

Biosystematics Education in Nigerian Universities

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Abstract

Biosystematics is a multidisciplinary and an interdisciplinary science aimed at identifying the diversity and relationship between and among organisms, the pattern of variations in the living world and the evolutionary mechanisms which have brought about this pattern. With the global focuses on biodiversity and sustainable developments, the needs for biosystematics are becoming bigger and bigger. Unfortunately, the teaching of biosystematics as a subject leaves much to be desired in many Nigerian universities. A major challenge is not unconnected with the dearth of properly trained Biosystematists. Non systematists are therefore saddled with the responsibility of teaching technical courses such as taxonomy to undergraduate students and their lack of prowess in communicating the heart of the subject could be misleading. Most students conclude the course is arduous and eventually prefer to pursue their postgraduate career in alternative disciplines. Some professionals are also being lost due to limited career advancement prospects. The issue of capacity-strengthening is critically imperative. The subject can be made more appealing by encouraging greater initiative participation of students in actual field work, incorporating regular excursions to standard botanical gardens and herbaria and by the teaching of modern application of computer software such as dendrogram in biosystematics. Prepared slides and colorful taxonomic monographs should also be employed as teaching aids, while government agencies, particularly those which are concerned with environmental matters, should enact programs which encourage the proper place and relevance of biosystematics and biosystematists.

Keywords: Biosystematics, Biosystematists, challenges, teaching, Nigerian, universities

Introduction

Biosystematics is a multidisciplinary and an interdisciplinary science aimed at identifying the diversity and relationship between and among organisms, the pattern of variations in the living world and the evolutionary mechanisms which have brought about this pattern. It is an organized study that seeks to recognize and identify organisms at the species level and to understand evolutionary and adaptive patterns and their characteristics. It entails the discovery, description and interpretation of biological diversity, as well as the synthesis of information on diversity in the form of predictive classification systems (Judd *et al.*, 1999). Biodiversity exists in three forms: genes, species and ecosystems but the distinctive feature of biosystematics is considered to be its emphasis upon the processes responsible for differences between taxa, rather than the differences themselves (Stebbins, 1970).

With the global focuses on biodiversity and sustainable developments, the needs for biosystematics are becoming bigger and bigger (Da Wei, 2001). The teaching of biosystematics in tertiary institutions is critical as it remains the principal agency by which the students may gain acquaintance with the diversity of organisms, the pattern of

variations in the living world and the evolutionary mechanisms which have brought this pattern about. On the other hand, many decision makers think that biosystematics is a traditional discipline and anyone can do systematic researches. This misconception, if left unchecked, can frustrate proper and adequate biosystematic development agenda in any institution or nation (Da-Wei, 2001).

Status

Nigeria is a signatory to the Biological Diversity Convention, and it is now generally acknowledged that there is a necessity to conserve biological diversity and integrate it with national development. Sound development planning requires comprehensive information on the local biodiversity resources if catastrophic over-exploitation and/or degradation of life-support processes were to be avoided. This calls for detailed biosystematic studies of various plants and animal groups in Nigeria, as well as a sustained programme of capacity-strengthening. The issue of capacity-strengthening is of great significance since there is a dearth of specialists in systematics biology in Nigeria. However, the implementation of this lofty ideal remains ineffective as the requisite knowledge base is lacking.

Challenges

Davies (1999) submitted that higher education faces challenges related to increasing financial constraints, greater student numbers and competition from non-accredited organizations, and also opportunities resulting from the use of new technologies in teaching, and new global, multi-purpose strategic alliances. The present state of biosystematics is unfortunately very unsatisfactory as the subject is neglected or overlooked in many Nigerian universities. Some of the drawbacks include dearth of human capacity, the dynamic nature of nomenclature, foreign language (Latin) barrier, poor financing of research project that focuses on biodiversity and poor government policies on management.

The lack of properly trained biosystematists and qualified teachers in related subjects is perhaps the most direct factor confronting the proper teaching of biosystematics in tertiary institutions. For instance, courses in taxonomy are often taught by non-taxonomists, who cannot themselves identify more than a few plants in the field. Teaching is therefore burdensome to the teacher, while at the same time makes learning uninteresting to the students. They are hesitant to take students to the field or organize reasonable practical sessions, but rather base most of their teachings on only theoretical studies. Unfortunately, such shy approaches do not escape the attention of the students and most develop a phobia for identification and naming of plant specimen and consequently perceive the subject as arduous.

