowers pendent, reddish-purple; fruits enclosed in persistent calyx and corolla.

Fl.: December-February. **Fr.:** not seen

Location & altitude Introduced and naturalised in private gardens in W.Phulpui, Mampui, etc. Alt. 850-1000 m.

Associates & ecology Grown with *Cantleya gracilis*, *Rauwolfia serpentina*, etc. in moist shady places and in dry open gardens.

Distribution Native of tropical Africa, distributed in Sri Lanka throughout the tropics; W.Bengal and warm moist parts of India; **introduced and naturalised in Mizoram.**

Part used Leaves.

Extraction and uses :

Medicinal *Bru* medicineman of W.Phulpui Village prescribed the scorched leaf to be applied on the forehead in vertigo.

Lagerstroemia speciosa (Linn.) Pers. GIMP 149.1956; WI 6:24.1962; FTS 2:173.1983; TFM 2:280.1983; UPI 314.1986; FFM 1:415.1985; DIMP 271.1992; TIMP 3:186.1994; MPM 101.1996. *L. flos-reginae* Retz. FFBB 1:524.1877; FBI 2L577.1879; DEP 4:582.1890; IT 339.1906; BBO 375.1922; IMP 2:1080.1935; RBSI 12(2):96.1938; FA 2:311.1938.

QUEEN GRAPE MYRTLE.

Family Lythraceae.

Local name **Thlado** (M); **Chahla Patawngpa** (Ma).

Botanical description A moderate-sized deciduous tree; bark grey; leaves ovate or elliptic-banceolate, 4-7 x 10-15 cm; nerves 10-12 pairs; base rounded; flowers large, conspicuous, mauve-purple in terminal pyramidal panicles up to 45 cm long; fruits ellipsoid or subglobose, woody, 306 valved; pale brown, small.

Fl.: May-August. **Fr.:** September-March (next year).

Location & altitude Chamdun forest, maisa forest, between Baktawng and Chhingchhip, etc. Also cultivated as an ornamental plant. Alt. 200-1000 m.

Associates & ecology *Lagerstromia parviflora*, *Amoora wallichii*, *Dillenia indica*, on sandy soil in tropical semi-evergreen forests and on cleyey-loam soil in tropical wet evergreen forest; often along river sides and forest margins.

Distribution S.China, Bangladesh, Sri Lanka, Myanmar, Java, Philippines and Australia; western Ghats and North-East India; **frequent in Mizoram, in tropical wet evergreen and semi-evergreen forests, fairly frequent in South-Western part of Mizoram.**

Part used	Bark and wood.
Extraction and uses :	
Medicinal	Decoction of the bark is taken internally for dysentery. The medicine is taken @ 1/2 cup (50 ml) once or twice daily.
Material culture	1) The heart-wood is red or dark-brown and very hard and used for house-posts, rafters, beams and planking. 2) The wood is also used for agricultural implements and furniture.
Notes	<i>Lagerstroemia parviflora</i> Roxb. is growing wild in south-western part of Lunglei and Chhimituipui Districts, whereas, <i>Lagerstroemia indica</i> L. is planted as an ornamental hedges in Aizawl town, etc.
Remarks	1) It is considered best timber in South Mizoram for building construction and house-posts. 2) Watt (1890) has noted that the tree is the most valuable timber of Shylet (Bangladesh), Cachar (Assam), and Chittagong (Bangladesh) and, in Burma (Myanmar), the timber is next in value after teak.

Laggera crispata (Vahl.) Hep. & Wd. DIFME 112.1991; CCENEI 273.1994; *L. pterodonta* Benth. FBI 3:271.1882; BBO 466.1992; RBSI 12(2);105.1938; FFM 2:530.1987 (Pl.35, P.68).

Family Asteraceae.

Local name **Ram-vaihlo** LR; **Ka-ua-thlo-ru** (Ma).

Botanical description A viscid much branched herb with deeply toothed or interrupted wings; leaves sessile, peltate, elliptic-ovate, acuminate, serrate, 4-5.5 x 6-14 cm; base attenuate; flower heads white subtended by numerous rigid bracts, peduncled.

Fl.: April. Fr.: May.

Location On roadsides between Serkawr and Tuipang.

& altitude

Alt. 1100 m.

Associates & ecology	<i>Firmiana clorata</i> , <i>Securinega virosa</i> and grasses, on dry sandy rocky places in secondary forests.
Distribution	Tropical Africa and Myanmar; tropical Himalayas eastwards, Bihar, Nagaland and Meghalaya; common in Mizoram in tropical semi-evergreen forests, old <i>jhum</i> lands and fallows.
Part used	Leaves.
Extraction and uses :	
Medicinal	The leaves are crushed and the juice is applied externally on ' <i>matupui</i> ' disease, a chronic ulcer or sore. The medicine is practised by the <i>Maras</i> .
Notes	The leaves are as sticky as those of tobacco plants, hence the name.

Reported for the first time.

Lannea coromandelica (Houtt.) Merr. WI 6:27.1962; EFPP 2:101.1979; FTS 1:463.1981; FFM 1:272.1985; UPI 315.1986; DIFME 112.1991; DIMP 272.1992; TIMP 3:150.1994; IMP 3:297.1995; MPM 102.1996. *L. grandis* (Dennst.) Engl. IMP 1:664-5.1935; FA 1:338.1934; GIMP 149.1956.

Family	Anacardiaceae.
Local name	Tawitawsuak (M); Dokao (Ma).
Botanical description	A large deciduous tree; bark whitish-grey; leaves imparipinnate, crowded at branchends; leaflets 3-9, oblong-ovate, 4-5.5 x 7-10 cm; flowers yellowish-green; fruits red, reniform; seed-1. Fl.: December-February. Fr.: March-May.
Location & altitude	Between Lengpui and Tut, Aizawl (Tlangnuam), etc. Alt. 600-1000 m.
Associates & ecology	<i>Wrightia tomentosa</i> , <i>Kydia cyclina</i> , <i>Albizia procera</i> , on shady-loam soil in secondary forests.

Distribution Sri Lanka and Myanmar; sub-Himalayan tract to North-East India; **very common in Mizoram, in tropical evergreen and semi-evergreen forests.**

Part used Leaves.

Extraction and uses :

Medicinal Leaves are boiled and the water is used as a lotion for swellings, sprains and pain of the body.

Lantana camara Linn. var. **aculeata** (Linn.) Moldenke, WI 6:31.1962; FTS 2:111.1983; UPI 316.1986; FFM 2:681.1987; IMP 3:300.1995; TIMP 4:229.1995; MPM 102.1996. *L.camara* L. FBI 4:562.1885; DEP 4:586.1890; BBO 705.1922; GIMP 149.1956; DIFME 113.1991; DIMP 272.1992; CCENEI 273.1994; *L. aculeata* L.IT 502.1906; IMP 3:1914.1935; FA 3:460.1939 (**Pl.36, P.70**).

Family Verbenaceae.

Local name **Hlingpangpar** (L); **Shillongpar** (M).

Botanical description An evergreen scrambling shrub, very pungent smell; bark greenish, peeling off in strips, with stout recurved prickles; leaves ovate or triangular, crenate, acute, rugose and scabrid above; base sub-cordate; flowers normally orange, varying to white or scarlet or dark-red or purple, in sub-umbellate heads, on a slender pedicel; bracts persistent; fruits fleshy drupes, spherical, 0.5 cm across, green when young, bluish-purple or black when ripe; endocarp hard.

Fl. & Fr.: Nearly throughout the year.

Location & altitude Common throughout Mizoram in the vicinity of villages & towns.
Alt. 500-1600 m.

Associates & ecology *Chromolaena odorata*, *Maesa indica*, in wastelands and roadsides in open forests or under partial shade.

Distribution Native of tropical America, distributed in Sri Lanka, Pakistan and tropical Africa, completely naturalised in India and North-East India; **indigenous and very common throughout Mizoram above 500 m up to 1500 m in wastelands and secondary forests or edges of forests.**

Part used	Leaves
Extraction and uses	
Medicinal	Juice of pressed leaves is applied externally on cuts, ulcers and swellings.
Food	Children are very fond of the fruits. Birds also relish the fruits.
Special opinions	<p>1) The bark of stems and roots contain a quinine-like substance '<i>lantanine</i>' which possesses antipyretic and anti-spasmodic properties, finds application in the treatment of asthma, bronchitis, arterial hypotension & fever" (Ojha & Dayal, 1992).</p> <p>2) Plant decoction is given in tetanus, rheumatism and malaria and much used in atoxy of the abdominal viscera, (Kirtakar & Basu, 1935).</p> <p>3) Leaves and twigs are used as green manure in forest areas, improves soil fertility, retains humans content, checks soil erosion. (Watt, 1890).</p>

Lasia spinosa (Linn.) Thw. DEP 4:589.1890; BBO 859.1924; WI 6:35.1962; FTS 2:400.1983; UPI 317.1986; DIFME 113.1991; DIMP 273.1992; CCENEI 134.1994. *L.heterophylla* (Roxb.) Schott. FBI 6:550.1893; IMP 4:2623.1935; GIMP 150.1956; EFPN 1:91.1978 (**Pl.36, P.71**).

Family	Araceae.
Local name	Zawngzang (M)
Botanical description	A stout prickly herb with prickly rhizome; leaves long petioled, 15-50 cm long, hastate, sagittate or pinnatifid; spathe cylindrical, convolute or spirally twisted, 20-40 cm long; spadix densely packed with dull-pink flowers; fruits muricate, 6-sided; seeds rugose.
	Fl. December-March. Fr. March-July.
Location & altitude	On riverside of Kawrawng, Ngengpui wildlife sanctuary. Alt. 225 m.
Associates & ecology	<i>Terminalia myriocarpa</i> , <i>Dillenia indica</i> , <i>Desmos dumosus</i> , <i>Musa</i> spp., in marshy shady places.

Distribution China, Sri Lanka, Myanmar, Singapore and Malaysia; from Sikkim Himalaya to W.Bengal, Bihar & Orissa, Assam, Tripura and Meghalaya; **occasional /rare in Mizoram, in marshy streams as an undergrowth in tropical wet evergreen forests.**

Part used Rhizome, petiole and leaves.

Extraction and uses :

Medicinal *Bawm* medicineman prescribes an infusion of the rhizome for throat-pain (diphtheria).

Food Petiole and young leaves are boiled with rice and taken as vegetable.

Lasianthus hirsutus (Roxb.) Merr. JAA 33:229.1952. *L. cyanocarpus* Jack. FBI 3:179.1880; IT 396.1906; FA 3:89-90.1939; FFM 2:483.1997 (**Fig.17**).

Family Rubiaceae.

Local name **Thingchangnei** LR.

Botanical description An evergreen shrub to 3 m high; young parts rusty-hirsute; stem dark grey annular, somewhat like a bamboo; branches horizontal; leaves elliptic-lanceolate, caudate-acuminate, fimbriate, 4-6 x 18-25 cm; base narrowed to the petiole and oblique; flowers white, corymbose, fascicled cymes; bracts folioceous hisute ; fruits obovoid, blue when ripe; seed-1.

Fl.: April-May. **Fr.:** August-November.

Location Ngengpui wildlife sanctuary.

& altitude

Alt. 275 m.

Associates & ecology *Murraya koenigii*, *Baccaurea ramiflora*, *Licula peltata*, on humus loamy soil under dense primary forests as an undergrowth.

Distribution Bangladesh, Singapore, Malacca and Indonesia; Andamans, Assam, Nagaland, and Meghalaya; **common in Ngengpui wildlife sanctuary.**

Part used Leaves.

Extraction and uses :

Medicinal Juice of crushed leaf is applied externally on cuts and wounds.

Reported for the first time.

Lasianthus wallichii Wight, FBI 3:180.1882; IT 396.1906; FA 3:90.1938.

Family Rubiaceae.

Local name **Ruih-thing** LR.

Botanical description Evergreen shrub; branches, petioles and underside of leaves hirsute with spreading hairs; leaves crowded towards the apex, paripinnate, sessile, elliptic-lanceolate, caespitate-acuminate; base rounded or cordate, often unequal, 2-2.7 x 5-10 cm. strongly nerved beneath; flowers axillary fascicled, white, few flowered; bracts subulate; fruits ovoid, when ripe, top depressed with circular.

Fl.: November-March. **Fr.:** March-May.

Location Ngengpui wildlife sanctuary.

& altitude

Alt. 280 m.

Associates & ecology *Murraya koenigii*, seedlings of *Podocarpus neriifolius*, *Baccaurea ramniflora*, *Licula peltata*, on brownish-loamy soil under dense forest.

Distribution Bangladesh, China, Indonesia and Malaysia; Andamans and North-East India; **fairly frequent in Mizoram, particularly in tropical wet evergreen forests as an undergrowth.**

Part used Leaves.

Extraction and uses :

Medicinal The crushed leaves, if smelled, induces hallucinogenic effect which lasts for about 10 minutes.

Reported for the first time.

Leea asiatica (Linn.) Ridsdale, DIFME 114.1991; *L. crispa* Linn. FBI 1:665.1875; FFBB 1:280.1877; DEP 4:616.1890; IT 180.1906; BBO 208.1922; FA 1:308.1934; IMP 1:618.1935; GIMP 151.1956; WI 6:56.1962; FTS 1:419.1981; UPI 320.1986; TIMP 3:172.1994; MPM 103.1996.

Family Leeaceae.

Local name **Kumtintuai (M)**

Botanical description A perennial shrub to 2 m tall; young parts pubescent; branches and leaf rachis subtended by crisped wings; leaves 2-pinnate; leaflets 3-5 foliolate, ovate-lanceolate, 3-8 x 10-20 cm, coarsely serrate; base rounded or sub-ordate; petiole stout; flowers greenish-white to slightly pale-yellowish in terminal corymbose cymes; fruit depressed-globose, shallowly lobed, purplish-black when ripe, 5-seeded.

Fl.: May-July. **Fr.:** October-December.

Location & altitude Teak (*Tectona grandis* L.) plantation (1958) near Tlabung. Alt. 45 m.

Associates & ecology *Ardisa colorata*, *Murraya koenigii*, *Hedychium spicatum*; on compact brown clayey-loam soil, near the streams and riverines in shady forest.

Distribution Bangladesh and Myanmar; tropical Himalayas, parts of South India, Bihar, Bengal and North-East India; **frequent in Mizoram, in tropical mixed evergreen forests.**

Part used Leaves and flowers.

Extraction and uses :

Medicinal 1) Juice of crushed leaves is applied on wounds and rheumatic pains.
 2) The flowers are boiled and the water is taken internally for placental disorder. The medicine is taken @ 1/2 cup (50 ml) twice daily.

Notes The plant is easily recognised by the large crisped-wings on the leaf-rachis. Other allied species, viz: *Leea indica* (Burm. f.) Merr. *Leea macrophylla* Roxb. ex Horn., *Leea compactiflora* Kurz, (Kawl-kar) are also recognised.

Lepidagathis incurva F.Ham. ex D.Don. FA 3:451.1939; WI 6:70.1962; FTS 2:293.1983; UPI 323.1986; DIFME 115.1991; MPM 104.1996. *L.hyalina* Nees, FBI 4:521.1885; BBO 688.1922 (**Fig.18**).

Family Acanthaceae.

Local name **Vangvattur** (M).

Botanical description A perennial herb, much branched; leaves variable, ovate acute, minutely pubescent, 3-8 x 5-15 cm, crenate, nerves 6-9; petiole 1.5-5 cm long; bracteoles linear-lanceolate, mucronate; flowers white with brown spots, on erect oblong spike up to 4 cm long; fruits small, oblong with a short beak.

Fl.: February-March. **Fr.:** April-May.

Location & altitude Near Rengdil Lake-II, Lungkulh virgin forest.

Alt. 500 m.

Associates & ecology *Polygonum chinensis*, *Ardisia paniculata*, *Phrynium capitatum*, on moist or marshy places in primary dense forest as an undergrowth.

Distribution S.China, Bangladesh and Myanmar; throughout India, Tripura and Assam; **common in Mizoram, usually in damp places in tropical evergreen forests.**

Part used Leaves.

Extraction and uses :

Medicinal The leaves are crushed and the juice is applied on leech-bite. The spotted brown inflorescence looks like that of striped Leech, hence the name.

Reported for the first time.

Lepidaganthis rigida Dalz. FBI 4:518.1885.

Family Acanthaceae.

Local name **Vangvattur** (M); **Chava-chamai** (Ma).

Botanical description A small decumbent herb rooting at the nodes; stem dull-red in colour, angled; leaves lanceolate, acuminate, 1.5-3 x 4-12 cm, variegated, pubescent; nerves 4-6, distant, arcuate, intramarginal; base attenuate or tapering, slightly oblique; petiole up to 2 cm long; flowers yellow-white, spotted with brown, on oblong terminal spikes; spikes 2.5 cm long; bracts rigid, pointed, spinous; fruits small, 4-seeded.

Fl.: March-April. Fr.: April-May.

Location & altitude Serkawr (Mission compound) and way-sides.

Alt. 1000 m.

Associates & ecology *Eupotarium adenophorum*, *Ageratum conyzoides*, on dry soils in open area and edges of forests.

Distribution Some parts of western Ghats; frequent in Mizoram, in tropical areas above 900 m (Mara Autonomous District Council, S.Mizoram)

Part used Leaves.

Extraction and uses :

Medicinal The expressed leaf-juice is dropped into the ear (3-4 drops) and the tooth-worms are expelled from the mouth. The medicine is practised by the *Marus*.

Reported for the first time.

Lepionurus sylvestris Bl. FFBB 2:330.1877; IT 150.1906; FA 1:250.1934; WI 6:73.1962; FTS 1:397.1981; FFM 1:217.1985; UPI 324.1986; TFM 4:293-4.1989. *L.oblongifolius* Mast. FBI 1:583.1875; RBSI 12(2):86.1938 (Fig. 20).

Family Opiliaceae.

Local name Anpangthum (M)

Botanical description A small tree to 2 m high; branchlets sub-angular; stem grey; leaves alternate, ovate or obovate, acute, 4 x 8 cm, membranous, pustulate; nerves 6-8; flowers

greenish-yellow or pale yellowish green in axillary spikes of 1-3 clusters, sub-pendent, faintly scented; fruits ellipsoid, 1.5 cm long, 1-seeded.

Fl.: February-March. **Fr.:** May-August.

Location & altitude Lungkulh virgin forest, west of Rengdil Lake-II. Alt. 500 m.

Associates & ecology *Ardisia paniculata*, *Embelia nutans*, *Calamus erectus*, on humus dark-brown loamy soil in dense forest as an undergrowth.

Distribution Indo-China, Nepal, Thailand, Indosia and Malaysia; confined to North-East India; **frequent in Mizoram, in tropical dense evergreen forests.**

Part used Leaves.

Extraction and uses :

Medicinal 1) Juice of leaves alone or in combination with yolk is applied on skin eruptions and inflamatory glands.
2) The leaves are boiled and the water is taken for strengthening the function of uterus @ 10 ml 3 times per day; and for diabetes @ 1/2 cup (50 ml) once per day.

Food The leaves are boiled with little rice and eaten as vegetable or pot-herb.

Remarks The roots are used poultice for headache in children. (Ambasta, 1986)

Reported for the first time.

Lindernia ruelloides (Colsm.) Pennell, FTS 2:276.1983; DIFME 118.1991; UPI 331.1986.
Bonnaya reptans (Roxb.) Spreng. FBI 4:284.1884; IMP 3:1822.1935; RBSI 12(2):115.1938; GIMP 39.1956; DIMP 82.1992 (**Pl.37, P.73**).

Family Scrophulariaceae.

Local name **Thasuih** (M).

Botanical description A small prostrate herb, rooting at the nodes; leaves obovate-oblong, serrate, obtuse, 1-2.5 x 20.4 cm; flowers bluish, subtended by green calyx, in axillary-terminal cymes; fruits small, slender, up to 2.5 cm long; seeds yellow.

Fl.: November-December. Fr.: January-March.

Location & altitude Samtlang, c 20 km, South of Aizawl. Alt. 1200 m.

Associates & ecology *Achyranthes aspera*, *Cyathula prostrata*, *Bidens biternata*, *Cassia* sp., in moist shady places.

Distribution Myanmar, Java, Philippine Islands; Tamil Nadu, Karnataka and the North-East India; **frequent in Mizoram, scattered in open forests above 900 m**

Part used Whole plant.

Extraction and uses :

Medicinal Infusion of the plant is used as a lotion for local swellings and sprains and as antispasmodic.

Notes The local name, "*Thasuih*" (re-joining of nerves) is just reverse to the ailment, "*Thachat*" (setting apart of veins or nerves due to muscular contraction).

Litsea monopetala (Roxb.) Pers. FTS. 1:95.1981; UPI 334.1986; FFM 2:732.1987; DIFME 118.1991; TIMP 1:107.1991; DIMP 279.1992; CCENEI 138.1994; MPM 106.1996. *L. polyantha* Juss. FBI 5:162.1886; DEP 5:82.191; IT 536.1906; BBO 794.1924; IMP 3:2160.1935; FA 4:83.1940; GIMP 155.1956; WI 6:154.1962; TFM 4:163.1989; DIMP 279.1992.

Family Lauraceae.

Local name **Nauthak** (M); **Bohlai** (B).

Botanical description A medium-sized tree; bark dark-grey; leaves alternate, obovate, 4-10 x 9-20 cm, obtuse, pubescent; base acute; nerves 8-10 pairs; tertiaries scalariform; flowers pale greenish-yellow, in umbellate cymes; fruits ellipsoid, seated on saucer-shaped perianth tube.

Fl.: April-May. Fr.: July-August.

Location & altitude Tuipuibari, Zuangtui roadside, etc.

Alt. 195 m and above.

Associates & ecology *Artocarpus chama*, *Albizia chinensis*, *Delonix regia*, in moist shady places.

Distribution China and Malaysia; throughout India and the North-East India; **frequent throughout Mizoram, in tropical evergreen and semi-evergreen forests.**

Part used Bark.

Extraction and uses :

Medicinal The bark is grinded with the bark of *Vitex peduncularis* var. *roxburghiana*, 3 leaves of *Piper bettle*, 4 clones of *Allium sativa*, 2-3 grains of *gulmori* (sold in market) and added 2 teaspoonfuls (10 gms) of sugar. The mixture is ground into a paste and the paste is made into pills. One pill is taken internally for jaundice associated with hepatitis 2 times per day for a week.

Material culture The wood can be used as firewood.

Lobelia angulata Forst. FFM 2 : 534.1987. *Pratia mummularia* Kurz, UPI 489.1986; DIFME 150.1991; MPM 153.1996. *P.begonifolia* (Wall.) Lindl. FBI 3:422.1882; RBSI 12(2):107.1938; WI 8:227.1969; CCENEI 302.1994.

Family Lobeliaceae.

Local name **Choakthi** (M).

Botanical description A small creeping herb, pubescent, rooting on lower stem; leaves cordate-ovate, repand or slightly notches; 1 x 2 cm, denticulate; flowers greenish-pink; berries ellipsoid with persistent style on tip, pinkish-black.

Fl.: April-May. Fr.: July-August.

Location & altitude Waste places of Mampui hmunnuam; on roadsides between Aizawl and Sairang, etc. Alt. 500-1100 m.

Associates & ecology *Centella asiatica*, *Oxalis corniculata*, *Hydrocotyle japonica*, on walls of road in damp places and open spaces.

Distribution S.China, Nepal, Sikkim and Malaysia; North-East India; **scattered in Mizoram, on waysides and clearings in tropical secondary open forests.**

Part used Whole plant.

Extraction and uses :

- Medicinal
- 1) The leaves and fruits are crushed and the juice is taken as an effective remedy against diarrhoea, dysentery and stomach ulcer. The medicine is taken @ table spoonful (10 ml.) twice daily.
 - 2) Two to three fresh fruits are eaten against tonsilitis.
 - 3) Juice of crushed plant is taken internally for ophthalmia @ table spoonful (10 ml) 3 times per day.
 - 4) Infusion of the plant is prescribed for kidney trouble and jaundice. The medicine is taken internally @ 1/2 cup (50 ml) once per day.

Lonicera macrantha DC. FBI 3:10.1880; IT 358.1906; FA 3:8.1939; FTS 1:199.1981; FFM 2:454.1987; DIFME 118.1991; CCENEI 278.1994; MPM 106.1996. *L.japonica* Thunb. RBSI 12(2):100.1938; WI 6:172.1962; UPI 337.1986.

JAPANESE HONEY SUCKLE.

Family Caprifoliaceae.

Local name **Leihruisen** (M)

Botanical description A large climber; stem rigid and dark-red; leaves ovate or oblong-ovate, caudate-acuminate, 1-4 x 9-10 cm, rugose above, villous beneath; base cordate; flowers white fading to yellow in short compact terminal panicles; fruits not seen.

Fl.: April-May. Fr.: not seen.

Location & altitude Mampui hmuntha ram etc.

Alt. 600 m.

Associates & ecology *Albizia chinensis*, *Wenlandia grandis*, *Schima wallichii*, *Erianthus longisetosus*, *Imperata cylindrica*, on compact clayey-loam soil in fallow lands and in dense forests.

Distribution S.China, Myanmar, Nepal and Bhutan; Eastern Himalayas to North-East India; **very frequent throughout Mizoram, in tropical evergreen and semi-evergreen forests.**

Part used Leaves.

Extraction and uses :

Medicinal Infusion of leaves is taken internally as an effective remedy against diarrhoea. The medicine is taken @ 1/2 (50 ml) twice daily.

Remarks 1) The plant has long been used in China as an antipyretic, stomachic and in dysentery. (Anonymous, 1962).
2) Stem used for cordage (Jain, 1996) and for rope (Saklani & Jain, 1994).

Reported for the first time.

Lycodium flexuosum (L.) Sw. HFBI 452.1883; FFMS 37.1982; CIP 60.1984; FN 136.1988; NPEI 148.1991; IFFWH 175.1994.

Family Lygodiaceae.

Local name **Dawnzem, Dawnzimpui (M).**

Botanical description A climbing fern; rachis twining; pinnae digitately lobed; pinnules ternate, bearing fertile and infertile parts; veins forked; spores marginal in biseriate spike, numerous.

Spores : January-September.

Location & altitude Forest of Diblibagh; on roadsides from Zodin to Tlabung, etc. Alt. 50-100 m.

Associates & ecology *Amomum dealbatum*, *Dillenia indica*, *Baccaurea ramniflora*, etc. in moist shady places.

Distribution China, Sri Lanka, Malaysia, Philippines and Australia; throughout India and the North-East India; **common throughout Mizoram, in waste places and in primary forests.**

Part used Roots and leaves.

Extraction and uses :

Medicinal 1) The roots are ground to a paste and made into pills. Three pills are taken 3 times a day as antihelmenthic.
2) Leaves are made into poultice and applied to wounds and scabies twice daily.

Food Young leaves are boiled with meat and taken as food.

Mallotus leucocarpus (Kurz) Airy-Shaw. FFM 2:795.1987. *Claoxylon longipetiolum* Kurz, FFBB 2:396.1877; FBI 5:413.1887; FA 4:211.1940.

Family Euphorbiaceae.

Local name **Sikiah** (Bm).

Botanical description A large shrub or small tree; young parts lenticellate; leaves large, 12-14 x 25-30 cm, elliptic-oblong; flowers in axillary spike; fruits small.

Fl.: March-April. **Fr.**: June-October.

Location & altitude Ngengpui wildlife sanctuary (eastward) Alt. 200 m.

Associates & ecology *Lasianthus hirsutus*, *Dillenia indica*, *Terminalia chebula*, on moist cleyey-loam soil in dense primary forest.

Distribution Myanmar; Andamans and North-East India; **frequent in Mizoram, in tropical wet evergreen forests.**

Part used Roots.

Extraction and uses :

Medicinal Decoction of root is used by Bawm people for stomach-cure. The medicine is taken internally @ tablespoonful (10 ml) thrice daily.

Reported for the first time.

Mallotus roxburghianus Muell. Arg.-FFBB 2:383.1877; FBI 5:428.1887; DEP 5:124.1891; BBO 106.1925; FTS 1:343.1981; FFM 2:796.1987 (**PI.38, P.74**).

Family Euphorbiaceae.

Local name **Zawngtenawhlung** (M).

Botanical description A shrub to small tree; young parts softly pubescent; bark grey, rough; leaves alternate, caudate-acuminate, distantly serrature, 6-15 x 10-15 cm; base rounded; nerves 5 at the base, intramarginal; tertiaries scalariform; veinlets reticulate; petiole up to 15 cm long; flowers racemes, terminal, as long as leaves; fruits 3-lobed, sub-globose.

Fl. May-June. **Fr.** Aug-September.

Location & altitude Catchment area of R.Khawthlangtuipui, between Tlabung and Dinthar, Dampa wildlife sanctuary, etc. Alt. 50-500 m.

Associates & ecology *Callicarpa arborea*, *Murraya koenigii*, *Garcinia paniculata*, in moist shady places.

Distribution Chittagong hill tracts of Bangladesh and Myanmar; **very common in Mizoram, particularly in tropical evergreen forests and mixed bamboo forests.**

Part used Root, bark and leaves.

Extraction and uses :

- Medicinal
- 1) Decoction of leaves is taken internally for diabetes @ 1/4 cup (25 ml) twice daily.
 - 2) Young twigs with 4-7 leaves are boiled with chicken and rice and the water (soup) is drunk as an effective cure for hepatitis and fever. The medicine is taken @ 1/2 cup (50 ml) twice daily.
 - 3) Infusion of the bark/leaves with the bark of *Alstonia scholaris* is taken internally for hypertension @ tablespoonful (10 ml) 2 times per day.

Material culture The wood is used as fuel and for handles.

Notes Other species, viz., *Mallotus philippensis* Muell.-Arg. (*Thingkhei*) a sub-tropical plant, and, *M. ferrugineus* (Roxb.) Muell.-Arg., a tropical semi-evergreen tree has been mentioned in common Indian medicinal plants literature are also present but not enumerated here for want of ethnomedicinal uses.

Reported for the first time.

Melia azedarach Linn. FBI 1:544.1875; FFBB 1:212.1877; DEP 5:221.1891; IT 140.1906; BBO 177.1921; FA 1:228.1934; IMP 1:542.1935; GIMP 163.1956; WI 6:323.1962; FF 1:210.1985; UPI 361.1986; DIFME 123.1991; DIMP 291-2.1992; CCENEI 142.1994; ADPR 325.1994; TIMP 3:80.1994; IMP 4:10.1996; MPM 112.1996.

PERSIAN LILAC BEAD TREE.

Family Meliaceae.

Local name Nim-suak LR.

Botanical description A small to medium-sized deciduous tree; branchlets lenticellate; bark dark-grey, shallowly fissured in old trunk; leaves bipinnate or 3-pinnate; leaflets ovate-lanceolate, unequally serrate; flowers lilac-blue, faintly fragrant, in axillary panicles; fruits ellipsoid-globose, yellow when ripe, remaining long on the tree after ripening; seeds-5.

Fl.: March. **Fr.:** May-February (next year), while leafless.

Location & altitude Planted on roadsides throughout Mizoram. Alt.Up to 1500 m.

Associates & ecology Interplanted with *Delonix regia*, *Cassia nodosa*, *Bischofia javanica*, etc. It grows on varied types of soil from sandy to loamy soil in an open environment.

Distribution Native of West Asia, distributed in China and parts of Myanmar; wild in sub-Himalayan tract and cultivated and naturalised throughout India; **introduced and naturalised in Mizoram since 1970's.**

Part used Leaves.

Extraction and uses :

Medicinal Decoction of leaves is taken internally against fever and hypertension @ 2 tablespoonful (20 ml) twice daily.

Food The leaves are boiled with small intestines of cattle or goat and taken as food by the Mizos.

Melocanna baccifera (Roxb.) Kurz in Monog. Bam. 104.1992; NRMM 1:258.1997. *M.bambusoides* Trin. FFBB 2:569.1877; DEP 5:225.1891; FBI 7:417.1897; FA 5:25.1940; WI 6:333.1962; FTS 2:52.1983; UPI 363.1986; MPM 112.1996. *Bambusa baccifera* Roxb. FI 2:197.1832.

Family Poaceae.

Local name Mautak (M); Rawmaw (Ma).

Botanical description An arborescent bamboo arising singly from horizontal rhizomes, up to 20 m tall; stem green, specked with white star-shaped in old culm; culm up to 45 cm long, thin, but thick at the base; nodes marked by a thin ring; culm sheath yellowish-green, 8-12 x 15-30 cm, bristle, striate, auricles oblanceolate finely acuminate up to 30 cm long; flowers in large panicles of drooping branches with secunded clustered spithelets; fruits (caryopsis) pyriform, fleshy, viviparous, up to 12 cm long.

Fl. & Fr. : Periodic 48 years cycle, the last of which was occurred in 1059, and the next flowering time is due to set in 2007 AD, inevitably.

Location & altitude Abundant throughout Mizoram.

Alt. Up to 1600 m.

Associates & ecology *Anogeisus acuminata*, *Gmelina arborea*, *Albizia chinensis*, *Aporosa octandra*, *Macaranga paniculata*, *Bambusa longispathus*, etc. along riverines, in slopes of sandy to compact clayey soil in tropical forests, and very often occurred in pure form in valleys and riverines up to 1600 m.

Distribution Bangladesh and Myanmar; North-East India; **abundant throughout Mizoram, particularly along riverine reserves.**

Part used Stem and wood.

Extraction and uses :

Medicinal The outer skin is scraped off and applied on cuts as haemostatics.

Material culture

- 1) The culm and the leaves are widely used for house construction and thatch roofs by *Chakmas*, *Brus* and *Pangs*.
- 2) The dry stem(wood) is used extensively as fuelwood in interior villages.
- 3) The culm is used as bamboo-spoons or as a substitute for a cup in jungles.
- 4) The mature rhizome is used as tool-handles.
- 5) The curved rhizome (L-shaped or semi-circle) with the culm is used as hockey sticks and without culms as balls in villages.
- 6) The culm is used as stilts, but the peddles are made of *Bambusa tulda* or *Dendrocalamus longispathus* or *D.hamiltonii*.

Food The young shoots are largely consumed as food/food-curry cooked or fried or canned, or by mixing with preserved fat (*sawh-bawl*). The bamboo shoots are available in local markets from ending May to September.

Notes Other bamboos, viz; *Dendrocalmus hamitonii*, *D.sikkimensis*, *D.strictus*, *D.longispathus*, *Bambusa tulda* are widely used for building construction, and *Neohouzea dullosa*, *Pseudostachyum Polymorphum*, *Arundinaria callosa* and *Chimonobambusa khasiana* finds no much use in construction nor medicines either.

Remarks *M.baccifera* Roxb. is the predominant bamboo species. The flowers are due to set in 2007 A.D. and assumed to be followed by starvation, owing to the rapid increase in rat population which fed upon the bamboo (*muli*) fruits.

Mesua ferrea Linn. FBI 1:277.1874; FFBB 1:97.1877; DEP 5:236.1891; IT 55.1906; BBO 55.1921; FA 1:111.1934; RBSI 12(2):81.1938; GIMP 166.1956; WI 6:349.1962; FTS 1:365.1981; TFM 2:232-3.1983; FFM 1:110.1985; UPI 368.1986; MMIP 343.1989; DIFME 124.1991; TIMP 2:163.1992; CCENEI 142.1994; MPM 114.1996. *M.nagassarium* (Burm. f.) Kost. DIMP 299.1992; IMP 4:27.1996 (Pl.38, P.74).

Family Clusiaceae.

Local name Herhse (M).

Botanical description A small to medium-sized tree; evergreen and handsome with dense crown; young shoots brilliant crimson, appearing in July; bark dark-brown; leaves opposite, decussate, drooping, linear-lanceolate or oblong-lanceolate, shortly acute, 1-4.5 x 6-12 cm, glossy above, white wax-like powder beneath; base sub-acute; petiole c 1 cm long; flowers with white petals and yellow stamens, large, very fragrant, usually terminal and solitary or in pairs; fruits ovoid, up to 3 cm long, supported by persistent calyx; seeds 1-4, shining.

Fl.: April-May. **Fr.:** Oct-November.

Location & altitude The forests of Saithah, S.Diltlang, Bungtlang, Kawnpui, etc.

Alt. 500-1000 m.

Associates & ecology *Syzygium* spp., *Cassia nodosa*, *Callicarpa arborea*, *Glochidion sphaerogynum*, on slopes of moist tropical evergreen forests.

Distribution Sri Lanka, Bangladesh, Myanmar, Thailand, Malaysia and Vietnam, mountains of eastern Himalayas, North-Eastern India, Andamans, **common in Mizoram, in tropical evergreen and semi-evergreen forests.**

Part used Flowers and wood.

Extraction and uses :

Medicinal The flowers are chewed as stomachic.

Material culture 1) The wood is used for making a large wooden pestle (1.5-2.5 cm long) for pounding rice.
2) The dark-red hard wood is used for house-posts and tool-handles.

Environmental conservation The trees are planted on roadsides for the purpose of shade and environmental conservation.

Michelia champaca Linn. FBI 1:42.1872; FFBB 1:25.1877; DEP 5:241.1891; IT 8:1906; BBO 8:1921; Fa 1:22.1934; RBSI 12(2):78.1938; GIMP 116.1956; WI 6:370.1962; FTS 1:79.1981; FFM 1:59.1985; UPI 369.11986; DIFME 124.1991; TIMP 1:109.1991; DIMP 300.1992; CCENEI 283.1994; IMP 4:33.1995; MPM 115.1996.

CHAMPAK.

Family Magnoliaceae.

Local name **Ngiau** (M); **Hrihrua** (Ma).

Botanical description A large evergreen tree with cylindrical bole; bark grey or brown; leaves ovate-lanceolate, acuminate, 5-9 x 10-25 cm, dark-green above, paler beneath; nerves 12-15 pairs; base cuneate; flowers yellowish to orange, very fragrant, large, solitary and axillary; fruits ellipsoid, cone-like capsule, drooping, dark-brown; seeds 1-12, scarlet or brown.

Fl.: March-April. Fr.: April-July.

Location & altitude Chamdun Project, Binghamun forest, Phuldungsei forest, Dampui forest etc.
Alt. Up to 1000 m.

Associates & ecology *Terminalia myriocarpas*, *Duabanga grandiflora*, *Gmelina arborea*, on sandy-loam soil in primary dense forest.

Distribution S.W.China, Myanmar, Vietnam, Laos and Java; throughout India from N.W.Himalaya to Nepal, western Ghats, Nilgiri hills and North-East India; **fairly common in Mizoram in tropical evergreen forests.**

Part used Root, stem-bark and wood.

Extraction and uses :

Medicinal 1) Infusion of the root-bark or stem-bark is used as febrifuge internally.
2) The fruits/seeds made into paste is applied on cracks in the feet.

Material culture The heartwood is light brown, striate, close-grained and polishes well. It is used for building construction, furniture, planking, door panels, etc. The timber is considered second best, next to *Tectonia grandis* L. (Teak/Tlawr).

Notes Monoculture of *Michelia champaca* has been taken-up by the state Environment & Forest Deptt. since 1990's to replenish the growing stock.

Remarks In Indian system of Medicine, the flowers and oils are largely used as medicine. The fresh flower-buds are largely imported by post into Simla, packed between pieces of banana stem (Surgeon-Major F.E.T. Aitchison, Simla, cited by Watt, 1891).

Mikania micrantha Kunth. WI 6:376.1962; FFM 2:524.1987; DIFME 125.1991; CCENEI 144.1994. *M.cordata* (Burm.) B.L. Robinson, FTS 2:225.1983; UPI 372.1986; MPMI 116.1996. *M.scandens* Hook. f. BP 592.1903.

Family Asteraceae.

Local name **Japan-hlo** (M); **Japa-pashi** (Ma).

Botanical description A dense climbing herb or twiner; branches slender, hairy; leaves ovate-lanceolate or detoid-ovate, 1-5 x 3.5-10 cm, acuminate, crenate or undulate;

base rounded cordate, sometimes villous beneath, 3-5 nerved at the base; flowers dirty white in compound corymbose heads; bracts lanceolate; fruits (achenes) linear-oblong with reddish pappus.

