

ROLE OF UNIVERSITY AND COLLEGE STUDENTS IN THE STUDIES ON INDIAN FLORA

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NEED FOR STUDY FLORA IN OUR COUNTRY

An uptodate and comprehensive Flora is an essential tool for the study and utility of plants of any area—essential not only to systematic botanists but also to ecologists, geneticists, horticulturists and indeed to all those who are concerned in any way with plants. A large country like ours with a rich and varied vegetation and Flora badly needs a comprehensive modern manual. The Flora of British India brought out by Hooker and collaborators is more than a century old (1872-1897). Lack of a modern Flora has seriously hampered the work of Indian Botanists. It is a pity that during 30 years of independence little has been done to achieve this important task essential for the progress of the country. Yet a very urgent and serious effort on the part of Government, Research Institutes, and taxonomists for the preparation and publication of the National Flora on uptodate and modern lines can no longer be put off.

It has been suggested and perhaps rightly that for the revision of the Flora of India, we must have District and Provincial Floras first (Santapau, 1962; Janaki Amal, 1954). Such botanical information as is contained in these florals could be usefully

utilized by the States in the development of their agriculture, forestry and industries based on plants. It will help a lot in achieving the ultimate goal of the production of the Flora of India. Even the five Provincial Floras which existed before independence were not available for a considerable time. The Botanical Survey did a very good job in reprinting these Floras. This has by itself given a great impetus to plant taxonomic research.

Still there are vast areas of our country which are unexplored or underexplored. There are many States which do not have a Flora of their own. It is in the production of these Floras at the district and the State level, that the students at universities and colleges can play a very important role. In fact, the cooperation and efforts of the universities and colleges has been commendable in the past and their work upto 1962 was reviewed by Fr. Santapau (1962) with satisfaction and admiration. The numerous Floras that have been published by various university personnel, indicate that they can extend a much needed cooperative hand in the revision of our National Flora. Such cooperation at university and college levels is discussed below.

POSSIBLE ROLE OF STUDENTS AT THE
UNDER-GRADUATE AND GRADUATE
LEVELS

While in the more advanced countries in the West, students even at the high school stage are familiar with the plants of their neighbourhood or even of their district or county, in India it is disappointing to know that even fresh master degree holders in Botany cannot often name 10 plants of their neighbourhood. Basic reason for this is the syllabii of the various Universities in our country. A perusal of the syllabii and examination papers in various (Indian) Universities of Botany show that with few exceptions they rigidly maintain plant taxonomy as static. It is little realized that the definition and scope of the subject has undergone, in recent years, a drastic transformation. Unfortunately, to many botanists the word "taxonomy" is synonymous with plant identification. Accordingly, the ability to identify plants is a sign of competence in taxonomy. Recently there have also been vigorous pleas for reduction of whatever taxonomic courses which remained in the syllabii of Indian universities. Upto last two decades of the present century, taxonomy constituted a very large part of botany curriculum. Other branches of botany were but "ancillaries to the main subject" In advanced countries where they completed the exploration of their own territories, they turned their attention to newer and more exacting branches of botany. Thus taxonomy in those countries was gradually relegated to the second place and there developed a tendency to regard it as an antiquated and even obsolete branch of botany. As a natural consequence of this development in most advanced countries, taxonomy came into disfavour in our country as well. In their craze to catch up and to keep pace with western botany, the architects and framers of syllabii of Indian Universities, unfortunately

