

Africa are amongst the richest areas of the world in terms of floristic diversity but amongst the poorest as far as the economic resources to pursue complete documentation of systematic information. The whole of Europe, with more than 30 m square kilometres of landscape and numerous rich nations with their vast economic resources, have to account for slightly more than 6 thousand species of vascular plants. India, on the other hand, with meager resources, less than one tenth of landscape, has to account for the study of at least four times more of the vascular plants. A small country like Colombia, similarly, has estimated 4,5000 different species, with only a few botanists to study the flora. Great Britain, on the other hand, has approximately 1370 taxa (Woodland, 1991), with thousands of professional and amateur botanists available to document the information. It is not strange, as such, that there is lot of disparity in the level of advancement concerning knowledge about respective floras. [Taxonomic advancement today can be conveniently divided into four distinct **phases** encountered in different parts of the world:

Exploratory or Pioneer Phase

This phase marks the beginning of plant taxonomy, collecting specimens and building herbarium records. The few specimens of a species in the herbarium are the only record of its variation. These specimens are, however, useful in a preliminary inventory of flora through discovery, description, naming and identification of plants. Here, morphology and distribution provide the data on which the systematists must rely. Taxonomic experience and judgement are particularly important in this phase. Most areas of tropical Africa and tropical Asia are passing through this phase.

Consolidation or Systematic Phase

During this phase, herbarium records are ample and enough information is available concerning variation from field studies.

This development is helpful in the preparation of Floras and Monographs. It also aids in better understanding of the degree of variation within a species. Two or more herbarium specimens may appear to be sufficiently different and regarded as belonging to different species on the basis of a few available herbarium records, but only a field study of populations involving thousands of specimens can help in reaching at a better understanding of their status. If there are enough field specimens to fill in the gaps in variation pattern, there is no justification in regarding them as separate species. On the other hand, if there are distinct gaps in the variation pattern, it strengthens their separate identity. In fact, many plants, described as species on the basis of limited material in the pioneer phase, are found to be variants of other species in the consolidation phase. Most parts of central Europe, North America and Japan are experiencing this phase.

Experimental or Biosystematic Phase

During this phase, the herbarium records and variation studies are complete. In addition, information on **biosystematics** (studies on transplant experiments, breeding behaviour and chromosomes) is also available. Transplant experiments involve collecting seeds, saplings or other propagules from morphologically distinct populations from different habitats and growing them under common environmental conditions. If the differences between the original populations were purely ecological, the differences would disappear under a common environment, and there is no justification in regarding them as distinct taxonomic entities. On the other hand, if the differences still persist, these are evidently genetically fixed. If these populations are allowed to grow together for several years, their breeding behaviours would further establish their status. If there are complete reproductive barriers between the populations, they will fail to interbreed, and maintain their separate

identity. These evidently belong to different species. On the other hand, if there is no reproductive isolation between them, over the years, they would interbreed, form intermediate hybrids, which will soon fill the gaps in their variation. Such populations evidently belong to the same species and better distinguished as ecotypes, subspecies or varieties. Further chromosomal studies can throw more light on their affinities and status. Central Europe has reached this phase of plant systematics.

Encyclopaedic or Holotaxonomic Phase

Here, not only the previous three phases are attained, but information on all the botanical fields is also available. This information

is assembled, analyzed, and a meaningful synthesis of analysis is provided for understanding phylogeny. Collection of data, analysis and synthesis are the jobs of an independent discipline of systematics, referred to as **numerical taxonomy**.

The first two phases of systematics are often considered under **alpha-taxonomy** and the last phase under **omega-taxonomy**.] At present, only a few persons are involved in encyclopaedic work and that too, in a few isolated taxa. It may thus be safe to conclude that though in a few groups omega-taxonomy is within reach, for the great majority of plants, mainly in the tropics, even the 'alpha' stage has not been crossed. The total integration of available information for the plant kingdom is, thus, only a distant dream at present.