Fl.: October-February. **Fr.:** October-February.

Location & altitude	Abundant throughout Mizoram.	Alt. Up to 2100 m.
Associates & ecology	They grow in waste places, plantation areas and forest edges, they climb on fencing bars, trees, amongst <i>chromoleana odorata</i> , <i>clerodendrum</i> spp., etc.	
Distribution	S.China, tropical America, Myanmar, Thailand, Malaysia and Philippines; West Bengal and North-East India; abundant throughout Mizoram, usually in secondary open forests and fallow lands.	
Part used	Leaves.	
Extraction and uses :		
Medicinal	<ol style="list-style-type: none">1) The juice of crushed leaves is used as an effective haemostatics in cuts and wounds, externally.2) The leaves are boiled and the water is drunk against diarrhoea and dysentery associated with fever. The medicine is taken 1/2 cup (50 ml) twice daily.3) 100 gms of leaves is crushed and the juice is mixed with '<i>Lungthi</i>' (an algal residue on cliff near waterfalls, dark-red in colour) and stirred thoroughly. The medicine is prescribe for ulcerated cancer and taken internally @ talbespoonful (10 ml) twice daily.	
Fodder	The leaves are used as pig's food in combination with the leaves of <i>Alocasia</i> sp., <i>Solanum nigrum</i> , etc. and small pieces of broken rice.	

Millettia pachycarpa Benth. FBI 2:106.1876; FFBB 1:353-4.1877; IT 221.1906;IMP 1:731.1935; FA 2:27.1938; RBSI 12(2):90.1938; GIMP 167.1956; WI 6:379.1962; FTS 1:176.1981; FFM 1:305.1985; UPI 373.1986; DIFME 125.1991; CCENEI 144.1994; MPM 117.1996 (**Pl.39, P.76**).

Distribution	Fabaceae.
Local name	Rulei (M).
Botanical description	A large scandent shrub or climber; stem dark-grey, rough; young parts and inflorescence rusty-brown tomentose; leaves 6-10 pairs, imparipinnate; leaflets oblanceolate or lanceolate, 2.5-5 x 5-22 cm, abruptly acuminate or caespitate, villous beneath; nerves 9-13; base rounded; petiole short; flowers violet or pinkish, c 2.5 cm long, in axillary racemes or terminal panicles; pedicels stout; pods rugose, 2.5 x 8-15 cm, indented between seeds; seeds 1-3. Fl.: March-April. Fr.: June-November.
Location & altitude	Ngengpui, on roadsides between Theivai-Teiri-Tuipang. Alt. 500-1400 m.
Associates & ecology	<i>Macaranga denticulata</i> , <i>Desmos chinensis</i> , <i>Litsea glutinosa</i> , on sandy to loamy soil, in shady places.
Distribution	Bangladesh and Upper Myanmar; eastern Himalayas to North-East India; common throughout Mizoram, in secondary and primary forests.
Part used	Root.
Extraction and uses :	
Medicinal	1) Infusion of the root is used as a lotion for wounds, swellings and sprains. 2) The poultice made of the root is used as antispasmodic. 3) Decoction of the root is used for washing scabies and itches. 4) The root-bark is washed and chewed against tooth-ache.
Fish poison	The roots are crushed and dipped into rivers for stupefying fishes.

Reported for the first time.

Millettia piscidia Wt. FBI 2:107.1876; IT 222.1906; FA 2:27.1938; RBSI 12(2):10.1938; FFM 11:305.1985; UPI 373.1986.

Family Fabaceae

Local name	Ruteng, (M).
Botanical description	A small, evergreen tree; bark dark-brown; leaves towards the ends of branchlets; leaflets 5-7, ovate-lanceolate. 1.5-3 x 4-8 cm, caudate, thinly coriaceous; base rounded; flower greenish-white, simple racemes, borne on branchlets; fruits pisciform, drooping, 7-15 cm long, narrowed at both ends; seeds 1-3. Fl.: May-June. Fr.: October-February.
Location & altitude	Zobawk-Sairep forest. Alt. 1200 m.
Associates & ecology	<i>Cinnamomum</i> spp. <i>Hedychium</i> spp., <i>Derris robusta</i> , <i>Schima wallichii</i> , on humus sandy-loam soil in shady areas.
Distribution	Endemic to North-East India; rare in Mizoram, in primary forests.
Part used	Fruits.
Extraction and uses :	
Medicinal	Decoction of fruits (seeds) can be used as abortifacient.
Fish poison	The fruits put into a bag are crushed manually and the whole thing is dipped into rivers for stupefying fishes.

Reported for the first time.

Mimosa invisa Mart. WI 6:382.1962; UPI 374.1986.

Family	Mimosaceae.
Botanical description	A diffuse thornless climber; stem hexagonal, white, pubescent; leaves sensitive small and numerous; flowers globose, purplish-pink on short pedicel; fruits small and light. Fl.: November. Fr.: December-January.

Local name	Di-hlo (M); Hlonuar-var LR.
Location & altitude	Between Rengtekawn and Govt Godown, c 3 km from Kolasib; on roadsides of Rubber plantation near Bilkhawthlir. Alt. 400-1000 m.
Associates & ecology	<i>Abelmoschus moschatus</i> , <i>Mikania micrantha</i> , <i>Derris robusta</i> , <i>Chromolaena odorata</i> , on sandy soil, in clearings and waste places.
Distribution	Indo-China, Sri Lanka and Indonesia; Western Ghats; rare in Mizoram, on dry sandy soils in open forests.
Part used	Roots.
Extraction and uses :	
Medicinal	Infusion of the roots is capable of dissolving stones in the kidney/gall-bladder.
Notes	The thornless straggling white variety is named <i>Hlonuar-var</i> (<i>Hlonuar Mimosa: var white</i>). on account of the stem being white. The existing Mizo name "Di-hlo" (<i>Di Imperata cylindrica; hlo-herb or herbicide</i>) indicates that the plant is capable of suppressing the growth of noxious spear-grass.
Recommendation	The plant may be used in agroforestry to suppressed weeds and conserve soil moisture.

Reported for the first time.

Mimosa pudica Linn. FBI 2:291.1879; IMP 2:915.1935; GIMP 167.1956; MPIP 110.1962; WI 382.1962; FTS 1:133.1981; UPI 374.1986; DIFME 125.1991; DIMP. 302.1992; CCNEI 145.1994; ADPR 271.1994; IMP 4:36.1995; MPM 117.1996.

SENSITIVE PLANT.

Family	Mimosaceae.
Local name	Hlonuar (M).

Botanical description A diffuse prickly undershrub; stem reddish; leaves sensitive; pinnae 1-2 pairs; leaflets 10-20 pairs; flowers pinkish, in globose heads; pods small, flat, jointed, prickly; seeds 3-5.

Fl.: August-November. Fr.: October-January.

Location & altitude On roadsides between Aizawl and Sairang, Zembawak, etc.
Alt. 500-1200 m.

Associates & ecology *Desmodium gyroides*, *Clotolaria spicata*, *Ageratum conyzoides*, on roadsides in open waste places.

Distribution Native of tropical America; nearly throughout tropical and sub-tropical parts of India; **frequent in Mizoram, in waste places above 500 m.**

Part used Roots, leaves.

Extraction and uses :

- Medicinal
- 1) Infusion of root is taken internally for the removal of stones in the kidney/gall-bladder @ 1/2 cup (50 ml) twice daily.
 - 2) Dried leaves are smoked as cigarettes to remove toothworms from the mouth.
 - 3) Juice of fresh leaves is applied on boil and bandaged. The pus comes out next morning and the boils healed.
 - 4) Decoction of plant is taken internally for placental disorder @ 1 cup (100 ml) per day.

Momordica charantia Linn. FBI 2:616.1879; DEP 5:236.1891; BBO 394.1922; IMP 2:1130.1935; FA 2:330.1938; GIMP 168.1956; RBSI 17(1):88.1959; WI 6:408.1962; FTS 1:263.1981; UPI 378.1986; IED 127.1986; DIFME 126.1991; DIMP 305.1992; CCENEI 285.1994; ADPR 220.1994; IMP 4:48.1995.

Family Cucurbitaceae.

Local name **Changkha-te** (M).

Botanical description A slender climber; stem, pubescent, grooved; leaves sub-orbicular, 5-7 lobed; lobes sinuate-dentate, pubescent; tendrils slender; flowers yellow, solitary; fruits fusiform, ribbed with tubercles, tapering at both the ends, c 15 cm long; seeds compressed, embedded in the red pulp.

Fl.: August. Fr.: August-February.

Location & altitude Forest edges near *jhums* and waste places. Both wild and cultivated.
Alt. Up to 1200 m.

Associates & ecology *Maesa indica*, *Macaranga indica*, *Melocanna baccifera* etc. in edges of *jhums* and waste places.

Distribution Tropical Africa, China and Malaysia; cultivated throughout India; **both wild and cultivated in Mizoram, in and near jhum lands.**

Part used Leaves and fruits.

Extraction and uses :

Medicinal 1) The leaves are boiled with that of *Benincasa hispida* (*Maipawl*) in the proportion of 5:100 gms, and the water is taken internally against jaundice and dysentery @ tablespoonful (10 ml) 3 times per day.
2) The fruits are boiled and eaten for hypertension and reduction of breast milk.

Food The leaves and fruits are boiled and taken as vegetable or pot herb. The fruits are also eaten fried.

Remarks The local wild variety is very bitter and the fruits are small and spindle-shaped. The indigosity is, however, uncertain.

Morinda angustifolia Roxb. FFBB 2:61.1877; FBI 3:156.1880; DEP 5:260.1891; IT 376.1906; BBO 424.1922; FA 3:79.1939; WI 6:423.1962; FTS 2:66.1983; UPI 380.1986; FFM 2:488.1987; DIFME 127.1991; CCENEI 145.1994 (Pl.39, P.77).

Family Rubiaceae.

- Local name **Kawrpel (M); Thing-aieng LR; Bolkormoha (B).**
- Botanical description A large shrub or small tree to 3 m high; shoots hairy; leaves opposite, 6-9 x 15-26 cm, oblanceolate, acute, glossy above, pale beneath; nerves 10-18 pairs; base attenuate; petiole channelled; flowers white, c 3 cm across; corolla-tube 3 cm long; stamens 5, yellow; pistil short; fruits obovoid-globose, turbinate.
- Fl.: March-April. Fr.: June-July.
- Location & altitude Lungkulh virgin forest (near Rengdil-I), Chikha forest, on roadsides between Kawlchaw and Serkawr, S.Mizoram. Alt. 500-1000 m.
- Associates & ecology *Ficus* sp., *Cinnamomum* sp., *Piper* sp., on sandy and loamy soil in mixed secondary and evergreen forests.
- Distribution Nepal, Bangladesh and Myanmar; eastern Himalayas, Bihar & Orissa, Andra Pradesh and North-East India; **frequent throughout Mizoram, in tropical evergreen and semi-evergreen forests.**
- Part used Root-bark.
- Extraction and uses :
- Medicinal The root-bark in combination with that of *Cinnamomum tamala*, rhizome of *Curcumorpha minor*, 2-3 grains of *Piper nigrum*, 4-5 cloves of *Cinnamomum aromaticum*, 3-5 slices of *Allium cepa* are pounded to powder. A teaspoonful (5 g) of the powder is mixed with 1/2 cup (50 ml) of water. The medicine is taken internally for hepatitis and jaundice @ table-spoonful (10 ml) thrice daily.
- Notes The plant is easily recognised by the turmeric-yellow root inside, hence the name (turmeric = aieng; thing = tree).

Mucana pruriens (Linn.) DC. FBI 2:187.1976; DEP 5:286.1891; IT 226.1906; FTS 1:179.1981; FFM 1:309.1987; MIMPI 353.1989; TIMP 2:102.1992; CCENEI 147.1994. *M.prurita* Hook. IMP 1:778.1935; FA 2:69.1938; GIMP 171.1956; MPIP 115.1962; WI 6:442.1962; UPI 383.1986; ADPR 67.1994; IMP 4:68.1995; UPI 383.1986; MPM 121.1996.

COMMON COWITCH, COWHAGE.

Family	Fabaceae.
Local name	Uiteme (M).
Botanical description	Slender hairy climber, annual; leaves pinnately 3-foliolate; leaflets broadly ovate or rhomboid-ovate, unequal sided; flowers in axillary pendulous racemes, purple; pods 1x 6 cm, curved, clothed with stinging brown hairs; seeds 5-6 black, ovoid.
	Fl.: January-February. Fr.: March-November.
Location & altitude	Pukzing forest, Chamdud Project, Mampui forest, etc. Alt. 200-900 m.
Associates & ecology	<i>Sterculia coccineum</i> , <i>Ficus quercifolia</i> , bamboos and grasses in secondary forest and fallow lands.
Distribution	Throughout tropical America, Africa, Bangladesh and Myanmar; nearly throughout the plains of India, foot hills of Himalaya and North-East India; common in Mizoram, in tropical secondary and mixed bamboo forests.
Part used	Seeds and roots.
Extraction and uses :	
Medicinal	1) The powdered seeds are pounded with an yolk. The mixture (c 10 gms) is taken with water for aphrodisiac, spermatorrhoea and nervine tonic. 2) Decoction of roots is given for delirium in fever and in dropsy.
Notes	The plant is treated as noxious weed in <i>jhums</i> for the hair caused painful irritation and skin eruptions.

Murraya koenigii (Linn.) Spreng. FBI 1:503.1875; FFBB 1:190.1877; DEP 5:288.1892; IT 113.1906; BBO 165.1921; FA 1:208.1934; IMP 1:59.1935; GIMP 171.1956; WI 6:446.1962; FFM 1:186.1985; UPI 384.1986; DIFME 128.1991; CCENEI 147.1994; ADPR 199.1994; IMP 4:75.1995; MPM 121.1996 (**Pl.40, P.78**).

CURRY LEAF TREE.

Family	Rutaceae.
Local name	Arpatil (M); Sadiu-ruit-chia (Ch).
Botanical description	An erect unbranched shrub or small tree; bark dark-brown; leaves strongly scented when bruised, imparipinnate, up to 30 cm long; leaflets 7-20, ovate-lanceolate, serrate, 1.2-5 x 2-12 cm; base oblique; flowers white, fragrant, in terminal corymbose cymes; fruits ovoid, succulent, black when ripe; seeds -2. Fl.: March-April. Fr.: May-October.
Location & altitude	The forests between Tlabung and Marpara, Lohre and Phura, Ngengpui wildlife sanctuary. Alt. 200-400 m.
Associates & ecology	<i>Ardisia paniculata</i> , <i>Lasianthus hirsutus</i> , <i>Carallia brachiata</i> , <i>Garcinia</i> sp., on brownish compact loamy soil in primary forest as an undergrowth.
Distribution	Bangladesh, Myanmar; the foot hills of Himalayas to Bengal, Assam Meghalaya and Manipur; very common in Mizoram, particularly in tropical wet evergreen forests.
Part used	Roots.
Extraction and uses :	
Medicinal	The roots are grinded with that of <i>Vitis bifurcata</i> on grindstone and the paste is collected in a cup of water. A red hot iron-rod is dipped into the water and then drunk against cardiac tonic once per day. (cf. <i>Vitis bifurcata</i> Wall.).
Megigo-religious belief	The plant is secret to the <i>Chakmas</i> and <i>Bawms</i> . For <i>Chakmas</i> , betel-nuts (<i>Areca catachu</i> and <i>Piper beetle</i>) are offered by putting near the plant before extraction. <i>Bawm</i> practioner claims that the plant is used for the practice of magic/witchcraft.
Musa glauca	Roxb. Fl 2:490.1824; FBI 6:262.1894; WI 6:450.1962; EFPN 62.1978; UPI 386.1986 (Pl.40, P.79).
Family	Musaceae.

Local name	Saisu (M).
Botanical description	A non-stoloniferous tree-like herb to 3 m tall; trunk below the leaves; pseudo-stem stout, cylindric, broadest at base and tapering towards the apex; leaves oblong-lanceolate; up to 2.5 m long, acute; spike drooping from the base; bracts many, ovate green many flowered; fruits pale yellow with thick skin, obovoid-oblong, up to 12 cm long; seeds numerous, sub-globose, blackish, 0.5-1 cm across. Fl.: March-July. Fr.: July-January.
Location & altitude	A single plant was seen at 2 or places between Lohre and Phura on the upper roadsides in the wild; also cultivated in Aizawl and elsewhere. <p style="text-align: right;">Alt. 250-1000 m.</p>
Associates & ecology	<i>Alcornia tiliifolia</i> , <i>Hedychium bracteatum</i> , etc. on sandy to loamy soil in semi-open forest.
Distribution	Bangladesh and Myanmar; lower slopes of Nepal and Meghalaya; rare in Mizoram, in tropical slopy areas of evergreen and secondary forests.
Part used	Seeds and fibre.
Extraction and uses :	
Medicinal	<ol style="list-style-type: none"> 1) The seeds are made into beads and used as necklace by children against convulsions associated with fever. 2) The fibre extracted from the leaf-stem is locally considered second best fibre and used for ladies-bags, hats, ropes, shoe-brushes, etc. 3) The sap of the cut stem is taken internally for dysentery and as coolant. Local people prefer the wild plantain which grows on tree-trunk for dysentery. 4) The watery juice of the stem is applied externally on insect-bites, snake-bite, wounds, sores and whitlow. 5) The powdered seeds of <i>Musa acuminata</i> Colla, is used as an effective remedy against tape-worm and diabetes. The seeds are locally called "<i>Changkef</i>".
Food	The spadix and convolute leaf-sheaths are consumed as vegetable.

Mythical observation	An iron-nail piercing through the foot is pulled out and fixed on the stem of any <i>Musa</i> spp. (banana or plantain) and it is said that the wounds are somehow prevented from becoming septic indirectly.
Remarks	I saw four men of Hauruang village (near Lunglei) had experienced the above mythical fact when I was on my field trip to Hauruang on 22.1.1996.
Material culture	1) Dried leafy-stem is chopped and used for mushroom culture in place of straw. 2) The green leafy-stem is used as shade for seedlings and moisture retainer in agro-farming systems.
Special remarks	Sap of the plantain considered alexeritic, is sometimes used for snakebite. Young leaves are applied to burns as a cooling poulice. The roots are considered alteratives, anthelmintic, antibillious, antidiabetic, antidotal, antiscorbutic, and styptic, and are used in a powder for anaemia and venereal diseases (Duke, 1986).

Reported for the first time.

Neolamarckia cadamba(Roxb.) Bosser, TFM 4:379.1989; IMP 4:120.1995. *Anthocephalus chinensis* (Lamk.) A. Rich. ex Walp. FFM 2:466.1985; WI 1-A:305.1985; DIFME 24.1991; DIMP 38.1992; CCENEI 219.1994; MPM 16.1996. *A. cadamba* Mig. FBI 3:23.1880; DEP 1:266.1889; IT 367.1906; BBO 421.1922; IMP 2:1251.1935; FA 3:18.1939; UPI 44.1986. *A. indicus* A. Rich. GIMP 20.1956.

Family	Rubiaceae.
Local name	Banphar (M).
Botanical description	A large tree with straight bole; branches more or less horizontal like an arms stretch (hence the name), bark brownish-grey; leaves paripinnate, 6-12 x 15-25 cm, broadly ovate-lanceolate, shortly acuminate; base rounded; petiole 2-3 cm long; flowers yellow, in globose heads, solitary and terminal; fruits 4-7 cm across, yellow when ripe.
	Fl.: November-March. Fr.: June-August.

Associates & ecology *Macaranga indica*, *Aporosa octandra*, *Glochidion sphaerogynum*, on sandy-loam soil in tropical forests.

Distribution China, Myanmar, Malaysia and New Guinea; Sub-Himalayan tract from Nepal eastwards to the North-East, South India and Andamans, eastern Ghats and W.Bengal; **common in Mizoram, particularly in tropical semi-evergreen forests.**

Part used Sap, leaves and wood.

Extraction and uses :

Medicinal 1) The sap that oozes out when the branchelets are cut is used as a lotion for bone-ache and swellings.
2) Decoction of leaves is used as a gargle in case of aphthae and stomatitis.

Material culture The wood is used for internal building construction.

Fodder The leaves are chopped for cattle fodder.

Ocimum gratissimum FBI 4.608.1885; GIMP 179.1956; WI 7:84.1966; FTS 2:331.1983; UPI 405.1986; DIFME 133.1991; DIMP 322-4.1992; MPM 127.1996 (Fig. 21).

SHRUBY BASIL.

Family Lamiaceae.

Local name **Khum-bang-bang** (B).

Botanical description A bushy, much branched perennial shrub; stem quadrangular; leaves aromatic, opposite, peltate, elliptic-acuminate, coarsely crenate-serrate, 2-5 x 4.5-8 cm; base abruptly attenuate; petiole up to 6 cm long, channelled above; flowers axillary terminal spikes, greenish-yellow, pubescent c 15 cm long; fruits (nutlets) sub-globose, rugose, brown.

Fl.: November-December. Fr.: January-March.

Location & altitude	Perhsang, Tuipubari. Cultivated .	Alt. 350 m.
Associates & ecology	Cultivated in association with <i>Solanum indicum</i> , <i>Amomum dealbatum</i> , etc. on sandy soil in kitchen gardens.	
Distribution	Sri Lanka, Bangladesh, tropical Africa and America; throughout India, often cultivated; cultivated in Mizoram, particularly in western parts, by Bru as home remedy.	
Part used	Leaves and flowers.	

Extraction and uses :

- Mdicinal
- 1) Strong decoction of leaves and flowers is given to children for aphthae @ teaspoonful (5 ml) twice per day.
 - 2) Decoction of leaves is used for aphrodisiac and as anti-gonorrhoea.
 - 3) The plant is used as mosquito repellent.

Ocimum tenuiflorum Linn. FTS 2:332.1981; MMPI 381.1989; DIMP 324.1992; ADPR 485.1994. IMP 4:168.1995; *O. sanctum* Linn. FI 3:14.1832; FBI 4:609.1885; DEP 5:443.1891; BBO 729.1922; IMP 3:1965.1935; FA 3:500.1939; GIMP 179.1953; MPIP 122.1962; WI 7:87.1966; UPI 405.1986; MPM 128.1996 (fig. 22).

SACRED BASIL, HOLY BASIL.

Family	Lamiaceae.	
Local name	Ruhmui-dum LR.	
Botanical description	A bushy aromatic plant, often hairy and purple or mauve colour; stem and branches sub-quadrangular; leaves peltate, elliptic-oblong, acute, 1.5-2 x 3-5 cm, serrate, pubescent, base acute; flowers purplish-pink, closely whorled, often paniced; fruits forming 4 reddish-brown nutlets, ellipsoid, reddish.	
	Fl.: November-December. Fr.: December-January.	
Location & altitude	Lalmon II, Chamdur Project, S.Mizoram.	Alt. 210 m.

Associates & ecology	Cultivated in homestead gardens, on loamy soil with <i>Abelmoschus esculentus</i> (L.) Moench., <i>Hibiscus sabdariffa</i> L., <i>Colocasia esculenta</i> (L.) Schott.
Distribution	Sri Lanka, Bangladesh, Myanmar, Australia and West Asia; throughout India; rare in Mizoram, often cultivated by the Chakmas.
Part used	Whole plant.
Extraction and uses :	
Medicinal	1) The plant is boiled and the steam is inhaled against hepatitis. 2) Infusion of the plant is used in cough, bronchitis, gastric disorders, and as mosquito-repellant by the <i>Chakmas</i> .
Notes	Two forms are recognised. One with greenish-white leaves and another with black or dark-red or dark-purple leaves. The dark purple leaves variety is recorded here.
Remarks	The Mizos cultivate <i>Ocimum americanum</i> L. and <i>O. kilimandscharicum</i> Guerke, whereas the <i>Brus</i> cultivate <i>O.gratissimum</i> L. and <i>O. tenuiflorum</i> L. (white variety) and the <i>Chakmas</i> cultivate <i>O.tenuiflorum</i> L. (dark purple leaf variety).

Oroxylum indicum (Linn.) Vent. FFBB 2:237.1977; FBI 4:378.1884; DEP 5:495.1891; IT 496.1906; BBO 650.1922; IMP 3:1839.1935;RBSI 12(2):119.1938; FA 3:401.1939; GIMP 1:82.1956; WI 7:107.1966; TFM 3:40.1978; FTS 2:95.1983; UPI 413.1986; FFM 2:656.1987; DIFME 135.1991; DIMP 326.1992; CCENEI 154.1994; ADPR 464.1994; IMP 4:186.1995; MPM 130.1996 (**Pl. 41, P.80**).

Family	Bignoniaceae.
Local name	Archangkawm (M); Ak-chem-chawr (P).
Botanical description	A small deciduous tree to 10 m tall, branched at the top; bark brownish-grey; leaves 2-pinnate, rachis cylindric, warty, leaflets 2-4 pairs, elliptic-ovate acuminate, 4-10 x 6-12.5 cm; base rounded or sub-cordate; flowers large, erect, purpish, in terminal lax racemes up to 60 cm long, foetid; fruits flat,

sword shaped, pods on stout peduncle, 5-8 x 30-60 cm, semi-woody; seeds flat, with silvery wings.

Fl.: July-August. **Fr.:** December-March. **Leafless :** February-May.

Location & altitude On roadsides between Zamuang-Zawlnuam-Kanhmun, Baktawng and Chhipphir, etc. Alt. Up to 1200 m.

Associates & ecology *Litsea cubeca*, *Lagerstroemia speciosa*, *Callicarpa arborea*, *Stereospermum colais*, in sandy rocky slopes and in tropical forests.

Distribution S.China, Sri Lanka, Myanmar, and Malaysia; throughout the greater part of India; **very common in Mizoram, in both tropical mixed evergreen forests and semi-evergreen forests.**

Part used Root-bark, bark and fruits.

Extraction and uses :

Medicinal

- 1) Infusion of root-bark/stem-bark is taken internally for diarrhoea @ 2 tablespoonful (20 ml) twice daily.
- 2) The poultice of bark is applied on rheumatic pains.
- 3) The tender pods are eaten raw for piles.
- 4) The powdered bark is taken (5 gms) with water for afterpains twice daily.
- 5) Roasted pods are eaten for goites.

Food Young leaves and fruits are boiled and salted and taken as vegetable or made into *Mizo relish*.

Osbeckia rostrata FBI 2:517-8.1879; IT 334.1906; BBO 370.1922; FA 2:293-4.1938; RBSI 12(2):95.1938; EFPN 2:170.1979; FTS 1:391.1981; FFM 1:410.1985; CCENEI 291.1994 (**Fig. 23**).

Family Melastomataceae.

Local name **Builukhampa** (M, L.)

Botanical description Erect shrub, branched; stem quadrangular with adpressed hairs; leaves lanceolate, acuminate, 2.5-5 x 7-12 cm, margins ciliate, tomentose above, slightly strigose beneath; basal nerves 5, running up to the apex; tertiaries scalariform; stipules folioceous; flowers mauve rose-purple, in pyramidal terminal panicles; fruits avoid-oblong or cylindric with a narrowed neck, covered with scattered stellate hairs.

Fl.: August-September. Fr.: October-December.

Location & altitude Pawizawh lui, c 1 km east of Mampui, N.Vanlaiphai, etc. Alt. 600-1400 m.

Associates & ecology *Maesa indica*, *Mucana pruriens*, *Musaenda roxburgii*, *Erianthus longisetum*, on sandy loose soils in secondary forest and on soil of rocky plates.

Distribution Nepal and Myanmar; Sub-Himalayan tract to North-East India; **frequent in Mizoram, in tropical and sub-tropical hill forests.**

Part used Roots.

Extraction and uses :

Medicinal 1) The roots are sliced in cross-section and put in a small pot without water. The small pot is put in a bigger pot filled with water and then boiled. The steamed roots with extracted solution is taken internally for renal disorder and genito-urinary problems. 3-5 pieces are taken once every day 3 days.
2) Decoction of roots is taken (i) tablespoonful (10 ml) twice daily for kidney trouble.

Notes The roots are slender, more or less horizontal, 1.5-2.5 cm across, grey-brown in colour.

Reported for the first time.

Paederia scandens FFM 2:494.1987; MMPI 388.1989; DIFME 137.1991; DIMP 328.1992. *P. foetida* Linn. FBI 3:195.1881; DEP 6(1):2-3.1892; BBO 442.1922; IMP 2:1297.1935; RBSI 12(12):102.1938; FA 3:77.1939; GIMP

184.1956; WI 7:210.1966; FTS 2:77.1983; UPI 421.1986; CCENEI 157.1994; MPM 133.1996.

Family	Rubiaceae.
Local name	Vawihuihhru (M); Veihna (Ma).
Botanical description	A slender foetid climber; stem dark purple when young, nearly black when old, foetid smell when bruised; leaves opposite, ovate-lanceolate, acuminate, 2.5-6 x 5-11 cm, glabrous; nerves 5-7; base sub-cordate; petiole long, up to 4 cm long; flowers violet or reddish-purple, tomentose, in axillary and terminal paniced cymes; fruits ellipsoid, compressed; pyrenes with pale wings. Fl.: August-October. Fr.: December.
Location & altitude	Forests of Tlabung, Dampa Tiger Reserve, etc. Alt. 40-1500 m.
Associates & ecology	<i>Willoughbeia edulis</i> , <i>Smilax ovalifolia</i> , <i>Knema linifolia</i> , <i>Dillenia indica</i> , in gentle and steep slopes on the ground or up the trees in shaded or open forest.
Distribution	Nepal and Myanmar; Central and eastern Himalayas, Bihar & Orissa, W.Bengal and North East India; common throughout Mizoram, in dense primary and secondary forests.
Part used	Leaves and stem.
Extraction and uses :	
Medicinal	1) Juice of crushed leaves is retained in the mouth for sometime 3 times per day for gum-boil and toothache. 2) The crushed juice of leaves with that of <i>Pithecellobium angulatum</i> Benth. can be used as above. 3) The poultice made of the stem and leaves is used in herpes externally.

Food The leaves are boiled with the leaves of *Cucurbita mixima* Duch. and taken as vegetable. The foetid smell disappear when boiled.

Pajanelia longifolia WI 7:211-2.1966; UPI 421.1986; FFM 2:657.1987. *P.rheedi* DC. FBI 4:384.1884; DEP 5(1):4.1892; IT 494-5.1906 (**Pl.41, P.81**).

Family Bignoniaceae.

Local name **Ram-archangkawm - LR; Va-ak-chem-chawr (P).**

Botanical description A medium-sized to large deciduous tree; bark warty, reddish-brown; leaves imparipinnate, up to 100 cm long; rachis ridged; leaflets 9-11 pairs, 4.5-10 x 10-25 cm, elliptic or ovate-lanceolate, acuminate; base very oblique; flowers dull purple, yellow inside the throat, in large panicles; fruits erect.flat, winged on each margin; seeds compressed.

Fl.: November-February. **Fr.:** February-March.

Location & altitude Chamdun Project-I, S.Mizoram Alt. 220 m.

Associates & ecology *Oroxylum indicum, Dipterocarpus rhetsusa, Chromolaena odorata*, on brown clayey-soil in edges of the forests.

Distribution Bangladesh and lower Myanmar; western Ghats, Andamans, Assam and Meghalaya; **rare in Mizoram, in tropical evergreen forests.**

Part used Young stem and leaves.

Extraction and uses :

Medicinal 1) The young stem or branch (about the height of the patient) is taken from the lowest rachis and cut into pieces. They are crushed and ground into a paste. The paste is directly applied on the fracture and then bandaged. The medicine (paste) is changed everyday for 3-4 days.
2) The leaf paste is used for the same purpose.

Reported for the first time.

Parabarium hookeri Pierre, EFPN 3:83.1982. *P.micranthum* (DC.) Peirre ex Spire. UPI 429.1986; FFM 2:604.1987. *Ecdysanthera micrantha* A.DC. FBI 3:662.1882; IT 465.1906; FA 3:266.1939. *E. brachiata* DC. FFBB 2:189.1877.

Family Apocyanaceae.

Local name **Theikelkibawr** LR.

Botanical description A large climber with rough and lenticellate grey stem, exuding milky latex when cut; leaves opposite, elliptic-lanceolate, caudate-acuminate, nerves 5-6, arcuate; flowers yellowish-white, axillary in trichotomous cymes; follicles 3-4, more or less horizontal, pointed, crutaceous; seeds compressed, crowned by white silky coma.

Fl.: March-April. Fr.: August-October.

Location Mampui tlangnuam.

& altitude

Alt. 1000 m.

Associates *Bruinsmia polysperma*, *Microemelum minutum*, *Macaranga indica*, on sandy-loam soil in primary forest.

Distribution Bangladesh, Myanmar and Hongkong; from Sikkim to North-East India; **frequent in Mizoram, in tropical evergreen forests.**

Part used Latex.

Extraction and uses

Medicinal The latex is applied to the wounds and the roots are used as a substitute for *Chonemorpha fragrans* (Moon) Alston.

Notes Another species, i.e., *Anodendron paniculata* A.DC. (*Theikelki*) is frequent in the tropical jungles. The fruit is edible and decoction of root-bark is used in placement disorder.

Reported for the first time.

Parkia timoriana (A.DC.) Merr. DIFME 138.1991; CCENEI 291.1994. *P. roxburgii* G. Don. FBI 2:289.1878; IT 262.1906; FA 2:151.1938; WI 7:265.1966; FFM 1:340.1985; UPI 1:134.1986; TFM 1:280.1983; MPM 135.1996 (Pl.42, P.82).

Family Mimosaceae.

Local name **Zawngtah (M); Bandor - ten-tuit (C); Cha-aw (Ma).**

Botanical description A medium-sized to large tree; bark light grey with white patches in old trunk, rough; leaves 2-pinnate, leaf-rachis up to 45 cm long; leaflets 50-100 pairs, tiny 0.1-0.3 x 0.4-0.6 cm, sessile, linear-lanceolate, pointed tip curved forward; base rounded; midrib nearer to upper side; flowers in dense turbinate heads hanging on long peduncles, yellowish; fruits obliquely oblong, pods flat, 3-4 x 20-45 cm, straight, curved or twisted, green while young, dark brown when mature; seeds 6-20, strongly foetid when crushed.

Fl.: August-September. **Fr.:** September-March.

Location & altitude Both wild and cultivated throughout Mizoram.

Associates & ecology *Dysoxylum gobara*, *Mangifera sylvestris*, *Acrocarpus fraxinifolius*, very often found in steep slopes and riverines in tropical forests.

Distribution Bangladesh, Myanmar, Malaysia and Java; Assam, Tripura and Meghalaya; **very common throughout Mizoram, and widely cultivated also.**

Part used Bark, twigs and pods.

Extraction and uses :

Medicinal

- 1) Decoction of bark and twigs is taken internally against diarrhoea and dysentery @ 2 tablespoonfuls (20 ml) twice or thrice daily.
- 2) The green skin of the pods is scraped off and made into a paste. The paste is applied externally on cuts and wounds.
- 3) The poultice of bark or pods is banded on the abdomen as an antihæmorrhage.
- 4) *Chakmas* use hot infusion of scraped pods for diarrhoea and dysentery.

Food 1) The outer skin is scraped off properly and the thick ridges removed. The scraped pods are cut into small pieces (c 2 cm long) and eaten as vegetable.
2) The endocarp or testa of the seed is made into chutney or eaten raw.

Notes The *Mizos* are very fond of *Zawngtah* pods and consume a large quantity annually during October-February, and also sold in the local markets.

Pentapetes phoenicea Linn. FBI 1:371.1874; DEP 6(1):132.1892; BBO 82.1925; IMP 1:376.1935; GIMP 188.1956; FTS 1:288.1981; UPI 439.1986; DIFME 139.1991; TIMP 2:98.1992; IMP 4:233.1995; MPM 137.1996 (**Pl.42, P.83**).

Family Sterculiaceae

Local name **Parsenbial** LR.

Botanical description A pretty small herb with few scattered hairs; leaves lanceolate, 2 x 5-8 cm, crenate-serrate, 1-nerved; flowers scarlet-red, rotate, conspicuous, axillary, supported by persistent hairy calyx (opening at noon and closing at dawn); fruits sub-globose with bristles; seeds small, dotted.

Fl.: October-December. Fr.: December-January.

Location & altitude Teirei Forest complex.

Alt. 180 m.

Associates & ecology *Ageratum conyzoides* and grasses, on brown loamy soil in waste places.

Distribution Myanmar; North-west India, Bengal and Orissa; **very rare in Mizoram, and found in Teirei Forest Complex only.**

Part used Leaves

Extraction and uses :

Medicinal 1) The leaves are boiled and the water is taken for inflammatory glands, cough and cold.
2) Juice of leaves is applied on inflammatory glands.

Notes The plant is easily recognised by its round and scarlet flowers, hence the name. (Par. = flowers; sen = red, bial = round). Mounted specimen does not lose the redness of the flower.

Phlogacanthus thysiformis (Hardw.) Mabb. DIFME 140.1991. *P. thysiflorus* (Roxb.) Nees. FBI 4:512.1885; DEP 6(1):198.1892; IT 501.1906; BBO 701.1922; IMP 3:238.1935; FA 3:443.1939; GIMP 190.1956; WI 8:14.1969; FTS 2:296.1983; FFM 2:665.1987; UPI 446.1986; CCENEI 161.1994.

Family Acanthaceae.

Local name **Khumtiangkohha** (B).

Botanical description A shrub to 3 m high; stem dark-green, lenticellate; branchlets quadrangular; leaves elliptic-lanceolate, drooping, 2-5 x 3-15 cm; flowers orange-red, in terminal thysoid panicles; fruits sub-quadrangular; seeds 12-14.

Fl.: November-January. **Fr.:** February-March.

Location & altitude On river bank of Sailui near Dintar.

Alt. 80 m.

Associates & ecology *Mussaenda macrophylla*, *Trevesia palmata*, *Musa* spp., on loamy soil in moist shady places.

Distribution Bhutan and Ava; Sub-Himalayan regions from Bhutan to Assam, Tripura and Meghalaya; **common in Mizoram, in tropical evergreen forests as an undergrowth.**

Part used Roots.

Extraction and uses :

Medicinal The roots with those of *Clerodendrum wallichii*, *Claoxylon khasiamum*, *Mussaenda macrophylla* and *Trevesia palmata* are grinded on grindstone and made into a paste. The paste is applied externally on an abdominal tumor anticlock-wise from base to top, gently. The medicine is applied a fresh daily for a week.

Remarks As traditional formulations usually contain a combination of several plants, it is being held that some plants constituents are effective only in the presence of other plants.

Reported for the first time.

Phyllanthus airy-shawii Brunal & Roux. ADPR 468.1994. *P.debelis* Klein, ex Willd. FBI 5:299.1878; BBO 126.1921; FA 4:155.1940; WI 8:34.1969 **Pl.43, P.83).**

Family Euphorbiaceae.

Local name **Mawsai** LR.

Botanical description A shrub to 1.5 m. stem reddish-brown; branches slender; leaves bifarous, bipinnate, distichous or alternate; leaflets sub-sessile, 6-9 pinnae, ovate or obovate, acute, 1 x 1.3 cm, dark-green above, glaucous beneath, lower ones smaller; nerves 3-5; stipules lanceolate; flowers greenish-white, shortly pedicelled, borne on rachis beneath; fruits small, ribbed.

Fl.: April-May. **Fr.:** July-January.

Location & altitude Serkawr, c 1 km. westward. Both wild and planted.

Alt.700-950 m.

Associates & ecology *Securinega virosa*, *Anogeisus acuminata*, *Woodfordia fruticosa*, on dry rocky places in steep slopes of secondary forests.

Distribution Bhutan, Bangladesh and tropical Africa; from Sikkim to Western and Eastern Himalayas, Assam and Meghalaya; **rare in Mizoram, scattered here and there in tropical secondary forests.**

Part used Leaves.

