STUDIES ON THE FLORA OF BALPHAKRAM WILD-LIFE SANCTUARY, GARO HILLS, MEGHALAYA

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CERTIFICATE

I certify that the thesis entitled "STUDIES ON THE FLORA OF BALPHAKRAM WILDLIFE SANCTUARY, GARO HILLS, MEGHALAYA" submitted by Sri Yogendra Kumar for the degree of DOCTOR OF PHILOSOPHY of the North-Eastern Hill University embodies the record of the original investigation carried out by him under my supervision. He has been duly registered, and the thesis presented is worthy of being considered for the award of the Ph.D. Degree. The work has not been submitted for any degree of any other University.

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PREFACE

Forest cover in our country has greatly diminished mainly because of population pressure. The need for more and more agricultural lands and the land areas needed for creation of new townships have also considerably affected the forest cover.

In the last few decades there has been considerable awareness about our shrinking Environment and Conservation of our natural resources. A network of protected areas in the form of Biosphere Reserves, National Parks and Wildlife Sanctuaries throughout the country have been established and a few more are being proposed.

The State of Meghalaya, which is one of the richest and interesting Botanical regions in the country has so far declared only two Wildlife Sanctuaries. Nevertheless, this is one region where maximum damage is done to the forests by way of 'Jhuming' or shifting agriculture as practised by the local people. Keeping this in view, the State Forest Department has proposed to declare Balphakram as a Wildlife Sanctuary. Hence an interdisciplinary pilot project financed by Forest Research Institute and Colleges, Dehra Dun was launched to assess the suitability of this area for establishing a Wildlife Sanctuary.

The present thesis embodies the results of certain botanical aspects investigated. Though main emphasis of the study is on the floristic composition, some studies on phenology and phytosociology are also conducted in order to have some basic information on the community structure and function. Based on the results presented herein, it is earnestly hoped that this newly proposed Sanctuary will receive further attention from conservationists, planners, administrators and biologists for its successful management and preservation.

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GENERAL INTRODUCTION

Much of our natural environment has been altered to varying degrees since man have started using the natural resources of the earth, specially forest resources. A stage has now reached, when further reduction in forest area would be disastrous for our very existence. While numerous species, both of plants and animals, have already vanished from the earth, yet many thousands have become endangered and are nearing extinction.

While our developmental programmes have to go on for the economic upliftment of our vast population, specially the weaker sections of the society, what is really needed is setting apart sizeable natural areas to preserve and maintain different types of forest ecosystems in their natural condition in different parts of the country, for conservation of the environment for all purposes - for scientific, scenic, recreational, and for educational values.

India has shown from the beginning a great concern for its natural resources and their conservation. But it is only during the last 2-3 decades concerted efforts have been made to establish numerous protected area (Wild-life sanctuaries, National parks, and Biosphere reserves) throughout the country (Anonymous, 1993).

In North-East India the destruction of the forests is proceeding in such an alarming rate (mainly due to shifting agriculture) that no forests in the near future will be left untouched, if immediate protection measures are not taken.

Meghalaya, which is one of the floristically richest states

in the country, has already lost much of the original forests. So far only 2 areas are declared as Wild-life sanctuaries (Siju Wild-life sanctuary in West Garo Hills and Nongkhyllum Wild-life sanctuary in East Khasi Hills). Recently the State has proposed to declare forests around Balphakram also as a Wild-life sanctuary/ National Park, mainly to conserve the rich flora and fauna.

For declaring any area as a Wild-life sanctuary/National Park/Biosphere Reserves, one must have basic information about the flora, fauna and the structure and functional aspects of the eco-system as a whole. Keeping this in view an inter-disciplinary project on "Survey of vegetation and flora; fungal and Insect Pathogen and the Wild mammals of Balphakram forests of Garo Hills, Meghalaya State" was launched in the year 1979, and some botanical aspects of the sanctuary are presented in this thesis.

Floristically this newly proposed sanctuary is totally unexplored. Kanjilal's regional flora of Assam (1934-40) firstly does not deal in detail with the flora of this sanctuary and secondly it has a strong bias towards woody species. Moreover monocots are totally excluded in his work. Though the Eastern Circle of the Botanical Survey of India has given much emphasis on the flora of the northeast India as a whole, the forests around Balphakram are almost untouched and no collections appear to have been made. The only published account on the flora of Garo Hills is that of Ghosh et al., (1978). This again does not include any collection from Balphakram area.

Added to this, there has been a considerable damage to the flora by way of deforestation due to the practice of jhum (shifting

agriculture) by the local people. It is therefore highly necessary to record all plant species occurring in the area, before they are eliminated.

In the present work, the families are arranged according to the Benthem & Hooker's (1862-1883) system of classification. 453 Genera and 683 Species under flowering plant families are dealt with. An account of Rare and Endangered flora of the sanctuary and wild plants of Horticultural importance are also discussed. The Pteridophytic flora of the sanctuary is appended at the end of the thesis.

For proper management of any wild-life sanctuary one should have adequate knowledge, not only of the flora and fauna but also the structure and functional aspects of the ecosystem. As a part of this study, phytosociology and phenology of different forest communities of the sanctuary are attempted.

Phenology is directly related with environment and species survival. A knowledge of phenology therefore helps to understand the adaptability to their environment, relate biological principle, explain the plant-animal interaction and their mutual adjustment with respect to habitat and life processes and also create mass ecological conscience. While phenological studies with reference to different climatic zones have received considerable attention (Mooney & Billing, 1961; Sorensen, 1941; Beatley, 1967; Shreve, 1942) the studies on tropical forest communities are few (Bowler, 1966; Daubenmire, 1972; Frankie et al., 1974b; Opler et al., 1980; Lieberman, 1982), the only comprehensive phenological study with

reference to forests of north east India is that of Shukla and Ramakrishnan (1982). Such a study has been conducted on different forest communities (Tropical moist evergreen and riverine forest; mixed evergreen forest, and deciduous forest) of Balphakram Wild-life sanctuary.

Phytosociological studies on forest communities are least attempted in India (Menon, 1979; Singh, 1980; Toky, 1980). Ramakrishnan and his associates (Toky, 1980; Kushwaha, 1981; Saxena, 1981) have studied the phytosociology in relation to different age groups of Jhum fallows in northeast India. But Phytosociology of forest communities of Balphakram sanctuary is not understood so far, and therefore, attempted in this work.