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ORCHID CONSERVATION: WHERE DO WE GO FROM HERE?

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Introduction

All that remains of the dodo are a few relics scattered around the museums of the world, the odd pile of bones, the remnants of a head and a foot at the Oxford University Museum of Natural History. Is this to be the fate of many orchid species? An occasional dried plant, mummified between dusty herbarium sheets, or even worse, no record at all? Although there is little hard evidence that, as yet, many species have become extinct in the wild, the sizes of orchid populations are often declining alarmingly. On a recent Kew expedition to Madagascar for example, only 25 plants of *Angraecum longicalcar* were found remaining in the wild and, reputedly, only a single plant of *Grammangis spectabilis*, the remainder of this population having been collected from its natural habitat in 1993.

We are all too aware of the current threats to wild orchid populations, habitat destruction, land conversion, over-collection. Nor are such problems confined to tropical countries with their rich orchid floras, species are in decline in many temperate areas. As if the situation wasn't sufficiently alarming, new threats are looming on the horizon. There is evidence that global warming is already having adverse effects in cloud forests around the world, and the much-vaunted move towards a change to biofuels may, paradoxically have the effect of pushing agribusiness further into rainforests, and taking up even more valuable land.

Faced with such a multitude of threats to the natural world, it is all-too-easy to become despondent. Yet the orchid community in general is becoming much more aware of the problems and, increasingly prepared to take action. Thus, the purpose of this paper is to focus on what can and is being done to conserve orchids.

In situ conservation

In an ideal world, examples of all the world's different natural habitats would be preserved, and

along with them all the orchid species they contain. Conservation of entire ecosystems should be our goal, but clearly this isn't going to happen in every case. Land purchase for reserves where possible, focusing on hotspots of biodiversity is, however, an important and effective strategy. The locations of orchid hotspots have been identified, and largely coincide with the biodiversity hotspots of other plant and animal groups. The conservation of the tropical dry forests of Costa Rica's Guanacaste province provide a shining example of what can be achieved with dedication and determination. Similarly El Pahuma and Jocotoco reserves in Ecuador have been established to conserve birds as well as orchids. Meadows, with their enormous plant diversity have been specifically targeted for purchase by the Wildlife Trusts in the UK, and my own home county contains many orchid-rich areas owned and managed by the Worcestershire Wildlife Trust.

Ex situ Conservation

There are those who express fears that if we spend our resources on *ex situ* conservation techniques this will reduce the impetus for conservation of habitats. *Ex situ* techniques should rather be seen as welcome additions to the conservation tool-box, essential components of an integrated approach.

Living Collections in botanical gardens have the capacity to perform both educational and research functions, as well as acting as an insurance policy against future losses. The collections of both commercial and amateur growers are equally important. Indeed, it was a commercial grower that provided us with the classic example of the potential importance of plant rescue and *ex situ* conservation. For many years, *Paphiopedilum delenatii* was thought to be extinct in the wild, and

was propagated in large numbers by Vacherot and Lecoufle. By producing good quality, affordable plants, commercial growers can reduce pressure from collection in the wild.

Amateurs have a positive role to play in orchid conservation. Often they are the best growers, having both the time and the dedication to nurture their plants. Many amateurs specialise in certain orchid groups, which in the UK can become recognised as National Collections. The Barbara Everard Trust was established in the UK to assist in resolving the problem of finding a suitable home for plants when the owner of the collection dies. The issue of long-term security of plants is not unique to amateur collections, however, botanical gardens may also encounter difficulties in maintaining continuity of care due to staff turnover.

An orchid collection should be viewed as being a dynamic entity. However long or short-lived individual plants may be, there will be a constant and on-going need to regenerate plants. There is a strong case to be made for the establishment of a network of living collections, first identifying the species which are rare in cultivation, then propagating and sharing them, including a scheme to maintain genetic diversity by out-crossing.

