

## Contribution of *Phrynium capitatum* Willd. leaf a non-timber forest product to the livelihoods of rural poor of South Meghalaya, North-East India

H Tynsong<sup>1</sup> and B K Tiwari<sup>2</sup>

<sup>1</sup>Regional Centre National Afforestation and Eco-Development Board, <sup>2</sup>Department of Environmental Studies, North-Eastern Hill University Shillong-793022, Meghalaya, India

Received 9 June 2010; Accepted 21 March 2011

*Phrynium capitatum* Willd. leaf is most common wrapping and packaging material used by the people of Meghalaya. The shelf-life of these leaves is about four to five weeks. It has been in use since time immemorial for packing and wrapping of edible items such as common salt, jaggery (*gur*), lentil, fresh and dry fish, meat, betel leaf, fruits, vegetables, lime, *channa* (gram) and the like. This paper focuses on the contribution of this leaf to the income of rural poor of Meghalaya. The average production of *Phrynium* leaf was found to be 480kg/ha/year and the revenue was Rs. 2880/ha/year, out of which Rs.2,010 was a net earning of the collector. The maximum benefits accrued to the trader (56%), followed by the producer (28%), transporter (10%) and wage earner (5%). The demand of leaves is high, since local people prefer *Phrynium* leaf for packing food items over polythene because of its capacity in retaining moisture and keeping the packed edibles fresh and lasting longer. Since most produce is used locally, the price remains almost stable year after year.

**Keywords:** *Phrynium capitatum*, Non-Timber Forest Product, South Meghalaya, Livelihood, Packing leaf, *Patta*.

### Introduction

People in the rural areas across the world extract a wide variety of Non-Timber Forest Products (NTFPs), from nearby forests. NTFPs are important to rural households in terms of their contribution to health, food, energy and other aspects of rural welfare<sup>1</sup>. In India, an estimated 50 million people living in and around forests rely upon NTFPs for their subsistence and cash income<sup>2</sup>. Bahuguna<sup>3</sup> and Mahapatra *et al*<sup>4</sup> have studied the contribution of NTFPs to cash income, however such studies are very few and our understanding of the subject remains inadequate. During recent years, forest managers have begun to consider the role of NTFPs in rural welfare and in some cases they have begun to manage forests in a way that promotes outputs other than timber<sup>5,6</sup>. When rural households use most of their agricultural output for subsistence consumption, cash from the sale of NTFPs can play an important role by allowing the households to use the same for vital cash dependent transactions, viz. buying tools and paying daily wage of labourers<sup>1</sup>. India's National Forest Policy of 1988 and Joint Forest Management Notification of 1990 reflect the desire and need to ensure that rural people

participate in the management of forests and capture benefits from those forests. Such people-oriented forest policy in India will be better implemented, and have more impact, if more researches on the analyses of NTFP extraction, quantities and values are undertaken across the diverse ecological, economic and social settings. In Meghalaya about 80% of the total populations are farmers and a large section of them cultivates cash crops. Hence, the contribution of forest-based production to cash income of the people is potentially important for understanding the dependency of rural poor on forests and forest products.

*Phrynium capitatum* Willd. commonly known as Packing leaf, is found throughout eastern Himalayas, Malay Peninsula, Malabar and Sri Lanka. In Meghalaya, *Phrynium* leaf grows wild at an altitude of 100-800 m above mean sea level in the forests and valleys along the streams. However, due to its high market demand, it has also been domesticated in arecanut (*Areca catechu* Linn.) agroforests as well as in betel leaf (*Piper betle* Linn.) agroforests<sup>7</sup>. *Phrynium* leaf is the most common wrapping and packaging material used by the people of Meghalaya. The shelf-life of these leaves is about four to five weeks. It has been in use since time immemorial for packing and wrapping of edible items such as

\*Correspondent author  
E-mail: herotyngsong@yahoo.com  
Phone: +91364 2551599

common salt, jaggery (*gur*), lentil, fresh and dry fish, meat, betel leaf, fruits, vegetables, lime, *channa* (gram) and the like. The leaf is also used during religious ceremonies by the people<sup>8</sup>. There is very little research done on this plant except for the work of Tilak and Pai<sup>8</sup> who presented the details of floral anatomy of two species of the genus *Phrynium* and the research done by Tiwari and Kumar<sup>9</sup> on its distribution and use; however, no study has been done on the production, marketing and income related aspect of this important NTFP. This paper focuses on the contribution of *Phrynium* leaf to the rural economy of the people living in Meghalaya north-east India.

