AROID CONSERVATION

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Conservation of natural resources is a subject that generates strong emotions. In recent years plant conservation has become headline news with the realization that there is little point in attempting to conserve animals if their habitats, most notably the tropical forests, are being destroyed. Plant conservation covers many topics and includes monitoring the collection of plants, and their commercial trade, together with control of habitat destruction.

In terms of plant collecting it is usually the horticulturally desirable groups that attract most attention. Orchids, cacti and other succulents, carnivorous plants, cycads and bulbous plants being pre-eminent; it is these groups that are most at risk from commercial collectors and amateur enthusiasts. To this list should be added the aroids. They may not be as commercially important as the groups mentioned above, but large scale trade does exist in certain wild-collected species. The worrying fact is that this trade seems to be largely unchallenged.

A visit to almost any aquarist centre in Europe will reveal enormous quantities of plants being sold to decorate aquaria. Closer inspection will reveal a mix of aquatic and terrestrial plants, including aroids such as *Syngonium*, *Monstera* and *Spathiphyllum*.

Nearly all of these are commercially propagated; however, a large percentage of the plants sold are species of *Cryptocoryne*, aquatic aroids with a natural range extending from India to New Guinea. Almost no nurseries are producing *Cryptocoryne* in commercial quantities and therefore most of those sold in Europe are collected from the wild. If the quantities on sale at present are a true indication, the rate of removal from the wild must be very high. Many *Cryptocoryne* occur in highly localized habitats; for example in South-east Asia it is possible to travel along many miles of jungle streams and rivers without seeing any species of *Cryptocoryne* but then, in a stretch of water which is apparently no different, there will be one or more. Little work has been undertaken on the ecology of *Cryptocoryne*, yet they are being taken from the wild to satisfy a demand for decorative plants. Some studies in Peninsular Malaysia by Mashhor Mansor (Mansor, 1989 & 1991; Mansor & Masnadi, 1994) have highlighted the destruction that commercial collection can cause.

Cryptocoryne, because of its 'market desirability', is a useful example to draw attention to the commercial trade, but other genera are also at risk. Over-collecting in the past of two Philippine species of *Alocasia*, *A. sanderiana* and *A. zebrina*, has resulted in their demise in the wild (Burnett, 1985; Oldfield, 1983), although reports now suggest that *A. zebrina*, at least, has to some extent recovered on Luzon (Burnett, 1985). Recently a species of *Scindapsus*, possibly *S. rupestris*, has been offered under the name 'Kalimantan Sword'; in the wild *S. rupestris* usually occurs as individuals or small colonies and is never common. Renewed commercial interest in the horticulturally attractive Philippine *Aglaonema* species means that native populations are now under severe pressure (Oldridge, 1985) and an increase in demand for Thai species of *Aglaonema* also poses a threat (Brown, 1984).

Another aspect of the commercial exploitation of aroids is linked to their supposed aphrodisiac qualities. The belief that the phallic shape of the spadix imparts the plant with the ability to improve male sexual performance is found among indigenous people almost everywhere that aroids occur. Generally this does not have a great impact on local aroid populations since it is usually only the inflorescence that is collected. However, in Sumatra the tubers of *Amorphophallus titanum* and perhaps other giant *Amorphophallus* species are being collected on a huge scale to satisfy demand abroad. Tubers of *A. titanum* can reach almost one metre in diameter and attain a

weight of 70 kg. The plants are slow growing, taking as much as ten years to flower from germination. Reproduction is slow, mature plants flowering about once every three years. At present *A. titanum* is a fairly common aroid in northern Sumatra but the continued large- scale removal of mature tubers must eventually have an adverse effect.

The collection of plants from the wild by amateurs presents a different problem. It is often very difficult to convince amateur 'plant hunters' that repeated collection of a few plants from wild populations can have serious effects on those populations. By way of an example, a recently described species of *Sternbergia, S. candida* B. Mathew & T. Baytop has, despite a limited local distribution, been depleted in its type locality in the wild to satisfy horticultural demand (Mathew, 1983). Among the temperate aroids horticulturally desirable species with limited distributions face the same potential threat. A number of years ago I was fortunate enough to find a new, horticulturally desirable, species of *Arum* on Crete. At the type locality there are several hundred individuals and anyone visiting the site would feel confident that 'one wouldn't be missed'. However, the plant's only extensive stand is at the type locality. Although it occurs elsewhere on Crete, it does so only as scattered plants or small groups, nowhere else does it colonize an area as successfully as at the type locality. Collecting could turn an abundant plant with a restricted distribution into one clinging to the edge of extinction.

The impact of habitat destruction on aroid populations is perhaps the most difficult to assess. The main difficulty lies in an absence of reliable data on the distribution of aroids particularly in the tropics. Many species have restricted distributions, either because of geographical limitations or ecological requirements. The implication of this is that many species are vulnerable to habitat disturbance. In areas of disturbed forest the diversity of aroid species is considerably less than in undisturbed areas. The destruction of habitats might not only wipe out local populations of aroids, it might well spell the extinction of a species or even a genus.

Some species are, however, afforded protection. Until recently *Alocasia zebrina* and *A. sanderiana* were listed on Appendix I of the Convention on International Trade in Endangered Species. It is now felt that wild populations have recovered sufficiently for the former to be moved to Appendix II on the basis that the trade is now confined to artificially propagated material and for the latter to be

deleted from the Convention. *Arum purpureospathum* is protected by law in Greece and will be included in the forthcoming Greek Red Data book. In the Netherlands and in Russia micropropagation of some *Cryptocoryne* species is being undertaken and commercial stocks of horticulturally important aroids, for example *Dieffenbachia*, *Anthurium* and *Spathiphyllum*, are almost exclusively produced from tissue culture. In Malaysia a start has been made to propagate artificially certain plants which are in commercial demand (Bogner, pers. comm.; Mansor, 1991).

There is much that amateur growers can do to help by propagating and distributing their plants. One seed head of any *Arum* species contains 100–400 seeds; if these were sown, grown to flowering size and allowed to fruit, 10,000–160,000 seeds could be produced. In three generations there would be a large quantity of plants in cultivation and, in the case of certain species, this might well exceed the numbers growing in the wild, thus reducing the need to collect from wild populations. This would be an effective way to help ensure the survival of many species.

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