Extraction and uses :

Medicinal 1) The leaves are crushed and the juice is applied externally on measles, skin eruptions and inflammatory glands (*mawsai* in *Mara*) hence the name.
2) An infusion of leaves is taken internally for diphtheria @ 1/2 cup (50 ml) once daily.

Remarks In Wealth of India, the species is considered with that of *P. fraternus* Webs. as allopatric sub-species (Anonymous, 1969). Hooker (1878), however, observed it to be very close, but the leaves, fruits and flowers are much larger in case of *P. delelis*. My specimen is also a shrub, much larger than that of the herbaceous species of *P. fraternus* in all respects.

Phyllanthus emblica Linn. FFBB 2:352.1877; FBI 5:289.1887; DEP 6(1): 217.1892; IT 570.1906; IMP 3:2220.1935; TFM 2:123.1983; DIFME 142.1991; DIMP 340.1992; ADPR 28.1994; IMP 4:256.1995. *Emblica officinalis* Gaertn. FA 4:159.1940; GIMP 106.1956; WI 3:168.1953; FTS 1:346.1981; UPI 195.1986; FFM 2:786.1987; CCENEI 103.1994; TIMP 3:33.1994; MPM 69.1996.

EMBLIC MYROBALAN, INDIAN GOOSEBERRY.

Family Euphorbiaceae.

Local name Sunhlu (M)

Botanical description A small tree, deciduous; bark greenish-grey, wrinkled; blaze reddish; leaves feathery, sub-sessile, linear-oblong, acute; base rounded; flowers greenish-yellow, axillary fasciated on branchlets; fruits depressed globose, obscurely 6-lobed, 1.5-2 cm across, 3-celled; seeds 6, trigonous.

Fl.: February-March. Fr.: August-January.

Location & altitude Tanhril, Kawnpui, etc. Both wild and cultivated.

Alt. Up to 1500 m.

Associates & ecology *Engelhardtia spicata*, *Aporosa octandra*, *Macaranga denticulata*, etc. in sandy-rocky places in secondary and mixed deciduous forests.

Distribution S.China, Sri Lanka, Myanmar and Malaysia; throughout tropical India and North-East India; **fairly common throughout Mizoram; less common in tropical; evergreen forests; most common in tropical semi-evergreen forests.**

Extraction and uses

- Medicinal
- 1) The bark is crushed and the juice is taken against diarrhoea and dysentery. The medicine is taken @ 1/2 cup (50 ml.) twice daily.
 - 2) Decoction of leaves is used as gargle for stomatitis and gum-bleeding.
 - 3) Fresh or dry fruits are crushed and the juice is mixed with the juice of *Citrus lemon* and taken as stomachic, in dysentery, nose-bleeding and gum-bleeding @ tablespoonful (10 ml) 2 times per day.
 - 4) Juice of bark is used for washing eye-sore.
 - 5) The above mixture is also applied on cuts and wounds, ringworm and cutaneous diseases
 - 6) Decoction of the seeds is used for eye-washing with the help of clean cotton or soft cloth to remove particles that causes eye itch.
 - 7) The fruits are crushed and the juice is strained through cloth and taken for cirrhosis of liver (@ tablespoonful (5 ml.) thrice daily.
 - 8) A combination of the pulp of *Embllica officinalis*, *Terminalia bellerica* and *Terminalia chebula* in the form of powder (*Triphala*) is very useful in cough and hiccup associated with fever.

Food-allergy vomitting The fruits are eaten-raw or the crushed fruit is taken against food-allergy and vomitting.

Material culture The wood is hard and used for fire-wood and agricultural implements.

Notes Crushed fruits packed in small polythene bags (8 x 10 cm) are sold in local markets (Hawkers) almost throughout the year for Rs. 5.00 per pocket.

Phyllanthus fraternus Webster, WI 8:34.1969; FTS 1:347.1981; UPI 450.1986; DIFME 142.1991; ADPR 466.1994; MPM 140.1996. *P.niruri* Linn. FBI 5:298.1887; DEP 6(1):222.1892; BBO 126.1922; IMP 3:2225.1935; GIMP 191.1956; MPIP 129.1962. *P.amarus* Schum & Thonn. TFM 2:122.1983; MMPI 395.1989; DIMP 339.1992; ADPR 466.1994; IMP 4:252.1995 (**Pl.43, P.85**).

Family Euphorbiaceae.

Local name Mithi-sunhlu (M); Lai-keng-thei-chah (Bm)

Botanical description	An annual erect herb to 60 cm high; branchlets spreading, slender; stem terrete; leaves distichous, pinnae 10-30 pairs, subsessile, elliptic-oblong, obtuse or shortly mucronate; base rounded, oblique; flowers greenish-white or yellowish, axillary or borne on lower rachis, shortly pedicelled; fruit subglobose, ribbed, on dorsal side of rachis, 3-5 mm across. Fl.: August-October. Fr.: November-March.
Location & altitude	Hlabung, Pukzing, Dampa Rengpui, Samtlang, etc. Alt. Up to 1200 m.
Associates & ecology	<i>Cyathula prostrata</i> , <i>Hedyotes scandens</i> , <i>Scleria cochinchinensis</i> , on shady moist soil, along roadsides and waste places.
Distribution	America and Sri Lanka; throughout hotter parts of India, Assam and Tripura; very frequent in Mizoram, usually in tropical areas up to 1200 m and very often found in current <i>jhum</i> lands at post-harvest period (November-December).
Part used	Whole plant.
Extraction and uses :	
Medicinal	<ol style="list-style-type: none"> 1) The whole plant is crushed and boiled in water and the water is drunk as an effective remedy against diabetes and jaundice. The medicine is taken @ 1/2 cup (50 ml) twice daily for 7 days. It is also taken for gastro-internal troubles. 2) The crushed leaves are applied externally on scabies, and the juice is used for aphthae. 3) Infusion of the plant is used in diuretic and genito-urinary infections. 4) A poultice of leaves made with rice water is applied on cutaneous diseases. 5) Decoction of the plant is taken for hepatitis and cirrhosis.
Plant used in combination	The powdered plant is mixed with the powdered bark of <i>Terminalia chebula</i> . The mixture is taken internally with or without water as an effective contraceptive @ tablespoonful (5 ml) twice daily for 1-2 months as per the prescription of <i>Bawm</i> specialist. The mixture is greenish yellow and tasted bitter-astringent and slightly irritating also.

Remarks Sivaranjan & Balachandra (1994) clearly stated that *Phyllanthus niruri* is an American species, and the Indian species assigned to *P. niruri* is subsequently identified as *P. fraternus* Webs. and subsequent authors have equated with the later. *P. amarus* Schum & Thonn. has been treated as separate species and not synonymous to *P. niruri* L. (Sala, 1995), whereas some authors treated as synonymous (Thakur, 1989; Hussain, 1992).

Picrasma javanica Bl. FBI 1:520.1875; FFBB 1:201.1877; IT 127.1906; FA 1:217.1934; GIMP 192-3.1956; WI 8:47.1969; TFM 1:35.1972; FTS 1:441-2.1981; FFM 1:35.1985; UPI 454.1986; DIFME 143.1991; DIMP 343.1992.

Family Simaroubaceae.

Local name **Thingdamdawi** (M, L).

Botanical description An evergreen, medium-sized tree; bark dark, specked with white patches, tetriculately fissured, pale yellowish-white when cut, thin; leaves imparipinnate; leaflets 5-7, dark green, shining above elliptic, acute, 2-4 x 5-10 cm; base swollen; flowers dull-white or green; fruits ovoid to sub-globose, black when ripe.

Fl.: April-May. Fr.: October-November.

Location & altitude Private gardens between Zodin and Tlabung; Mampui tlangpui, Darzo, etc. Alt. 100-1300 m.

Associates & ecology *Dillenia pentagyna*, *Artocarpus chama*, *Ficus hispida*, *Amomum dealbatum*, on sandy-loam soil in moist shady places.

Distribution Myanmar, Malaysia; Nepal, Sikkim, Assam, Meghalaya and Andaman Islands; **frequent in southern part of Mizoram, in tropical evergreen and semi-evergreen forests.**

Part used Bark.

Extraction and uses

Medicinal 1) The inner bark is very bitter like that of cinchona. An infusion of the inner coat of bark is taken internally against fever and malaria, in lieu

- of quinine @ tablespoonful (10 ml) twice daily.
- 2) Decoction of bark is taken internally for diabetes and hypertension @ 2 tablespoonfuls (20 ml) twice daily.

Materia culture The wood can be used as fuel.

Piper diffusum Vahl. FBI 5:96.1889; DIFME 144.1991.

Family Piperaceae.

Local name Pawhrual (M).

Botanical description A small diffused undershrub, stem dark green; branches angled, dichotomous; leaves alternate, peltate, ovate-lanceolate, acute or acuminate, 2.5 - 3.5 x 5.5 -10 cm, 3-nerved at the base and at the above upper nerves, sub-sessile, slightly oblique; flowers not seen; fruits axillary, globose, black.

Fl.: Not seen. Fr.: November-December.

Location & altitude Chikha forest, Miasa forest, Tuipang forests, etc.

Alt. 250-1400 m.

Associates & ecology *Cinnamomum tamala*, *Morinda angustifolia*, *Elsholtzia blanda*, *Anacolosa crassipos*, in hill-tops and stream-sides under dense primary forests as an undergrowth.

Distribution Sri Lanka and Java; **frequent in Mizoram, particularly in tropical dense evergreen forests.**

Part used Leaves.

Extraction and uses :

Medicinal Infusion of the leaves or juice of crushed leaves is used for sprains, spasm and swellings by external application. *Bru* people used it in the form of poultice.

Notes The characteristic feature is that in whatsoever the leaf is torn apart, it cuts into a straight line always, hence the name (pawt or pawh = tear apart; rual = straight or truncate).

Reported for the first time.

Plantago *erosa* Wall. FI 1:423.1820; FTS 2:186.1983; UPI 466.1986; DIFME 145.1991; CCENEI 166.1994; MPM 144.1996. *P.major* Linn. FBI 4:705.1885; DEP 6(1):285.1892; IMP 3:2035.1935; GIMP 196.1956; UPI 467.1986. *P.asiatica* Linn. RBSI 12(2):126.1938; WI 8:146.1969; UPI 466.1986 (Pl.44, P.86).

Family Plantaginaceae.

Local name **Kelba-an** (M); **Lyu-ra-ao-ma** (Ma).

Botanical description A stemless perennial herb with stout rootstock; leaves radical, oblong-ovate, 2.5-8 x 6-13 cm, irregularly toothed, sub-acute, 3-7 veined; base tapering, cuneate, petiole long, up to 5 cm long; flowers small, on slender scape or spike, up to 15 cm long, bracteate; fruits ovoid; seeds very minute, black, angled

Fl.: March-April. **Fr.:** April-May

Location & altitude On roadsides between Serkawr and Tuipang; Mampui and Lawngtlai, etc. Alt. 1100 m.

Associates & ecology *Ageratum conyzoides*, *Chromolaena odorata*, *Mikania micrantha*, on sandy dry soil and sandy-loam soil in waste places, clearings and waysides.

Distribution Tibet, Sri Lanka, Myanmar and Singapore; the hills of South India and Eastern Himalayas and North-East India; **frequent in Mizoram, usually in waysides and clearings in tropical semi-evergreen forests and secondary forests.**

Part used Whole plant.

Extraction and uses :

- Medicinal
- 1) Infusion of the plant is taken internally for fever, inflammation and diarrhoea. The medicine is taken @ tablespoonful (10 ml) twice or thrice daily.
 - 2) The pressed juice of leaves is applied on burns and bruises.

Plumeria acuminata Alt. GIMP 199.1956; WI 8:164.1969; UPI 471.1986; DIMP 359.1992; CCENEI 299.1994; TIMP 4:114.1995; MPM 146.1996. *P.acutifolia* Poiret, FBI 3:641.1882; DEP 6(1):297.1892; IT 458.1906; BBO 536.1922; IMP 2:1561.1935; FA 3:252.1939; IED 155.1986. *P.rubra* Linn.*var.acutifolia* (Poir.) Bailey, MPIP 135.1962; FTS 2:21.1983; IMP 4:329.1995.

TEMPLE TREE, PAGODA TREE.

Family Euphorbiaceae.

Local name **Chhi-chu** (B); **Vaingai** LR.

Botanical description A robust small tree; bark greyish-white, exuding milky juice; leaves crowded at branchends, elliptic-lanceolate or oblanceolate, acute, 3-10 x 10-35 cm, midrib prominent beneath; lateral nerves anastomosing, base cuncate; petiole stout, up to 14 cm long; flowers white with yellow centre, externally lined with pink, very fragrant, in terminal panicles; fruits not seen.

Fl.: April-May. **Fr.**: not seen.

Location & altitude Planted throughout Mizoram on roadsides and in private compounds.
Alt. up to 1300 m.

Associates & ecology Planted in private gardens as home remedy by the *Brus*, and as an ornamental plant by the *Mizos*.

Distribution Native of tropical America, Mexico and Guatemala; cultivated and naturalised throughout India; in gardens and near public places; **so also in Mizoram, on roadsides and in public avenues.**

Part used Milky juice, bark and leaves.

Extraction and uses :

- Medicinal
- 1) The milky juice is externally applied on carbuncles, verrucose.
 - 2) The bark is crushed with the fruits of *Piper nigrum* and 2-3 clones of *Allium sativa* and taken internally as an effective remedy against enlargement of spleen and liver.
 - 3) The *Brus* apply the scorched leaf on the forehead in vertigo or hemicrania.

Podocarpus neriifolia D. Don, FBI 5:649.1988; DEP 6(1):298-9.1892; IT 695.1906; RBSI 12(2):135.1938; FA 4:335.1940; WI 8:169.1969; FTS 1:72.1981; TFM 1:51.1983; UPI 473.1986; DIFME 146.1991; DIMP 360.1992 (**Pl.44, P.87**).

THIMIM, MOUNTEAK.

Family Podocarpaceae.

Local name **Thlang-far/Tu-far/Phai-tufar (M), Sar-thing (P).**

Botanical description A medium-sized to tall tree with straight bole and whorled branches; bark grey, fissured in old trunk; leaves scattered, linear-lanceolate, 2 x 30-60 cm, caudate, sub-falcate, thickly chartaceous, 1-nerved, sub-sessile; base narrowed; petiole short; flowers axillary, clustered; seeds globose, solitary.

Fl. & Fr.: not seen at the time of collection (Feb. 1995 & March, 1996).

Location Ngengpui wildlife sanctuary.

& altitude

Alt. 230-900 m.

Associates & ecology *Knema linifolia*, *Dalbergia spicata*, *Amoora wallichii*, on humus dark-brown soil in tropical dense forest.

Distribution China, Bangladesh, Myanmar, Japan, Malaysia and Fiji; eastern Himalaya, North-East India and Andamans; **not common in Mizoram, but occurred in tropical wet evergreen forests.**

Part used Bark and leaves.

Extraction and uses :

Medicinal	The leaves are boiled and the patient (with herpes) is bathed with the water. A decoction of the bark is externally applied on herpes with cotton wool.
Material culture	Wood is yellowish, finely grained and used in furniture, planking, boxes, etc.
Remarks	The wood is highly prized in Burma (Watt, 1892; Brandis, 1906; Kanjilal, <i>et al.</i> 1940).
Recommendation	The growing stock being small in population should be conserved <i>in-situ</i> and allowed natural regeneration.

Polygonum plebium R. Br. FBI 5:27.1889; DEP 6(1):319.1892; BBO 775.1924; IMP 3:2097.1935; FA 4:15.1940; GIMP 200.1956; WI 8:200.1969; FTS 2:156.1983; UPI 481.1986; DIFME 148.1991. *P. plebium* R. Br. var. *plebium* R.Br. MPM 151.1996 (Fig.24).

Family	Polygonaceae.
Local name	Bakhate/Anngharil (M); To-ku-lai (B).
Botanical description	A diffusely brached prostrate herb, branches angled; leaves linear-oblong, subsessile; stipules lacerate and fimbriate; flowers pinkish, axillary, solitary, or 2-3 flowered; fruits (nuts) rhomboid, 3-gonous, shining. Fl.: March-June. Fr.: November-December.
Location & altitude	On bank of R.Ngengpui, R. Teirei, etc. Alt. 60-300 m.
Associates & ecology	<i>Lycianthes laevis</i> , <i>Solanum nigrum</i> , etc. mainly on river banks and marshy places.
Distribution	The tropic of Asia, Afganistan, Philippines, Australia and South Africa; throughout tropical India ascending to Eastern Himalayas and the North-East India; frequent in Mizoram, in tropical low lying areas along river banks and marshy places.
Part used	Whole plant.

Extraction and uses :

- Medicinal
- 1) Decoction of the plant is taken against cirrhosis of liver and gastric complaints.
 - 2) The plant forms one ingredient for infertility. The combination consists of the roots of *Millettia pachycarpa* Benth., *Aeginetia indica* Linn., *Trichosanthes tricuspidata* Lour. *Ricinus communis* Linn., *Musa* sp. (local variety) and a small portion of the stomach of *Hysterix indica*, the Indian porcupine.

The above ingredients are grounded into a paste and the paste is made into 3 pills. Two pills are taken just after menstruation before bed, and one pill next morning before meal.

Precaution The married couple should abstain from indulging in liquor for 3-5 months. The *Bru*s specialist observes that the medicine has no side-effects.

Food The plant is boiled with rice and mixed with salt and taken as vegetable.

Pothos cathcartii Schoot. FBI 6:552.1895; BBO 858.1922; IMP 4:2625.1935; RBSI 12(2):148.1938; GIMP 203.1956; WI 8:224.1969; FTS 2:402.1983; UPI 488.1986; DIFME 149.1991; MPM 152.1996.

Family Araceae.

Local name **Leh-pong** (B).

Botanical description A climber on tree trunk; stem and leaves thick and fleshy, with nodes and internodes; leaves alternate; ovate-oblong or lanceolate, acuminate, 2-5 x 3-9 cm; based rounded or nearly auriculate; glossy dark-green above, nerves indistinct; spadix stout, sub-erect stipitate or decurved oblong on a short stipe; berries scarlet, obovoid.

Fl. January-February. **Fr.** March-August.

Location & altitude Dinthar forest, Serhmun forest, Nghallimlui forest, etc.

Alt. 50-600 m.

Associates & ecology Epiphytic on tree trunk with *Pothos scandens*, *Rhaphidophora glauca*, ferns and mosses.

Distribution Bhutan and Myanmar; tropical Himalaya from Kumaon to the North-East India; **common in Mizoram, particularly in tropical wet evergreen forest.**

Part used Stem and leaves.

Extraction and uses :

Medicinal The stem and leaves are used for bone-setting in combination with others. (cf. *Pothos scandens*).

Pothos scandens Linn. FBI 6:551.1893; BBO 858.1924; IMP 4:2625.1935; GIMP 203.1956; WI 8:224.1969; FTS 2:402.1983; UPI 488.1986; DIMP 373.1992; CCENEI 302.1994; MPM 152.1996.

Family Araceae.

Local name **Leh-pong** (B).

Botanical description A climber on tree trunk; leaves elliptic-lanceolate, bright green, 4 x 15 cm; base rounded; petiole broadly winged, 7 cm long; spathe cymbiform; spadix yellow; globose, ovoid; fruits oblong, scarlet.

Fl. & Fr.: March-June.

Location Dinthar forest, c 2 km away from Tlabung.

& altitude Alt. 180 m.

Associates Epiphytic mosses etc. in shady forests.
& ecology

Distribution China, Sri Lanka, Myanmar, Singapore and Malaysia; Andaman & Nicobar Islands, Bihar & Orissa, W.Bengal and Tripura; **common in Mizoram in tropical wet evergreen forests.**

Part used Stem and leaves.

Extraction and uses :

Medicinal The stem and leaves are crushed with those of *Rhaphidophora decursiva*,

Pothos cathcartii, and the leaves of *Callicarpa macrophylla*. The mixture or paste is applied on fracture of bone and then bandaged. The paste is changed every alternate day for a week.

Pottsia laxiflora (Bl.) O. Kuntze, UPI 488.1986; FFM 2:605.1987; *P. cantoniensis* Hk. & Arn. FFBB 2:190.1877; FBI 3:652.1882; IT 462.1906; FA 3:257.1939; WI 8:224.1969.

Family Apocyanaceae.

Local name **Ludi-rani-tak** (C).

Botanical description A large climber, often tufted, exuding milky latex; stems slender; leaves up to 10 pairs; leaflets ovate, acute, 3-6 x 5-12 cm, dark green above, paler beneath; base sub-sessile; flowers pinkish in axillary lax panicles; follicles slender, flexuous; seeds black.

Fl.: June-July. Fr.: August-November.

Location Chamdun Project Reserved forest.

& altitude

Alt. 240 m.

Associates & ecology *Mallotus roxburghianus*, *Callicarpa longifolia*, *Globo* spp., on deep dark-brown clay-loamy soil in primary forest as an undergrowth.

Distribution S.China, Bangladesh, Myanmar and Java; confined to North-East India; **common in tropical wet evergreen forests of Mizoram.**

Part used Roots and leaves.

Extraction and uses

Medicinal Infusion of roots and leaves is taken against snake-bite. (*Rulluha*, the green snake). The medicine is drunk @ 1 cup (100 ml) a day for 5-7 days.

Pseudodrynaria coronans (Wall.ex Meet.) Ching, FFMS 73.1982; FTS 1:60.1981; CPI 52.1984; DPI 38.1984; FN 130.1988. *Drynaria coronans* J.Smith, HFBI 338.1983. *Aglaomorpha coronans* (Wall.ex Meet.) Copel, in Univ.Calif. Pub. Bot 16:117.1929 (PL.45, P.88).

Family	Polypodiaceae.	
Local name	Awmvel (M).	
Botanical description	A large epiphytic plant with paw-like rhizome covered with thick brown hairs, encircling the host tree; fronds sessile, pinnatisect, lower ones gradually shorter; veins conspicuous, anastomosing; sori oval, confluent in one row between each pair of lateral veins; spores bilateral.	
	Spores : May - November.	
Location & altitude	Mampui tlangnuam.	Alt. 1000 m.
Associates & ecology	Epiphytic mosses and some orchids on tree trunks in shady forest.	
Distribution	China, Taiwan, Nepal, Bangladesh, Malay Islands and Hongkong; Eastern Himalayas, Tripura and Meghalaya; common throughout Mizoram in tropical evergreen and semi-evergreen forests.	
Part used	Rhizome.	
Extraction and uses :		
Medicinal	The hair is removed and the rhizome is crushed and the juice is applied on herpes located below the chest around the body.	
Notes	The local name, "Awmvel" is given after the disease name, known as "awmvel" the herpes. The disease, if severe, can cause even death.	
Rauvolfia serpentina	Benth.ex Kurz. WI 8:377.1969; TFM 2:21.1972; FTS 2:22.1983; UPI 516.1986; MMPI 439.1989; DIFME 153.1991; DIMP 381.1992; CCENEI 306.1994; ADPR 439.1994; IMP 4:409.1995; TIMP 4:116.1995; MPM 158.1996. <i>Rauvolfia serpentina</i> Benth. FBI 3:632.1881; DEP 6(1):398.1892; FA 3:251.1939; GIMP 210.1956 (Pl.45, P.89).	

RAUVOLFIA ROOT, SERPENTINA ROOT.

Family Apocyanaceae.

Local name	Rulturzung I.R; Chandoma (B).	
Botanical description	Undershrub; bark grey; leaves 3-4, whorled, oblong-lanceolate, acute, 2.5-6 x 6.5-16 cm; base attenuate; flowers white, terminal or axillary corymbose cymes; fruits reddish, obliquely ovoid, purplish-black when ripe; seed-1, ovoid.	
	Fl.: June. Fr.: October-December.	
Location & altitude	W.Phulpui, Chikha, Tuipuibari-1, Darzo.	Alt. 190 - 400 m.
Associates & ecology	Planted under <i>Artocarpus heterophyllus</i> Lamk., <i>Musa x paradisiaca</i> L.etc in homestead gardens.	
Distribution	Sri Lanka, Myanmar, Java, Vietnam and Malaysia; Western Ghats, Utter Pradesh, W.Bengal, Bihar, Assam, Tripura and Meghalaya; planted in the western part of Mizoram and naturally grow in Darzo-S. Vanlaiphai forests.	
Part used	Roots.	
Extraction and uses		
Medicinal	The roots are grinded on grindstone and the paste is collected in a cup of water. The water is drunk as an effective remedy against dysentery and stomachache @ teaspoonful (5 ml) twice a day for children; 1/4 cup (25 ml) twice daily for adult.	
<i>Bru</i> folk-lore	" <i>Ha-phung thais-ni bi-cha-ri naiphaw chan-do-mai nia ring le.</i> " That means, Chandoma is like a beautiful girl and you will not find its precious root even after crossing-over seven ranges.	
Notes	Chandoma is domesticated by <i>Bru</i> medicinemen as home remedy in small quantity only in their kitchen gardens.	

Rhaphidophora hookerii Schott. FBI 6:546.1893 (Pl.46, P.89).

Family .Araceae

Local name	Thiallawn (M); Zunhnahtial (Bm).	
Botanical description	A profuse climber on tree trunk; stem stout and fleshy, 2.5-4 cm in diameter; leaves simple, ovate-oblong, caudate-acuminate, sub-falcate, 8.5-13 x 20-30 cm; base oblique; petiole and midrib channelled; flowers and fruits not seen.	
	Fl. & Fr.: not seen at the time of collection (Feb.-March, 1996, April, 1997).	
Location & altitude	Ngengpui wildlife sanctuary; Lohre Forests, etc.	Alt. 200-300 m.
Associates & ecology	<i>Rhaphidophora decursiva</i> , <i>Beaumontia grandiflora</i> , etc. on tree trunk in dense forests.	
Distribution	Bangladesh; from Sikkim to Assam and Meghalaya; fairly frequent in Mizoram, particularly in tropical wet evergreen forests.	
Part used	Stem.	
Extraction and uses :	-	
Medicinal	1) Juice of crushed stem is mixed with the fatty-oil of <i>Buceros bicornis (Vapual)</i> . The mixture is given to a pregnant women for easy labour. 2) <i>Bawm</i> practioners used the plant in combination with <i>Beaumontia grandiflora</i> Wall. and a net-like pale-green lichen [<i>Langakthei (Bm)</i>] in the form of a paste for bone-setting by external application.	
Food	The boiled stem mixed with salt is taken as a vegetable.	

Reported for the first time.

Rhaphidophora decursiva B (Roxb.) Schott. FBI 6:547.1993; BBO 858.1924; RBSI 12(2):149.1938; EFPN 1:92.1978; FTS 2:404.1983; FFM 2:867.1987; CCENEI 306.1994. *Pothos decursiva* Roxb. FI 1:436.1820.

Family Araceae.

Local name **Tubal (M); Makhai (B).**

Botanical description A stout climber; leaves pinnatifid, 6-12 segments; segments falcate, acuminate; petiole as long as leaves, channelled; spathe cymbiform, yellow; peduncle 7-15 cm long.

Fl.: May - July. Fr.: not seen.

Location & altitude Near Chikha fountain on tree trunk.

Alt. 420 m.

Associates & ecology Epiphytic mosses etc. in shady forest.

Distribution Sri Lanka, Myanmar, and Malaysia; tropical Himalayas to Assam, Tripura and Meghalaya; **very common in Mizoram in tropical wet evergreen forests.**

Part used Stem and leaves.

Extraction and uses :

Medicinal A paste is prepared from the leaves of *Pothos cathartii*, *P.scandens*, *Callicarpa macrophylla*, and wrapped with the leaf of *Phrynium capitatum* and put inside the hot ashy-hearth. The paste is applied on fracture of bone and bandaged.

Notes In case of bone-setting, *Rhaphidophora decursiva* forms the major ingredient and others as adjuncts.

Rhus semialata Murr. FBI 2:10.1876; FFBB 1:316.1877; DEP 6(1):498.1892; IT 197.1906; BBO 223.1922; FA 1:331.1934; IMP 1:646.1935; RBSI 12(2):88.1938; GIMP 213.1956; UPI 524.1986; DIFME 154.1991; CCENEI 178.1994. *R.javanica* Linn. FBB 1:319.1877; WI 9:19.1972; FFM 1:276.1985. *R.chinensis* Mill. GIMP 213.1956; MPM 159.1996 (**Pl.46, P.91**).

Family Anacardiaceae

Local name **Khawmhma-thing (M); Thoh-maw (M).**

Botanical description A small tree, deciduous; young parts and inflorescence covered with brownish-grey pubescent; bark ashy-grey, warty; leaves imparipinnate, up to 45 cm long; leaflets 4-6 pairs, opposite, dentate, triangular or elliptic-ovate, 2-7 x 5-15 cm, acuminate, sharply serrate; base oblique or rounded; flowers numerous, greenish-white or pale yellowish-green, in large terminal pyramidal peduncles; fruits sub-globose, or orbicular, compressed, green when young, fully covered with curious white acidic substance, red-brown when ripe.

Fl.: August-September. **Fr.:** November-March.

Location & altitude W.Rotlang, S.Bungtlang, Aizawl, etc.

Alt. 500 - 1200 m.

Associates & ecology *Eurya ceratifolia*, *Maesa ramentacea*, *Derris robusta*, on sandy-loam soil in secondary and open forests.

Distribution China, Japan and Upper Myanmar; endemic to North-East India; **common throughout Mizoram between 500 and 1200 m asl.**

Part used Fruits and wood

Extraction and uses :

Medicinal The fruits are grinded and mixed with water and left for sometime (15-30 mins). The mixture is drunk 1 cup (100 ml) twice or thrice per day to cure colic and diarrhoea.

Notes The fruits, with or without salt and chilly, are packed in small polythene bags (8 x 10 cm) and sold for Rs. 5/- in local markets by the hawkers throughout the year.

Ruella suffruticosa Roxb. FI 3:53.1832; FBI 4:413.1885; DEP 6:(1):590.1892; BBO 674.1922; IMP 3:1867.1935 *Dipterocanthus suffruticosus* (Roxb.) Voigt. GIMP.99.1956; UPI 179.1986; DIFME 77.1991; MPM 64.1996. **(Pl.47, P.92).**

Family Acanthaceae.

Local name Sa-vang-ma (B).

Botanical description A small pubescent herb; stem gnarled, 15-30 cm high; roots slender with fusiform swellings, pellucid; leaves arising from apex of stem, elliptic-oblong or oblanceolate, acute, villous with hairs on both surfaces, more on nerves beneath; nerves-5, arcuate; distant, intramarginal; petiole channeled, 6-8 cm long; tertiaries transverse; flowers terminal, solitary; white or pale-purple; (opening at night and soon falling in the morning); bracts foliaceous; fruits globose or oblong; reddish when ripe, 0.5 cm across, 1-seeded. (The outer covering of the fruits easily adhered on finger when touched upon).

Fl.: May-September. **Fr.:** October-December.

Location & altitude Near Tuipuari (northward).

Alt. 195 m.

Associates & ecology *Ageratum conyzoides*, *Tabernaemontana divericata*, *Eurya acuminata*, *Smilax* sp., in moist shady places.

Distribution Upper Myanmar; upper Gangetic Plain, Bengal, Chota Nagpur, Bihar and Orissa: **very rare in Mizoram, in tropical secondary forests.**

Part used Roots.

Extraction and uses

Medicinal 1) The roots are boiled and the water is taken internally for kidney trouble and liver ailments @ tablespoonful (10 ml) twice daily. The medicine is used by the *Bru* tribe.

Remarks 1) The root is used by Santals in gonorrhoea, syphillis and renal infections. (Watt, 1892; Kirtakar & Basu, 1935).
2) Dried and ground root taken in a dose of 2 oz. causes abortion; also used as medicine for sore-eyes. (Chopra, *et al.* 1956).
3) The root is used to cause fermentation of rice with which the Santals make their *huria* or rice beer (Watt, 1892; Ambasta, 1986).

Saraca asoca (Roxb.) de Wilde, WI 9:232.1972; FEM 1:269.1983; FEM 1:325.1985; UPI 549.1986; MMPI 456.1989; DIFME 159.1991; DIMP 408.1992; TIMP 2:45.1992; CCENEI 184.1994; ADPR 57.1994; IMP 5:66.1996; MPM

165.1996. *S. indica* Linn. FFBB 1:415.1877; FBI 2:271.1878; DEP 6(2):475.1892; IT 250.1906; BBO 312.1922; IMP 2:883.1935; FA 2:136.1938; RBSI 12(2):91.1938; GIMP 221.1956 (Pl.47, P.93).

ASHOKA.

Family	Caesalpiniaceae.
Local name	Mualhawih (M).
Botanical description	A small evergreen beautiful tree; crown umbrella-shaped; bark dark or black, rough; leaves paripinnate, 15-25 cm long; leaflets 4-6 pairs, oblong-lanceolate, acute, 3-5 x 10-20 cm, drooping when young, dark-green above; base slightly oblique; flowers orange-scarlet, fragrant, in dense axillary corymbs, appearing with the leaves; fruits oblong, 2.5-3.5 x 10-16 cm, veined, compressed, acute at both the ends; seeds 4-8, oblong, compressed.
	Fl.: April-May. Fr.: October-February.
Location & altitude	Lungkulh virgin forest, (near Rengdil - II), Haurang, etc. Alt. 400-700 m.
Associates & ecology	<i>Knema lonifolia</i> , <i>Garcinia amola</i> , <i>Licula peltata</i> , <i>Ardisia paniculata</i> , on humus loamy soil in primary forests.
Distribution	Sri Lanka, Bangladesh, Myanmar, Malaysia and Java; central and eastern Himalayas, parts of south India and North-East India; rare in Mizoram, but seen here and there in tropical evergreen forests.
Part used	Bark and root-bark.
Extraction and uses :	
Medicinal	1) Decoction of coat of inner bark is taken internally for placental disorder, easy labour and diuretic. The medicine is drunk 1/2-1 cup (50-100 ml) twice per day. 2) Fresh or dried fibrous bark is boiled with the roots of <i>Citrus limetta</i> Wt. & Arn. and the water is taken internally for stomach-ulcer @ tablespoonful (10 ml) twice daily. 3) Infusion of root bark is taken internally to stop haemorrhage.

Material culture The outer skin is removed and the inner coat of bark is boiled with tea leaves and taken as tea in the jungles. It is used as a substitute for milk.

Schima wallichii (DC) Korthals, FBI 1:280.1874; FFBB 1:106.1877; DEP 6(2):485.1892; IT 60.1906; FA 1:120.1934; IMP 1:278.1935; RBSI 12(2):1938; GIMP 223.1956; WI 9:246.1972; TFM 3:291.1978; FTS 1:357.1981; FFM 1:120.1985; UPI 555.1986; DIFME 161.1991; DIMP 412.1992; TIMP 2:135.1992; CCENEI 185.1994; MPM 166.1996 (**Pl.48, P.94**).

NEEDLE WOOD.

Family Theaceae.

Local name **Khiang** (M); **Khainei** (Ma).

Botanical description A medium-sized to large evergreen tree; young shoots silky pubescent; branches lenticellate; bark dark-grey or brown with deep vertical cracks and small thick angular plates; inner bark red-brown fibres with lustrous or silky hairs, irritant; leaves oblong-lanceolate or obovate, 2-4.5 x 5-13 cm, acute or acuminate, shining above, pubescent along nerves beneath; base cuneate; flowers white, fragrant, solitary, axillary, on lenticellate pedicels; stamens yellow, appearing with the leaves; fruit c 2 cm across, sub-globose, a loculicidal capsule, 5-celled, silky while young, warty when mature.

Fl.: April-May. Fr.: November-February.

Location & altitude Common throughout Mizoram; very common in Thenzawl areas.
Alt. up to 2000 m.

Associates & ecology *Phoebe attenuata*, *Engelhardtia spicata*, *Cinnamomum* spp., *Sapium baccatum* *Pterospermum acerifolium*, in dry and moist habitats.

Distribution China, Bhutan, Bangladesh, Myanmar and Malaysia; eastern Himalaya from Nepal eastwards to the North-East India; **common throughout Mizoram, from tropical evergreen to sub-tropical hill forests.**

Part used Bark, sap, leaves, fruits and wood.

Extraction and uses

Medicinal	<ol style="list-style-type: none">1) Juice of crushed bark is applied externally on cuts and wounds as an antiseptic.2) The crushed bark or fruit is applied on insect-bites.3) The sap oozes out when an iron-nail is fixed on the stem. The sap is collected and applied on aphthae.4) Decoction of dry fruits is taken internally as an effective remedy against snake-bite. The medicine is taken @ 1-2 cups (100-200 ml) at a time.5) Juice of crushed leaves is also prescribed for snake-bite.
Material culture	<ol style="list-style-type: none">1) The heart-wood is reddish-brown and moderately hard and used for house -pillars.2) The bark and wood are excellent firewood, inspite of its intricate blast and irritating silky hairs of bast fibre.
Food	The young twigs and leaves are boiled or cooked with meat and consumed as vegetable or food.

Scoporia dulcis Linn. FBI 4:289.1884; IMP 3:1823.1935; RBSI 12(2):116.1938; FA 3:380.1939; GIMP 224.1956; WI 9:260.1972; FTS 2:277-8.1983; UPI 562.1986; IED 171.1986; DIFME 162.1991; DIMP 415.1992; CCENEI 186.1994; MPM 167.1996 (**Pl.48, P.95**).

SWEET BROOM WOOD.

Family	Scrophulariaceae
Local name	Perhpawngchaw (M); Bu-ra-ha-kanja (B).
Botanical description	A small, erect, tough and branched herb, slightly foetid smelling; leaves 3-ternately rhomboid or whorled, elliptic, tapering at the base into a short petiole, coarsely serrate on the upper half, glossy-above, dull beneath; flowers white, small, axillary, numerous, on slender pedicels; fruits globose or sub-globose, valves ultimately bifid; seeds obovoid, angled. Fl. March-May Fr. May-December.
Location & altitude	Teirei, Tlabung, Kawnpui, etc. Alt. Up to 1400 m.

Associates & ecology Gregarious. They grow in varied types of soil in open spaces and waste places.

Distribution Tropics of America, Africa, Asia and Australia; widely spread in India, abundant in plains of Bengal and North-East India; **very common throughout Mizoram near human settlements.**

Part used Whole plant.

Extraction and uses :

- Medicinal
- 1) The aerial parts are crushed and mixed with water and left for sometime. The water is strained through a clean cloth or tea-strainer and taken for renal disorder, jaundice and genito-urinary trouble. The medicine is taken as tea once daily.
 - 2) Infusion of the plant is taken internally as an effective remedy against diarrhea and dysentery associated with stomachache, @ 1/2 cup (50 ml) twice daily. Infusion is also taken against snake-bite.
 - 3) Decoction of the roots is taken against fever @ 1/2 cup (50 ml) twice daily.
 - 4) It is also used for the removal of stones in gall-bladder.
 - 5) Juice of crushed leaves and paste is applied on burns, sores and ulcers.
 - 6) The juice of leaves is used as haemostatics.

Notes The plant is sweet-and-bitter when chewed. The water extract of plant is bitter with characteristic odour. Sugar is added to the medicine for children.

Securinega virosa (Roxb. ex Willd.) Baill. WI 9:268.1972; FTS 1:351.1981; TFM 2:131-2.1983; TFM 2:131.1983; UPI 564.1986; FFM 2:800.1987; DIFME 162.1991; DIMP 416.1992; CCENEI 315.1993; MPM 168.1996. *S. obovata* Muell.-Arg. DEP 6(2):496-7.1892. *Flueggea microcarpa* Bl.FBI 5:328.1887; IT 569.1906. *F. obovata* Baill. BBO 123.1922. *F. virosa* Baill. FA 4:160.1940

Family Euphorbiaceae

Local name Saisiak (M).

Botanical description A staggling shrub, dioecious; stem often with spiny at the base; bark reddish-brown, peeled off in thin strips; leaves obovate or sub-orbicular, acute, 1.5 - 4 x 2-6 cm; petiole short; flowers greenish-yellow, scented, in axillary clusters; fruits globose berries, white, fleshy or pulpy, 0.5 cm across; seeded 3-6, punctate.