#### Study area

The study was conducted at Nongkwai village (25°20' N, 91°54' E) located in southern part of Meghalaya, India (Fig. 1). South Meghalaya is inhabited by *War Khasi* people, a tribal community having long tradition of forest conservation<sup>10</sup>. The natural vegetation of south Meghalaya ranges from tropical evergreen to sub-tropical evergreen forests<sup>11</sup>. The altitude of the study area ranged from 450 m to 700 m ASL. The mean annual maximum temperature is 23°C and minimum temperature is 13°C. The mean annual rainfall is 11565 mm. The people are

predominantly employed in plantations and forestry related activities. Agriculture is limited to some small valleys where mainly tuber crops are grown. Arecanut, orange, betel leaf, jack fruit, bayleaf, honey and broom grass are the principal produce of the region.

#### Materials and Methods

*P. capitatum* is popularly known as 'Patta' in Hindi and the local tribes of Meghalaya call it by different names such as 'Sla Met' by the *Khasi* and *Bolgota* by the *Garo*. It is an undergrowth shrub belonging to family Marantaceae. It is a fast growing evergreen plant. It grows very well in the forests with sparse tree cover (Plate 1).

The field work was done in the year 2008. In this study, four complementary approaches were adopted, namely; (a) formal interview with the village Headmen and secretary; (b) field observation, (c) interaction with the Head of the selected households through questionnaires and (d) phytosociological study in natural forests as well as agroforests. The survey was administered to a random sample of 30 households. The total number of household at Nongkwai village is 200. The production and marketing was studied by using household questionnaires and PRA methods as described by Mukherjee<sup>12</sup>. For understanding the

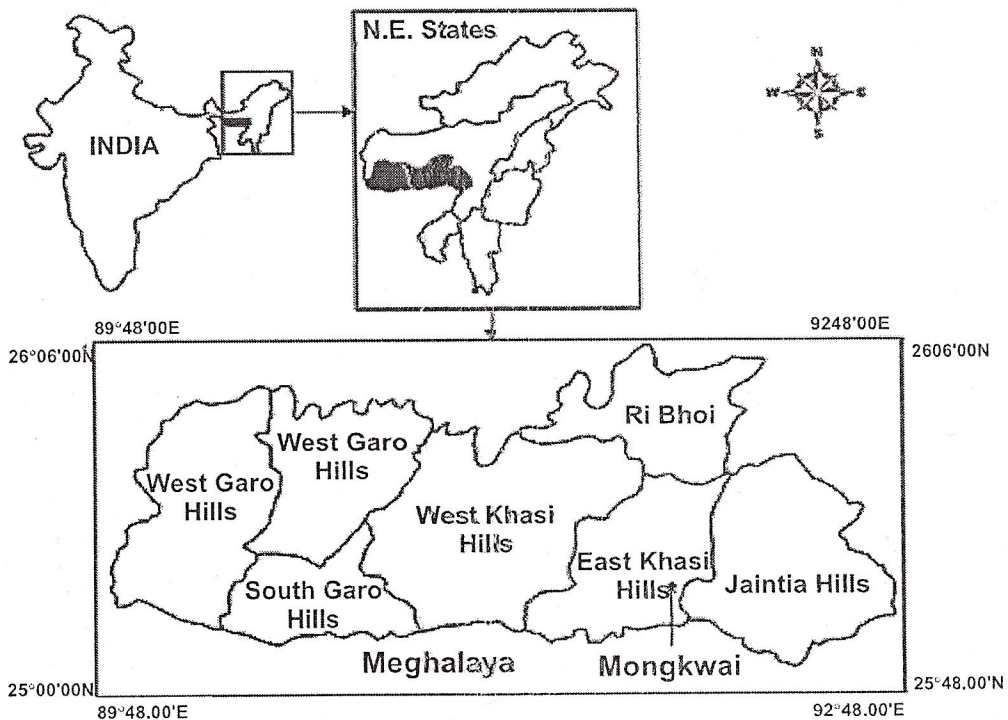


Fig. 1—Location of the study area



Plate 1—*Phrynium capitatum* growing in the forests of South Meghalaya

economic value of the *Phrynium* leaf, data were collected on costs of collection/production, harvesting, processing, value addition, transportation, storage, taxation and benefit sharing. Marketing analysis was conducted by interviewing growers/local collectors, traders, dealers and retailers<sup>10</sup>. The marketing channels were investigated using methods described by Raintree<sup>13</sup> and Karki<sup>14</sup>. For knowing the density and distribution of *Phrynium* leaf, 40 quadrats (10 × 10 m size) were laid in the natural forests as well as the agroforests. We selected an area of 1 ha to assess the average production (quantity) and analyze its monetary production in term of per unit area.