treated taxonomy as a finished area of our knowledge of plants pleading that it is the oldest of botanical disciplines. It is not uncommon to hear the opinion, that taxonomy is not even a science but simply an outdated mechanistic hobby of the 19th century botanists—and is a subject limited to the study of "bits of hay stuck on herbarium sheets and pigeon-holed in cup-boards" (as has been pointed out by Subramanyam & Nayar 1971). Moreover, the rise and extension of other branches of botany, such as physiology, biochemistry, anatomy, embryology and more recently cytology, genetics and plant ecology captured the imagination and enthusiasm of students. With due apologies to those teaching and doing research in these branches, I may be allowed to say that those subjects are easier to teach under the average conditions in the departments of our universities and colleges, than taxonomy. Even in teaching of Botany, taxonomy is considered as a dry and uninteresting subject. Perhaps, also teachers have some difficulties in 'camouflaging their ignorance' in replying to simple questions like 'What is this?', in plant taxonomy than in other branches. As a gradual result of this decreased interest in taxonomy and increased interest in other branches of botany, there developed a vicious circle; teachers neglected to teach taxonomy, students ceased to take taxonomy as their favourite subject and gradually there were fewer and fewer teachers capable of teaching taxonomy. Moreover, in this critical stage, taxonomy was exploited by others. Due to dearth of properly trained taxonomists, any one, who could identify and collect a few plants and had the facilities of staff and finances, became a taxonomist over night.

Taxonomy is now coming back to its own along modern lines. Now-a-days taxonomists seek data from ecologists, geneticists, biochemists, physiologists, horticulturists and

all other exponents of this or that branch of Botany. Not only this, they go outside the rank of botanists and request help from zoologists, geologists, geographers and numerous other specialists. Taxonomists do not feel abashed in borrowing factual data from other fields to make their study both interesting and purposeful. Nevertheless taxonomists have their own special problems, their original methods of teaching and research, their own peculiar outlook and criticism. Some biologists may plead for teaching of material representing newer fields of biology-like molecular biology with little or no teaching of classical biology. Such a curriculum, which discards the entire quantum of classical or traditional biology and is replaced completely by material representing modern fields, as late Prof. Tandon (1971) pointed out, would be to provide stimulation without nourishment. The right approach, therefore, would be a synthetic approach, teaching both traditional and modern biology with proper emphasis on newer fields including molecular and applied biology. This approach would be best suited to the needs of our country and society and the training of our undergraduate students would become more purposeful than at present.

Notwithstanding any change in the course contents of our undergraduate students, their role, cannot be much in the study of floristics of our country. The whole purpose of introducing the subject to the students should be to encourage young minds to develop love and respect for plants of their neighbourhood and to inculcate in them the interest and curiosity about the plants they come across in their daily life. This would certainly attract the students at post-graduate level to take up plant taxonomy and floristic study as their subject of choice and special study. The present apathy of the students to systematics and taxonomy is also due to faulty methods of teaching at different levels.

Over-emphasis and undue importance to systems of classifications and abstract plant names has resulted in disenchantment of the students to this branch. If taxonomy has again to come of its own, methods of teaching the subject shall have to be improved.

Misconceptions as mentioned above seem to be rather general in our country and have been, in part, responsible for the tremendous gaps that persist in our knowledge of the flora of our country. While there is no doubt, that development and discoveries in life sciences have been significant and there is an urgent need in our country for a radical revision of our syllabii and its restructuring, this question should be considered in its total perspective.

FLORISTIC STUDIES AT POST-GRADUATE LEVEL

If the graduates who come at post-graduate level, have been properly groomed and made interested in plants of their vicinity, this might perhaps help them in the study of the country-wide flora. It is unfortunate that as Father Santapau (1962) pointed out "There are many universities where taxonomy is not taught beyond undergraduate level and some universities do not even have Professors able to guide research in taxonomy of higher plants" Despite the fact that Prof. P. Maheswari (1962) in his U.G.C. report for improvement of botanical curriculum strongly pleaded for more encouragement to taxonomy in all universities, nothing has been achieved so far. In a recent survey for recommending names for a panel of experts in plant taxonomy from amongst the Professors of University departments, it was found that barring a few, whose names could be counted on finger tips, there are hardly any who could be regarded as a specialist in plant taxonomy. However, as has been reviewed by Father Santapau (1962)

and also mentioned by Prof. Maheswari in his report, many University departments and colleges have contributed considerably to floristic study of our country.