Fl. : May-August. Fr. : July-September.

Location & altitude In the vicinity of villages/towns, e.g. Kolasib-Sialsuk, Aizawl, etc.
Alt. 600-1200 m.

Associates & ecology *Mussaenda glabra*, *Bridelia tomentosa*, *Phyllanthus missionis*, in sandy rocky places in secondary forests.

Distribution China, Japan, Sri Lanka, Myanmar, Malaysia, Australia and tropical Africa; throughout India, Nicobar Islands; **frequent throughout Mizoram in tropical secondary forests.**

Part used Leaves.

Extraction and uses

Medicinal The leaves are boiled and the water is used for bathing children suffering from small-pox, measles and scabies.

Material culture The wood is reddish-yellow, hard and strong, and used for handles of axes, hoes, etc.

Semecarpus anacardium Linn. f. FBI 2:30.1876; FFBB 1:312.1877; DEP 6(2) : 498.1892; IT 207.1906; FA 1:333.1934; IMP 1:667.1935; GIMP 225.1956; WI 9:271.1972; FTS 1:465.1981; FFM 1:277.1985; UPI 566.1986; MMPI 464.1989; DIFME 162.1991; DIMP 417.1992; ADPR 85.1994; TIMP 3:157.1994; IMP 5:98.1996; MPM 168.1996.

MARKING NUT TREE, ORIENTAL CASHEW.

Family Anacardiaceae.

Local name **Vawmbal-pui** (M).

Botanical description A moderate-sized tree; bark dark-brown or blackish; young parts tomentose; leaves crowded at the branchends, obovate or elliptic-oblong, 8-15 x 20-30 cm, dark-green above, grey tomentose beneath; base sub-acute; flowers greenish-white or pale yellow in terminal panicles; fruits ovoid, reniform, black when ripe, seated on orange-coloured receptacle.

Fl.: July-August. **Fr.:** December-March.

Location & altitude Near Dampui village, on roadsides between Tuidam and Kawrthah, etc.
Alt. 100-1000 m.

Associates & ecology *Sapium baccatum*, *Bischofia javanica*, *Macaranga indica*, in moist shady forests.

Distribution Bangladesh and North Australia; Sub-Himalaya to North-East India, parts of Central and Southern India; **frequent in Mizoram, in tropical evergreen forests and more frequent in semi-evergreen forests.**

Part used Fruit or nut.

Extraction and uses :

Medicinal The juice of fruit (nut) is applied externally on sprains and in rheumatism.

Notes Its value in folk-medicine is relatively low, probably because it can cause rash and skin eruptions, insomuch as *Drimycarpus racemosus* (Roxb.) Hk. f. which is also known by the same name '*T̄wmbal*' in *Mizo*. People scared of touching the plant as it causes rash/skin eruption.

Senecio scandens Buch.-Ham.ex D.Don. FBI 3:52.1881; IT 402.1906; RBSI 12(2): 106.1938; FA 3:122.1939; WI 9:276.1972; UPI 567.1986; FFM 2:526.1987; DIFME 163.1991; MPM 168.1996 (**Pl.49, P.96**).

Family Asteraceae.

Local name **Si-chhia-va** (Ma); **Kansar-damdawi** LR.

Botanical description A slender climber; stem greenish,ribbed, terete; branches zig-zag, grooved or ribbed; young parts slightly pubescent; leaves hastate while young, ovate-

lanceolate when old, acuminate, 1-2.5 x 5-12 cm, crenate or distantly denticulate, coarsely hairy; midrib channelled above, raised beneath; nerves arcuate, anastomosing; base acute; petiole auricled; flowers heads yellow, on lax divaricate terminal corymbs; involucre bracts 10-15, linear-oblong, retrorse; achenes ribbed or 4-angled, outer recurved or retrorse; pappus white, c 1 cm long.

Fl.: February-April. **Fr.:** April-May.

Location & altitude	Below the road c 1 km north of Teirei, S.Mizoram. Alt. 1320 m.
Associates & ecology	<i>Measa indica</i> , <i>Engelhardtia indica</i> , <i>Smilax</i> sp., <i>Paliosanthes violacea</i> and ferns, on dark-brown sandy loose soil in open forest.
Distribution	China, Sri Lanka and Upper Myanmar; eastern Himalayas, Nilgiri Hills of S.India and North-East India; rare in Mizoram, but seen here and there in sub-tropical hill forest/secondary forests.
Part used	Leaves or aerial parts.
Extraction and uses :	
Medicinal	The leaves or aerial parts of plant are boiled in water and left overnight. The water is strained through a clean cloth in a container and the solution is used for treatment of ulcerated cancer/ulcers. The medicine is taken @ 1/2 cup (50 ml) daily for 2-3 days.
Notes	Two cancer patients belonging to Serkawr and Thingfal villages repectively, were treated with the above prescription and both of them recovered normal health in 1995. Hence, the plant is called ' <i>Kansar-damdawi</i> ' (Kansar = Cancer; damdawi = medicine).
Soil test	Result of soil-test (in which the plants grow) indicates pH 5.8; O.C = 1.8; P,O, = 23.3 and K,O = 221.
Smilax glabra	Roxb. FBI 6:302; IMP 4:2495.1935; GIMP 228.1956; WI 9:366.1972; UPI 577.1986; DIFME 166.1991; DIMP 424.1992; CCENEI 318.1994.
Family	Smilacaceae.

Local name	Tluang-ngil (M).
Botanical description	A slender climber with nodose or knotty roots; stem and unarmed; leaves alternate, distant, elliptic-lanceolate, 3.5 x 4.5 x 5-18 cm, acuminate or subcaudate, glaucous beneath, 3-costate; base rounded or cuneate; petiole and sheath up to 1.8 cm long; cirrhi very slender and coiled; flowers in axillary umbels, many-flowered, white, minute, barries dark-blue. Fl. : June - July. Fr. : November - January.
Location & altitude	The forests of Lungmuat, Bukpui, Hnahlan, etc. Alt. 500 - 1300 m.
Associates & ecology	<i>Schima wallichii</i> , <i>Litsea salicifolia</i> , <i>Globba</i> sp., on sandy soil in shady area.
Distribution	S.China, Upper Myanmar and Chittagong hill tract of Bangladesh; Assam and Meghalaya; uncommon in Mizoram but founs here and there in the tropical semi-evergreen forests.
Part used	Root/Tuber.
Extraction and uses	
Medicinal	The knotty root or tuber is pale pinkish-brown in colour. The root is trimmed and boiled and the water is taken as tea against gynaecological problems as well as stomachic.
Remarks	Kirtikar & Basu (1935); Chopra, <i>et al.</i> (1956); Ambasta (1936) and Hussain, <i>et al.</i> (1992) reported that decoction of fresh root is used to cure sores and venereal complaints. Saklani & Jain (1994) reported that the leaf is used for skin diseases.
Notes & Recommendation	The underground tubers resemble that of <i>Smilax China</i> L. The tubers has been extensivelyextracted from outside the state. This practice should be stopped and the roots should be used locally on a sustained basis.
Smilax ovalifolia	Roxb. WI 9:367.1972; UPI 578.1986; MPM 171.1996. <i>S. zeylanica</i> L. FBI 6:309.1892; IMP 4:2496.1935; GIMP 229.1956; FTS 2:392.1983. <i>S. macrophylla</i> Roxb. non. Willd. DEP 6(3):255.1892; FBI 6:310.1892; IT

641.1906; BBO 1986.1924.

Family	Smilacaceae.
Local name	Kaihhapui (M); Bor-hmui-chia (C); Kamakua (Ma).
Botanical description	A large climber; stem with prickles, glabrous, striate; leaves ovate-oval or sub-orbicular; 9-17.5 x 9.5-18 cm, lanceolate; tendrils spirally coiled; base 5-7 costate; flowers axillary umbels; fruits globose; seeds 1-3, bi-convex. Fl.: April-June. Fr.: November-January.
Location & altitude	On road-sides from Tlabung towards Marpara; river banks of Khawthlangtuipui, etc. Alt. upto 1200 m.
Associates & ecology	<i>Bridelia tomentosa</i> , <i>Derris robusta</i> , etc. on sandy-loam soil in primary and secondary forests.
Distribution	Sri Lanka, Bangladesh, Malaya Peninsular Islands and Myanmar; from Kumaon eastwards to Bihar, Central India and North-East India; common throughout Mizoram, particularly in tropical evergreen forests.
Part used	Roots and leaves.
Extraction and uses :	
Medicinal	1. The roots with those of <i>Bridelia tomentosa</i> and <i>Ardisia paniculata</i> are grinded on grindstone and the paste is collected in a cup of water. The water is boiled and drunk for jaundice. 2. Decoction of roots is used in rheumatism and gonorrhoea by external application.

Reported for the first time.

Solanum khasianum Cl. var. **chatterjeeanum** Sen Gupta, BBSI 3:412.1961; RBSI 21(2):149.1981. *S.khasianum* Cl. FBI 4:234.1883; IT 490.1906; FA 3:371.1939; WI 382.1972; UPI 580.1986 (**PL.49, P.97**).

Family Solanaceae.

Local name	Athlo (M); Rulpuk (Ma, L).
Botanical description	A much-branched spinous undershurb to 1 m tall, whole part covered with straight and curved prickles; branches angled; leaves ovate or deltoid-acute, lobed; lobes triangular, hirsute and prickly on both surfaces, 5-12 x 6-18 cm; base sub-cordate; petiole to 4 cm long; flowers white or pale-yellow in few flowered axillary racemes; fruits globose, greenish spotted while young, yellowish when ripe, c 2.5 cm across; seeds many, compressed, smooth and brown
	Fl.: July-August. Fr.: November-February.
Location & altitude	Old Siathai between Tuipang and Zawngling; on roadsides between Zuangtui and Durtlang, etc Alt. 1200 m.
Associates & ecology	<i>Solanum torvum</i> , <i>Clerodendrum</i> spp., <i>Alangium chinensis</i> , on waysides, clearings, waste places and edges of forests.
Distribution	Upper Myanmar, Meghalaya; rare in Mizoram, but seen at different places in forest edges and waste places above 700 m.
Part used	Fruits; seeds.
Extraction and uses :	
Medicinal	The smoke of burnt fruits/seeds is sucked through a pipe (bamboo or leafstalk of Papaya) and retained in the mouth for sometime to expel tooth-worms from the mouth.

Reported for the first time.

Solanum nigrum Linn. FBI 4:229.1883; BBO 610.1922; DEP 6(3):263.1892; IMP 3:1748.1935; FA 3:366.1939; GIMP 229.1956; WI 9:391.1972; FTS 2:247.1983; UPI 581.1986; FFM 2:648.1987; DIFME 168.1991; DIMP 426.1992; CCENEI 190.1994; TIMP 4:196.1995; IMP 5:160.1996; MPM 173.1996. *S. americanum* Mill. ADPR 201.1994.

BLACK NIGHTSHADE.

Family Solanaceae.

Local name	Anhling (M).
Botanical description	An annual suffrutescent plant up to 40 cm tall; leaves variable, ovate-lanceolate, 1.5-4 x 3-8 cm, acuminate; base cuneate, tapering to the petiole; petiole hairy; flowers 2-6 flowered, clustered, small, 0.4 cm across, white; stamens yellow; fruits globose berries, 0.5 cm across on short pedicel with recurved calyx, purplish when ripe; seeds discoid, minute, pale yellow.
	Fl. & Fr.: throughout the year, except winter season.
Location & altitude	In new <i>jhum</i> lands and in waste places throughout Mizoram up to 1500 m.
Associates & ecology	<i>Ageratum conyzoides</i> , <i>Cassia tora</i> , <i>Portulaca oleracea</i> in open areas or waste places and in <i>jhums</i> , appearing from May-September.
Distribution	Sri Lanka, South East Asia, Australia and America; throughout India up to 2000 m; fairly frequent in Mizoram up to 1500 m in wastelands.
Part used	Whole plant.
Extraction and uses :	
Medicinal	Infusion of the plant is prescribed for liver problems and dropsy. The medicine is taken @ 1/2 cup (50 ml) twice daily.
Food	The leaves and tender shoots are boiled and eaten as vegetable.
Special opinions	1) "I have used with success a decoction in jaundice, chronic enlargement of the liver, in combination with acid nitromauriatic". (Asst. Surgion Bhagwan Das, Rawalpindi Punjab, cited by Watt, 1892). 2) The leaf is chewed in ulcerated states of the tongue, in stomatitis, and dyspepsia (native Surgeon T.R. Moodelliar, Chingleput, Madras Presidency, cited by Watt, 1892).
<i>Sonchus wightianus</i> DC. DIFME 169.1991. <i>S. brachyotus</i> DC. FTS 2:225.1983; CCENEI 191.1994. <i>S. arvensis</i> auct. non FBI 3:414.1881; DEP 6(3):275.1892; BBO 497.1922; IMP 2:1443.1935; GIMP 230.1956; WI 9:430.1976; FTS 2:225.1983.	

Family	Asteraceae.	
Local name	Gangmula (C).	
Botanical description	An erect, much branched herb; leaves narrowly oblanceolate, 15-30 cm long, uncinately pinnatifid and spinously denticulate; base amplexicaul with auricles; flowers yellow, in umbellate comymbose cymes; pappus silky-white; achenes rugose.	
	Fl.: January-February. Fr.: February-March.	
Location & altitude	In <i>jhum</i> land, c 2 km away from Tlabung towards Marpara.	Alt. 50 m.
Associates & ecology	<i>Ardisia paniculata</i> , <i>Urena lobata</i> , <i>Physalis minima</i> , etc. on sandy soil in <i>jhum</i> land/fallow land.	
Distribution	Native of tropical America; Himalaya to North-East India and the plains of India; common in Mizoram, particularly in the previous <i>Jhums</i>.	
Part used	Roots.	
Extraction and uses :		
Medicinal	The roots with those of <i>Tabernaemontana divericata</i> , <i>Alstonia scholaris</i> and the rhizome of <i>Curcumorpha longiflora</i> are crushed and mixed with water. A red hot iron-rod is dipped into the water and drunk against cardiac tonic associated with dysentery and vomiting. The medicine is taken 1/4 cup (25 ml) twice per day.	

Spondias pinnata (Linn.f.) Kurtz, IMP 1:673.1935; GIMP 233.1956; WI 10:20.1976; FTS 1:466-7.1981; FFM 1:278-9.1985; UPI 595.1986; TFM 4:54.1989; DIFME 171.1991; DIMP 433.1992; CCENEI 193.1994; ADPR 36.1994; TIMP 3:159.1994; IMP 5:186.1996; MPM 176.1996. *S. mangifera* Willd. FBI 2:42.1876; FFBB 1:322.1877; DEP 6(3):338.1892; IT 201.1906; BBO 224.1922; FA 1:340.1934; RBSI 12(2):88.1938.

WILD MANGO, HOG-PLUM.

Family	Anacardiaceae.
Local name	Tawitaw (M); Dangko (Ma).
Botanical description	A small to medium-sized deciduous tree to 25 m tall; bark white or brownish-grey, furrowed and horizontally wrinkled, aromatic; leaves imparipinnate, up to 45 cm long; leaflets usually 3-5 pairs, elliptic-oblong, caudate-acuminate, 4-8 x 8-20 cm; base oblique; nerves intramarginal; flowers greenish-white to pale yellow, fascicled in large terminal panicles; fruits oblong-ovoid 3-5 cm long, olive-green mottled with black while young, yellow when ripe; seeds 1-3. Fl.: March-April. Fr.: January-March (next year) while leafless.
Location & altitude	Lungkulh virgin forest, Phairuangkai-Lungsen roadside, etc. Alt. 100-1200 m.
Associates & ecology	<i>Gmelina arborea</i> , <i>Artocarpus lakoocha</i> , <i>Derris robusta</i> , on moist sandy-loam soil in secondary forest.
Distribution	Bangladesh, Myanmar, Philippines and Malaysia; throughout India and Andamans; frequent in Mizoram, in tropical evergreen and mixed bamboo/secondary forests.
Part used	Bark and fruits.
Extraction and uses :	
Medicinal	1) Juice of crushed bark is drunk against food allergy, <i>i.e.</i> , fish. 2) Decoction of bark is taken internally for diarrhoea. The medicine is taken @ 1/4 cup (25 ml) twice per day.
Food	The fruits are eaten raw; the kernels are eaten by children.
Notes	Sambars (<i>Cervus unicolor</i>) and barking deer (<i>Muntiacus muntjak</i>) relish the fruits.
Stemon tuberosa	Lour. FBI 6:2981.1892; BBO 1100.1924; BBSI 15 (3&4) 203.1973; WI 10.40.1976; FTS 2.416.1983; UPI 598.1986; MPM 177.1996 (Pl.50, P.99).

Family	Stemonaceae.	
Local name	Kaiman LR.	
Botanical description	Twiner or scandent with fasciculated roots; stem dark-green, smooth, nodes present; leaves ovate-cordate, 2-3 whorled or opposite, 7.5-11 x 15-20 cm long, acuminate, coriaceous; base 9-12 costate; petiole 7-10 cm long; bracts lanceolate; flowers 2-3, usually 2, often opposite, campanulate, 6.5 cm long; capsule ovoid-oblong, 4-5 cm long; seeds 5-8.	
	Fl.: March-April. Fr.: June-July.	
Location & altitude	Mampui hmuntha ram.	Alt. 550 m.
Associates & ecology	<i>Aporosa octandra</i> , <i>Emblica officinalis</i> , <i>Tabernaemontana divericata</i> , <i>Globa</i> spp., on sandy-loam soils in shady forests.	
Distribution	China, Bangladesh, Bengal and North-East India; rare in Mizoram, in tropical evergreen forests.	
Extraction and uses :		
Medicinal	The tuber is very bitter. Decoction of tuber is taken against fever and tuberculosis @ teaspoonful (5 ml) twice daily.	
Notes	Another species of <i>Stemona</i> whose roots are whitish, fleshy and slightly sweet which is used as a substitute for tea. It could be <i>Stemona</i> var. <i>minor</i> Fischer (Pl. 50, P.99) syn. <i>S. minor</i> H.k.f. <i>Roxburghii gloriosoides</i> Wt. (Anonymous, 1976).	

Stephania japonica (Thunb.) Miers. var. *discolor* (Miq.) Forman WI 10:42.1976; FTS 2:132.1983; FFM 1:81.1985; UPI 599.1986; DIFME 171.1991; TIMP 1:134.1991; DIMP 435.1992; CCENEI 194.1994; MPM 178.1996. *S. hernandifolia* (Willd.) Walp. FBI 1:103.1872; IT 23.1906; BBO 17.1925; FA 1:51.1934; IMP 1:92.1935; GIMP 234.1956.

TAPE VINES

Family	Menispermaceae.	
Local name	Hruifei I.R.	
Botanical description	A slender climber; branches striate or ribbed; leaves triangular-ovate, broader than long, peltate, pubescent undr surface; apex blunt or sub-acute; nerves 9-11 at the base; flowers yellow, umbellate on very slender axillary pedicels; fruits globose, red when ripe.	
	Fl.: March-April. Fr.: May-June.	
Location & altitude	Near grave yard, Ramhlun (S), Aizawl.	Alt. 900 m.
Associates & ecology	<i>Eurya acuminata</i> , <i>Chromolaena odorata</i> , <i>Sida acuta</i> , on sandy soil in damp waste places.	
Distribution	Nepal, Sri Lanka, Bangladesh, Singapore, Malaya Islands, tropical Africa and America; Sub-Himalayas, Orissa, Andra Pradesh and Norht-East India; rare in Mizoram in an open and secondary forests.	
Part used	Root-stock.	
Extraction and uses :		
Medicinal	The root is bitter. An infusion of root is taken internally against diarrhoea, fever and dyspepsia @ tablespoonful (10 ml) 2 times per day.	
Fibre	The stem is fast and lasting and used for tying purposes, hence the name. (Hrui = climber or vine; fei = lasting, fast).	

Stereospermum colais (Buch.-Ham.ex Dillwyn) Mabb. ADPR 364.1994; IMP 5:192.1996. *S. chelonoides* auct. non (Linn. f.) DC. FFBB 2:230.1877; FBI 4:382.1884; DEP 6(3):366.1892; IT 495.1906; RBSI 12(2):119.1938; FA 3:404.1939; FFM 2:658.1987; DIFME 171-2.1991; CCENEI 195.1994. *S. personatum* (Hassk.) Chatt. BBSI 2:70.1948; WI 10:49.1976; TFM 3:44.1978; FTS 2:97.1983; UPI 602.1986; MPM 178.1996. *S. tetragonum* DC. BBO 655.1922; IMP 3:1846.1935; GIMP 234.1956 (**Pl.51, P.100**).

TRUMPET FLOWER, YELLOW SNAKE TREE.

Family	Bignoniaceae.
Local name	Zinghal (M)
Botanical description	A large deciduous tree; bark grey thick, rough, fissured in old trunk; leaves imparipinnate, up to 40 cm long; leaflets 4-6 pairs; ovate or elliptic, caudate-acuminate; nerves 8-9; base oblique; petiole up to 4 cm long, channelled, lenticellate; flowers yellow, tinged with pale red in large drooping panicles; fruits slender up to 60 cm long, spirally twisted, curved sub-quadrangular or 4-angled; seeds winged.
	Fl.: April-May. Fr.: November-February.
Location & altitude	Perhsang near Tuipuibari, W.Phulpui, Chamdur Project, etc. Alt. 210-1000 m.
Associates & ecology	<i>Dillenia indica</i> , <i>Gmelina arborea</i> , <i>Macaranga indica</i> , on sandy-rocky places to loamy soil in the forest.
Distribution	S.China, Sri Lanka, Bangladesh, Myanmar, Singapore and Malaysia; throughout moist regions of India; common in Mizoram, in tropical evergreen and semi-evergreen forests.
Part used	Bark, young leaves and shoots.
Extraction and uses :	
Medicinal	1) <i>Pangs</i> use decoction of bark as anthelmintic. The medicine is taken @ teaspoonful (5 ml) before bed once per day for 3 days. 2) Infusion of the leaves is taken as an antifebrile and for the treatment of malarial fever @ tablespoonful (10 ml) twice daily. 3) The young shoots are chewed and swallowed once everyday for a week as stomachic.
Material culture	Wood is hard and used for building construction and as firewood.

Stereospermum neuranthum Kurz. FFBB 2:230-1.1877; FBI 4:382.1884. DEP 6(3):367.1892; IT 495.1906.

Family	Bignoniaceae.	
Local name	Zihaw (M,L).	
Botanical description	A large tree; bark dark-grey, thick; shoots softly pubescent; leaves up to 45 cm long; leaflets 5-7 pairs, oblong 6 x 13 cm, shortly acuminate, grey tomentose while young, scabrid when old; base oblique; flowers corymbose, viscous-hairy, pale-lilac or bluish-white; lobes rounded, pillose; fruits linear, 30-45 cm. long; valves 1-ribbed on the sature; seeds sub-trigonous embedded in the septum.	
	Fl.: May-August. Fr.: October-March.	
Location & altitude	Mualbu Kawnpui, Zamuang, Lohre, etc.	Alt. 230-550 m.
Associates & ecology	<i>Knema lanifolia</i> , <i>Terminalia myriocarpa</i> <i>Mangifera sylvestris</i> , in moist shady places	
Distribution	Lower Myanmar; occasional in Mizoram, in tropical evergreen forests.	
Part used	Heartwood/ wood.	
Extraction and uses :		
Material culture	The sap-wood is light grey and used for construction purposes and firewood.	
Medicinal	The wood-vinegar extracted from the heart-wood is used as an effective cure for chronic ulcer, sores and other skin diseases.	
Mode of extraction	The heartwood is split into c 20 cm long and c 2.5 cm width and put them into a large pot or vessel. A small hole is made at the bottom of the vessel. The mouth of the vessel is tied closely with the leaves of <i>Phrynium capitatum</i> or <i>Musa</i> spp. This is known as 'Khuangtuam'. The pot is put into a Mizo-trivet or hearth, and a smale pot is placed just below the hole of a big pot for collection of wood-vinegar. The pot is covered with soil and the firewood are set to blaze on it. The wood-vinegar is thus collected in a small pot.	

The wood-vinegar is used as an effective medicine for chronic ulcers and skin diseases.

Notes The local method of extraction has some similarities with the modern Japan technology for the production of good quality charcoal and wood-vinegar.

Reported for the first time.

Syzygium cuminii(Linn.) Skeels, GIMP 238.1956; WI 10:100.1976; FTS 1:371.1981; UPI 614.1986; FFM 1:394.1985; DIFME 174.1991; DIMP 445.1992; CCENEI 196.1994; ADPR 188.1994; TIMP 4:18.1995; IMP 5:225.1996; MPM 181.1996. *Eugenia jambolana* Lamk. FFBB 1:485.1877; FBI 2:499.1879; DEP 3:284-5.1892; IT 323.1906; BBO 360.1922; IMP 2:1052.1935; FA 2:278.1938 (Pl.51, P.101).

JAMAN JAMBOLAN, BLACK PLUM, JAVA PLUM.

Family Myrtaaceae.

Local name Hmuipui (M).

Botanical description A moderate-sized evergreen tree to 30 cm tall; bark dark-grey; leaves oblong-elliptic or ovate-elliptic, 3.5-6 x 7-15 cm, acute or acuminate; base abruptly narrowed to the petiole; flowers greenish-white, sessile, in compound trichotomous panicles; fruits ellipsoid up to 3 cm long, reddish-pink while ripening, purplish-black when fully ripe, juicy and edible.

Fl.: March-May. Fr.: June-July.

Location & altitude Between Dampa Rengpui and Chikha, Saithah, Hmuifang, etc.
Alt. 450-1500 m.

Associates & ecology *Callicarpa arborea*, *Lagerstroemia parviflora*, *Cinnamomum* spp., on sandy-loam well-drained soil along streams in damp forests.

Distribution China, Sri Lanka, Myanmar, Malaysia and Australia; throughout India and the North-East; **common in Mizoram in tropical evergreen and semi-evergreen forests.**

Part used Leaves, fruits and wood.

Extraction and uses :

Medicinal 1) Juice of young leaves is retained in the mouth for spongy and painful gums, and in stomatitis.
2) Pulp of fruit is sliced, put into a pot or dekchi, covered with cloth and made air-tight and then kept over the fire for 2-3 days for fermentation. The fermented liquor is poured out in a container and drunk as laxative, cooling and as stomachic.

Material culture The wood is reddish-grey and used for agricultural implements, house-pillars and firewood.

Notes The trees are used as roadside plantations for the purpose of environmental conservation. The fruits are relished by birds and animals.

Tabernaemontana divaricata (Linn.) R. Br. ex Roem. & Schultes, FFM 2:607.1987; DIFME 175.1991; DIMP 441.1992; CCENEI 196.1994; ADPR 321.1994; TIMP 4:107.1995; IMP 5:232.1996. *T. coronaria* Willd. FBI 3:646.1882; IT 460.1906; FA 3:255.1939. *Ervatamia coronaria* (Jack.) Stapf. DEP 6(3) 401.1892; IMP 2:1577.1935; RBSI 12(2):111.1938; WI 3:192.1953; GIMP 110.1956; MPIP 80.1962. *E. divaricata* (Linn.) Alston, UPI 1962; MPM 71.1996 (**Pl.52, P.102**).

EAST INDIAN ROSEBAY.

Family Apocyanaceae.

Local name **Pararsi (M); Keltebengbeh (L); Khumtau-tui (B).**

Botanical description A handsome evergreen bushy shrub; stem greyish-white, exuding milky juice; branches lenticellate, warty; leaves opposite, 2.5-6 x 5-20 cm, elliptic-oblong or oblanceolate, acute, undulate, glossy green above, pale beneath; base narrowed, oblique; flowers pure white fragrant, in axillary or terminal dichotomous cymes; follicles 2, divaricate, 1-3 ribbed, recurved, red indise; seeds enclosed in a red aril, striate.

Fl. May-November. **Fr.** December-February.

Location & altitude Mampui hmuntha ram, Pukzing, near fountain, etc (Both wild and planted).
Alt. 550-1000 m

Associates & ecology *Aporosa octandra*, *Smilax* sp., *Ficus hispida*, *Globa versicolor*; on compact dry soil in shady places.

Distribution Native country unknown, cultivated throughout Myanmar; throughout sub-Himalayan tract and North-East India; **fairly frequent in Mizoram in tropical secondary forests.**

Part used Roots and milky juice.

Extraction and uses :

Medicinal 1) The roots are chewed for the relief of toothache and gum-boil.
2) The root-bark is pounded and made into a paste. The paste is applied on ulcerated mouth once or twice daily.
3) The milky juice mixed with oil is rubbed on the forehead to cure pain in the eyes and head.

Local liquor The plant is used by *Brus* for preparation of local liquor, or as an yeast for fermentation of rice beer.

Notes The *Mizos* use the plant ornamentally, whereas the *Brus* domesticate it as herbal medicine.

Tarenna odorata (Roxb.) Robinson, FJ 1:233.1981; FFM 2:505.1987. *Webera odorata* Roxb. FBI 3:102.1880; IT 378.1906; FA 3:52.1939 (**Pl.52, P.103**).

Family Rubiaceae.

Local name **Kha-la-gor-song** (C).

Botanical description A shrub (black when dry); bark grey; leaves opposite, elliptic-lanceolate, 4-8 x 12-30 cm, acuminate, glossy green above, dull beneath; base acute; flowers white, corymbose, terminal, pedicellate, pubescent; fruits sub-globose, clustered, crowned by stylar structure.

Fl.: September-October. **Fr.:** December-January.

Location & altitude	Chamdur Project Reserved Forest, Ngengpui wildlife sanctuary. Alt. 240 m.
Associates & ecology	<i>Circuligo capitulata</i> , <i>Mallotus roxburghianus</i> , <i>Hedychium coccineum</i> , <i>Licula peltata</i> , on humus loamy-clay soil in dense forest.
Distribution	Bangladesh; confined to North-East India; very frequent in Mizoram in tropical wet evergreen forests, particularly in Chhimtuipui District, South Mizoram.
Part used	Roots and leaves.
Extraction and uses :	
Medicinal	1) The roots are grinded on grindstone and the paste is collected in a cup of water and then drunk against snake-bite. The leaves are also crushed and applied on the part bitten.

Reported for the first time.

Terminalia bellirica (Gaertn.) Roxb. FFBB 1:455.1877; FBI 2:445.1878; DEP 6(4):18.1892; IT 307.1906; BBO 352.1922; FA 2:243.-4.1938; GIMP 241.1956; WI 10:164.1976; TFM 1:175.1983; FFM 1:383.1985; UPI 627.1986; MMPI 493.1989; DIFME 177.1991; DIMP 457.1992; CCENEI 196.1994; ADPR 505.1994; TIMP 3:201.1994; IMP 5:258.1996; MPM 183.1996.

BELLERRIC MYROBALAN.

Family	Combretaceae.
Local name	Thingvandawt (M).
Botanical description	A tall deciduous tree with buttressed stem at the base; twigs pubescent; bark pale grey-brown; leaves clustered at the ends of branchlets, broadly obovate-elliptic, 6-10 x 8-15 cm, acute; base narrowed, often oblique; flowers greenish-yellow, sessile, on axillary drooping spikes; fruits sub-globose or pyriform, c 2 cm across, densely and finely hairy, obscurely ribbed when dry.
	Fl.: March-May. Fr.: January-February.

Location & altitude Mampui tlangpui, Pukzing forest.etc. Alt. 200-800 m.

Associates & ecology *Bombax ceiba*, *Toona ciliata*, *Ficus* spp., in moist shady forest.

Distribution Sri Lanka, Myanmar and Malaysia; throughout India; **common in Mizoram, in tropical evergreen forests.**

Part used Fruit.

Extraction and uses :

- Medicinal
- 1) The fruit is astringent and acrid, and the pulp is eaten raw for diarrhoea and dysentery
 - 2) The pulp of fruit is crushed with the bark of *Emblica officinalis* for renal trouble. The medicine is taken @ 2 tablespoonful (20 ml) twice daily
 - 3) Infusion of bark is applied on leucodermia.

Remarks A combination of belleric myrobalans (*Terminalia bellerica* Gaertn) Roxb., chebulic myrobalans (*T.chebulla* Retz.) and emblica (*Emblica officinalis*) under the name of 'triphala' or 'three myrobalans' is used extensively in Ayurvedic medicine either in powder or decoction (Manobar, 1996). In traditional Tibetan medicine, the three combination is called "three-magic-fruits" which are used together for reducing body fat, keeping fit, and treating hypertension (Xia, *et al.*, 1996). They are used as adjuncts to other medicine in almost all diseases (Watt, 1892).

Terminalia chebula Retz. FBI 2:446.1878; DEP 6(42.24.1892) IT 308.1906; BBO 352.1922; IMP 2:1020.1035; FA 2:244.1938; GIMP 242.1956; UPI 628.1986; MMPI 496.1989; DIFME 177.1991; DIMP 458.1992; CCENEI 197.1994; ADPR 172.1994; TIMP 3:203.1994; IMP 5:263.1996; MPM 184.1996.

CHEBULIC MYROBALAN.

Family Combretaceae.

Local name Reraw (M).

Botanical description	A moderate-sized deciduous tree; bark dark-brown; leaves elliptic-oblong, acute, 5-9 x 7-16 cm; base rounded; petiole with 2 glands; flowers pale greenish-yellow, in terminal spikes; fruits ellipsoid, 5-angled, spindle-shaped, greenish-yellow, astringent and acrid. Fl.: April-May. Fr.: November-February.
Location & altitude	Ngengpui wildlife sanctuary, W.Bunghmun, Serhmun forest, etc. Alt. 200 - 450 m.
Associates & ecology	<i>Dillenia indica</i> , <i>Amoora willichii</i> , <i>Terminalia myriocarpa</i> , on clayey soil in dense forest.
Distribution	Sri Lanka, Myanmar and Malayan Peninsula; throughout the greater part of India; fairly frequent in Mizoram, in tropical wet evergreen forests.
Part used	Fruits
Extraction and uses :	
Medicinal	<ol style="list-style-type: none"> 1) The fruits are crushed and mixed with water and left overnight for fermentation. The fermented water is strained through tea-strainer or clean cloth and used for the following purposes:- <ol style="list-style-type: none"> a) 2-3 drops are put into the eye for eye-sore 2 times per day. b) gargie in stomatitis. c) applied on chronic ulcer and wounds. d) a tablespoonful (10 ml) is taken internally for cirrhosis of liver twice daily. 2) The dried pulp is pounded to powder and mixed with coconut oil and applied externally on burns. 3) Seeds are grinded on grindstone with water in which rice has been washed and applied externally on pimples.
Remarks	Chebulic myrobalans are described as laxative, stomachic, tonic and alter-native. They are used in fevers, cough, asthma, urinary diseases, piles, intestinal worms, chronic diarrhoea, costiveness, flatulence, vomiting, hiccup, heart diseases, enlarged spleen and liver, ascites, skin diseases, etc. (Watt, 1892).

Recommendation The trees should be conserved and establish *ex.situ* added regeneration.

Tetracera sarmentosa (Linn.) Vahl. **spp. andamanica** Hoogl. FFM 1:54.1985. *T. asiatica* (Lour.) Hoogl. **spp. andamanica** Hoogl. FTS 1:103.1981. *T. scandens* Merr. UPI 630.1986; MPM 184.1996; *Delima sarmentosa* var. *glabra* Hook. f. & Thoms FBI 1:31.1872.

Family Dilleniaceae.

Local name **Hruithindeng** I.R; **Zun-aitlang** (Bm).

Botanical description A scrambling climber; bark reddish-brown, rough, leaves 3-5, elliptic-oblong or oblanceolate, coarsely serrature, acute, scabrid; nerves 15-20 pairs; flowers white, in terminal panicles; fruits ovoid; beak short.

Fl. May-June. **Fr.** July-August.

Location & altitude Ngengpui wildlife sanctuary (east = ward) c.1.5 km from Khawmawi village Alt. 200 m.

Associates & ecology *Dillenia indica*, *Terminalia myriocarpa*, *Phrynium capitatum*, on loamy-clay soil in primary dense forest.

Distribution Singapore and Malaysia; Andaman Island, W.Bengal and North-East India; **not common in Mizoram, in tropical wet evergreen forests.**

Part used Bark.

Extraction and uses :

Medicinal 1) The bark is astringent. Infusion of bark is drunk against diarrhoea and dysentery @ 1/2 cup (50 ml) twice daily.
2) Infusion of bark is taken a febrifuge.

Reported for the first time.

Tetrameles nudiflora R.Br. FFBB 1:534.1877; FBI 2:657.1879; DEP 6(4):41.1892; IT 346.1906; FA 2:335.1938; WI 10:198.1976; TFM 2:29.1983; FFM 1:425.1985; UPI 630.1986.

BAING TREE, MAINA TREE.

Family Tetramelaceae.

Local name **Thingdawl** (M); **Amo** (Ma).

Botanical description A tall deciduous tree, buttressed at the base, silvery grey, horizontally wrinkled or smooth; leaves broadly ovate, 6-15 x 8-14 cm, orbicular, serrate; base cordate; flowers small, yellow, sessile, in many flowered pubescent panicles, appearing before the leaves; fruit roundish, glandular, 0.5 cm across.

Fl.: March-April. Fr.: May-June.

Location & altitude Forests of New Serkawr and Phura, S.Bungtlang and Tuithumhnar, Lungsen-Tlabung, etc. Alt. up to 1000 m.

Associates & ecology *Sterculia coccinea*, *Mangifera indica*, *Drymicarpus racemosus*, on sandy to loamy-clay soil in dry and wet localities.

Distribution S China, Indo-China, Sri Lanka, Myanmar, Java, Malaysia, Papua-New Guinea, eastern Himalaya, Nilgiri hills, western Ghats, Andamans, Assam and Meghalaya; **very common in Mizoram, particularly in Chhimtuipui District, in tropical evergreen and semi-evergreen forests.**

Part used Sap, bark and leaves.

Extraction and uses :

Medicinal 1) The sap or juice of crushed bark is used for the bite of grey-wood tick by external application, or dropped (2-3 drops) into the ear.

Detergent The extract of leaf-saponin is used as detergent for washing clothes.

Notes Local betel-vine growers preferred the area in which the plants (*Tetrameles nudiflora*) grow, because the soils are usually rich and moist.

Reported for the first time.

Thunbergia grandiflora Roxb. FFBB 2:240.1877; FBI 4:302.1885; IT 497.1906; BBO 666.1922; RBSI 12(2):123.1938; FA 3:410.19039; WI 10:234.1976; FTS 2:299.1983; UPI 637.1986; FFM 2:670.1987; CCENEI 198.1994; MPM 186.1996

Family Acanthaceae.

Local name **Vako/Zawngafian (M); Zawnghaileng (P); Sylyti (Ma).**

Botanical description A large climber; stem hairy and terete; leaves ovate, angularly lobed, 8-18 x 12-24 cm, scabrid above, pubescent beneath; nerves 5-7; base deeply cordate; petiole curved, up to 7 cm long; flowers large, light blue or bluish, in axillary racemes, fascicled; fruits up to 5 cm long, curved upwards with 4-quetrous beak, pubescent; seeds flat, sub-triangular.

Fl.: April-May. Fr.: September-November.

Location Vathuampui (southward), Tuipuibari etc.

& altitude

Alt. 190-240 m.

Associates & ecology *Anogeisus acuminata*, *Dalbergia stipulacea*, *Aporosa octandra*, on brown loamy and sandy soils in open forest.

Distribution Bangladesh and Upper Myanmar; Sikkim, Bihar and North-Eastern India; **fairly common throughout Mizoram, particularly in tropical secondary forests.**

Part used Leaves.

Extraction and uses :

Medicinal The cut-ends of the stem when blow produces a sap which is dropped into the eye for eye-sore and ophthalmia.