## Results

### Density and Production

The mean density of *P. capitatum* was found to be 800 stem/ha in agroforests and 225 stem/ha in the natural forests. The mean production from 1 ha area of agroforests was 600 kg/annum. However, in the natural forests the production was relatively low mainly because of low density with 360 kg/annum. The total production of *Phrynium* leaf from Nongkwai village was estimated to be 6, 265 qt/annum out of which 3,325 qt were used for household purposes and 2,940 qt was sold in the market.

### Management

In agroforests the plant are semi-domesticated and its growth is promoted by pruning of tree branches for

enhancing light conditions and weeding of the forest floor. The plant grows naturally through seeds in the natural forests as well as in agroforests.

### Harvesting

About 80% of the people involved in the collection of packing leaf are the landless and poor. *Phrynium* leaf is collected from natural forests as well as from agroforests. A mature plant has 6-7 leaves. From the agroforests, collection is done in a sustainable way where the older leaves are collected by cutting from the base leaving at least two younger leaves for regeneration. In about three month's time, the plant produces again the same number of leaves which become ready for collection. In one year, people could harvest three times from the same plant. In natural forests (wild) however, the collection of leaves are done in an unsustainable way where people collect the leaves without the petioles by hand. Mostly women and children were involved in harvesting of the leaves. On an average woman collect about 35 kg/day and children about 15 kg/day. After collection from the forest, the product is loaded and carried on the head to the village. Eighteen leaves are arranged and tied together in vertical rolls, locally known as *shi song*. Then 35 rolls are packed together forming a large bundle locally known as *shi kit*, weighing about 35 kg. Both women and children are involved in this task. A woman takes about one and half hour in

arranging and packing of 35 kg leaf (Plate 2). Packed leaves are carried by head load to the road. From the road it is then transported to the market by motor car. During the months of May to December the market is flooded with this product. But during winter due to slower regeneration of the leaves, the availability of this product was found to be minimal. The cost incurred by the growers in management, harvesting, processing, transportation and marketing of 480 kg leaf collected from 1 ha area is given in Table 1.

#### Market and pricing

The *Phrynium* leaf has got a very good market in the state of Meghalaya. A very small inter-state marketing with Assam and a small quantity is traded to Bangladesh via Dawki market. The growers bring the product to the local market where they sell it to the traders, who in turn directly sell it to the consumer at different local and regional markets. This product fetches good price in Shillong which is the most

important market of Meghalaya. It is from this market that the traders of different districts buy the leaves and sell it to different towns of the state. The market channel of the produce is shown in Fig. 2.

In the year 2008, the prevailing price of *Phrynium* leaf was Rs.6/kg at Pynursla market (local market) where the traders purchased the leaf from the growers at this rate. In Shillong the consumers use to buy at the rate of Rs.15/kg to the trader. The demand of leaves is high, since local people prefer *Phrynium* leaf for packing food items over polythene because of its capacity in retaining moisture and keeping the packed edibles fresh and lasting longer. Since most produce is used locally, the price remains almost stable year after year.

#### Economic impact

A total of 2,940 quintals of leaf were marketed annually from Nongkwai village, which was equivalent to 14.7 quintal/annum/household. Therefore, the



Plate 2—Packing of *Phrynium* leaves: A. Roll of leaves; B. Basket of leaves

Table 1—Mean annual expenditure/ha incurred by producers in management, harvesting, processing, transportation and marketing of 480 qt *Phrynium* leaf

Activity	Worker	No. of worker	Wage (Rs.)	Number of days/hours	Total cost (Rs.)
Weeding	Women	2	40	2 days	80
	Children	2	20	2 days	40
Harvesting	Women	2	40	4 days	160
	Children	2	20	4 days	80
Packing	Women	1	40	½ day	20
	Children	1	40	½ day	10
Head load from village to road	Women	13	25/35kg*	-	343
Transport from road to market	Motor car		10/35kg*	-	137
Grand Total		23			870