At Post-graduate level in most Indian Universities there is a provision for botanical excursions. In some Universities these excursions are essential parts of the curriculum and a good percentage of marks is reserved for participation of students in these excursions. If these excursions are properly planned and conducted, they can play a very important role not only in study of floristics of a particular region but also familiarising students in studying plants in natural habitats. It is here, during these excursions, unlike other branches of botany, that the amateur botanist can take an active and lively part. These excursions can certainly help a lot in inculcating the beginner's interest in the subject. Yet many of the excursions conducted annually, do not enable the students to take full advantage of time, money and energy spent on them. Unfortunately, most university excursions are treated as class room material collection tours. Therefore, if these excursions are to be made purposeful rather than 'enjoyment trips' (views held by mainly non-botanists), an army of students can thoroughly explore small and limited areas and many unexplored and underexplored areas could be surveyed in this way. Every time, newer and fresher areas could be taken up and this would eventually lead to the preparation of the District Floras.

Another aspect of Post-graduate level which could attract students towards study of floristics of our country is to start specialization in floristics and taxonomy. Of course such a move would certainly require the services of competent taxonomists to handle these specializations. A few Universities in India do have special papers in plant taxo-

nomy in their syllabii. The name of Universities of Calcutta, Vallabh Vidya Nagar, Jodhpur, Patna, Patiala and Waltair, are but few, where specialization in plant taxonomy is allowed. The Botanical Survey and Ministry should plead with other Universities for such a provision. Universities on their part should acquire the services of competent taxonomists wherever the regional centres of BSI are located or elsewhere their trained taxonomists are available. This cooperation between Survey and Universities would not only encourage the study of plants, it would also lead to the production of a properly trained crop of young people who could man the stupendous task of the 'Flora of India' project.

Another aspect which could fruitfully be utilized at this stage is to offer short-floristic projects as post-graduate theses in lieu of a special paper. Small areas could be given to the student wherein a thorough collection of plants, properly preserved, mounted and identified is desired. Such project could be assigned to students within the vicinity of university towns. This could be an important step for the compilation of District Floras which could in turn accelerate our final goal.

THE ROLE AT THE RESEARCH LEVEL STAGE

At the research degree level numerous universities in the past have produced floras (Santapau, 1962) and continue to do so. Numerous floras have appeared, like the Flora of Delhi by J. K. Maheswari, the excellent Exotic Flora of Kodaikanal by Mathews (1969), the meticulous Flora of Hussan District by Prof. Saldhana (1976), Flora of Visakhapatnam by Venkateswarlu Bhiravamurty & Rao (1972), Flora Gorakhpurensis by Srivastava (1976), Flora of Bhopal by Oomachan, and Flora of Indian Desert at the University of Jodhpur. Flora of Gujarat by

G. L. Shah and Flora of Eastern Rajasthan by Drs. Tiagi & Sharma are also shortly expected to be published. Certain difficulties are bound to arise for completing floristic work at University centres, but a conscientious worker can overcome them by working for short intervals at Regional and Central Herbaria, where the availability of rich literature and material will more than compensate their absence at the university departments. That certainly does not mean that University departments do not build their own herbaria and libraries for strengthening research in these fields.

ROLE OF BOTANICAL SURVEY OF INDIA

A training in floristics is a prerequisite for any future specialization in Plant Taxonomy. Such a course should preferably be organized by B.S.I. so as to attract the students to take up floristics as a subject of their research and this would ultimately help in developing the much needed infra structure for the preparation of the Flora of India.

MORE INCENTIVES NEEDED

Subramanyam & Nayar (1971) pointed out that after years of quiescence, there is a great revival in the study of taxonomy in foreign countries especially in USA, UK, Europe and elsewhere. This is due to the increasing awareness on the part of scientists, that even in these countries where the 'Flora' is more adequately known than ours, the inventory of living organisms is far from satisfactory. To give a boost to such efforts, some governments started special lectureships and taxonomic chairs in some selected universities. Taxonomic schools have been built up in many centres. It is high time that the University Grants Commission of our country also takes an initiative to create taxonomic chairs in selected universities.