Tinospora cordifolia(DC) Miers. ex Hoof. f. & Thoms. FBI 1:97.1872; FFBB 1:52.1877; DEP 6(4):63.1892; IT 24.1906; BBO 18.1925; IMP 1:77.1935; FA 1:54.1934; RBSI 12(2):78.1938; GIMP 244.1956; WI 10:251.1976; FTS 2:133.1983; UPI 639.1986; MMPI 499.1989; DIFME 179.1991; DIMP

463.1992; CCENEI 199.1994; ADPR 38.1994; IMP 5:283.1996; MPM 186.1986.

GULANCHA TINOSPORA.

Family	Menispermaceae.
Local name	Theisawntlung (M).
Botanical description	A deciduous climbing shrub, stem warty and creamy-grey; leaves broadly ovate-cordate, shortly acuminate, 5-10 cm long; flowers greenish-yellow, in axillary and terminal racemes, on leafless branches; fruits ovoid, succulent red when ripe. Fl.: March-April. Fr.: April-May.
Location & altitude	Kolosib and Bukpui forests, etc. Alt. 300-900 m.
Associates & ecology	<i>Smilax</i> spp., <i>Baccaurea ramiflora</i> , etc on sandy soil in shady places.
Distribution	Sri Lanka, Bangladesh and Myanmar; throughout tropical India, Andamans and Tripura; rare in Mizoram, in tropical evergreen and semi-evergreen forests.
Part used	Bark and leaves.
Extraction and uses :	
Medicinal	1) Decoction of bark is taken internally for insect-bite @ 1/2 cup (50 ml) twice per day. 2) The bark is boiled with the leaves of <i>Centella asiatica</i> and drunk for insanity. 3) Infusion of leaves is taken against rheumatic pains and swellings. The medicine is taken @ tablespoonful (10 ml) twice daily. 4) Extracted juice of leaves is made warm and dropped into the orifice (2-3 drops) to cure otorrhoea/earache.

Toona ciliata Roem. FTS 1:452.1981; FFM 1:212.1985; DIFME 180.1991; DIMP 464.1992; CCENEI 199.1994; TIMP 3:84.1994; IMP 5:294.1996; MPM 187.1996. *Cedrela toona* Roxb. FBI 1:563.1875; FFBB 1:228-9.1877; DEP 2:233.1889; IT 145.1906; BBO 174.1921; FA 1:242.1934; RBSI 12(2):86.1938; WI 2-C:104.1950; GIMP 56.1956; UPI 112.1986.

TOON, RED CEDAR.

Family Meliaceae.

Local name **Tei, Teipui** (M).

Botanical description A large tree, semi-evergreen; bark dark-grey or grey; leaves paripinnate, up to 45 cm long; leaflets sub-opposite, obliquely ovate-lanceolate, caudate-acuminate, undulate, shining above, pubescent at secondary nerves beneath; base acute, oblique; flowers white, faintly fragrant, in large drooping terminal panicles nearly as long as leaves; fruits oblong, dark-brown, lenticellate; seeds winged at both the ends.

Fl.: March-April. Fr.: September-November.

Location & altitude Dampui forest near Mamit, Pukzing-Marpara, Tuichawng, Chamdur forest, etc. Alt. 200-1200 m.

Associates & ecology *Duabanga grandiflora*, *Toona exelsa*, *Anthocephallus chinensis*, in moist shady areas on shady-loam soil.

Distribution S.China, Bangladesh, Myanmar, Thailand, Java and W.Australia; tropical Himalayas, Central and Southern India and North-East India; **very common throughout Mizoram, in tropical wet evergreen and semi-evergreen forests.**

Part used Bark and wood.

Extraction and uses :

Medicinal Decoction of bark is prescribed for diarrhoea and dysentery. The medicine is taken @ teaspoonful (5 ml) twice daily for children.

Material culture The wood is brick-red and durable, and used for house-building furniture and firewood.

Trapa natans Linn. var. **bispinosa** (Roxb.) Makino, WI 10:274.1976; FTS 180.1983; UPI 645.1986; IMP 5:308.1996; MPM 188.1996. *T. bispinosa* Roxb. FBI 2:590.1879; DEP 6(4):73.1892; BBO 383.1922; IMP 2:1090.1935; GIMP 246.1956 (**Pl.53, P.104**).

Family Trapaceae.

Local name **Dil-hlo** L.R.

Botanical description An aquatic herb; stem submerged, very slender, stoloniferous with fixing roots on mud and free floating on water; leaves whorled, crowded at apex, 2.5-4 cm long, rhoboidal or triangular, serrate-dentate, acute, glossy green above, densely hairy beneath; base truncate; petiole swollen, reddish purple or green; flowers white, axillary, solitary, opening above the surface of water; fruits obovoid, angular, with short conical beak at apex and sharp spinous horn at either side; seed triangular.

Fl. August. **Fr.** November-December.

Location & altitude Palak Lake in Mara Autonomous District (S.Mizoram) located between Phura and Tongkolong. Alt. 290 m.

Associates & ecology Submerged (hydrophytic) plant in lake.

Distribution Sri Lanka, South-East Asia and tropical Africa; throughtout India, particularly in Utter Pradesh, Orissa, W.Bengal, Tripura and Manipur; **very rare in Mizoram and found to be present only in the Palak Lake.**

Part used Aerial part.

Extraction and uses

Medicinal Infusion of the aerial part is said to be used in diarrhoea.

Remarks The fruits are sweetish and useful for chronic fevers, billiousness and bronchitis (Kirtakar & Basu, 1935). The kernel is used as food and

medicine; nut powder as dye and puddings and adulterant of butter; kernel powder in textile industry and ice-cream; the roots and the leaves for effective purification of water (Hajra, *et al.*, 1996).

Personal observation Occasionally, the water becomes dirty-ferruginous but the reason is unknown. *Trapa natans* var. *bispinosa* must be responsible for purification of such dirty water.

White water-birds like *Anhinga melanogaster*, *Podiceps ruficollis*, etc. and a couple of wild elephants (*Elephas maximus*) and a baby elephant are seen in the biodiversity in April, 1997.

Trevesia palmata (Roxb.) vis FBI 2:732.1879; IT 353.1906; BBO 416.1922; FA 2:363.1938; RBSI 12(2):99.1938; WI 10:442.1985; UPI 646.1986; DIFME 181.1991 (**Pl.53, P.104**).

Family Araliaceae.

Local name **Kawhtebel (M)/ Chinchawk-suak (M).**

Botanical description Unbranched small evergreen tree, armed with recurve prickles; young shoots rusty pubescent and prickly; leaves crowded at the apex, orbicular in outline, deeply palmately lobed, lobes acuminate, serrate, 5-9 nerved from base; petiole up to 60 cm long, often prickly; flowers umbels, rusty tomentum while young; fruits ovoid, crowned by the stout style.

Fl.: January-February. **Fr.:** March-May.

Location & altitude Sailui near Dithar, Dampui forest near Mamit, Tongkolong, etc. Both wild and cultivated. Alt. 100-1500 m.

Associates & ecology *Costos speciosus*, *Chasalia* spp., *Melocanna baccifera*, on sandy soil, or rocky places in shady areas, and near rivelets.

Distribution China, Nepal, Bangladesh and Myanmar, from Sikkim to Bihar and Orissa and the North-East India; **common throughout Mizoram, on banks of rivelets and shady rocky places in tropical evergreen and semi-evergreen forests.**

Part used Roots, petiole and fruits.

Extraction and uses :

- Medicinal**
- 1) Infusion of the basal portion of the petiole (stalk) is taken internally against stomachache and colic. The medicine is taken as tea once per day.
 - 2) The paste made of the roots with those of *Claoxylon khasianum*, *Clerodendrum wallichii*, *Mussaenda macrophyllum*, *Phlogacanthus thysiformis*, *Ardisia paniculata*, is externally applied on tumor on the abdominal wall developing from within (cancer). The paste mixed with water is taken internally @ 1/2 cup (50 ml) daily for 7 days.
Bru medicineman prescribes fresh paste for daily applications.

Food The fruits are eaten cooked or fried as vegetable. The fruits are sold in local markets during March-June.

Reported for the first time.

Trichosanthes tricuspidata Lour. EFPN 2:180.1979; FFM 1:422.1985; DIFME 182.1991; DIMP 472.1992; ADPR 183.1994; IMP 5:328.1996. *T. palmata* Roxb. FBI 1:606.1879; BBO 387.1922; IMP 2:1107.1935. *T. bracteata* (Lamk.) Voigt. GIMP 247-8.1956; WI 10:291.1976; FTS 1:266.1981; UPI 647.1986; MPM 189.1996.

Family Cucurbitaceae.

Local name **Vankhaum** (M).

Botanical description An extensive climber; stem light grey, lenticellate, 7-grooved; branches pendent, leaves palmately 3-5 lobed; lobes acute, denticulate; base 5-nerved, deeply cordate; flowers white; fruits globose or ellipsoid, 5-6 cm long, red when ripe; seeds numerous, reddish-brown.

Fl.: July-August **Fr.:** October-December.

Location & altitude On roadsides between Teirei and Dampa Rengpui.

Alt. 195 m.

Associates & ecology *Albizia procera*, *Callicarpa arborea*, etc. in moist shady areas.

Distribution China, Sri Lanka, Bangladesh, Myanmar, Malaysia and Australia; nearly throughout India; **frequent in Mizoram, in tropical evergreen and semi-evergreen forests.**

Part used Roots, fruits.

Extraction and uses :

Medicinal 1) The roots with those of *Musa* sp. (local variety), *Millettia pachycarpa*, *Aeginatia indica*, *Richinus communis* (white variety), *Polygonum plebium*, and a small portion of the stomach of *Hysterix indica* (Sakuh) are pounded and made into pills. The pills are used for infertility. 2-3 pills are taken before bed just after menstrual period and another pill in the next morning before meal.

(The couple should be abstained from taking liquor for 5-6 months during the treatment)

2) The dried leaves are smoked as cigarette for asthma and cough.

3) The ripe fruit is taken for diptheria and as stomachic.

4) The fruit-oil obtained by boiling it in coconut-oil is applied on the forehead in hemicrania.

Notes The fruit is devoured by Indian Pied Hornbill (*Anthracoceros malabaricus*) and also used as a bait in bird's trap.

Uncaria sessilifructus Roxb. FI 2:130.1824; FBB 2:71.1877; FBI 3:30.1880; IT 371.1906; RBSI 12(2):103.1038; FA 3:24.1930; WI 10:406.1976; FTS 2:86.1983; UPI 660.1986. FFM 2:508.1987; CCENEI 330.1994; MPM 191.1996 (**Pl.54, P.106**).

Family Rubiaceae.

Local name **Ralsamkuai-ziksen** (M).

Botanical description An extensive woody climber; branches 4-angled; tendrils much coiled; leaves opposite, peltate, broadly obovate or ovate, 2.5-6 x 5-12 cm, bluntly acuminate, shining above, pale beneath; base rounded; flowers whitish-yellow, in terminal paniced heads; fruits sessile, turgid, pubescent.

Fl.: October-November. Fr.: February-April.

Location & altitude	Ngengpui wildlife sanctuary.	Alt. 350-1000 m.
Associates & ecology	<i>Podocarpus nerifolius</i> , <i>Pithecellobium angulatum</i> , <i>Terminalia myriocarpa</i> , in dense forest.	
Distribution	Tropical Himalayas to North-East India; frequent in Mizoram, in tropical evergreen forests.	
Part used	Twigs and leaves and roots.	

Extraction and uses :

- Medicinal
- 1) Young leaves and twigs boiled in water is taken internally against diphtheria, throat-pain and inflammatory glands. The medicine is taken @ 1/2 cup (50 ml) twice daily.
 - 2) The roots are boiled and the water is drunk against excess bleeding.
 - 3) The tender leaves are crushed and applied on boils.

Notes The species is easily recognised by its reddish young leaves. Another species, *i.e.*, *Uncaria laevigata* Wall. of same genus is known as *Ralsamkuai* (M). The young leaves are white and considered inferior to the former.

Vernonia albicans DC. DIFME 186.1991. *Vicinerea* (Linn.) Less.FBI 3:233-4.1881; IMP 2:1322.1935; RBSI 12(2):106.1938; FA 3:104.1939; GIMP 254.1956; MPIP 174.1962; WI 10:448.1976; FTS 2:229.1983; UPI 672.1986; DIMP 486.1992; NPM 193.1996.

ASH-COLOURED/PURPLE FLEABANE.

Family Asteraceae.

Local name **Dawn-do-u-pun (C); Buar-vutbuak LR.**

Botanical description An erect ash-coloured herb; stem grooved or striate; leaves alternate, elliptic-lanceolate, acute, 2-3 x 5-8 cm, pubescent on both sides, toothed, waxy; petiole short; stipules foliaceous; flowers pink or purple, in lax divaricate terminal corymbose heads; involucre narrowly campanulate; pappus clothed with silky hairs.

Fl.: December-February. **Fr.:** March-April.

Location Chamdun Project-I, S.Mizoram.
& altitude Alt. 210 m.

Associates *Chromolaena odorata*, *Cassia tora*, etc. on brown clayey soil in edges of
& ecology forest and near streams.

Distribution Tropical Asia, Africa and America; throughout India as common weed;
common in Mizoram, in waste places, waysides and edges of forests.

Part used Leaves.

Extraction and uses :

Medicinal Infusion of leaves is made warm and then dropped into the ear (2-3 drops)
against earache/otorrhoea.

Vitex peduncularis Wall. ex Schauer. FBI 4:587.1885; IT 505.1906; BBO 712.1922; IMP
3:1941.1935; FA 3:485.1939; GIMP 257.1956; WI 10:524.1976; FTS
2:110.1983; UPI 683.1986; FFM 2:692.1987; DIFME 188.1991; DIMP
500.1992; CCENEI 204.1994; MPM 196.1996.

Family Verbenaceae

Local name **Thingkhawilu** (M); **Ko-bai-kai** (Ma).

Botanical A medium-sized to large semi-deciduous tree; stem fluted at the base; bark
description dark-grey; young parts pubescent; rachis winged, leaves 3-foliate; leaflets
lanceolate, 2-5 x 6-16 cm, base acute; flowers yellowish-white or greenish-
white, in axillary lax peduncles; fruits obovoid, c. 1 cm across.

Fl.: April-May. **Fr.:** July-September.

Location The forests of Pukzing, Lengpui, Bungtlang, etc.
& altitude Alt. 450-1000 m.

Associates *Toona ciliata*, *Bombax insigne*, *Castanopsis* spp., on humus sandy-loam soil
& ecology in primary forest.

Distribution Bangladesh and Myanmar; Sub-Himalayan tract to North-East India; **common throughout Mizoram in tropical evergreen and semi-evergreen forests.**

Part used Bark and wood.

Extraction and uses :

Medicinal 1) The coat of inner bark is boiled in water and the water is taken as an effective remedy against malarial fever and black water fever. The medicine is taken as specified below:-

i) A teaspoonful (10 ml) is taken orally 2 times per day.

ii) The patient is bathed with the water.

ii) The steam is deeply inhaled while the patient is covered with a cloth.

Material culture 1) The wood is hard and locally considered as one of the best charcoal in Mizoram.

2) The wood is also employed for house-posts and yokes.

Notes Mara local informant reported that there is a small tree species the bark of which is used for the treatment of malaria. It could be *Vitex negundo* L

Vitex peduncularis Wall. var. **roxburghiana** Cl. FBI 4:587.1885; DEP 6(4):250.1892; BBO 712.1922; FA 3:485.1939; WI 10:524.1976; FTS 2:118.1983.

Family Verbenaceae.

Local name **Thingkhawilu** (M); **Ko-bai-kai** (Ma).

Botanical description A large tree with pubescent young shoots and winged petiole; bark dark-grey, splitted into rectangular flakes; leaves 3-foliolate; petiole winged; broad cordate at the base; leaflets elliptic-lanceolate, long acuminate, 2-3 x 15-24 cm; flowers greenish-white, few flowered in lax axillary-terminal panicles, villous; fruits not seen.

Fl.: April-May. **Fr.:** not seen.

Location & altitude	About 1 km from Pukzing (eastward).	Alt. 520 m.
Associates & ecology	<i>Firmiana colorata</i> , <i>Macaranga indica</i> , on sandy-loam soil in mixed bamboo forest.	
Distribution	Bangladesh, East Bengal, Assam and Tripura; scattered in Mizoram, in tropical evergreen and semi-evergreen forests.	
Part used	Bark.	
Extraction and uses :		
Medicinal	<ol style="list-style-type: none"> 1) The bark is crushed and boiled. The steam vapour is inhaled by a patient suffering from malarial fever/fever, and the water is also used for bathing. 2) The <i>Maras</i> take decoction of bark against diabetes and enlargement of liver @ 1/2 cup (50 ml) twice daily. 3) Infusion of leaves is drunk against stomach-ulcer and black water fever/typhoid. 	
Material culture	The wood is hard and heavy and used for house-pillars and considered an excellent charcoal.	
Remarks	The species is distinguished by the winged petiole of 3-foliolate.	

Reported for the first time.

Vitis bifurcata Wall. *V. furcata* Laws. FBI 1:646.1875 (Pl.54, P.107).

Family	Vitaceae.	
Local name	Hruiveikual LR. Du-de-bra (B); Rangabut-tua (C).	
Botanical description	A large woody climber, twining left; bark fissured; young branches pale green; leaves orbicular, secunded, shortly caudate, serrate, 8-10 x 8-13 cm; base sub-truncate, 5-7 nerved; petiole 5-10 cm long.	

Fl. & Fr.: not seen at the time of collection (Nov. 1995).

Location & altitude About 5 km east of West Phulpui, Teirei, etc. Alt. 200-900 m.

Associates & ecology *Vitex peduncularis*, *Stereospermum colais*, *Cissus repens*, on river banks in moist shady places.

Distribution Singapore, Malacca, East coast of India; **common in Mizoram, in tropical evergreen and semi-evergreen forests.**

Part used Root.

Extraction and uses :

Medicinal The root is fibrous and contains mucilaginous lilac-bluish substance. The substance is collected in a splited bamboo-culm and warmed in the fire. Sometimes, it is mixed with the viscous glands of calyx of *Dillenia indica* and made into a poultic. The poultice is used for sciatica, swellings and sprains.

Reported for the first time.

Woodfordia fructicosa Kurz. FFBB 1:518.1877; BBO 374.1922; IMP 2:1074.1935; FA 2:313.1938; GIMP 259.1956; MPIP 178.1962; WI 10:586;1976; UPI 690.1986; MMPI 536.1989; DIFME 189.1991; DIMP 495.1992; TIMP 3:188.1986; IMP 5:412.1996. *W. floribunda* Salis. FBI 2:572.1879; DEP 6(4):312.1892; IT 341.1906; ADPR 130.1994 (**Pl.55, P.108**).

FIRE-FLAME BUSH.

Family Lythraceae.

Local name **Ainawn (M)**.

Botanical description A staggling shrub to 3-5 m high; bark reddish-brown; young parts hairy; branches spreading, drooping; leaves opposite or in whorls of 3, sessile, ovate-lanceolate or oblong-lanceolate, acuminate, puberulous above, white with black dots beneath; base cordate; flowers numerous, brilliant-red in dense axillary

clusters from the old wood, often completely covering the branches; fruits ellipsoid, irregularly dehiscent; seeds brown, obovoid, smooth, small.

Fl. March-April. **Fr.** April-May.

Location & altitude. Near Mat river, on roadsides between Kawlchaw and Tlawk river; Maubawk and Theiva. Alt. 250-1200 m.

Planted in Chawntlangpui and Aizawl as an ornamental plant.

Associates & ecology. *Tetrameles nudiflora*, *Millettia pachycarpa*, *Macaranga paniculata*, *Phyllanthus* sp., on rocky places and dry areas in secondary forest.

Distribution. China, Pakistan, Upper Myanmar, Madagascar and tropical Africa; in north India, up to 1500 m; **rare in Mizoram, in dry tropical secondary forests in southern part of Mizoram.**

Part used. Flowers.

Extraction and uses :

Medicinal. The powdered flower is used in sores and ulcers by external application.

Folk-song. The famous Mizo poet and composer, the late Mr. Rokunga composed a folk-song on common beautiful flowers of Mizoram, such as, **Phunchawng** (*Bombox ceiba*), **Nauban** (*Orchids*), **Ainawnpar** (*Woodfordia fruticosa*), **Tuah-vau** (*Erythrina stricta* & *Bauhinia indica*), **Chhawkhlei** (*Rhododendron arboreum*), **Senhri-par** (*Renanthera imschoothiana*), **Chawnpui-par** (*Lagerstroemia speciosa*), **Tlangsam** (*Chromolaena odorata*) and **Dingdi** (*Aselepias curassavica*). The song is sung on special occasions.

Remarks. The fresh leaves are excellent remedy in cases of snake-bite. The juice is given internally, a few drops poured into each nostril, and some rubbed on the part bitten (Kirtakar & Basu, 1935).

Zanonia indica Linn. FBI 2:633.1879; DEP 6(4):322.1892; IMP 2:1168.1935; GIMP 259.1956; WI 11:17.1976; UPI 697.1986; DIMP 498.1992 (**Pl.55, P.109**).

Family	Cucurbitaceae.
Local name	Lalruanga-dawibur (M).
Botanical description	A slender climber; stem green, striate; blaze greyish; all parts bitter; leaves alternate, 3-foliolate; leaflets oblong-oblongate, acute, bright green, 4-8 x 6-14 cm, 3-nerved at base; base slightly cordate; petiole channelled; tendrils lateral; flowers greenish-yellow, clustered on slender panicles; fruits cylindrical-obconic, like a candle extinguisher, c 8 cm long, slightly tapering towards a rounded base, truncate and triangular at the apex, pale yellowish-brown; seeds laterally compressed, white to pale yellow, somewhat like the seeds of <i>Momordica charantia</i> Linn. Fl.: June-August. Fr.: November-December.
Location & altitude	Chikha forest towards Serhmun. Alt. 450 m.
Associates & ecology	<i>Clerodendrum villosum</i> , <i>Litsea</i> spp., <i>Macaranga indica</i> , <i>Dracaena spicata</i> , on sandy-loam soil in shady area.
Distribution	Pakistan, Sri Lanka and Malaysia; very rare in Mizoram in tropical evergreen forests.
Part used	Fruits, seeds and leaves.
Extraction and uses :	
Medicinal	1) The fruit is cylindrical. Warm water is put into the cavity and shaken well. The water becomes bitter and is drunk twice daily to cure stomachache. 2) The seeds are ground to powder and the powder (5 gms) is taken with water against colic. 3) Infusion of the leaves is taken against fever @ tablespoonful (10 ml) twice daily.
Folk-tale	There was a poor fellow named <i>Lalruanga</i> , who used to practice a magic by using the fruits and his enemies were said to have always been conquered, hence the name (Lalruanga = a poor fellow man; dawi = magic; bur = vessel, which literally means <i>Lalruanga's magic vessel</i>).

Remarks The roots being very bitter, may be useful for the treatment of malarial fever. The species is critically endangered and requires *in-situ* and *ex-situ* conservation.

Zanthoxylum armatum DC. WI 11:18.1876; FFM 1:191.1985; UPI 697.1986; DIFME 191.1991; DIMP 499.1992; TIMP 3:115.1994; CCENEI 205.1994; IMP 3:1996; MPM 200.1996. *Z.alatum* Roxb. FI 3:768.1832; FBI 1:493.1875; DEP 6(4):323.1892; IT 116.1906; FA 1:199.1934; IMP 1:460.1935; RBSI 12(2):85.1938; GIMP 260.1956.

Family Rutaceae.

Local name **Arhrikreh** (M).

Botanical description A small, strongly aromatic tree; branches armed with prickles; twigs lenticellate; leaves imparipinnate; rachis with a foliaceous green wing; leaflets opposite, elliptic-lanceolate, caudate-acuminate, serrate and each serrature with punctate, terminal up to 11 cm long, lateral smaller; flowers greenish-yellow, in dense pubescent lateral panicles; fruits red, globose; seeds solitary, globose, shining black.

Fl.: April-May. **Fr.:** October-December.

Location Lungkulh virgin forest.

& altitude

Alt. 550 m.

Associates & ecology *Knema linifolia*, *Ficus bengalensis*, *Calamus eretus*, on humus soil under dense forest.

Distribution Hot valleys of Himalaya ascending up to Bhutan, Andra Pradesh and North-East India; **not common in Mizoram, in tropical evergreen and semi-evergreen forests.**

Part used Leaves and seeds.

Extraction and uses :

Medicinal The powdered seeds is used in stomatitis and the removal of foul smell from the mouth.

Veterinary	The fresh leaves are used to rid a fowl's nest of lice, hence the name. (Ar = chicken; hrik = lice; reh = driven off.)
Food	The cooked leaves are pounded with the liver of chicken and made into chutney.
Fish-poison	The bark is used for intoxicating fish.

Zanthoxylum rhetsa (Roxb.) DC. FBI 1:495.1875; IT 118.1906; TFM 1:386-7.1983; FFM 1:193.1985; DIFME 191.1991; CCENEI 206.1994; TIMP 3:116.1994. *Z. budrunga* (Roxb.) DC. FBI 1:495.1875; FFBB 1:182.1877; DEP 6(4):325.1892. *Z. budrunga*. Wall. BBO 160.1925; FA 1:198.1934; IMP 1:104.1935; GIMP 260.1956. *Z. limonella* (Dennst.) Alston, WI 11:21.1976; FTS 1:437.1981; UPI 698.1986; DIMP 500.1992; MPM 200.1996.

Family Rutaceae.

Local name **Chingit** (M); **Zo-reng** (Bm).

Botanical description A small to moderate-sized evergreen tree; trunk, shoots and petioles armed with recurved prickles, strongly pungent smell; leaves imparipinnate, clustered towards the ends of branchlets; leaflets 5-10 pairs, oblong-lanceolate, oblique at the base, crenate, caudate-acuminate; flowers greenish-white in trichotomous cymes in large terminal panicles; fruits globose, reddish, rugose; seed solitary, blue-black.

Fl.: March-April. Fr.: July-October.

Location & altitude Kawnpui, W.Phulpui, Tuichawng, etc in slopy shady areas. Alt. 200-1200 m.

Associates & ecology *Sapindus pinnata*, *Gmelina arborea*, *Macaranga denticulata*, on sandy-loam soil in primary forest and *jhum* lands.

Distribution China, Sri Lanka, Java, Bangladesh, Myanmar, Philippines and New Guinea; tropical Himalayas and North-East India; **very common in Mizoram, in tropical evergreen and semi-evergreen forests.**

Part used Roots and leaves.

Extraction and uses

- Medicinal** The roots are grinded on grindstone and the paste is collected in a cup of water and drunk against fever twice daily.
- Food** The young shoots and tender leaves are eaten boiled by the *Mizos*. Sometimes it is boiled with the leaves of *Clerodendrum colebrookianum* Walp. or *Vigna unguiculata* (L.) Walp. **ssp.** *cylindrica* (L.) van *Eseltine*, or *Cucurbita maxima* Dutch. and taken as vegetable.
- Notes** The tender shoots/leaves are sold in local markets during May-August.

Zingiber officinale Rose. FBI 6:246.1890; DEP 6(4):358.1892; BBO 11:43.1924; IMP 4:2435.1935; GIMP 261.1956; BBSI 14(1-4):137.1972; WI 11:89.1976; FTS 2:379.1983; UPI 701.1986; DIFME 191.1991; DIMP 501.1992; CCENEI 207.1994; ADPR 50.1994; Ethnobotany 7:85.1995; JETB. Addl. Ser. 12:18.1996; IMP 5:431.1996; MPM 201.1996.

GINGER.

Family Zingiberaceae.

Local name **Sawhthing** (M).

Botanical description A perennial herb to 1 m high; rootstock stout, horizontal, jointed rhizome, pale yellow inside; leaves distichous, sessile on sheaths, linear-lanceolate, 1.5-3 x 12-30 cm, puberulous along midrib beneath; flowers yellowish-green in oblong, cylindric spikes; bracts scarious; calyx united, 3-toothed at apex; corolla lobes 3, lanceolate, green; lip 3-lobed, purplish, spotted with yellow; fertile stamen 1; ovary inferior, 3-chambered; stigma sub-globose; fruits oblong; seeds globose.

Fl. & Fr.: July-November.

Location & altitude Cultivated throughout Mizoram by Ginger growers and farmers.
Alt. Up to 2000 m.

Associates & ecology Cultivated in *jhum* lands monoculturally, or sometimes under shades of *Aleurites montana* E.H.Wils (*Tingrah-chuar*) or *Artocarpus heterophyllus* Lamk. (*Lamkhuang*), etc.

Distribution Native of tropical Asia; cultivated all over the warmer parts of India, run wild in some places in the western Ghats; **cultivated throughout the length and breadth of Mizoram in large-scale as cash-crop.**

Part used Rhizome and flowers.

Extraction and uses :

Medicinal 1) Extract ginger-oil is used in cough and bronchitis.
2) The rhizome is roasted and eaten against throat pain.

Food 1) Ginger is largely employed as condiment in the preparation of almost all curries, chutneys pickles, etc.
2) The flowering bunches are sold in the local markets.

Notes At present, ginger is the largest single cash-crop in Mizoram.

Remarks Monoculture of ginger brings about severe loss of top-soil in run-off water. Monoculture which may be changed to multitier method of cultivation for sustainable production is desirable.

Zingiber purpureum Rosc. DIFME 191.1991. *Z. cassumunar* Roxb. BBO 1143.1924; FBI 248.1892; IMP 4.2439.1935; GIMP 261.1956; BBSI 14(1-4):137.1972; WI 11:89.1976; UPI 701.1986.

Family Zingiberaceae.

Local name **Pale** (C, Br).

Medicinal A slender herb, arising from rootstock; rhizome deep yellow inside; stem 1-2 m high; leaves oblong-lanceolate, sessile, 3-6 x 25-35 cm, pubescent along midrib beneath; flowers oblong-ellipsoid spikes, up to 15 cm long, yellow; fruit globose.

Fl.: August-September. **Fr.:** October-November.

Location & altitude Lalmon-I village, S.Mizoram (cultivated in kitchen garden).

Associates & ecology	Cultivated along with <i>Ocimum tenuiflorum</i> , <i>Solanum melongana</i> , etc. in kitchen garden.
Distribution	Sri Lanka and Malaysia; throughout India; very rare in Mizoram, survive only in cultivation.
Part used	Rhizome.
Extraction and uses :	
Medicinal	<i>Chakmas</i> used the rhizome to cure stomachache and diarrhoea and as stomachic.
Notes	Jain (1995) and Rahman & Yusuf (1996) also reported the same uses.

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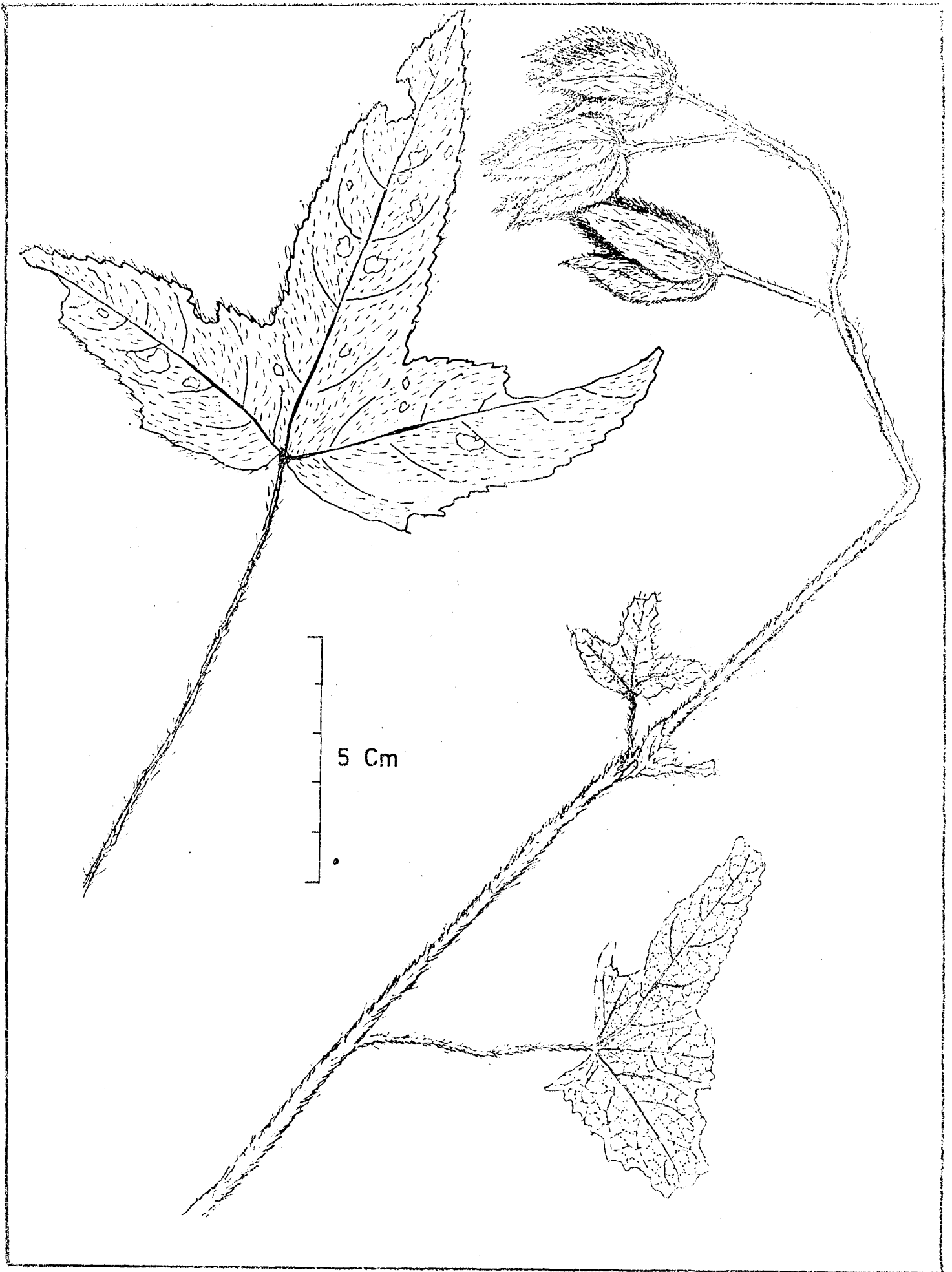


Fig. 6. *Abelmoschus moschatus* Medic.

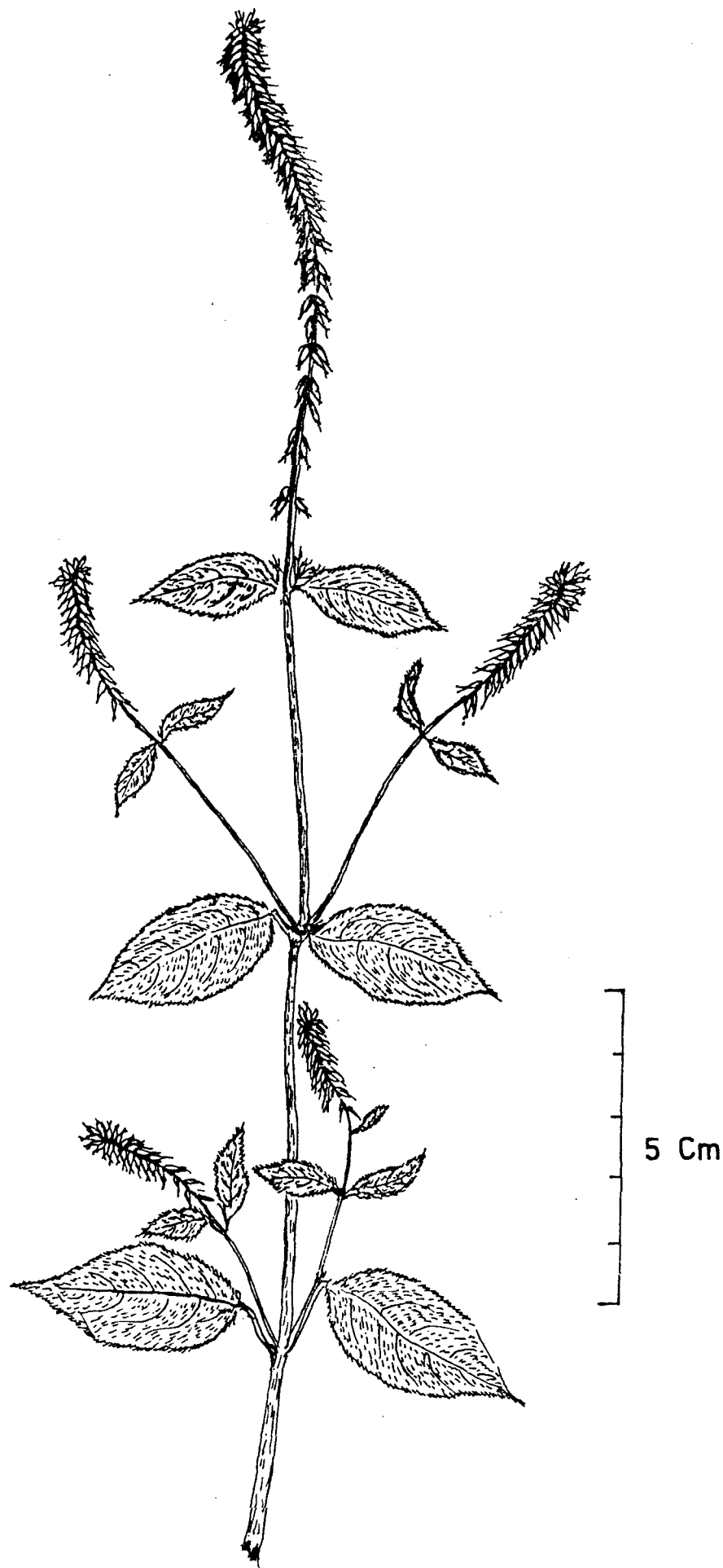


Fig. 7. *Achyranthes aspera* L.

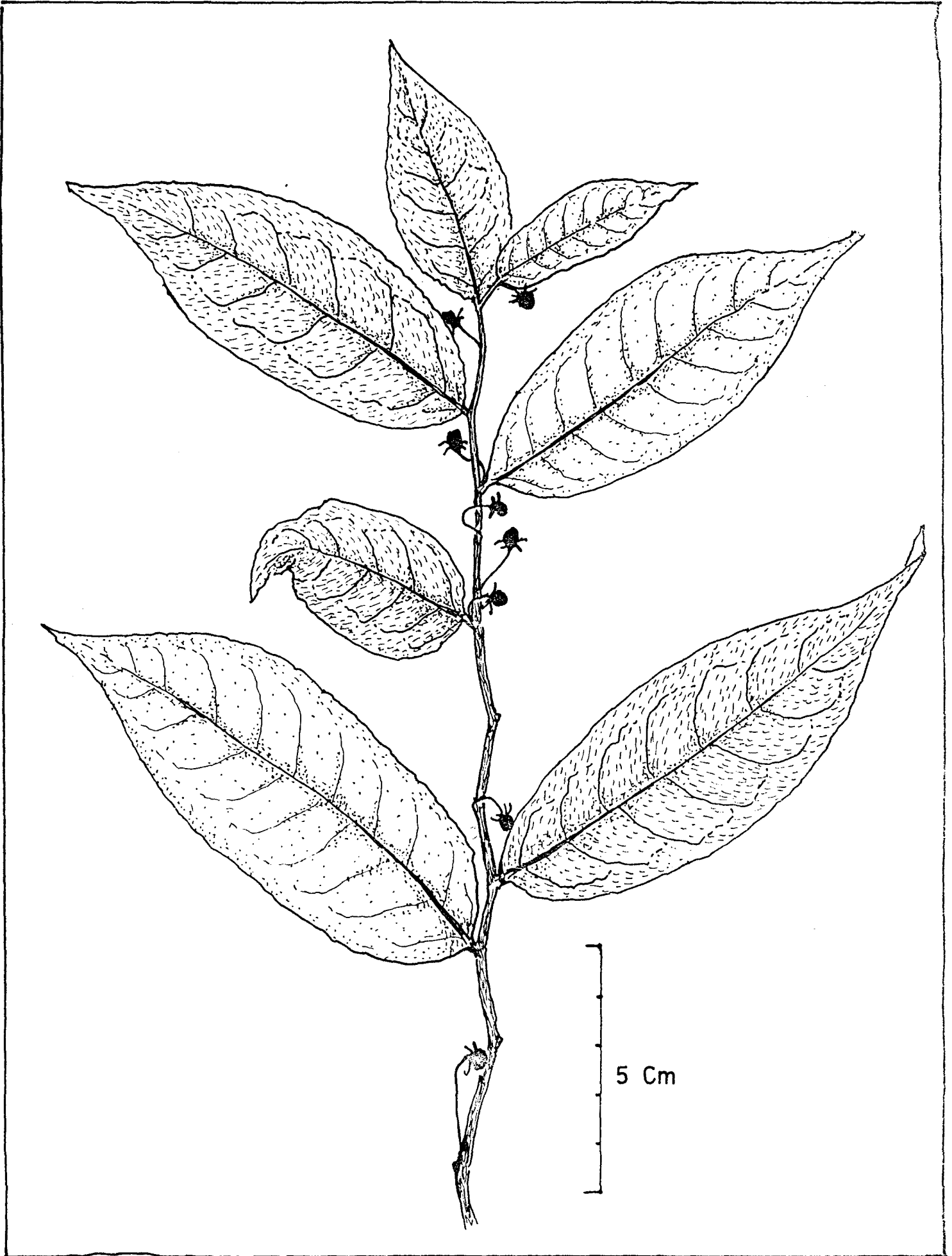


Fig. 8. *Anacolosa crassipes* Kurz.