\*Average total production per ha=480 kg/annum

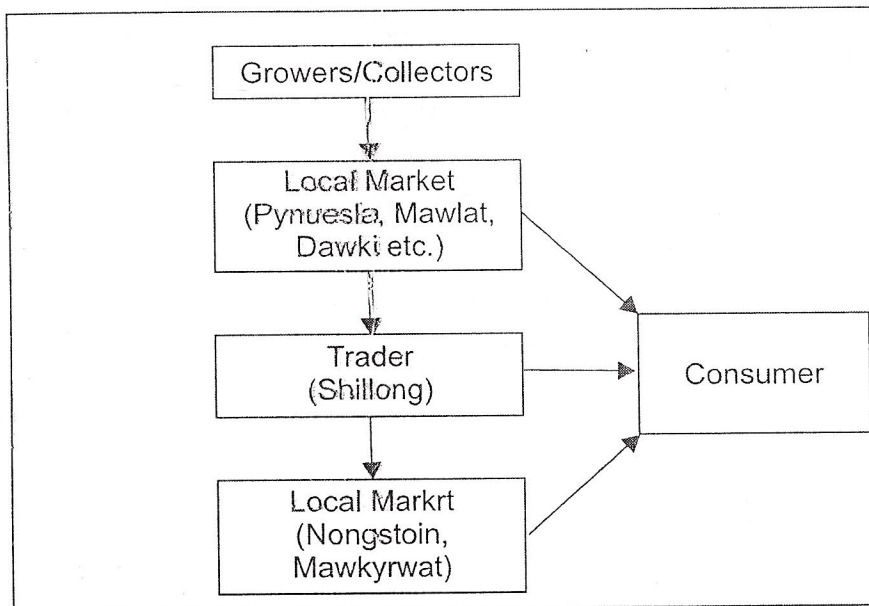


Fig. 2 —Marketing channel of *Phrynium* leaf in Meghalaya

annual gross income was Rs.8, 820/household. The average annual gross income of the people in this village was estimated to be approximately Rs.65,000/annum/household, thus *Phrynium* leaves contribute 13.56% of household gross income. Out of the 480 kg *Phrynium* leaves collected from 1 ha area, the grower received a gross income of Rs.2,880/annum, out of which total production cost, was Rs.870 and Rs.2,010 was a net earning of the grower. The products are then brought by the traders to the market and are sold to the consumer. The final market price of Rs 480 kg *Phrynium* leaf collected from 1 ha area fetched Rs.7,200 which the consumer had to pay. Thus only 28% of the money paid by the consumer goes to the grower. The rest was profited by the trader 56%, transporters 10%, and wage earners 5%. The maximum benefit accrued to the trader. The product pathway and cost from grower to consumer at the various stages of movement and processing within Meghalaya is given in Fig. 3.

### Discussion

The study revealed that 80% of collectors were from poor families. Therefore, this product can be called as forest product for the poor, which is in contrast to Ambrose-Oji<sup>15</sup> findings who reported that in Cameroon, it was the richer group which derives greater benefit from NTFPs who also harvested a greater volume. However, in terms of marketing the

traders gained maximum profit. The average production of *Phrynium* leaf was 480kg/ha/year and the revenue was Rs.2880/ha/year. However, this amount was much less than the gross production of other NTFPs collected from south Meghalaya, e.g the gross production of Wild Pepper (*Piper peepuloides* Roxb.) fetches Rs.1,75,000/ha/year and Bayleaf (*Cinnamomum tamala* Nees & Eberm.) fetches Rs.22,500/ha/year<sup>7</sup>. In this study a cost-benefit analysis revealed an output/input ratio of 2.31 which is higher than 1.8 obtained by Gangwar and Ramakrishnan<sup>17</sup>, 1.7 obtained by Shankar<sup>17</sup> on their studies on broomgrass but lesser than 3.1 obtained by Tynsong<sup>7</sup> from bayleaf and 6.84 of broom grass by Singh<sup>18</sup>. A final value of 28% accrued to the growers from *Phrynium* leaf was much better return when compared with the forest produce collectors of Solika in Karnataka who received only 4% of the final value of *Emblica officinalis* Gaertn. fruits<sup>19</sup>, War community of south Meghalaya benefited 23% from Bayleaf (*Cinnamomum tamala*)<sup>7</sup> but people in Darjeeling got a better return with 35% from the cultivation of broomgrass<sup>17</sup> (Table 2).

