

VIII. IT IS THE GENERA OF THREATENED PLANTS THAT NEED ATTENTION

Plant species protection seems a popular concept nowadays, which leads to the preparation of Red Data Lists, and of sheets for recognition. Such an approach may be sensible in civilized temperate countries with a poor flora widely known; in the humid tropics it is out of the question. There are too many species, and neither books nor people are available to identify them, not to speak of implementation. Besides, dealing with species as isolated entities easily creates the impression that protecting such species would be of any help, to the neglect of the only effective way of conservation: wholesale protection of primary ecosystems. The latter concept, however, is difficult to convey to the public; it is too complex to create a lasting, vivid impression.

To the Malesian botanist, who in the wake of C.G.G.J. van Steenis and M.M.J. van Balgooy has learnt to think in terms of genera (see *Blumea Suppl.* 6, 1971, 38-49) to make plant geographical counts and to judge progress in taxonomy, the concept of endangered plant genera presents itself naturally. It cannot, however, be regarded as the same thing as a species but in a higher rank. Durio as a genus is clearly in grave danger to be decimated by loggers, but nobody would think of forbidding the trade of durian fruits, or even of durian timber, a kind of softwood occasionally used for the crates in which our specimens are shipped. According to A.J. Kostermans (*Reinwardtia* 4, 1958, 357-460) who monographed the genus, there are 27 species, of which *D. zibethinus* is known only in cultivation. The nucleus of the genus occurs in west-Malesia, in Sumatra with 7 species, 0 endemic, in Malaya with 11 species, 5 endemic, in Borneo with 19 species, 14 endemic, and smaller occurrences around this area. Several species are known to have fine fruits, and it is evident that the gene pool must be preserved in the interest of breeding and genetic improvement, so that the spectrum of adaptation, resistance, and fruit quality is broadened. Similar examples can be worked out for *Artocarpus*, *Citrus*, *Garcinia*, *Mangifera*, *Myristica*, *Musa*, *Nephelium*, and others which are all outstanding as future losses if the governments in Malesia continue to allow their forests to be devastated under whatever pretext.

While protection of such genera cannot be implemented in any way, the strongest possible arguments can be advanced for saving them in their entirety: not one species must get lost, and this can only be effected by protecting large and varied tracts of primary lowland forest. Many well-known genera of economic plants with wild relatives in these forests (including the rattans and *Dipterocarpaceae*) are thus fit to symbolize the need for conservation of whole ecosystems. In this

connection, the following arguments are to be considered.

1. The genera as such are indeed endangered. *Durio zibethinus* will survive in cultivation, but makes up 1/27 or nearly 4% of the genetic capital of the genus; the remainder is in for destruction. This is quite a representative example. Few species are in cultivation, many wild relatives need to be kept for future breeding. The loss in most cases can be estimated at 80-95% of the genetic capital, which amounts to an evolutionary disaster.

2. What holds good for fruiting trees, equally applies to timber trees, with equally serious consequences for the future of forestry in countries that have made themselves now so heavily dependent on it.

3. The genera here intended are all known at all levels of the population. The only authentic list I know of is the one given by C.G.G.J. van Steenis, *Fl. Males. i 4* (1949) lxviii, containing 'cultigens which in all probability were obtained from the original Malesian flora.' The list is not exhaustive and serves to illustrate merely the number and diversity of cultigens in a tropical arboreous flora. — *Antidesma*, *Areca*, *Arenga*, *Artocarpus*, *Averrhoa*, *Baccaurea*, bamboos, *Bouea*, *Citrus*, *Cocos*, *Codiaeum*, *Coleus*, *Colocasia*, *Dioscorea*, *Durio*, *Eugenia*, *Flacourtia*, *Garcinia*, *Lansium*, *Mangifera*, *Metroxylon*, *Morinda*, *Musa*, *Nephelium*, *Ocimum*, *Pandanus*, *Piper*, *Pisonia*, rattans, *Saccharum*, *Sandoricum*, *Spondias*, *Tamarindus*, *Zalacca*. Van Steenis's text, with several considerations with regard to 'The Origin of Malesian Cultigens', is very well worth reading in the light of conservation policy-making.

Not all of the listed genera can be traced to the primary forests (like 'bamboos', *Cocos*, *Ocimum*, *Saccharum*, *Tamarindus* probably), a number have to be added, including commercial timber trees; if we confine the list to well-known genera of undisputed value, it will be headed by something like 50 top genera.

4. The different concepts of genus and species, so important in this context, can easily be explained with the *Citrus* example: *C. aurantifolia* is Jeruk Nipis, *C. aurantium* is Jeruk Manis, *C. hystrix* is Jeruk Purut, *C. maxima* is Jeruk Bali, and by the *Eugenia* example: *E. aqua* is Jambu Ayer, *E. malaccensis* is Jambu Bol.

5. The known species of an endangered genus are part of a much greater entirety. This fact can serve to emphasize the importance of an entirety, and the function of a single element in it; the relation between part and whole.

6. The concept leads people, directly, to the all-important goal: conservation of the lowland rain forests, since it is there that the most endangered genera occur.

7. The argument is economically sound and easy to understand. Diversification of a crop in order to cover a wider

range of habitats and to be resistant to pests and diseases is something nobody can shrug off.

8. The assortment is limited, and taxonomically fairly well-known; ecological and plant-geographical distribution too, are well-known.

9. The Dipterocarpaceae can be given more publicity because all genera: *Anisoptera*, *Cotylelobium*, *Dipterocarpus*, *Dryobalanops*, *Hopea*, *Parashorea*, *Shorea*, *Upuna*, and *Vatica*, are endangered.

10. A meaningful connection is demonstrated between taxonomy, genetics, conservation, and economy. The value of the gene-pool, already emphasized in Indonesia by BIOTROP and LBN, is of course an essential factor in this context.

11. The distribution of the genera is far better known than that of the species in virtually all cases, also the taxonomic limits of the species are uncertain, at least in unrevised groups. This calls for research in various branches.

12. No implementation problems exist because of impracticability. The only way open is persuasion. But since everybody knows these genera, immediate success in terms of recognition and appeal is to be expected, and further education can make use of this advantage.

13. Good plates, in colour as well as in black and white, exist already of most of the genera intended, which gives an effort a start.

14. Education based on fruit genera works directly at all levels and in all regions.

15. The endangered genera of fruits have for a good deal been domesticated by man. This underscores man's dependence on the plant world. An account of their wild relatives invites a strengthening of the ancient bonds between plants and man, through deliberate and moderate action.

The available knowledge of endangered plant genera forms a solid basis for a variety of education efforts, all along the line: fruit — improvement by breeding — taxonomy — wild relatives — primary forests — conservation — economy — future.