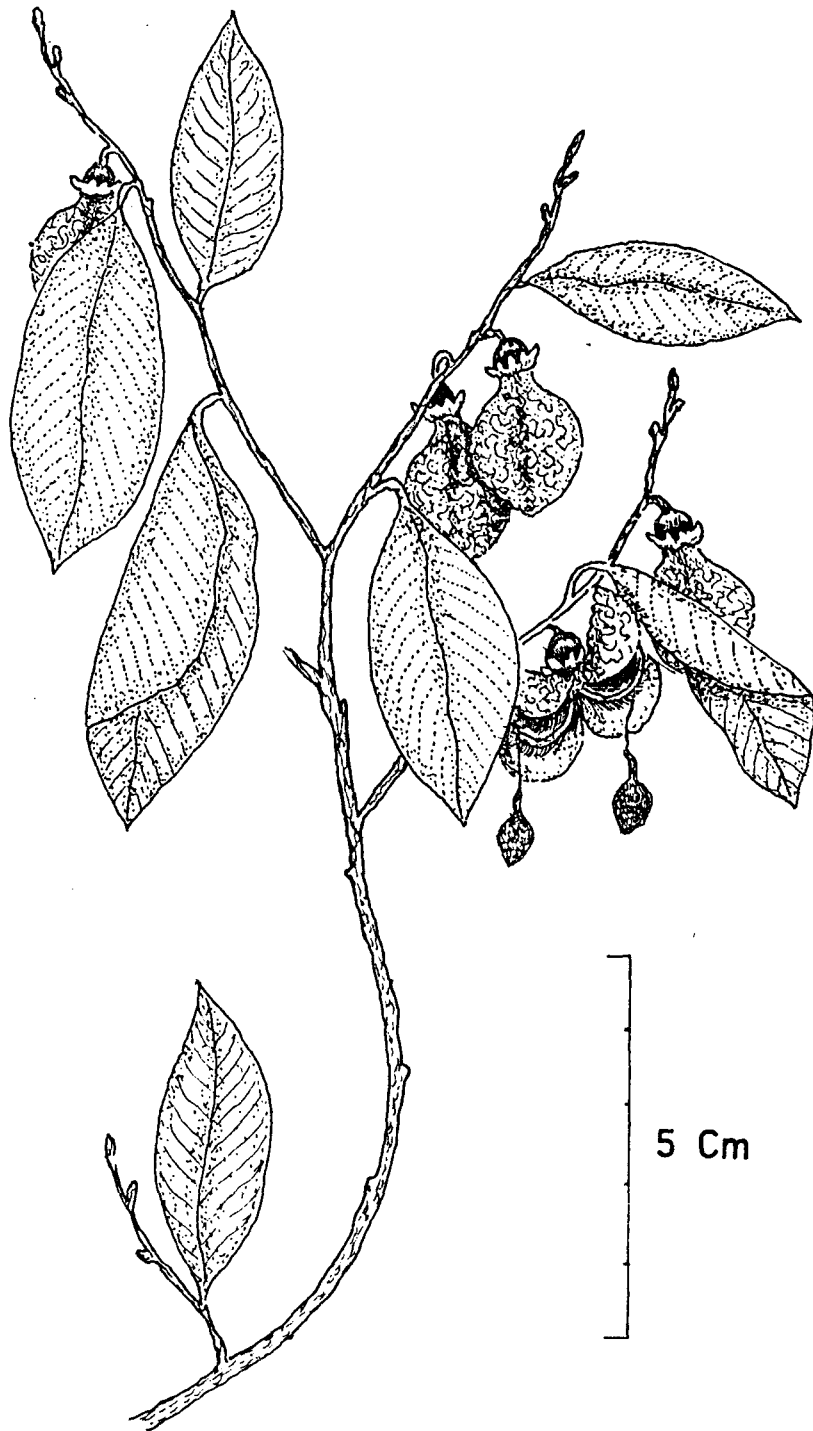


Fig 9. *Aquilaria malaccensis* Lamk.

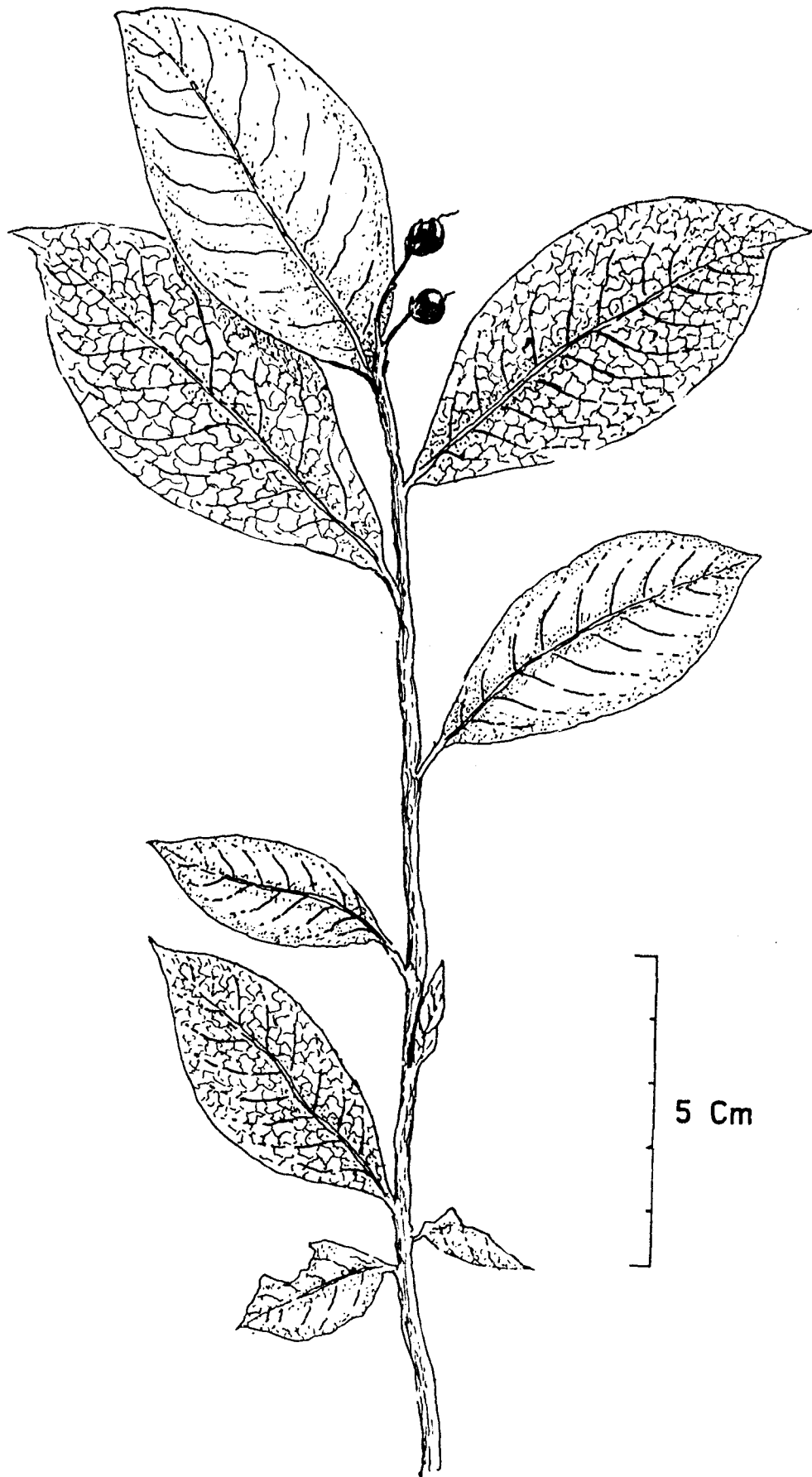


Fig. 10. *Ardisia elleptica* Thunb.

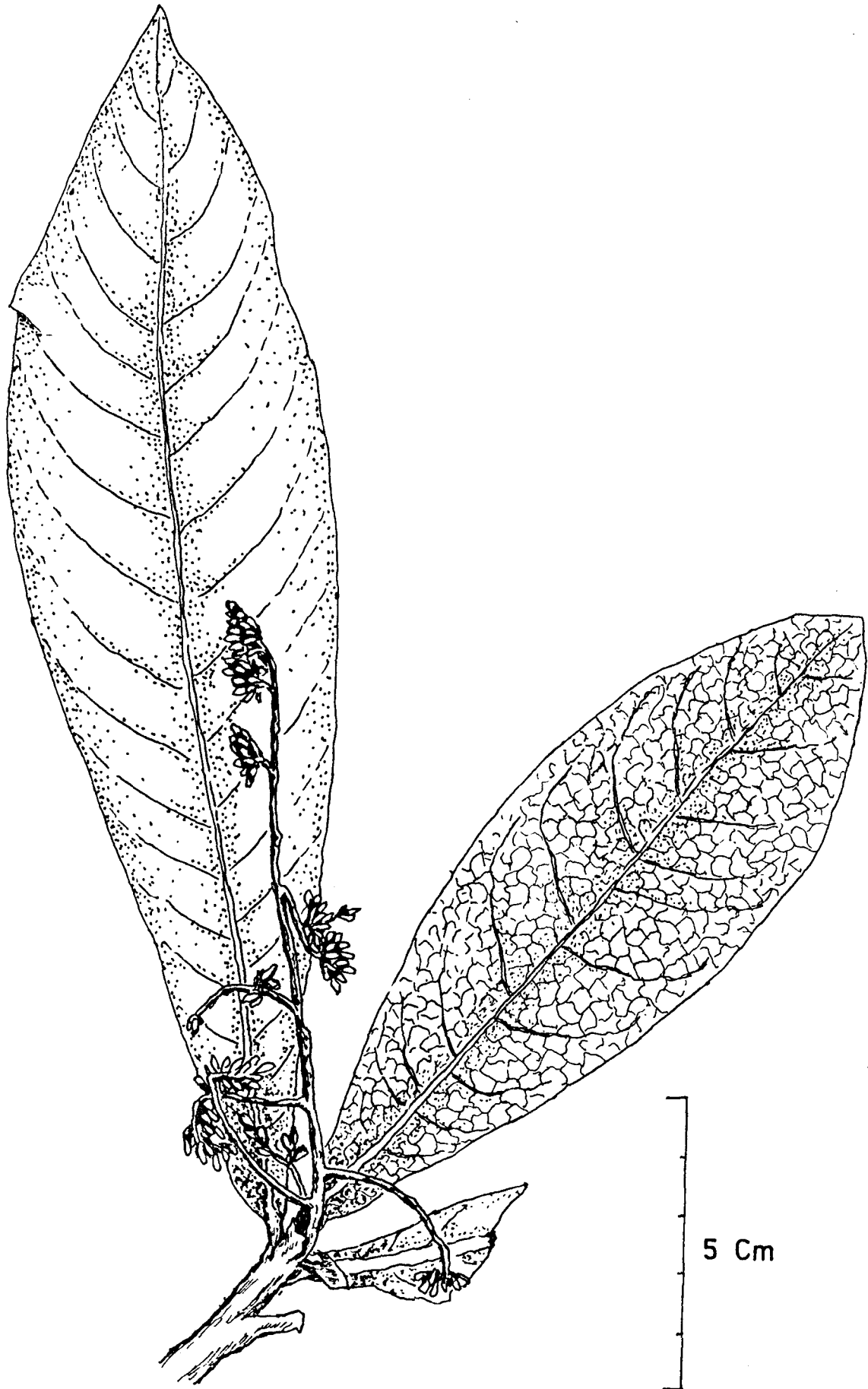


Fig. 11 *Ardisia paniculata* Roxb.



Fig. 12. *Cassia hirsuta* L.

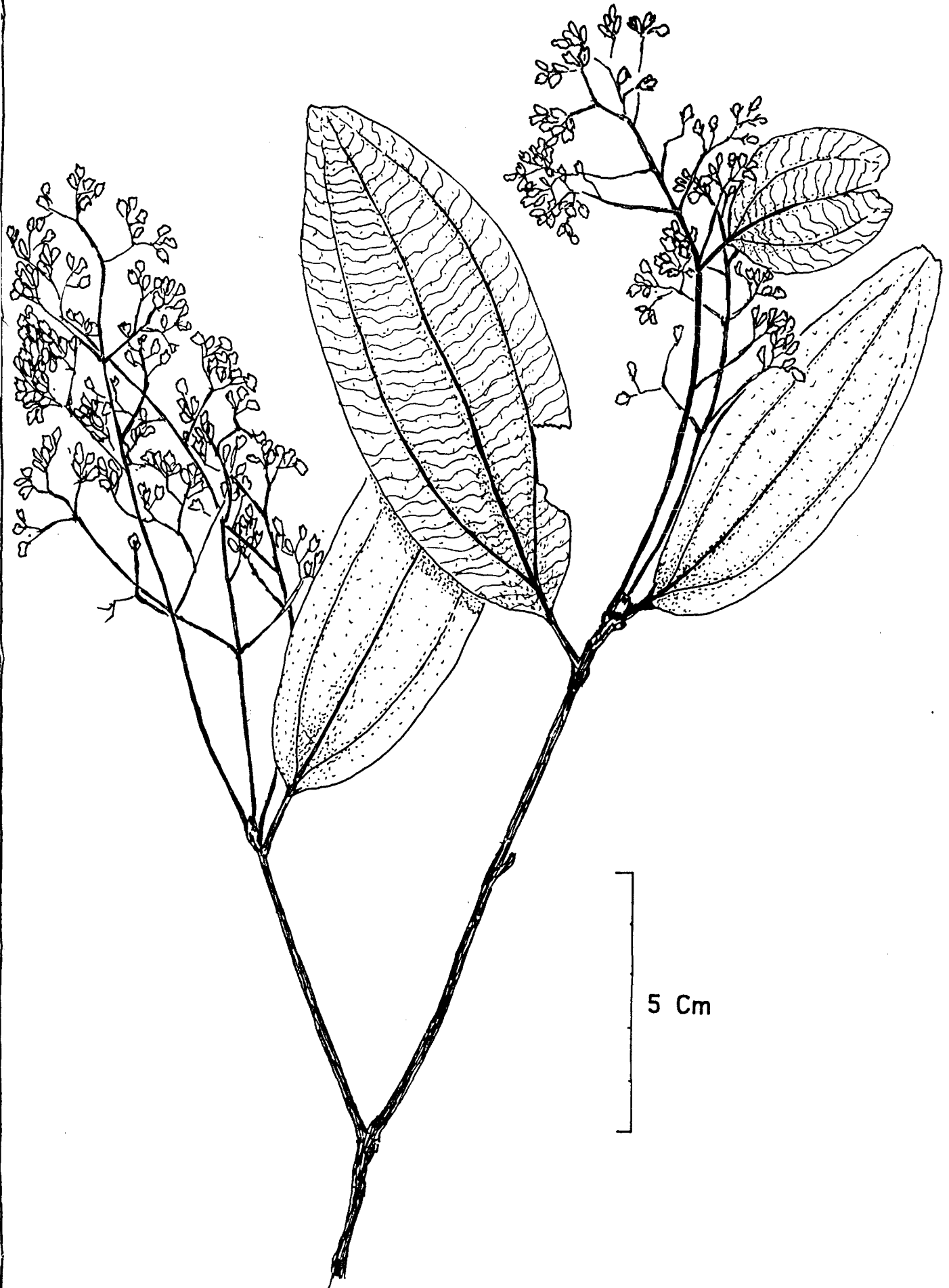


Fig. 13. *Cinnamomum bejolghota* (Buch.-Ham.) Sw.

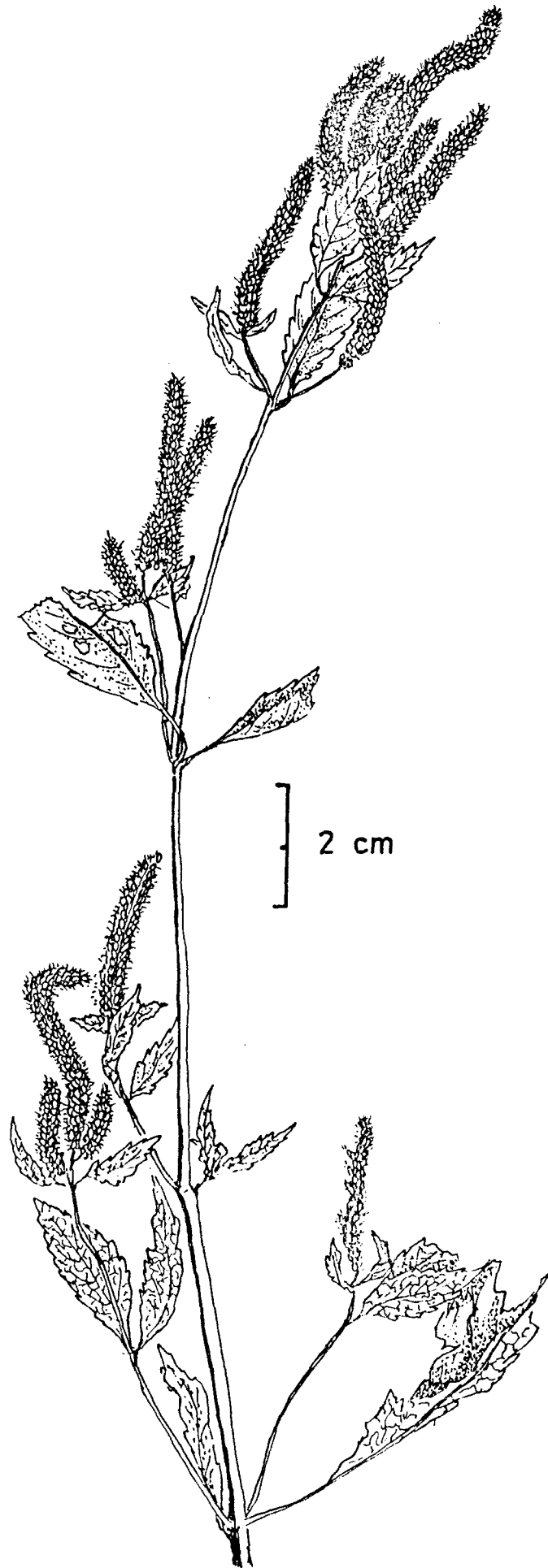


Fig. 14. *Elsholtzia blanda* (Benth.) Benth.

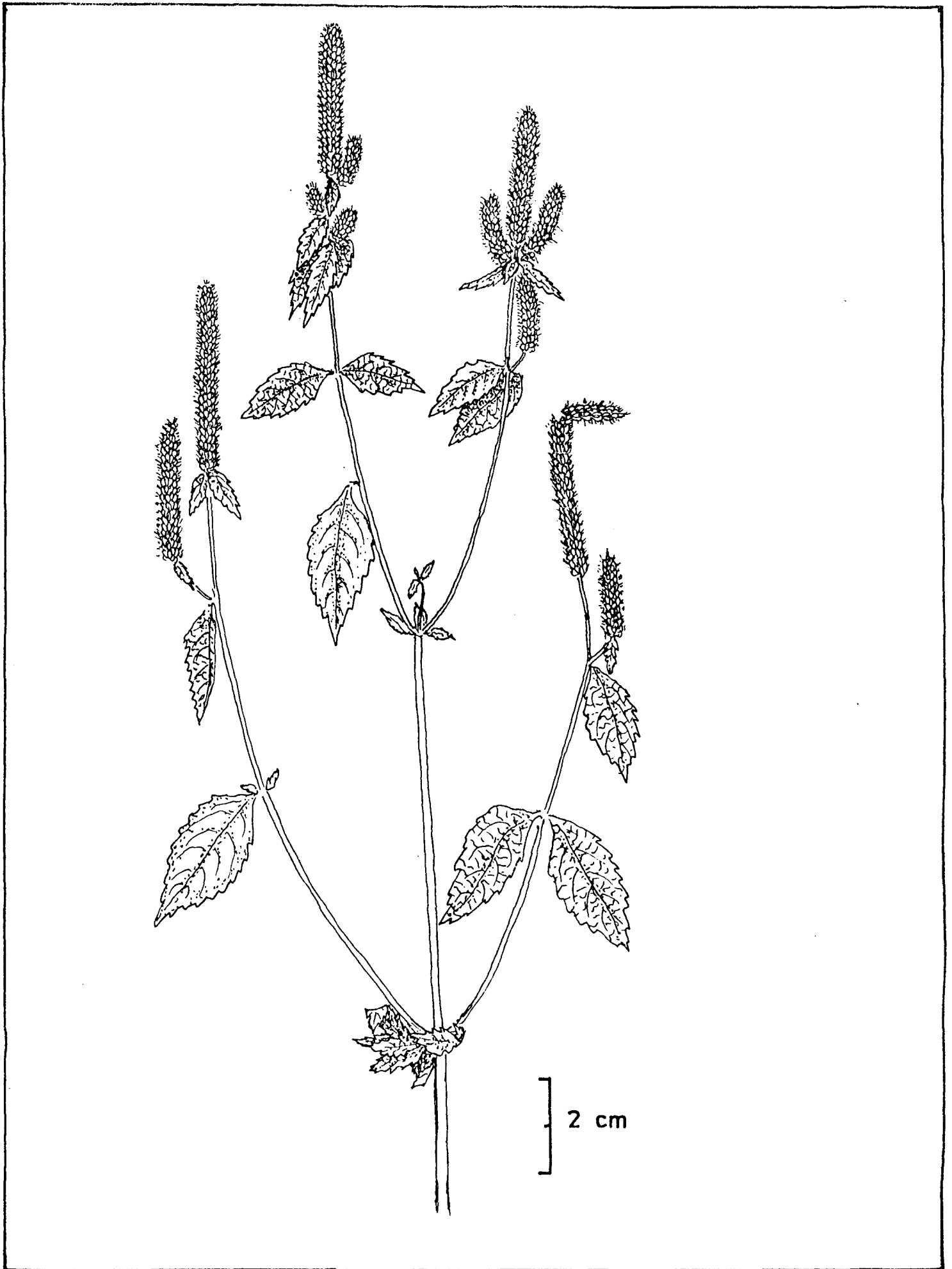


Fig. 15. *Elsholtzia ciliata* (Thunb.) Hyland.

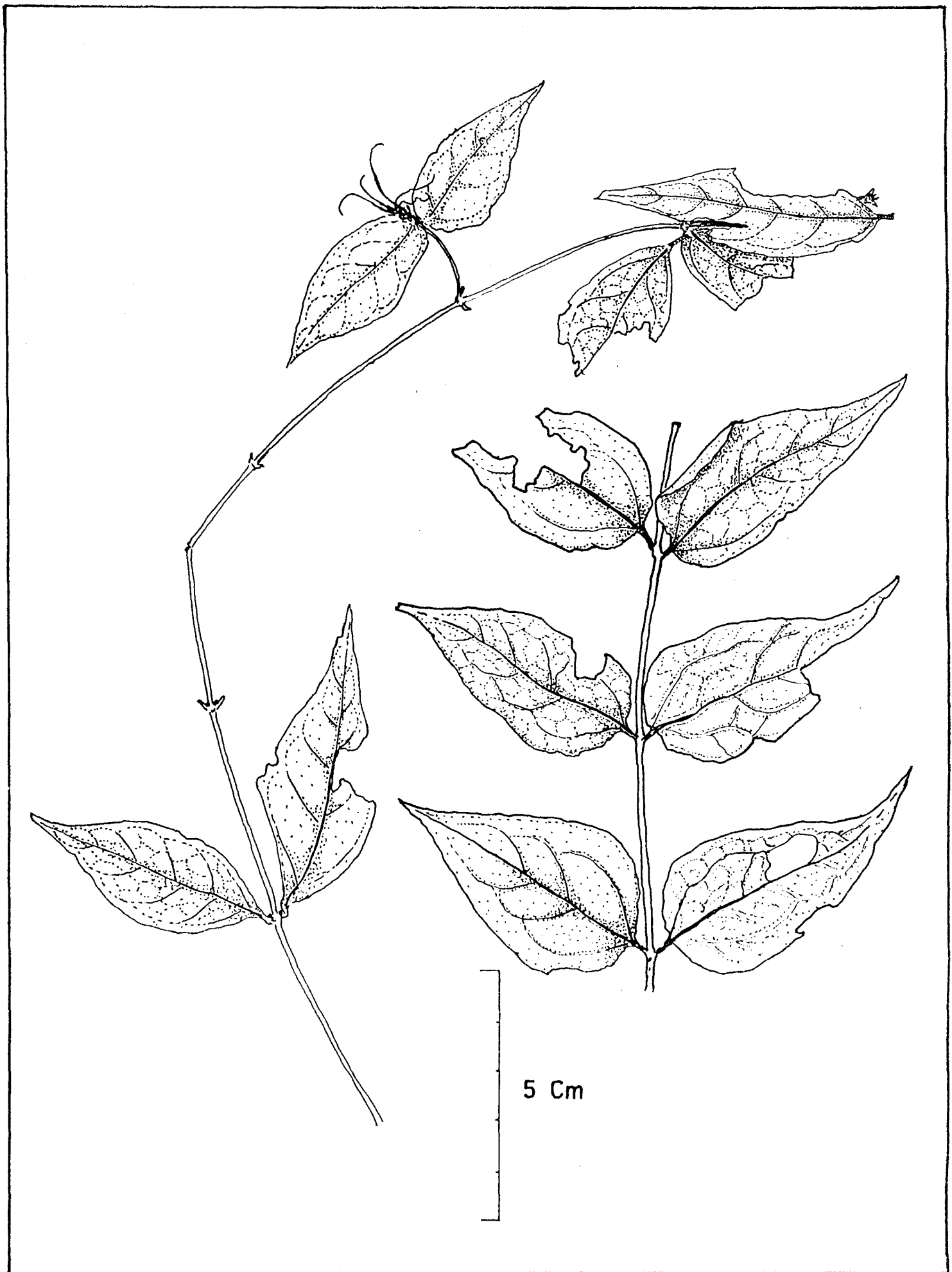


Fig. 16 *Jusminum nervosum* Lour.

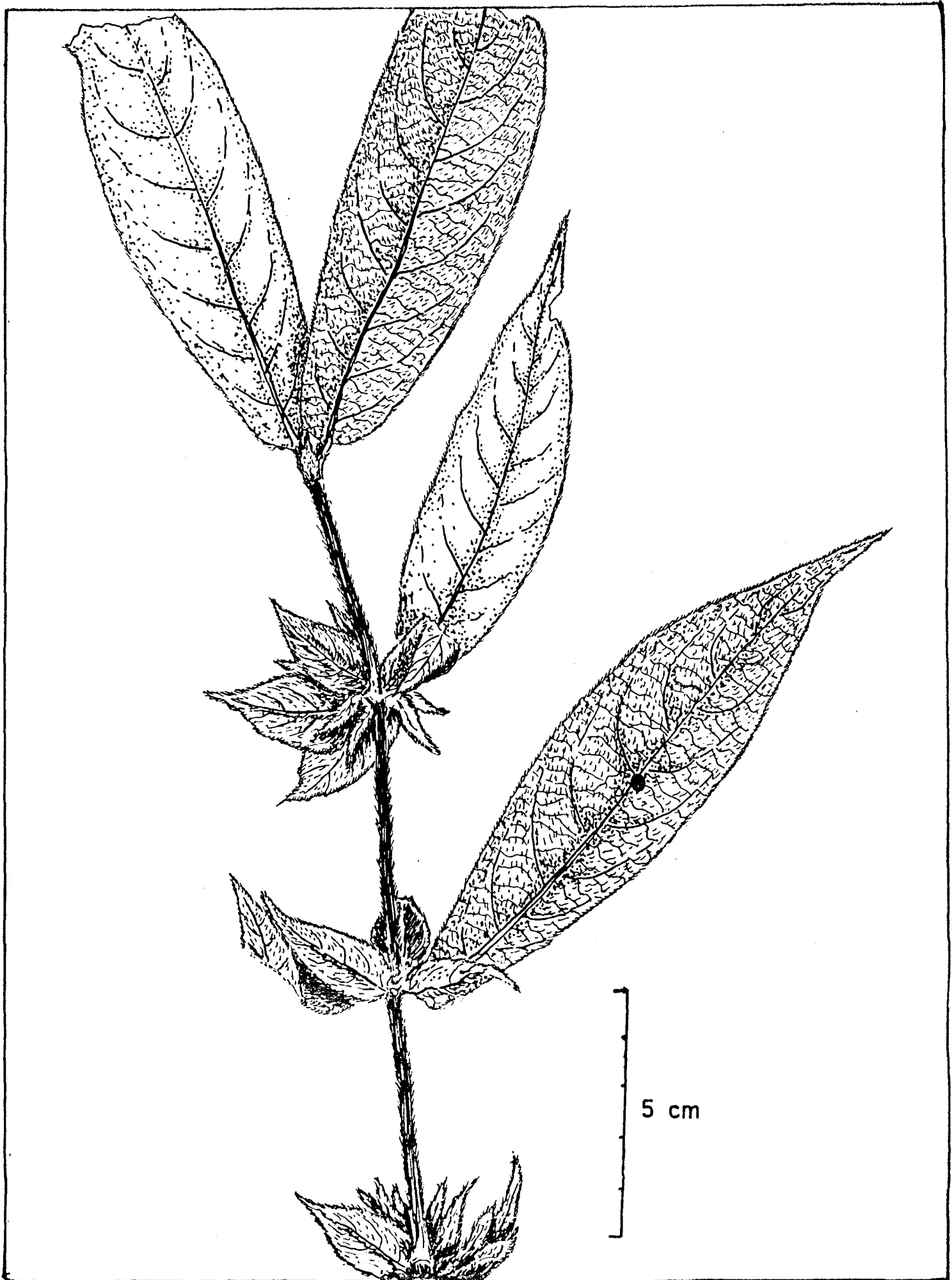


Fig. 17. *Lasianthus hirsutus* (Roxb.) Merr.

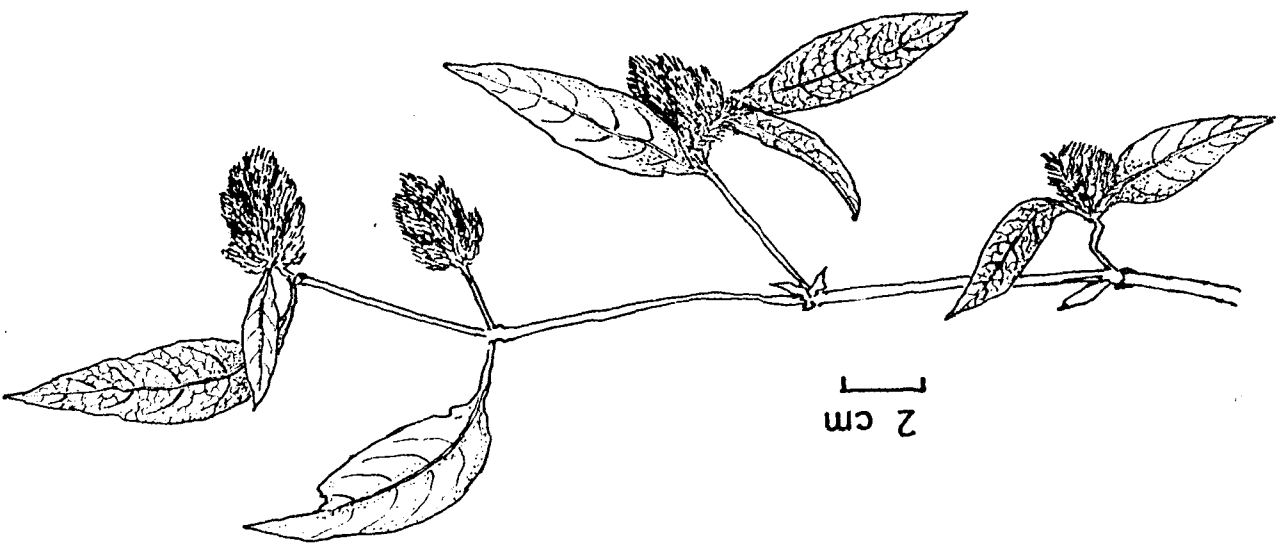


Fig. 19. *Lepidagathis rigida* Dalz.

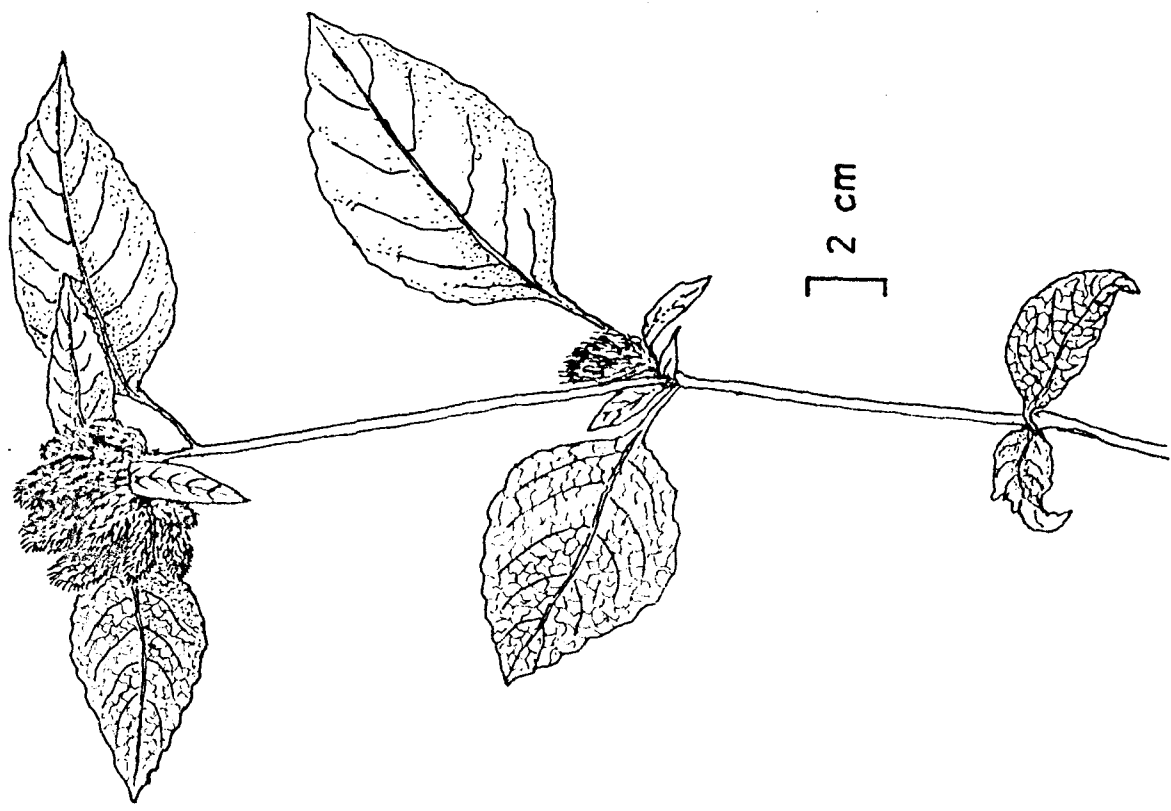


Fig. 18. *Lepidagathis incurva* F.Ham. ex D.Don.

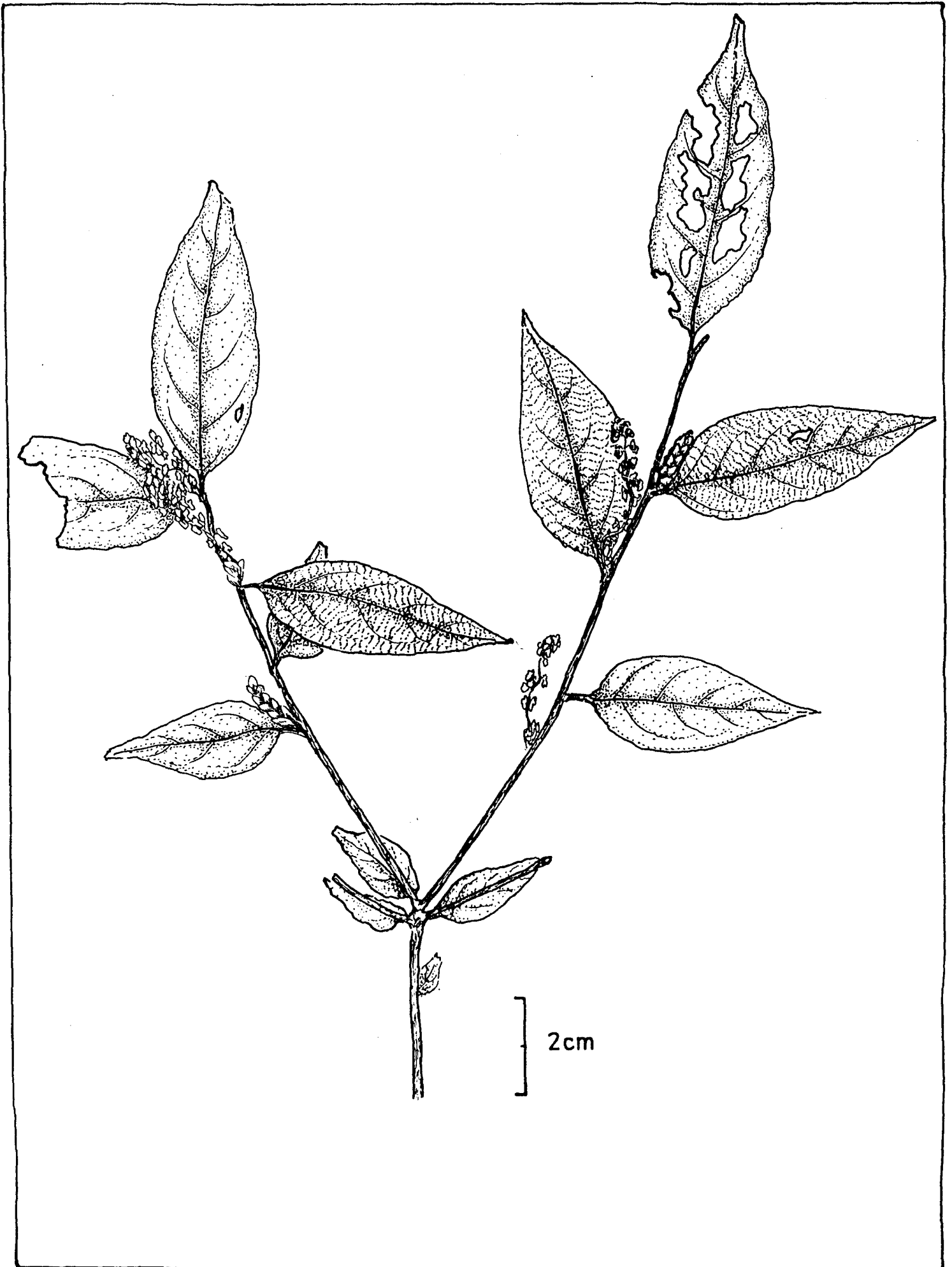


Fig. 20. *Lepionurus sylvestris* Bl.