Considering the adverse environmental impacts of polythene bags, it is desirable to continue and promote use of *Phrynium* leaf as packing material. All year round availability of the leaves has made it a suitable packing material for meat, vegetables and fruits. Increasing emphasis of development agencies on production of leaves during recent times showed

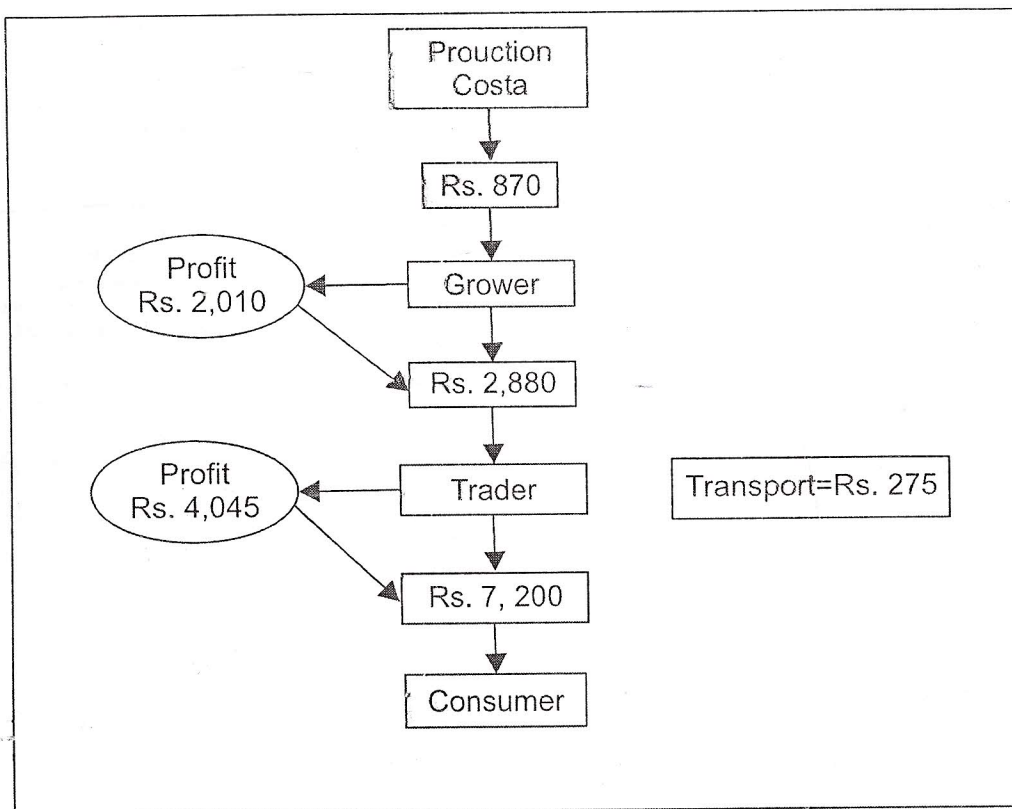


Fig. 3—*Phrynium* leaf pathway from grower to consumer depicting price appreciation at various stages of movement of 480 kg leaf collected from 1 ha area

Table 2—Comparison of benefits accrued by collectors from different forest products

NTFPs	States	Net benefit of collector (%)	References
<i>Phrynium capitatum</i> (Packing leaf)	Meghalaya	28	Present study
<i>Cinnamomum tamala</i> (Bayleaf)	Meghalaya	23	7
<i>Phyllanthus emblica</i> (Amla)	Karnataka	4	19
<i>Thysanolaena maxima</i> (Roxb.) Kuntze (Broomgrass)	Sikkim	35	17

brighter future for this forest product<sup>9</sup>. There was some scope of its export to Bangladesh from Dawki border and to the neighbouring states of Assam from Ri Bhoi area. The study revealed that deforestation is the major threats for regeneration of the plant. Unsustainable harvest from wild is also causing damage to natural population of this economically important wild plant of Meghalaya. Some degree of domestication has been initiated in the arecanut and betel leaf agroforests of south Meghalaya region but greater attention is needed for conservation of wild germ plasm of *Phrynium* in Meghalaya.