Many students graduate with their first degree in Plant Science (Botany), for example, without grasping the most basic principles of taxonomy, which can guide them in identifying living species within and around their immediate environment. A teacher who is a minor in a dynamic subject such as Taxonomy, is likely to find the occasional changes in nomenclature of species a daunting task to cope with, whereas to the skilled taxonomist, this is part of the thrill of the subject.

There is also a poor conceptualization about the prospects of biosystematics in Nigeria. This is particularly true considering the rate at which professionals are being lost due to limited career advancement prospects. The relative ease with which some lecturers can shift their research interest can be a source of concern to the fidelity of programmes within the nation's tertiary institutions. Consequently, a greater proportion of the students eventually prefer to pursue their postgraduate carriers in other seemingly more attractive options. This trend can only imply a growing decline in availability of manpower in the field of biosystematics. That is, unless definite measures are adopted to initiate a reversal.

Another issue has to do with poor government policies, which at the moment gives very mild recognition, if any, to the relevance of biosystematics in national development. It might be easy to recall that Nigeria is signatory to the Biological Diversity Convention, which includes all that it portends. However, lack of political will as well as pertinent economic drive are limiting factors to the full realization of its noble objectives. One such objective would be the proper placement of, and increased demand for biosystematists in the development of effective environmental conservation strategies. Government posture as it stands may be the most significant deterrent to career prospect in biosystematics in Nigeria.

Recommendations

Promoting education, public awareness and training in environmental issues can help redress the problems associated with biodiversity loss. The need to develop human resources in the teaching of biosystematics as well as develop a pool of taxonomic specialists for biological inventory is quite evident. The following recommendations have been suggested to meet these quests:

- i. Taxonomy should be made more appealing to the students by encouraging greater initiative participation of students in actual field work, collection of live material, growing the plants in experimental garden, study of variations and where possible, extraction of economic and vital products.
- ii. Students' interest in taxonomy should be encouraged by organizing workshops at universities where secondary school students should be shown how to identify a plant, how to press plants and properly mount them. The importance of herbarium specimen in identification, ecology and conservation of natural resources should be stressed.
- iii. Frequent visits to field will help develop a natural attitude towards appreciation of diversity in plants and observing them in natural habitats. The morphology and family characteristics should be taught in the field and then supplemented by laboratory exercises. In the field, the students should be encouraged to distinguish characteristics as an aid to identify families. For this purpose, dichotomous artificial keys for local floras, if prepared will be useful. Visits to standard botanical garden and herbarium should be arranged. It is within this context that relevant examples should be employed to elaborate the significance of botanical gardens and herbarium in the modern society to students..
- iv. Establishment of centres, at least one at each university, for holding collection of all plant material (dried and pickled) to cater for the needs of undergraduate students.

- v. Practical know-how in basic techniques of Biosystemics is lacking at M.Sc./M,Phil. levels and should be provided for. Practicals should include not only scientific methods of herbarium preparation, data gathering and handling, identification and nomenclature, but also modern approaches in palynology, chemotaxonomy, cytotaxonomy etc.
- vi. Computer data bank with their storage and retrieval systems are handy tools in modern taxonomic work. Research students should be encouraged to get acquainted with these techniques e.g. the application of dendrogram in the study of relationship within and among biological systems.
- vii. The central organizations like Botanical Survey of Nigeria should also get coloured slides of different plants prepared and made available for sale for the purpose of teaching taxonomy. Colorful taxonomic monographs should also be employed as teaching aids.

Conclusions

The need for improved teaching methods of biosystematics is crucial in order to capture modern day students' interest in learning and specialization. A fundamental shift from the traditional, theoretical and abstract approach to the use of contemporary, sophisticated and practical tools will make the subject more tangible and appealing to students.

Teaching of subjects in biosystematics should be devoted to trained professionals, and not to be treated as an "all comers" affair. The drain of professionals as well as the reluctance of students to pursue careers in biosystematics can be significantly addressed by making the programme more lucrative. This is mostly a function of government policies.

It is not sufficient for the government to simply enact environmental policies; such policies must be supported with adequate political and economic will if the demand for biosystematics and systematists is to thrive. Government agencies, particularly those concerned with environmental affairs should enact programs which encourage the proper place and relevance of biosystematics and biosystematists, in Nigeria and other African countries.

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