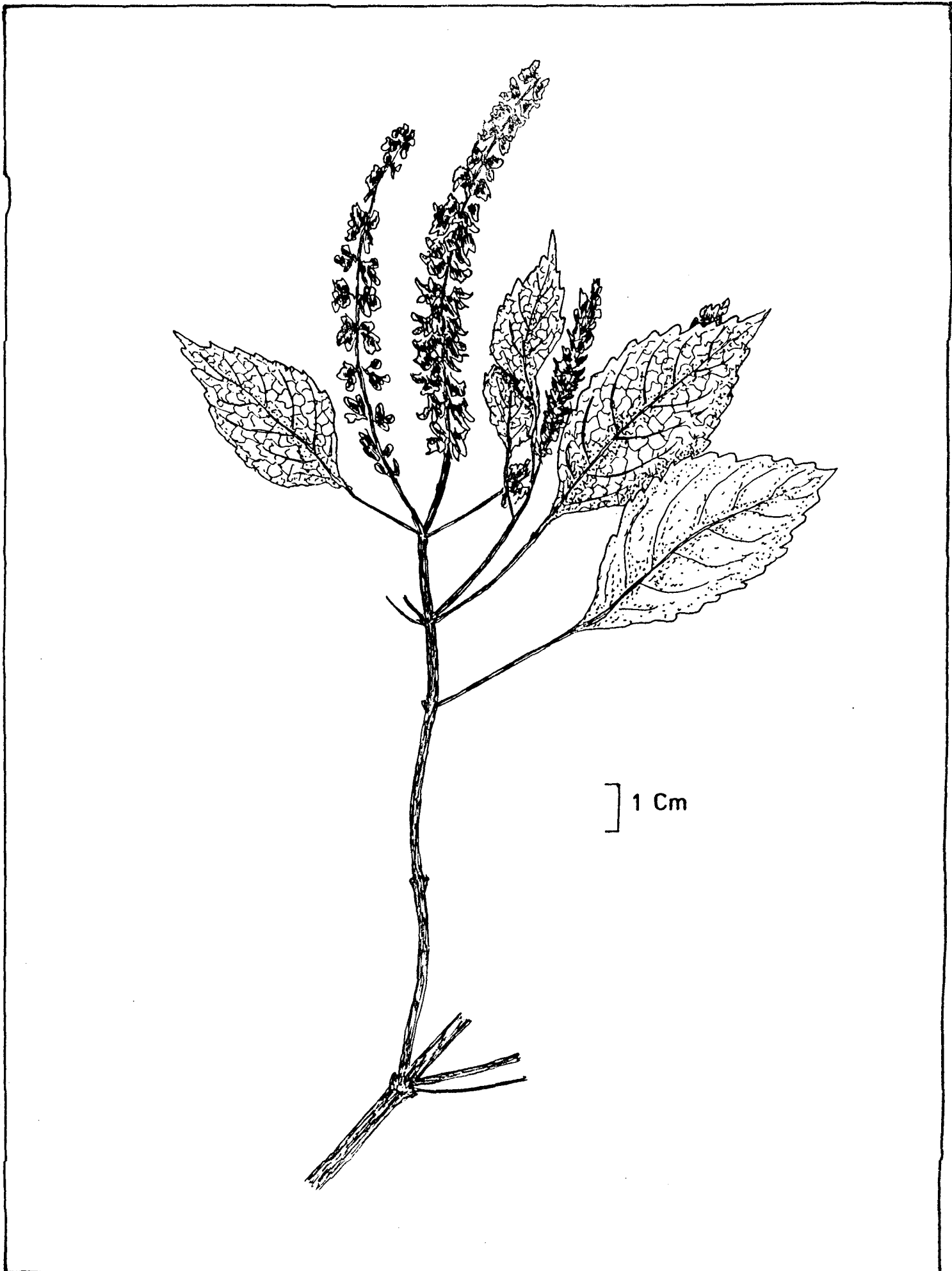
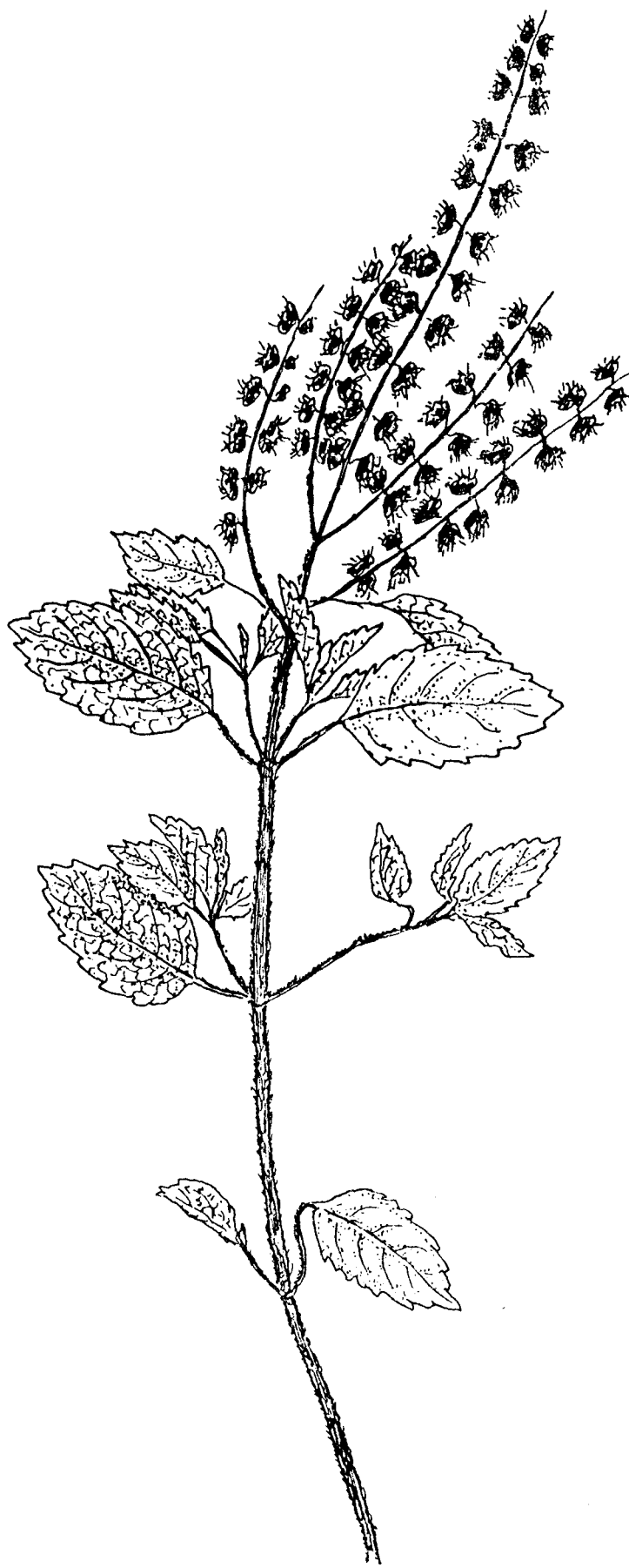


Fig. 21. *Ocimum gratissimum* L.



] 1 Cm

Fig. 22. *Ocimum tenuiflorum* L.

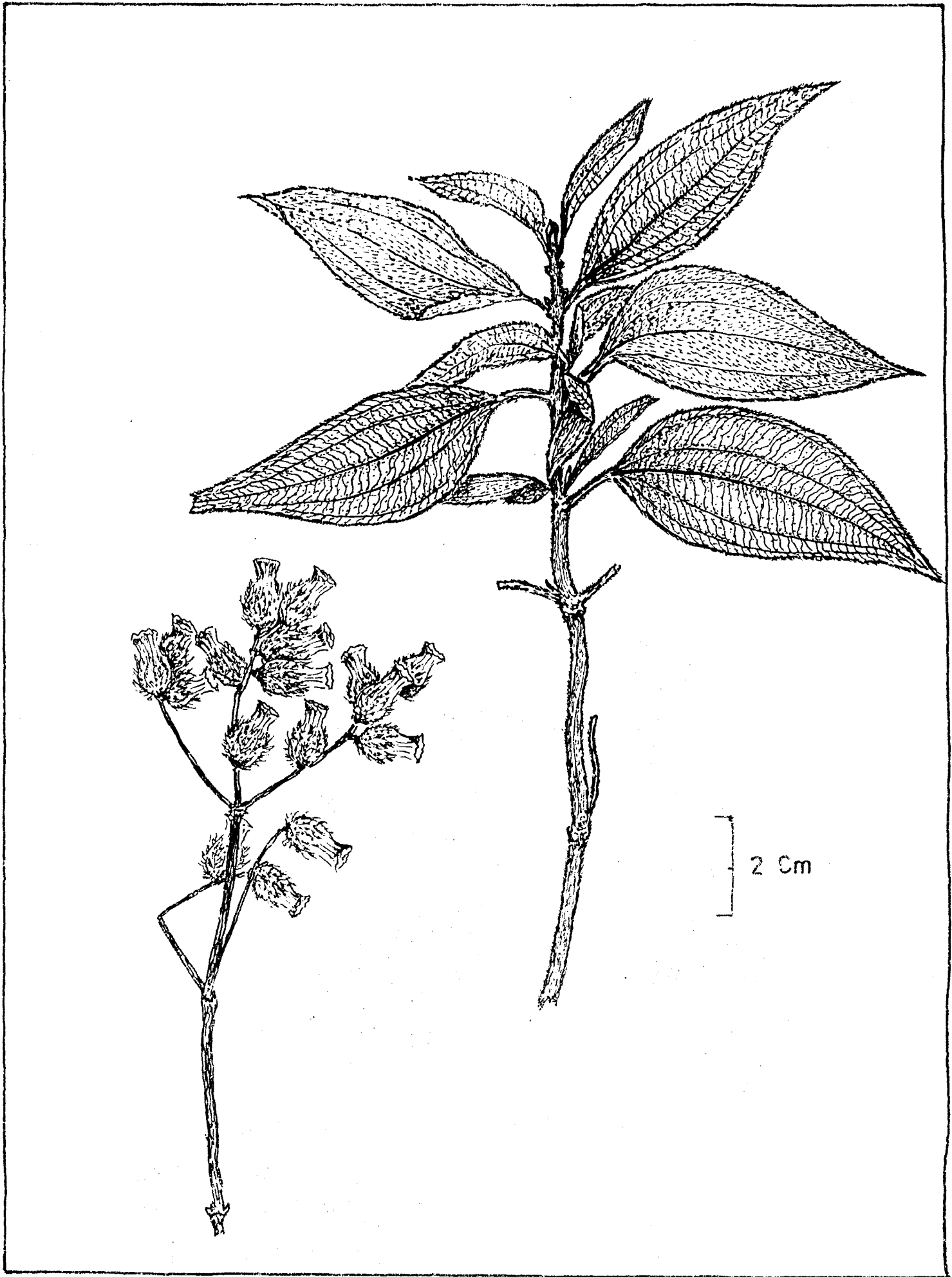


Fig. 23. *Osbeckia rostrata* D. Don.

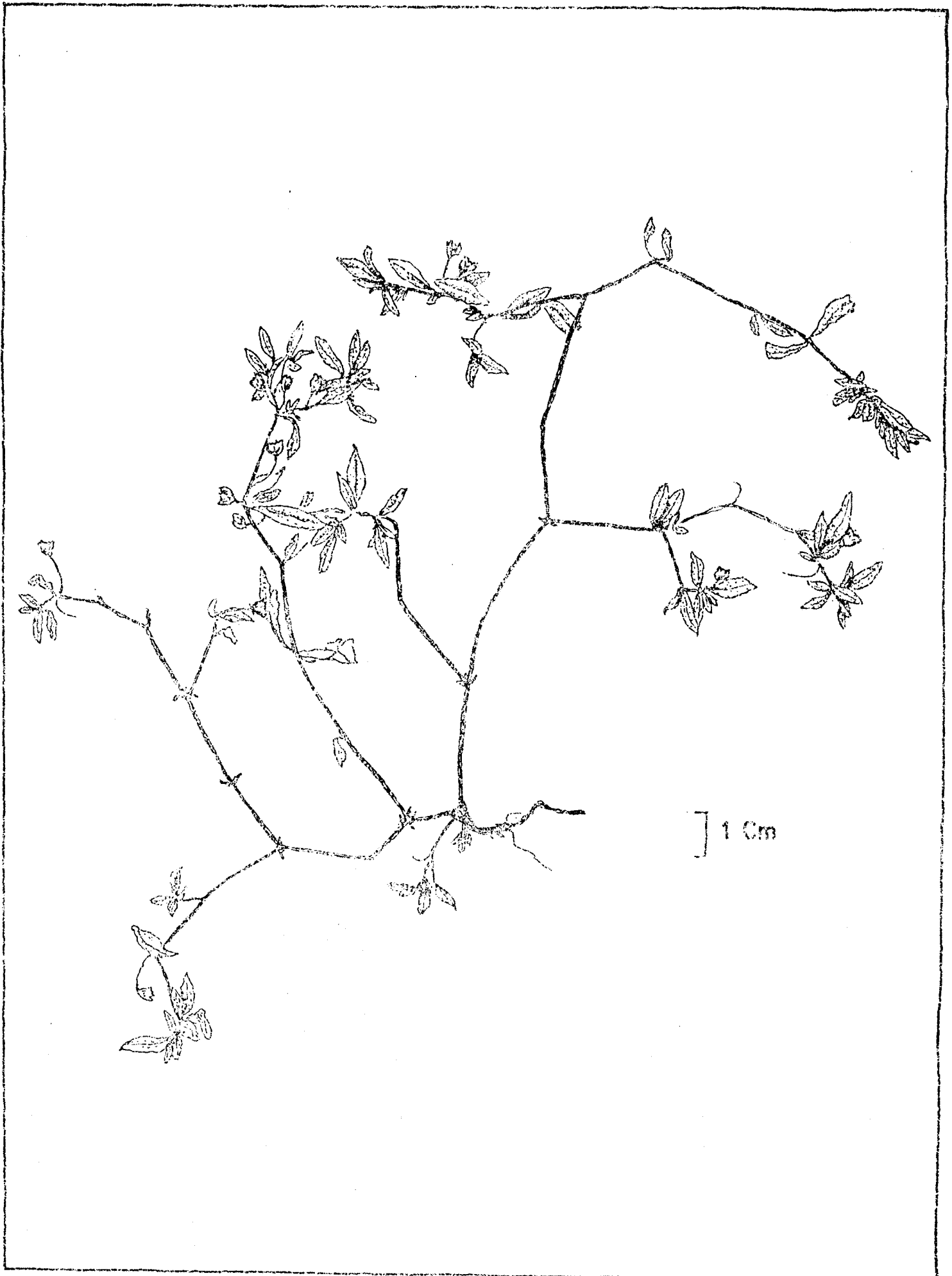


Fig. 24. *Polygonum plebium* R.Br.

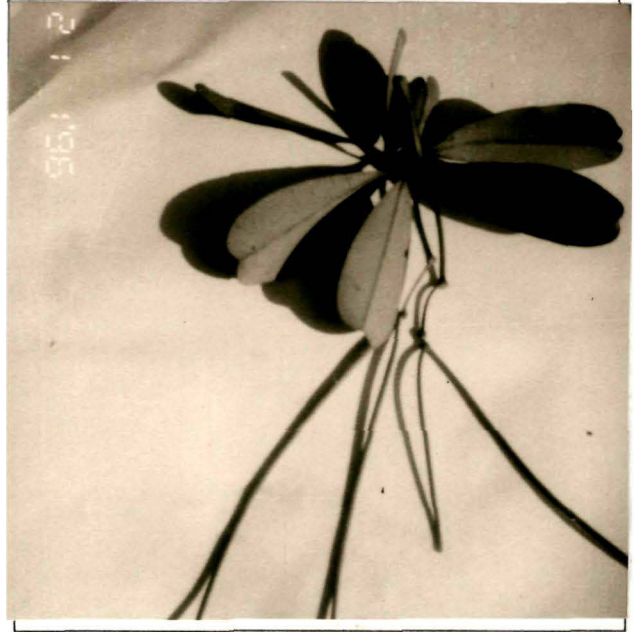


21. *Albizia chinensis* (Osb.) Merr.

11

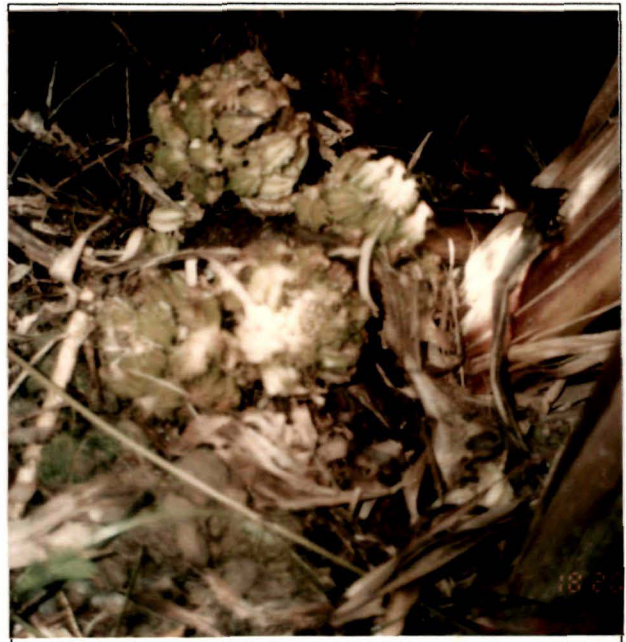


22. *Allophyllus cobbe* (L.) Raeusch.



23. *Alstonia scholaris* (L.) R. Br.

12



24. *Amomum dealbatum* Roxb.



25. *Angiopteris evecta* (Forst.) Hoffm.

13



26. *Aporosa octandra* (Buch.-Ham. ex
D. Don) Vick.



27. *Artemisia indica* Willd.

14



28. *Averrhoa carambola* L.



29. *Blumea lanceolaria* (Roxb.) Druce.

15



30. *Bridelia monoica* (Lour.) Merr.



31. *Callicarpa arborea* Roxb.

16



32. *Calotropis gigantea* (L.) R. Br. ex Ait.



33. *Cascabela thevetia* (L.) Lipp.

17

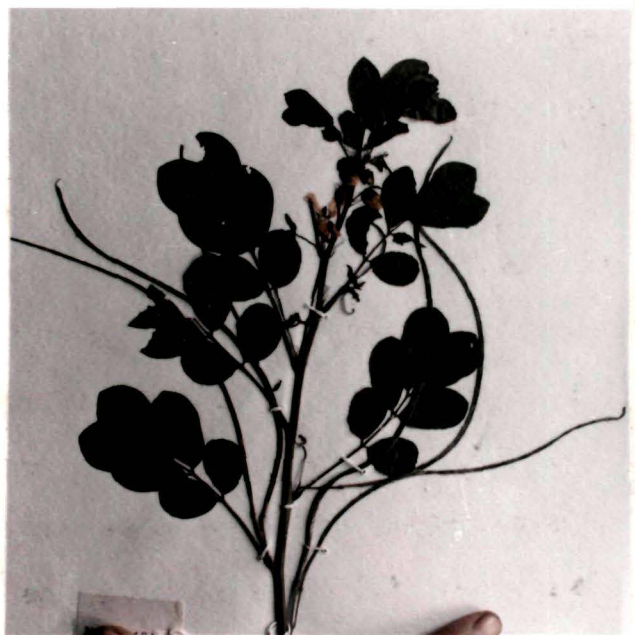


34. *Cassia alata* L.



35. *Cassia floribunda* Cav.

18

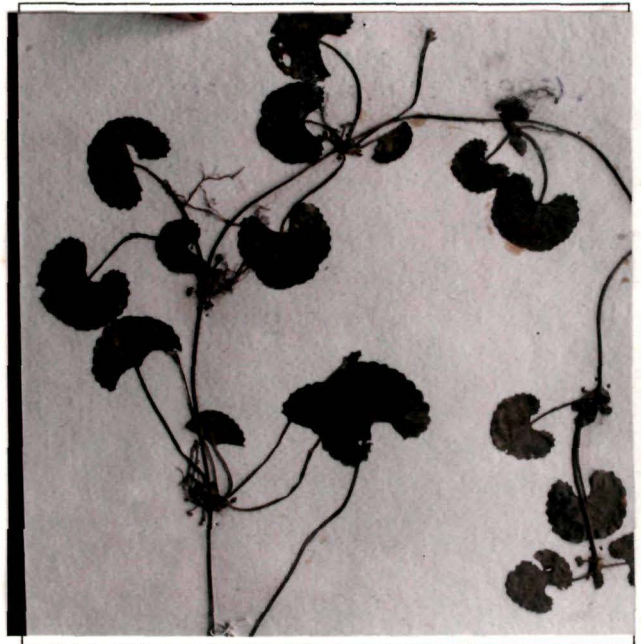


36. *Cassia tora* L.

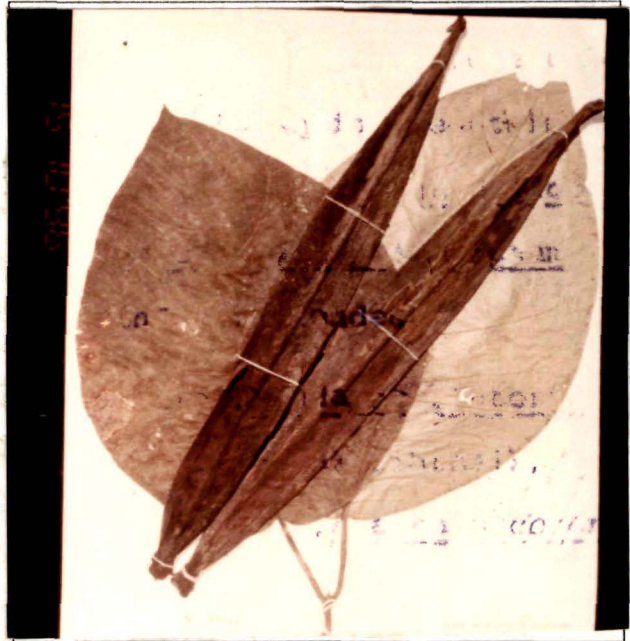


37. *Catharanthus roseus* (L.) G. Don.

19



38. *Centella asiatica* (L.) Urb.



39. *Chonemorpha fragrans* (Moon.) Als.

20



40. *Cinnamomum tamala* (Buch.-Ham.)
Nees & Eberm. (Roots & Leaves).



41. *Clerodendrum colebrookianum* Walp.

21



42. *Clerodendrum wallichii* Merr.



43. *Costus speciosus* (Koenig) Sm.

22



44. *Costus speciosus* var. *argyrophyllus* Wall.



45. *Curcumorpha longiflora* (Wall.)
Rao & Verma.

23



46. *Cyathula prostrata* (L.) Blume.



24

47. *Dalbergia pinnata* var. *acaciaefolia* (Dalz.)
Thoth. (vegetative)



48. *Dendrobium ariaeflorum* Griff.

25

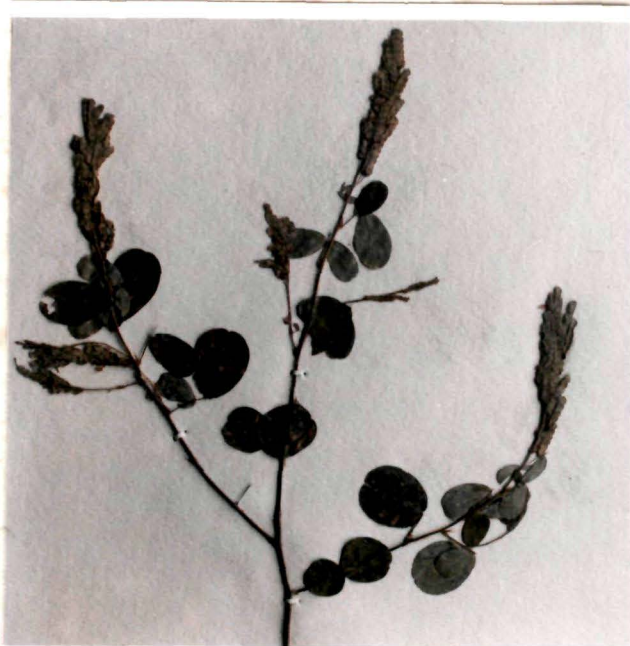


49. *Dendrobium denundans* D. Don.

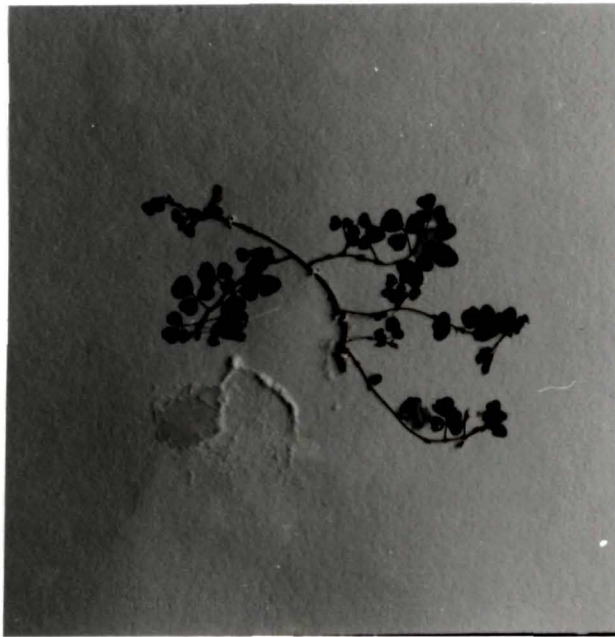


50. *Dendrocnide sinuata* (Bl.) Chew.

26



51. *Desmodium gyroides* DC.



52. *Desmodium triflorum* DC.

27



53. *Desmodium triquetrum* DC.



54. *Desmos longiflorus* (Roxb.) Staff.

28



55. *Diplazium maximum* (D. Don.) C. Chatt.



56. *Dracaena spicata* Thunb.

29



57. *Embelia subcoriacea* (Cl.) Mez. (Vegetative)



58. *Erythrina stricta* Roxb.

30



59. *Ficus semicordata* var. *conglomerata*
(Roxb.) Kurz.



60. *Garcinia cowa* Roxb. ex DC.

31



61. *Garcinia coronaria* Ham.



62. *Gelsemium elegans* Benth. (roots)

32



63. *Gmelina arborea* Roxb.



64. *Hedychium villosum* Wall. (rhizome)

33



65. *Hedyotes scandena* Roxb.



66. *Hodgsonia macrocarpa* (Bl.) Cogn. A Pang
boy of Vathuampui carries the plant. 34



67. *Inula cappa* (D. Don.) DC.



68. *Ixora nigricans* R. Br.

35



69. *Laggera pterodonta* Benth.



70. *Lantana camera* var. *aculeata* (L.) Mold. 36

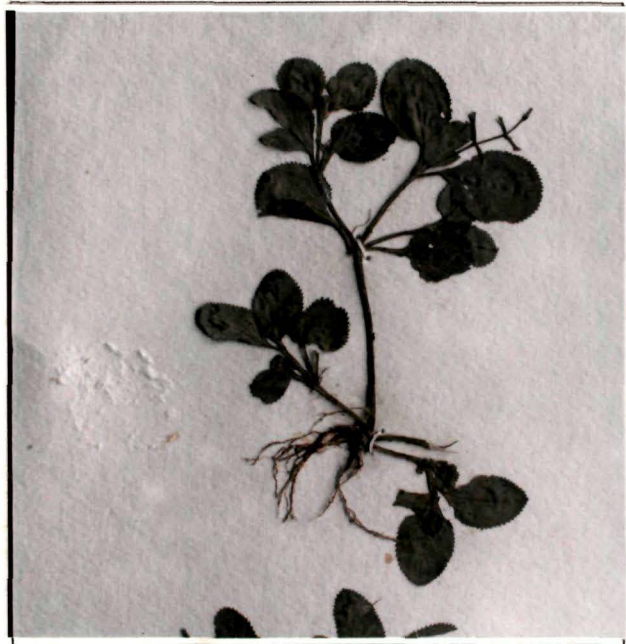


71. *Lasia spinosa* (L.) Thw. Mr. Sanbura of Khawmawi is standing behind the plant.

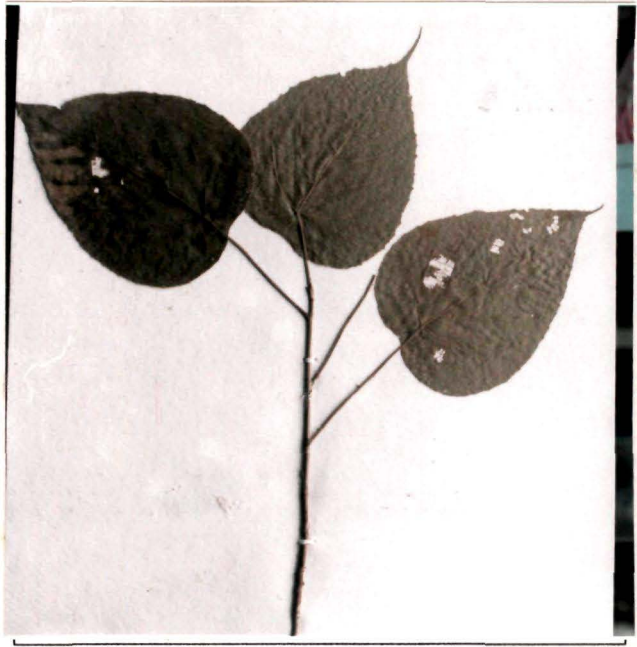


72. *Lasianthus wallichii* Wt.

37



73. *Lindernia ruelloides* (Colsm.) Penn.



74. *Mallotus roxburghianus* Muell.-Arg.

38



75. *Mesua farrae* L.



76. *Millettia pachycarpa* Benth.

39



77. *Morinda angustifolia* Roxb.



78. *Murraya koenigii* (L.) Spreng.

40



79. *Musa glauca* Roxb.



80. *Oroxylum indicum* (L.) Vent.

41

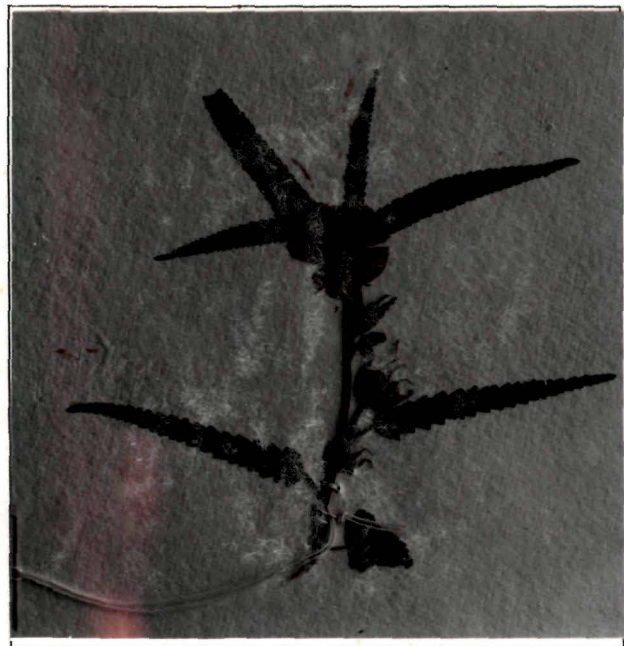


81. *Pajannelia longifolia* (Willd.) K. Schum.
(vegetative)



82. *Parkia timorensis* (A. DC.) Merr.

42



83. *Pentapetes phoenicea* L.



84. *Phyllanthus debelis* Willd.

43



85. *Phyllanthus fraternus* Webs.



86. *Plantago erosa* Wall.

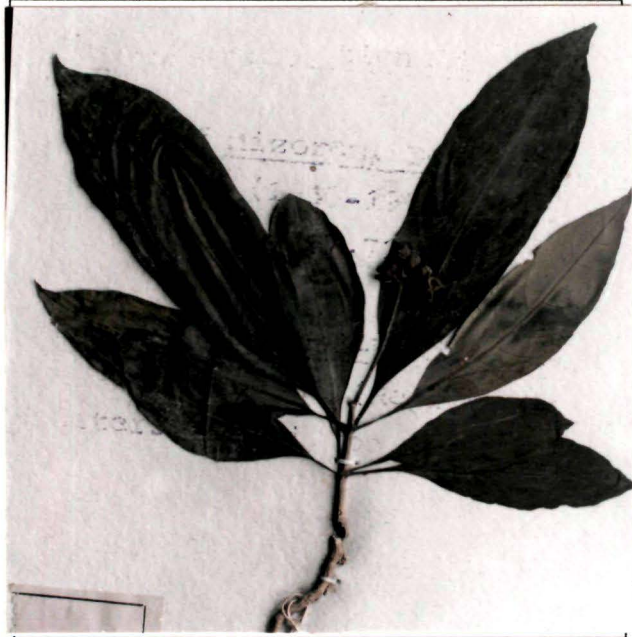
44



87. *Podocarpus neriifolius* D. Don. (vegetative)



88. *Pseudodrynaria coronans* (Wall. ex Mett.)
Ching. 45



89. *Rauwolfia serpentina* Benth.



90. *Rhaphidophora hookerii* Schott. (vegetative)
46



91. *Rhus semialata* Murr.



92. *Ruellia suffruticosa* Roxb.

47



93. *Saraca asoca* (Roxb.) de Wilde.



94. *Schima wallichii* (DC.) Korth.

48



95. *Scoparia dulcis* L.



96. *Senecio scandens* Buch.-Ham. ex D. Don.

49



97. *Solanum khasianum* var. *chatterjeeanum*
Sen Gupta.



98. *Stemona tuberosa* Lour. (roots) Mr. Buanga of Mampui is uprooting the plant. 50



99. *Stemona* var. *minor* King.



100. *Stereopermum colais* (Buch.-Ham. ex Dillo.) Mast. 51



101. *Syzygium cumini* (L.) Skeels.

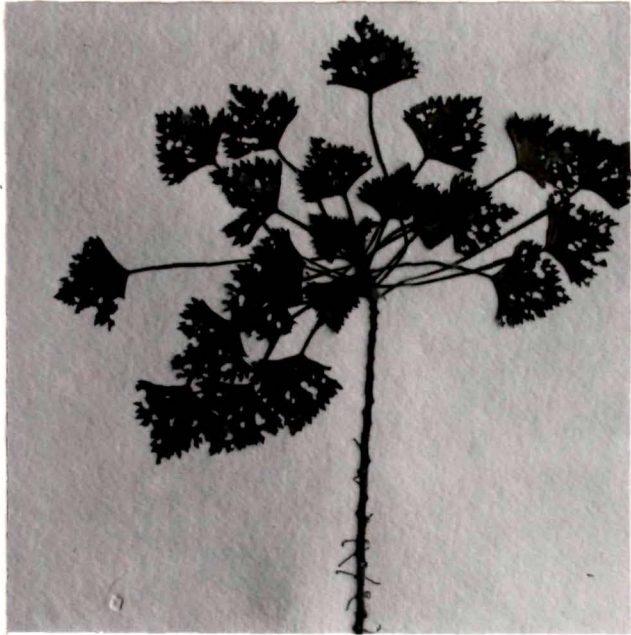


102. *Tabernaemontana divericata* (L.) R. Br.

52



103. *Tarenna odorata* (Roxb.) Robins.



104. *Trapa natans* var. *bispinosa* Roxb.

53

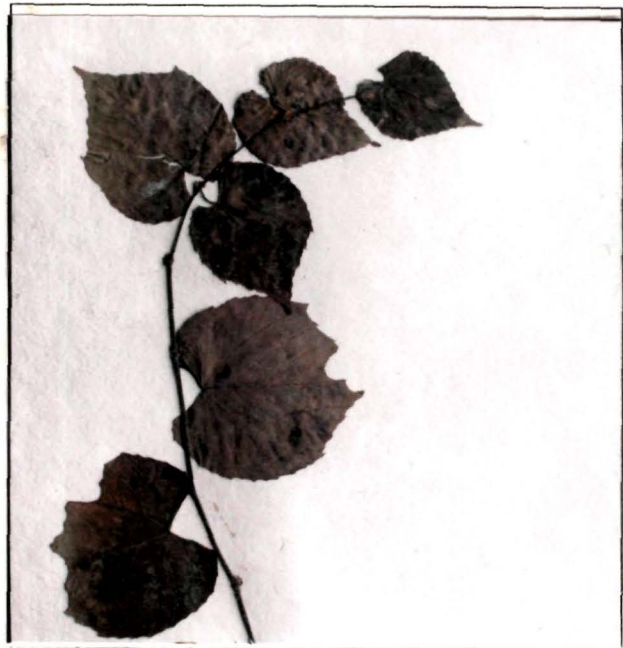


105. *Trevesia palmata* Vis.

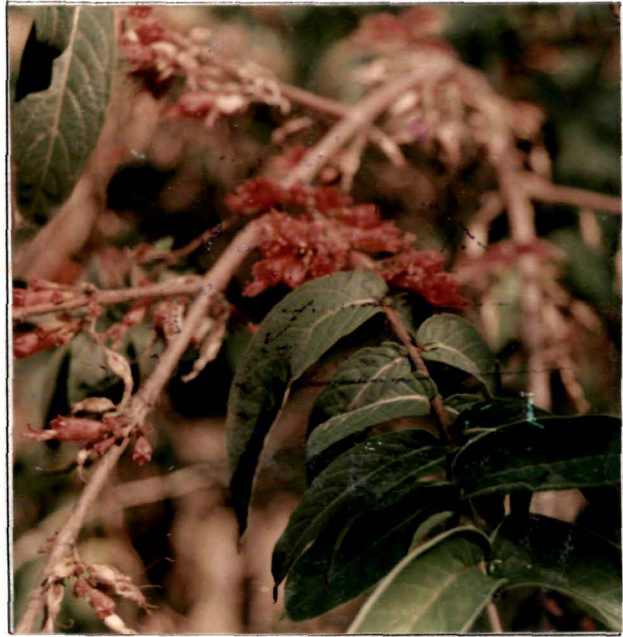


106. *Uncaria sessilifractus* Roxb. (vegetative)

54



107. *Vitis bifurcata* Wall. (vegetative)



108. *Woodfordia fruticosa* Kurz.

55



109. *Zanonía indica* L.

RESULTS, DISCUSSION AND CONCLUSION

CHAPTER 6

RESULTS, DISCUSSION AND CONCLUSION

6.1. Results and Discussion

World-wide interest in the study of ethnobotany today may be asserted to (i) the discovery of new drugs and foods from plants (Boom, 1990); (ii) increased trade demand for crude plant materials in drug industry (Maheshwari, 1987; Holly and Williams, 1996); (iii) sustainable resources management (Arora, 1995) and (iv) biodiversity conservation (Damania, 1996; Balick, 1996) for the growing interest in natural remedies. According to Cox (1994), at least 50 pharmaceutical drugs have been discovered from ethnobotanical leads.

Bodekar (1994) has highlighted the Asian traditional systems of health care. China had integrated traditional medicine to modern national health care-system. Thailand promotes the uses of sixty six traditional medicinal plants in primary health care. Republic of Korea has held 15-20 % of national health budget to traditional medical service. Several countries in Latin America have departments/divisions of traditional medicine within Health Ministry and selected about 1000 medicinal plants.

Japan 'Kampo' medicine has increased fifteen times while western medicine increases up to two and a half times. Republic of Vietnam has selected 1869 herbal plants for dependency of one third population and asserted the importance of traditional medicine in primary health care. Chaudhury (1990) further elaborated how herbal medicines have gained importance and uses as medicine in advanced countries like U.K., Canada, U.S.A, Australia and China. India has contributed about three-fourths of worldwide plant-based drugs in the natural state (Holley & Williams, 1996).