### Conclusion

The study revealed that *Phrynium* leaf plays an important role in the livelihood of rural poor in this

region. There is also ample scope and possibility of making this forest product as a livelihood based resource to improve the income of the rural poor. Since *Phrynium* leaf grows wild in the natural forest, labour during collection is the only input that the farmers have to make. The expenditure incurred on the management of *Phrynium* in agroforests is minimal.

### References

- 1 Cavendish W, Empirical regularities in the poverty-environment relationship of rural households: Evidence from Zimbabwe, *World Develop*, 2000, 28, 1979-2003.
- 2 Tewari DN, Tropical forestry in India. International Book Distributors, India, 1992. p.387.
- 3 Bahuguna VK, Forests in the economy of the rural poor: An estimation of the dependency level, *Ambio*, 2000, 29, 126-129.

- 4 Mahapatra AK, Albers HJ and Robinson EJZ, The impact of NTFP sales on rural households' cash income in India's dry deciduous forest, *Envir Manag*, 2005, **35**, 258-265.
- 5 Anderson AB, Alternative to deforestation: Steps towards sustainable use of the Amazon Rain forests, Columbia University Press, New York, 1990.
- 6 Clay J, A rainforest emporium, *Garden*, 1990, **14**, 2-7.
- 7 Tynsong H, Plant diversity and NTFP management in community forests of War area Meghalaya, *Ph.D. Thesis*, North-Eastern Hill University, Shillong-793022, 2009, India.
- 8 Tilak VD and Pai RM, Studies in the floral morphology of the Marantaceae, *Proc Pl Sci*, 1968, **68**, 240-249.
- 9 Tiwari BK and Kumar C, Forest products of Meghalaya-present status and future perspectives. Regional Centre, National Afforestation and Eco-development Board North-Eastern Hill University, Shillong-793022, 2008.
- 10 Tiwari BK, Forest biodiversity management and livelihood enhancing practices of War Khasi of Meghalaya, India. In: Thomas, Y., Karki, M., Gurung, K. and Parajuli, D. (eds) Himalayan medicinal and aromatic plants, balancing use and conservation. Published by His majesty Government of Nepal Ministry of Forests and Soil Conservation, 2005. p. 240-255.
- 11 Balakrishnan NP, Flora of Jowai, Meghalaya, Vol. I & II. Botanical Survey of India, Howrah, 1981-1983, p.666.
- 12 Mukherjee N, Participatory methods and Rural Knowledge. Participatory Rural Appraisal Methodology and Applications. Concept Publishing Company, New Delhi, 1993, p. 40-47.
- 13 Raintree J, Developing and marketing of non-timber forest products: Methods used in protected areas in Vietnam. In: IFAD, IDRC, CIFAD, ICRAF and HRR (eds) Shifting cultivation towards sustainability and resource conservation in Asia. Published by International Institute of Rural Reconstruction Y.C.James Yen Centre, Biga, Silang Cavite, Philippines, 2001, p. 269-271.
- 14 Karki M, Medicinal plants for sustainable management of uplands in south and south-east Asia. In: IFAD, IDRC, CIFAD, ICRAF and HRR (eds) Shifting Cultivation towards sustainability and resource conservation in Asia. Published by International Institute of Rural Reconstruction Y.C.James Yen Centre, Biga, Silang Cavite, Philippines, 2001, p. 225-231.
- 15 Ambrose-Oji B, The contribution of NTFPs to the livelihood of the 'rural poor': Evidence from the tropical forest zone of south-west Cameroon, *Inter For Rev*, 2003, **5**, 106-117.
- 16 Gangwar AK and Ramakrishnan PS, Ethnobiological Notes of Some Tribes of Arunachal Pradesh, Northeastern India, *Econ Bot*, 1990, **44**, 94-105.
- 17 Shankar U, Lama SD and Bawa KS, Ecology and Economics of Domestication of Non-Timber Forest Products: An Illustration of Broomgrass in Darjeeling Himalaya, *J Trop For Sci*, 2001, **13**, 171-191.
- 18 Singh KA, Itri RN and Pradhan IP, Grow amliso grass in the NEH region, *Indian Farm*, 1989, **38**, 43-44.
- 19 Shankar U, Marali KS, Shankar UR, Ganeshiaiah KN and Bawa KS, Extraction of non-timber forest products in the forest of Bilgiri Rangan Hills, India. 3. Productivity, extraction and prospects of sustainable harvest of amla, *Phyllanthus emblica* (Euphorbiaceae), *Econ Bot*, 1996, **52**, 320-336.