As mentioned above the position of taxonomy among biological sciences has undergone some marked shifts in recent years. The systematist or taxonomist for that purpose is no longer content to focus his entire attention upon the discovery of new taxa. Instead, he is more concerned with species about which something is already known. How and under what circumstances has a particular species arisen? What is the mechanism of its reproduction and perpetuation? What is the range of variation found in it and what is the mode of its origin? What is the history of its distribution and where on the earth surface is it found at present? What are comparative relationships of these aspects between the related species? These are some of the complex questions that a student of Taxonomy has to face. Some problems concerning population studies, the nature of variability and the study of ecological adaptability of species would certainly need lengthy, detailed studies. They would eventually enlarge our knowledge and understanding of these species.

There is a need for greater collaboration between universities and the Botanical Survey of India. This could be achieved by providing incentives to universities to take up task-oriented or sponsored projects and by increasing the number of fellowships for working on the Flora of India.

One of the greater difficulties encountered by Indian botanists in their work whether in universities or in various establishments of BSI or elsewhere, is the scarcity of scientific literature and references. Even greater than the scarcity of literature is the absence of the type material of our plants. In an assignment on monographic revision of Rhamnaceae of India, one of the first projects assigned by BSI to any university under its revision of 'Flora of India' project, I have encountered this difficulty, since basing my conclusions entirely on the published description or illus-

trations, is not only incorrect but valueless without a reference to the type specimens. Such specimens are not loaned, and therefore the BSI should take immediate steps to procure the photographs of 'types' of as many Indian species as possible and make them available to the needy researchers.

TAXONOMIC STANDARDIZATION PROGRAMME

Comparative analysis of the field data collected by several researchers in colleges and university departments are not reliable unless they are made accurate by consistent and correct identifications. The Botanical Survey should undertake taxonomic standardization programme. The purpose of the programme would be to facilitate exchange of information and to promote uniformly correct identification amongst participating taxonomists. To realize its general goal, the Taxonomic Standardization Programme should sponsor meetings of taxonomists to discuss taxonomic problems and communication of papers pertaining to regional floras. At these meetings handouts containing corrections to the existing literature, annotated bibliographies, keys and distributional notes of the various species could be distributed. Individuals not able to participate directly in the programme could receive the information by mail. Thus such standardization programme will assist several institutions in resolving identification problems encountered in the field. Meetings in the form of training sessions and consultation regarding systematic problems could also take place.

HERBARIA IN THE UNIVERSITY DEPARTMENTS AND COLLEGES

Out of more than 50 Universities in India teaching Botany, not all have herbaria of their own. The few herbaria which university departments and colleges possess are not properly organized. This is both due to lack

of interest and lack of funds. However, in the universities where organized herbaria are in existence, they contain a rich storehouse of information, but these resources are all too often almost impossible of access. The method of organization of these herbaria varies from institution to institution, making it difficult to obtain data available from these collections.

There is more and more concern today that the taxonomists in the universities and colleges take a critical look at their collecting philosophy.

There should be marked increase in emphasis on quality of specimens, and data as well as a retreat from traditional methods of collecting and preserving specimens in order that the research needs of a wider body of scientists could be served. Most of the universities require the students of the post-graduate and even of graduate level to submit herbarium specimens at the time of their practical examinations. The preparation and identification of these herbarium specimens are usually far from satisfactory. These are not always prepared or identified by the students themselves. The whole purpose of these collections is often lost.

New insight needs to be gained and new questions should be formulated. What information are we acquiring and what are we losing from the plants we are collecting today? Can we improve our collecting techniques to provide more information on the biological whole—the ecosystem rather than focussing attention on a group of plants. Those concerned must make a change in their outlook so that these collections are capable of providing information on the changing biological world. Populations of plants are not static, but are dynamic and future collections must look to these biological units in this light. Collections must be made at regular intervals in future and we must be able to compare them readily with the earlier data

in order to assess the changes in the community brought about by naturally occurring phenomena and also by the man-made changes. It is this continual monitoring of environmental situations, which will, in time, give some degree of ecological predictability.

The very fact that the Botanical Survey of India had to organize the symposium, stresses that the problem needs an urgent attention. Luckily some of the universities

and colleges have kept the light burning, and given proper support, will not disappoint.

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