In the present study, special attention is given to the screening of economically viable species, rare species and endangered species of ethnomedicinal values. *In-situ* and *ex-situ* conservation of such species (priority group) are expected to safeguard the natural resources, promote the eco-cultural heritage of the local people and its incorporation in hill-farming system will strengthen the subsistence agriculture. Adoption of conservation strategies will provide replenishment of medicinal plants stock as well as its availability for door-step remedies.

It is apparent that forests are fast depleting everywhere, and invaluable genetic resources are rapidly being lost. Mizoram is no exception. The most serious threat to this effect is *slash-and-burn* method of agriculture. Jha (1997 a & b) also reported the same reasons for

depletion of forests. Other threats to the habitat destruction are extraction of timber, fuel wood, construction materials, plantations and even landslides.

Proper management of genetic resources and careful adoption of conservation strategies can only pave the way to economic sustainability of local communities. Infrequent harvest of small amounts of biomass does not affect much on the individuals or populations, but bulk removal of biomass from the wild is disastrous; even if the amount is small, frequent removal of biomass results into local extinctions (Bennett, 1992). For example, bulk collection of an orchid, *Dendrobium denundans* D. Don from the forest causes loss of host tree species as well as loss of genetic resource of a valuable orchid. Small herbs, such as *Scoparia dulcis* L. and *Solanum nigrum* L. are neither cultivated nor protected due to frequent availability around human habitats.

An attempt has been made to delineate the important medicinal plants located in each district of Mizoram (Fig. 25 & 26). Lungkulh virgin forest located in Aizawl district, Tlabung forest in Lunglei district and Ngengpui wildlife sanctuary in Chhimtuipui district, are among the few important 'hot-spots' of medicinal plants in Mizoram. Though there are other 'hot-spots', the objective here is not to give a detailed treatment to all the 'hot-spots', rather to restrict our study to a few localities which serve reference sites and depict the location and distribution of important medicinal plants.

Esteemed medicinal plants like *Blumea lanceolaria* (Roxb.) Druce and *Costus speciosus* (Koenig) Sm. are rarely cultivated in the backyard or kitchen gardens, whereas *Rauvolfia serpentina* Benth.ex Kurz, *Ocimum tenuiflorum* L., *O.gratissimum* L., *Curcuma amada* Roxb. *Zingiber purpureum* Rosc. etc. survive only in cultivation, while *Anacolsa crassipes* Kurz and *Jusminum nervosum* Lour. etc. remain in the forest in the wild.

Conservation is the key word to the researchers for development of local environment, whereas farmers give importance only to the cultivation due to lack of awareness, although their lives revolve in and around the forests. Forest is an integral part of their lives and provides their livelihood and habitat. Thus, conservation of biodiversity alongwith the ethnobioculture of indigenous people is imperative.

The conservation measures practised in rural areas are all the same throughout Mizoram but differs only in the choice of species cultivated. Consciously or unconsciously, genetic resources are conserved *in-situ* or *ex-situ* by forest dwellers. *In-situ* conservation involves protection of habitats of species which are seen in nature reserves - in parks and sanctuaries,

verine reserves, village supply and safety reserves and other unclassified reserves. There is no such natural reserves as *sacred grooves* or *taboos* in Mizoram. The *ex-situ* conservation is centred mainly in private gardens, homestead gardens and semi-permanent gardens. There is

no such *ex-situ* conservations through botanic gardens or arborata, and the conservation through seed-banks and gene-banks are not known in the state.

As far as the indigenous systems of medicine is concerned, it has been observed that a type of cancer and a cattle disease have correlations (not by pathogenic proof) based on indigenous classification of diseases and the phytomedicines used. The Mizos consider *Blumea lanceolaria* (Roxb.) Druce and *Dillenia pentagyna* Roxb. as cancer medicines since a very long time and they are still used to kill animals' sore-worms and cure for pig's mange.

Likewise, *Gelsemium elegans* Benth. is used for pig's sicknesses by oral administration, while it is deadly poisonous to the human beings. Such incidences of death were reported by the villagers during the course of field work. It can be assumed that dilute solution in parts per million may lead to the discovery of a new drug. *Cascabela thevetia* (L.) Lipp. a yellow oleander or Lucky Nut Tree is also highly poisonous (Watt, 1892; Dev & Wasir, 1985) but seed extract is useful in haemorrhoids and insedicial (Sinha, 1996). *Mallotus roxburghianus* Muell.-Arg. is effectively used for liver complaints and *Dalbergia pinnata* var. *acaciaefolia* (Dalz.) Thoth. for hepatitis and stomatitis. These are new records in Indian medicinal plants literature.

The roots and leaves of *Cassia hirsuta* L. and *Pottisia laxiflora* (Bl.) O.Ktze. constitutes snake-bite remedies, and the roots of *Tarenna odorata* (Roxb.) Robins are also used for the same purpose. Sinha (1996) reported the use of leaves of *Cassia hirsuta* L. for ring-worms and pustules. The fruits of *Schima wallichii* Korth. are used for snake-bites and insect-bites. The bark of *Albizia procera* (Roxb.) Benth. and the roots of *Millettia pachycarpa* Benth. are used as fish poison. The same use has also been reported by Chopra, *et al.* (1956). The fruits of *Trichosanthes tricuspidata* Lour. and *Ruellia suffruticosa* Roxb. are used as baits for bird's trap.

The barks of *Picrasma javanica* Bl. and *Vitex peduncularis* Wall. var. *roxburghiana* Cl. are peeled off and used for treatment of malarial fever. The use of the bark and leaves of *Vitex peduncularis* Wall. ex Schauer for treatment of fever and black water fever has been reported by Chopra, *et al.* (1956), Saklani & Jain (1994) and Sinha (1996) but, the usefulness in malarial fever is, however, disputed (Anonymous, 1976). The use of bark of *Vitex peduncularis* var. *roxburghiana* Cl. for malarial treatment is a new record for India. The bark of *Dillenia pentagyna* Roxb. has been prescribed for cancer, while the barks of *Aporosa octandra* (Buch.-Ham. ex D. Don) Vick. and *Helicia exelsa* (Roxb.) Bl. has been used to cure stomachache and as stomachic. The bark of *Callicarpa arborea* Roxb. used to cure stomachache has also been reported by Rao and Jamir (1982). The fruits of *Dillenia indica* L., *Terminalia chebula* Retz., *T. bellerica* (Gaertn.) Roxb. and *Phyllanthus emblica* L. which are used to cure cough are usually collected from the forest floor as well as by cutting the branches.

There is a need to protect them from being overexploited. These medicinal trees can best be conserved in their natural habitats.

Lasianthus wallichii Wt. possess hallucinogenic effect in field condition. If crushed leaves is smelled it brings about hizziness and headache. Orchid species like *Dendrobium ariaefflorum* Griff. and *D.demandans* D.Don are strongly narcotic when the water extract of the plant is consumed.

Indigenously, *Saraca asoca* (Roxb.) de Wilde, *Elaeagnus caudata* Sch.ex Mom. and *Chonemorpha fragrans* (Moon.) Als. are effectively used against gynaecological disorders. Chopra, *et al.* (1956) and Ambasta (1986) also reported its use as uteritis. *Hedyotes scandens* D.Don, *Lobelia angulata* Forst. and *Osbeckia rostrata* D.Don are employed for dissolving kidney-stones and other kidney troubles. Bennet (1985) reported the use of roots of *Hedyotes scandens* D.Don for jaundice. *Phyllanthus fraternus* Webs. has been employed for diabetes and jaundice in the form of infusion, whereas Watt (1892), Dastur (1962) and Dixit and Achar (1983) reported the use of *Phyllanthus fraternus* Webs. to cure jaundice only. *Clerodendrum colebrookianum* Walp. has been used for hypertension, and the same use has also been reported by Nath and Bordoloi (1991). The roots of *Stemona tuberosa* Lour. is used to cure tuberculosis, whereas other workers reported its use for phthisis and cough (Anonymous, 1976; Ambasta, 1986, etc.). Infusion of leaves of *Senecio scandens* Buch.-Ham.ex D.Don has been used effectively against ulcerated cancer and other forms of ulcers by oral administration. Mention may be made that *Sapindus mukorossi* Gaertn. (*Hlingsi* in Mizo), the fruit extract of which is used as bio-insecticide by some Mizo farmers, is being investigated for cream contraceptive by Central Drug Research Institute (CDRI) Lucknow (Anonymous, 1996).

Flemingia macrophylla (Willd.) Prain, *Desmodium triquetrum* (L.) DC. and *D.gangeticum* DC. can be used as botanical barrier in agro-farming system to conserve soil moisture and nutrients and as green manure to enrich soil fertility. The use of the above species as greenhedge in the Philippines has been reported by Partap and Watson (1994). *Mimosa invisa* Mart. and *Hydrocotyle javanica* Thunb. can be used in agroforestry system as soil binder and moisture retainer. The use of *Hydrocotyle javanica* Thunb. in rubber and coffee plantations has also been reported (Anonymous, 1959). Farmers reported that *Clerodendrum colebrookianum* Walp. and *Mimosa invisa* Mart. can suppress the growth of weed population.

The material use of timber trees like *Gmelina arborea* Roxb., *Langerstroemia speciosa* (L.) Pers., *Mesua ferrae* L., *Michelia champaca* L., *Toona ciliata* Roem., *Artocarpus chama* Buch.-Ham. is common. The leaves of *Borassus flabillifer* L., *Imperata cylindrica* (L.) P.Beauv. and *Melocanna baccifera* (Roxb.) Kurz. are widely used as thatch-roofs in rural areas among the *Pangs*, the *Bawms*, the *Brus* and the *Chakmas*. The same uses of *Borassus flabellifer* L. and *Imperata cylindrica* (L.) P. Beauv. has been reported by Saklani and Jain (1994).

Dysoxylum gobara (Buch.-Ham.) Merr., *Parkia timoriana* (DC.) Merr., *Clerodendrum colebrookianum* Walp., *Zanthoxylum rhetsa* (Roxb.) DC., *Amomum dealbatum* Roxb., *Zingiber officinale* Rosc. etc. are commonly cultivated for food resources. Saklani and Jain (1994) also reported the above food plants consumed by tribals in northeast India.

The leaves of *Bombax ceiba* L., *Artocarpus chama* Buch.-Ham. and *Ficus* spp. constitute fodder plants. Singh (1982) has also included the above plants in his book entitled, "Fodder trees of India". *Abelmoschus moschatus* Medic., *Amomum dealbatum* Roxb. and *Stephania japonica* var. *discolor* (Mig.) Forman are used as fibres or tying purposes.

Trees having medicinal values are generally not cultivated unless they bear edible fruits. The common medico-edible fruits include: *Artocarpus chama* Buch.-Ham., *Embelia subcoriacea* (Cl.) Mez., *Garcinia cowa* Roxb.ex DC., *Elaeagnus caudata* Sch.ex.Mom., *Phyllanthus emblica* L., *Spondias pinnata* (L.f.) Kurz, *Ficus semicordata* var. *conglomerata* (Roxb.) Kurz, etc. The wild edible fruits are also recorded in Nagaland by Jamir (1995), and a detailed account of the uses and conservation aspects has been given by Arora and Pandey (1996).

Different uses of plants discussed so far have been obtained through field observation. Phytochemical analysis of plants or pathogenic proof of diseases have not been procured; diseases are diagnosed from the symptoms only and present findings are based on the experiences of local herbal specialists of the study area. However, in many cases, local preparations are therapeutically effective even though the active principles are not known by the users as well as the practitioners. It has been observed that plants are often used in combinations. Some plants may be potentiating the effect of the other or may prevent toxicity of another (Chaudhury, 1990). For instance, the twigs of *Mallotus roxburghianus* Muell.-Arg. are cooked with chicken (preferably black chicken) and the soup is taken for liver ailment. As per the herbal doctor, chicken reduces toxicity of plant substance and activates the bio-active ingredient(s).

In the present study, attention is being focussed on rare species, endangered species or threatened species and new species. Jain and Rao (1983) documented an assessment of threatened plants of India. The rarity of plant is determined by field observation (observed in the year 1990-91 and in the present study) and visual decline of species in respect of their ecological or geographical distribution, frequency of individuals or populations and restricted habitats. The factors affecting rarity are : (i) deterministic events (e.g., deforestation, etc.) (ii) stochastic or chance events (e.g., landslides, fires, etc.) (Given, 1996; Rao, 1997).

Out of 230 species documented, 61 species are placed under 'rare', 'threatened' and 'endangered' category, of which 12 species are extinct in the wild (EW), 15 critically endangered (CR), 6 endangered (EN), 11 vulnerable (VU) and 18 low risk (LR). (Box 1). Plants which are recorded for the first time as medicinal plants are presented in Box 2.

Among the north-east endemics, *Aquilaria malaccensis* Lamk, is categorised as critically endangered (CR), *Hydnocarpus kurzii* (King) Warb. as endangered (EN) and *Clerodendrum colebrookianum* Walp and *Rhus semialata* Murr. as vulnerable (VU) (Anonymous, 1997). Plants like *Eleoagnus candata* Sch.ex Mom., *Saraca asoca* (Roxb.) de Wilde and *Woodfordia fruticosa* (L.) Kurz are also enlisted in "A First Red Data List of India Medicinal Plants" (Anonymous, 1995).

Thus, to conserve the traditional principles and techniques and to improve the economic status of land races on a sustainable basis, quick identification of 'hotspots' or centres of species diversity, screening of important medicinal plants for phytochemical analysis, development of appropriate field level technologies suitable to the local environments and provision of financial incentives to the reliable herbal practitioners and growers are imperative.

6.2. CONCLUSION

It is reiterated that ethnobotanical studies has tapped worldwide interest in recent years mainly due to the discovery of new drugs and conservation and utilization of plant resources for the socio-development of tribal communities.

The Southwest of United States is the best studied area in the world for ethnobotany (Ford, 1985) and the Indian sub-continent represents one of the greatest emporia of ethnobotanical wealth. And as such, detailed studies had been carried out in different areas of tribal concentrations, since Dr.Mrs.E.K.Janaki Amal (1897-1984) started work in the field of ethnobotany in India in 1955, followed by Jain (1960 onwards) and many succeeding workers throughout the country except Tripura and Mizoram (Saklani and Jain, 1994). The present work is thus, the pioneer work on ethnobotany in Mizoram.

On the basis of present study, it may be inferred that 98 % of the rural population of the study area rely on traditional herbal medicines and 99% of raw materials are harvested from the wild plant resources or biological resources.

It has been found that most valuable drug resources are critically endangered and a few are conserved in homestead or kitchen gardens. Furthermore, the species like *Bergenia ciliata* (Haw.) Sternb., *Cassia alata* L., *Curcumorpha longiflora* (Wall.) Rao & Verma., *Clerodendrum wallichii* Merr., *Curcuma zedoaria* (Christ.) Rose., *Camada* Roxb., *Dalbergia pinnata* var. *acaciaefolia* (Dalz.) Thoth., *Phyllanthus airy-shawii* Brunal & Roux., *Senecio scandens* Buch.-Ham.ex D.Don, *Stemona tuberosa* Lour., *Stephania japonica* var. *discolor* (Miq.) Forman and *Zanania indica* L. are at the verge of extinction. Unless immediate conservation measures are taken up, an irreversible loss of valuable genetic resources shall soon occur in the near future.

The following recommendations are put forth for future line of work :

- (1) Conduction of extensive and intensive ethnofloristic inventory survey throughout Mizoram and documentation of the Mizoram Ethnopharmacopoeia.
- (2) Ethnopharmacological studies on biodynamic medicinal plants through the process of phytochemical and pharmacological analysis.
- (3) Domestication and cultivation of therapeutically effective ethnomedicinal plants in the local agroecosystems and incorporation of important economic plants in agro-farming systems.
- (4) *In-situ* conservation of ethnobiodiversity and *ex-situ* conservation of important medicinal plants should go hand-in-hand along with the preservation of ethnobiocultural heritage.
- (5) Development of Herbal Gardens or Ethno-Botanical Gardens or Germplasm Conservatory Sites (GCS) with special reference to the rare/threatened/endangered genetic resources on top priority.
- (6) Establishment of appropriate Research Laboratory to cater the functions of seed-banks, gene-banks, plants extraction, storage, processing, phytochemical analysis and computer database.
- (7) Incorporation of indigenous system of medicines in the Primary Health Care (PHC) level on the basis of common ailments/diseases and their corresponding ethnomedicinal plants.
- (8) Legislation of Medicinal Plants of Mizoram under patent rule and the regulation of Indigenous Property Right (IPR). The Government alone can do this.

Mizoram has still some virgin forests with rich ethnobiodiversity. These natural *reservoirs* of wild plant resources are the best custodians of medicinal plant resources. Thus, conservation of biodiversity *in-situ* and *ex-situ* is imperative for the well-being of the present and future generations.

Box 1.	RARE, THREATENED AND ENDANGERED SPECIES	
Sl.No.	NAME OF PLANT SPECIES	CATEGORY
(1)	(2)	(3)
1.	<i>Aegle marmelos</i> (L.) Corr.	EW
2.	<i>Anacardium occidentale</i> L.	EW
3.	<i>Aeschynanthus sikkimensis</i> (Cl.) Stapf.	LR
4.	<i>Aquilaria malaccensis</i> Lamk.	CR
5.	<i>Ardisia polycephala</i> Wall. ex A.DC.	VU
6.	<i>Bergenia ciliata</i> (Haw.) Sternb.	CR
7.	<i>Blumea lanceolaria</i> (Roxb.) Druce	VU
8.	<i>Bombax ceiba</i> L.	LU
9.	<i>Calotropis gigantea</i> (L.) R.Br. ex Ait	EW
10.	<i>Cassia alata</i> L.	CR
11.	<i>Cautleya gracillis</i> (Sm.) Dandy.	EW
12.	<i>Claoxylon khasianum</i> Hook.f.	LR
13.	<i>Chonemorpha fragrans</i> (Moon.) Als.	LR
14.	<i>Clerodendrum wallichii</i> Merr.	CR
15.	<i>Curcuma amada</i> Roxb.	EW
16.	<i>Curcuma zedoaria</i> (Christ.) Rosc.	CR
17.	<i>Curcumorpha longiflora</i> (Wall.) Rao & Verma	EW
18.	<i>Curcumorpha</i> var. <i>minor</i> King.	EW
19.	<i>Cyclea peltata</i> (Lamk.) Hook.f. & Thoms	EN
20.	<i>Dalbergia pinnata</i> var. <i>acaciaefolia</i> (Dalz.) Thoth.	CR
21.	<i>Desmos longiflorus</i> (Roxb.) Saf.	LR
22.	<i>Elaeagnus pyriformis</i> Hook.f.	VU
23.	<i>Elsholtzia blanda</i> (Benth.) Benth.	LR
24.	<i>Flemingia macrophylla</i> (Willd.) Prain.	VU
25.	<i>Garcinia lanceaefolia</i> (G.Don) Roxb.	EN
26.	<i>Gardenia coronaria</i> Ham	LR
27.	<i>Gynocarpus odorata</i> R.Br.	EN
28.	<i>Hydnocarpus kurzii</i> (King) Warp.	EN

(1)	(2)	(3)
29.	<i>Ixora nigricans</i> R.Br.ex Wt.& Arn.	LR
30.	<i>Lasia spinosa</i> (L.) Thw.	LR
31.	<i>Lindernia ruelloides</i> (Colsm.) Penn.	EN
32.	<i>Lobelia angulata</i> Forst.	CR
33.	<i>Mimosa invisa</i> Mart.	LR
34.	<i>Musa glauca</i> Roxb.	VU
35.	<i>Ocimum gratissimum</i> L.	EW
36.	<i>Ocimum tenuiflorum</i> L.	EW
37.	<i>Osbeckia rostrata</i> D.Don.	VU
38.	<i>Pajanela longifolia</i> (Willd.) K.Schum.	LR
39.	<i>Pentapetes phoenicea</i> L.	EW
40.	<i>Phyllanthus airy-shawii</i> Brunal & Roux.	CR
41.	<i>Phyllanthus fraternus</i> Webs.	VU
42.	<i>Picrasma javanica</i> Bl.	LR
43.	<i>Podocarpus neriifolius</i> D.Don.	LR
44.	<i>Polygonum plebium</i> R.Br.	VU
45.	<i>Rauwolfia serpentina</i> Benth.	EW
46.	<i>Ruellia suffruticosa</i> Roxb.	CR
47.	<i>Saraca asoca</i> (Roxb.) de Wilde	CR
48.	<i>Senecio scandens</i> Buch.-Ham.ex D.Don.	CR
49.	<i>Solanum khasianum</i> var. <i>chaterjeeanum</i> Sen Gupta.	VU
50.	<i>Stemona tuberosa</i> Lour.	CR
51.	<i>Stemona</i> var. <i>minor</i> Hk.f.	EN
52.	<i>Stephania japonica</i> var. <i>discolor</i> (Miq.) Forman.	CR
53.	<i>Stereospermum neuranthum</i> Kurz.	LR
54.	<i>Tabernaemontana divaricata</i> (L.) R.Br.ex Roem & Schultes	LR
55.	<i>Terminalia chebula</i> Retz.	LR
56.	<i>Tinospora cordifolia</i> (DC.) Miers.ex Hook.f. & Thoms.	CR
57.	<i>Trapa natans</i> var. <i>bispinosa</i> (Roxb.) Makino.	VU
58.	<i>Woodfordia fruticosa</i> Kurz.	LR
59.	<i>Zanonia indica</i> L.	CR
60.	<i>Zanthoxylum armatum</i> DC.	LR
61.	<i>Zingiber purpureum</i> Rosc.	EW

BOX 2.		ETHNO-MEDICINAL PLANTS RECORDED FOR THE FIRST TIME		
SL.No.	NAME & FAMILY	LOCAL NAME	PART USED	USES
(1)	(2)	(3)	(4)	(5)
1.	<i>Aeschynanthus sikkimensis</i> (Cl.) Stapf. (Gesneriaceae)	Bawltehlantai	stem	fever, pain.
2.	<i>Alpinia bracteata</i> Roxb. (Zingiberaceae)	Aichal	rhizome	colic, cough
3.	<i>Anacolosia crassipes</i> Kurz. (Olacaceae)	Lushai-natur	leaves	small-pox
4.	<i>Angiopteris evecta</i> (Forst.) Hoffm. (Angiopteraceae)	Arthladawnpui	root-stock	fracture
5.	<i>Anogeisus acuminata</i> (Roxb.) (Wall.ex Guill. (Combretaceae)	Zairum	bark	cuts & wounds
6.	<i>Aporusa octandra</i> (Buch.-Ham.ex D.Don.) Vick. (Euphorbiaceae)	Chawntual	bark	colic
7.	<i>Ardisia paniculata</i> Roxb. (Myrsinaceae)	Naunuar	root	haemorrhoea
8.	<i>A.polycephala</i> Wall.ex.A.DC. (Myrsinaceae)	Sialtuai	root	- do -
9.	<i>Begonia inflata</i> Cl. (Bigoniaceae)	Sekhupthur	plant	straunguary
10.	<i>Blumea laciniata</i> (Roxb.) DC. (Asteraceae)	Khuanglawi	root	cardiac tonic
11.	<i>B.lanceolaria</i> (Roxb.) Druce (Asteraceae)	Buarzo	leaves	tumor/cancer, veterinary.
12.	<i>Bombax insigne</i> Wall. (Bombacaceae)	Pang	bark	tonsilitis
13.	<i>Canarium strictum</i> Roxb. (Burseraceae)	Beraw	bark	rash.
14.	<i>Caulokaempferia linearis</i> (Wall.) Larsen (Zingiberaceae)	Lung-aithing	plant	heahache.

(1)	(2)	(3)	(4)	(5)
15.	<i>Caulaya gracilis</i> (Sm.) Dandy. (Zingiberaceae)	Pale	rhizome	cough.
16.	<i>Claoxylon khasianum</i> Hook.f. (Euphorbiaceae)	Nagabang	root	tumor/cancer.
17.	<i>Clerodendrum bracteatum</i> Wall.ex Walp. (Verbenaceae)	Phuihnamchhia	leaves & roots	diarrhoea
18.	<i>Colysis hemionitides</i> (Wall.ex Mett.) Presl. (Polypodiaceae)	Ua-ma-kal	rhizome	fracture
19.	<i>Curcumorpha longiflora</i> (Wall.) Rao & Verma. (Zingiberaceae)	Ai-tur	rhizome	dysentery, diarrhoea
20.	<i>Curcumorpha</i> var. <i>minor</i> King (Zingiberaceae)	Ailaidum	rhizome	- do -
21.	<i>Dalbergia pinnata</i> var. <i>acaciaefolia</i> (Dalz.) Thoth. (Fabaceae)	Hruitengtere LR	root-bark	stomatitis hepatitis.
22.	<i>Dendrobium ariaeflorum</i> Griff. (Orchidaceae)	Naubanhlo-sen LR	stem	narcotic
23.	<i>D.demundans</i> D.Don. (Orchidaceae)	Naubanhlo-var LR	stem	- do -
24.	<i>Desmos chinensis</i> Lour. (Annonaceae)	Min-ze-chek	root	dysuria
25.	<i>D.dumosus</i> (Roxb.) Saff. (Annonaceae)	Zunin-damdawi	root	- do -
26.	<i>D.longiflorus</i> (Roxb.) Saff (Annonaceae)	Chi-ri-pi	leaves	ulcer
27.	<i>Diplazium maximum</i> (D.Don.) Chatt. (Athyriaceae)	Chakawk-hel-ei	root-stock	fracture.
28.	<i>Dracaena spicata</i> Roxb. (Dracaenaceae)	Phunhrin	root	stomachache
29.	<i>Dysoxylum gobara</i> (Buch.-Ham.) Merr. (Meliaceae)	Thingthupui	young leaves	diarrhoea

(1)	(2)	(3)	(4)	(5)
30.	<i>Ficus semicordata</i> var. <i>conglomerata</i> (Roxb.) Kurz. (Moraceae)	Theipui	bark, leaves.	liver ailment in combination with others.
31.	<i>Garcinia lancaefolia</i> (Roxb.) Kurz. (Clusiaceae)	Pelhte	leaves fruits	stomachic
32.	<i>Garcinia sopsopia</i> (Buch.-Ham.) Mabbe (Clusiaceae)	Theisakei	branches	snake-bite.
33.	<i>Gelsemium elegans</i> Benth. (Loganiaceae)	Hnamtur	roots	veterinary
34.	<i>Hedychium villosum</i> Wall. (Zingiberaceae)	Thingsawhthing	rhizome	asthma, cough
35.	<i>Helicia exelsa</i> (Roxb.) Bl. (Proteaceae)	Sialhma	bark	colic
36.	<i>Jasminum nervosum</i> Lour. (Oleaceae)	Hruikha	leaves	stomachache fever
37.	<i>Laggera crispata</i> (Vahl.) Hep. & Wd. (Asteraceae)	Ramvaihlo LR	leaves	sores
38.	<i>Lasianthus hirsutus</i> (Roxb.) Merr. (Rubiaceae)	Thingchangnei LR.	leaves	wounds
39.	<i>L.wallichii</i> Wt. (Rubiaceae)	Ruihthing LR	leaves	hallucino- genic
40.	<i>Lepidagathis incurva</i> F. Ham. ex D. Don (Acantheceae)	Vangvattur	leaves	haemostatic
41.	<i>L.rigida</i> Dalz. (Acanthaceae)	- do -	leaves	tooth - worms
42.	<i>Lepionurus sylvestris</i> Bl. (Opiliaceae)	Anpangthuam	leaves	diphtheria
43.	<i>Lindernia ruelloides</i> (Colsm.) Penn. (Scrophulariaceae) Penn.	Thasuih	plant	diphtheria
44.	<i>Lonicera macrantha</i> DC. (Caprifoliaceae)	Leihruisen	leaves	diarrhoea

(1)	(2)	(3)	(4)	(5)
45.	<i>Mallotus leucocarpus</i> (Kurz) Airy-Shaw. (Euphorbiaceae)	Si - kiah	root	colic
46.	<i>M.roxburghianus</i> Muell.-Arg. (Euphorbiaceae)	Zawngte- nawhlung	leaves	hepatitis
47.	<i>Millettia pachycarpa</i> Sm. (Fabaceae)	Rulei	root	toothache
48.	<i>M.piscidia</i> Wt. (Fabaceae)	Ruteng	root	infertility
49.	<i>Mimosa invisa</i> Mart. (Mimosaceae)	Di-hlo	root	calculus
50.	<i>Musa glauca</i> Roxb. (Musaceae)	Saisu	seed	convulsions
51.	<i>Osbeckia rostrata</i> D.Don. (Melastomaceae)	Builukhampa	root	kidney problem
52.	<i>Pajanela longifolia</i> (Wild.) K.Schum. (Bignobniaceae)	Ramarchangkawm	leaves	fracture
53.	<i>Parabarium hookerii</i> Pierre (Apocyanaceae)	Theikelkibawr	root	placental disorder
54.	<i>Phlogacanthus thyriformis</i> (Hardw.) Mabb. (Acanthaceae)	Khumtiangkoha	root	tumor in combination
55.	<i>Piper diffusum</i> Vahl. (Piperaceae)	Pawhrual	leaves	stomachache
56.	<i>Pseudodrynaria coronans</i> (Wall.ex Mett.) Ching. (Polypodiaceae)	Awmvel	rhizome	awmvel
57.	<i>Rhaphidophora hookerii</i> Schott. (Araceae)	Thiallawn	stem	easy labour
58.	<i>Solanum khasianum</i> Cl. var. <i>chatterjeeanum</i> Sen Gupta. (Solanaceae)	Athlo, Rulpuk	fruits	tooth-worms

(1)	(2)	(3)	(4)	(5)
59.	<i>Stereospermum neuranthum</i> Kurz (Bignoniaceae)	Zihaw	wood vinegar	chronic ulcer
60.	<i>Tarenna odorata</i> (Roxb.) Rob. (Rubiaceae)	Khalagorsong	root	snake-bite
61.	<i>Tetracera sarmentosa</i> (L.) Vahl. (Dilleniaceae)	Hruithingdeng	bark	stomachache
62.	<i>Tetrameles nudiflora</i> R.Br. (Araliaceae)	Thingdawl	bark/ leaves	ottorea
63.	<i>Trevetia palmata</i> (Roxb.) Vis. (Araliaceae)	Kawhtebel	root/ leaves	stomachache
64.	<i>Vitex peduncularis</i> var. <i>roxburghiana</i> Cl. (Verbenaceae)	Thingkhawihlu	bark	fever, hepatitis.
65.	<i>Vitis bifurcata</i> Wall. (Vitaceae)	Hruiveikual	root	sciatica, swellings.

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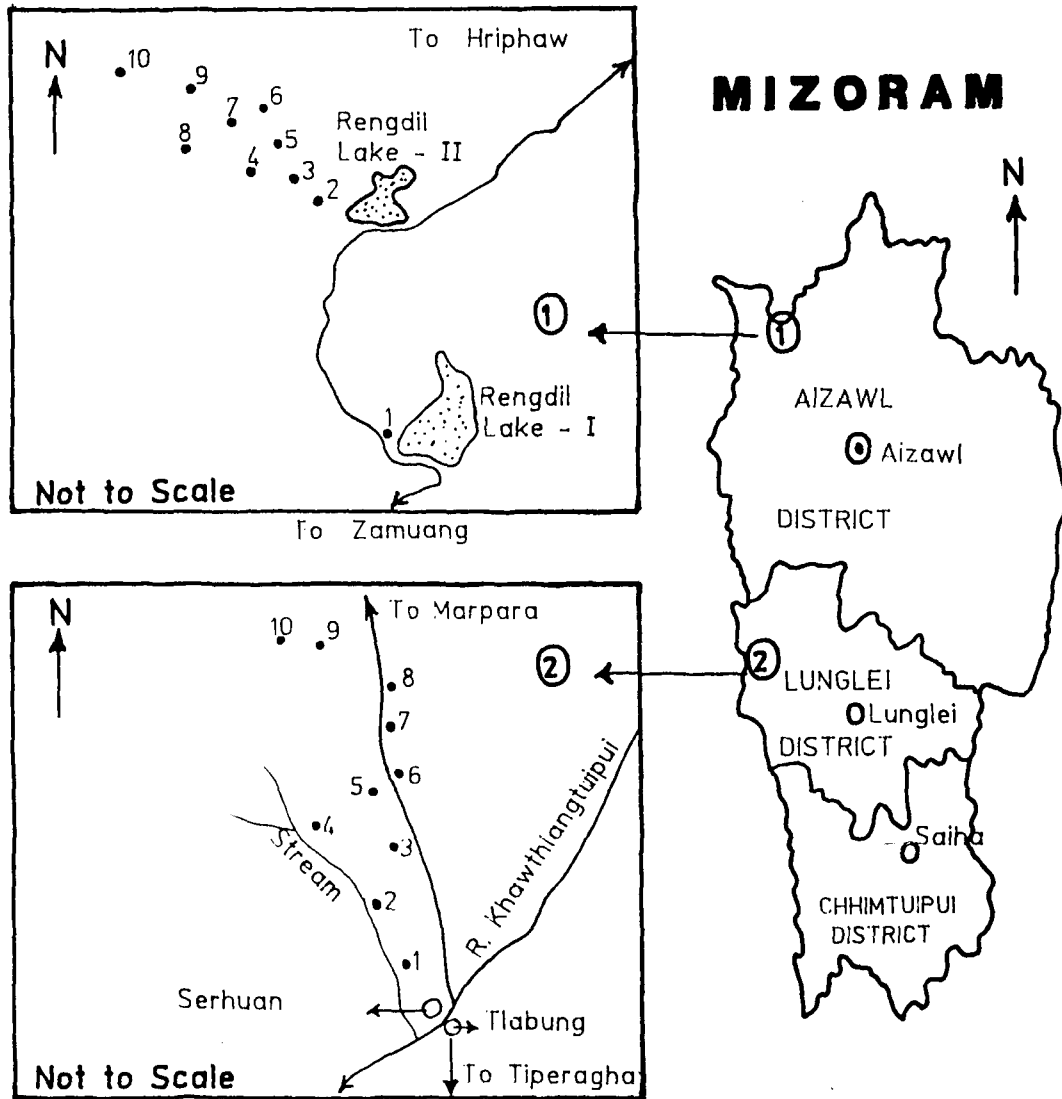


Fig. 25 Delineation of map showing localities of medicinal plants in ① & ②

① LUNGKULH VIRGIN FOREST.

- | | |
|--|---|
| 1. <i>Morinda angustifolia</i> Roxb. | 6. <i>Embella subcoriacea</i> (Cl.) Mez. |
| 2. <i>Saraca asoca</i> (Roxb.) de Wilde. | 7. <i>Chonemorpha fragrans</i> (Moon.) ALA. |
| 3. <i>Dracaena spicata</i> Thunb. | 8. <i>Clerodendrum wallichii</i> Merr. |
| 4. <i>Smitax ovalifolia</i> Roxb. | 9. <i>Lepionurus sylvestris</i> Bl. |
| 5. <i>Ardisia paniculata</i> Thunb. | 10. <i>Artocarpus chama</i> Buch.-Ham. |

② TLABUNG FOREST INCLUDING TEAK PLANTATION (1958)

- | | |
|---|---------------------------------------|
| 1. <i>Cissus repanda</i> Vahl. | 6. <i>Dillenia pentagyna</i> Roxb. |
| 2. <i>Murraya koenigii</i> (L.) Spreng. | 7. <i>Bridella tomentosa</i> Bl. |
| 3. <i>Dalbergia pinnata</i> Var. <i>acaciaefolia</i> (Dalz.) Thoth. | 8. <i>Butea superba</i> Roxb. |
| 4. <i>Ardisia colorata</i> Roxb. | 9. <i>Phyllanthus fraternus</i> Webs. |
| 5. <i>Anacardium occidentale</i> L. | 10. <i>Sonchus wightianus</i> DC. |

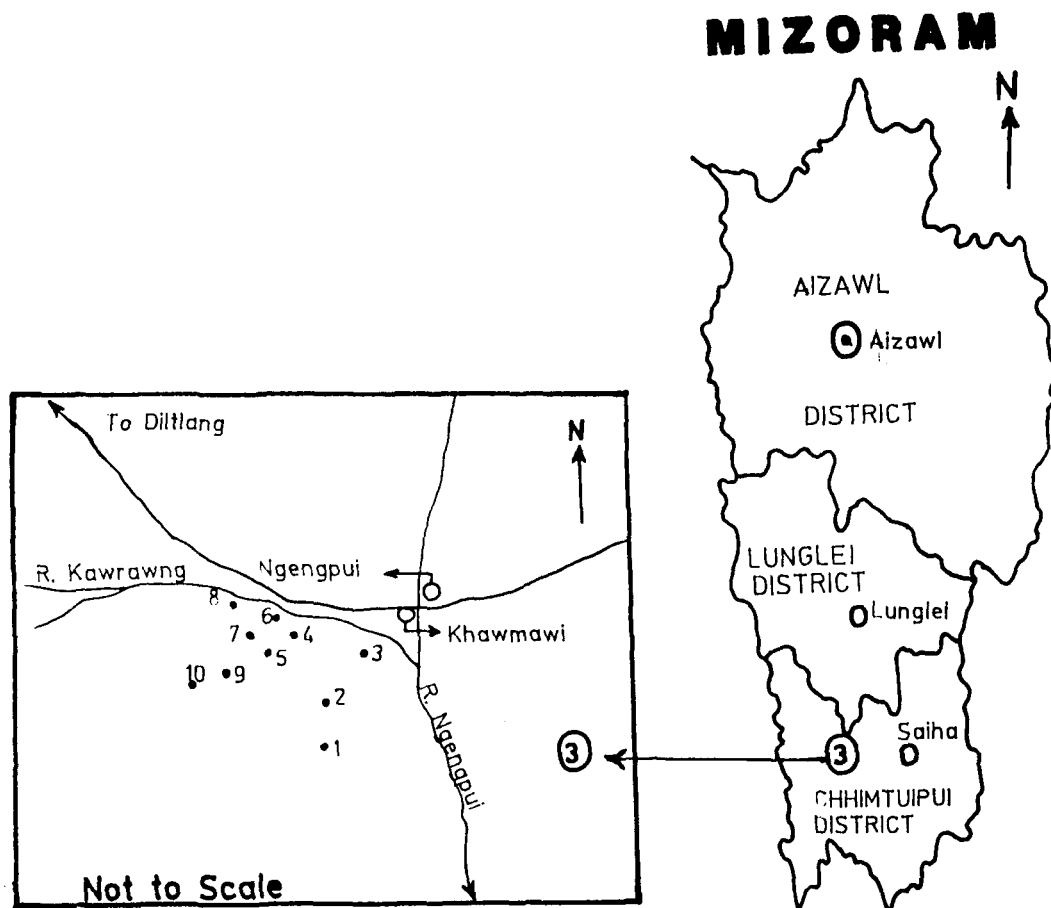


Fig. 26. Delineation of map showing localities of Medicinal plants in ③

③ NGENGPUI WILDLIFE SANCTUARY.

- | | |
|--|---|
| 1. <i>Terminalia chebula</i> Retz. | 6. <i>Lasia spinosa</i> (L.) Thw. |
| 2. <i>Dillenia indica</i> L. | 7. <i>Lasianthus hirsutus</i> (Roxb.) Merr. |
| 3. <i>Gynocardia odorata</i> R. Br. | 8. <i>Desmos longiflorus</i> (Roxb.) Saff. |
| 4. <i>Rhaphidophora hookerii</i> Schott. | 9. <i>Lasianthus wallichii</i> Wt. |
| 5. <i>Tarena odorata</i> (Roxb.) Robs. | 10. <i>Baccaurea ramniflora</i> Lour. |

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- 2) Wild food plants of Mizoram - communicated in *Bulletin of the Botanical Survey of India*.
- 3) Biodiversity and ecology of rare and endangered species of Ethnomedicinal Plants in Mizoram (Northeast India) - communicated in *Economic Botany*.