Techniques for growing orchids seldom get much of an airing, if they get an airing at all, at orchid conservation events. Perhaps they are viewed as being the province of the horticultural world. And yet there is a need for sharing best-practice regarding the cultivation of rare species in particular. In this respect (and others) the American Orchid Society (AOS) web site provides a valuable service. Pest and disease control are essential components of maintaining healthy plants in virus-free collections.

Growing Orchids from Seed

With increasing regulation it is becoming ever more difficult for the amateur grower, in temperate countries at least, to obtain species for cultivation in collections.. Yet the production of plants from seed is not difficult, and reduces the pressure on wild populations from unscrupulous collectors. With the increasing availability of pre-packaged media and simple step-by-step

manuals, growing orchids from seed does not need sophisticated laboratory equipment, and is relatively straightforward to perform in the home.

Often the only limitation is obtaining good, viable orchid seed. This has been resolved, at least in part, by the setting up of short-term seed banks in many countries. Seed can, for example, be purchased from the Orchid Seedbank Project (OSP) in the USA. Long-term storage requires a greater financial investment. Larger institutions such as The Royal Botanic Gardens, Kew's Millennium Seed Bank can provide a means of preserving maximum genetic diversity in a minimum space and at a minimum cost.

The development of techniques for germination, particularly for some of the more 'difficult' temperate species has raised the possibility of habitat restoration and re-introduction, exemplified by the pioneering Sainsbury Orchid Conservation Project to reintroduce *Cypripedium calceolus* in the UK, which at one time had declined to just one individual plant in the wild due to over collection.

Sustainable development

The collection and sale of wild plants seems to have become something of a taboo subject, and yet there could be a place for the collection and sale of some orchids if it is done in a controlled and renewable fashion. More often than not, there is a lack of data about the status of wild plants. *Cattleya dowiana* is still being collected from the forests of Turrialba in Costa Rica for example and yet, in part due to the difficulties of access, no studies are in place to study the impact, if any, of its continued removal.

The idea of sustainable development is viewed by some as being something of a contradiction in terms, what is clear, however, is that involvement of local people is key to the success of many projects. Many *Laelia* species in Mexico are traditionally used as cut flowers for use in religious festivals. Local people could be encouraged to cultivate plants generated by *in vitro* propagation techniques, rather than collecting plants from the wild. A project at Soconusco directed by Anne Damon is encouraging campesinos to cultivate their local

orchids sustainably. I am not suggesting for a moment that such projects can provide would be a sole source of income, rather they could form part of a mixed portfolio. Likewise the encouragement of ecotourism can provide an income for a range of associated businesses, such as Gabriel Barboza's orchid garden on the margins of the Monteverde Cloudforest Reserve.

Many tropical countries have built or are in the process of building their own indigenous orchid industries. Over recent years there has been an explosion in the production and sale of *Phalaenopsis* as pot plants for example. There are also opportunities to establish smaller nurseries catering for the needs of specialist orchid growers.

Education

It is encouraging to see more articles with a conservation focus appearing in orchid journals such as *The Orchid Review* and *Orchids*, and there does appear to be an increasing interest in environmental issues by the general public, if only because of rapidly increasing concerns about the effects of global warming. Although not able to compete with the so-called 'charismatic megafauna', orchids have been referred to as the 'pandas of the plant world'. There is no doubt that they have a special aura and could act as flagships for plant conservation in general.

The need to involve young people is self-evident, indeed our efforts are largely devoted to preserving the orchid diversity for them to enjoy. The project at Writhlington School in the UK serves as a beacon, where young people are encouraged to participate in a wide range of orchid activities ranging from growing and showing orchid to visits to tropical climes to carry out conservation projects. It has already spawned at least one imitator at King Charles 1 school in Kidderminster in a project aimed at raising local orchids to set up an orchid garden at the headquarters of the local Wildlife Trust.

As part of a strategy to engage a wider audience as possible Orchid Conservation International has set up a partnership with staff and students at Blackpool and The Fylde College in the UK. Students who are studying for a degree in Scientific

and Natural History Illustration have produced two posters. Not only are these posters attractive in their own right, by telling different stories they can act as valuable teaching tools. The first, by Ian Cartwright, tells the story of the bucket orchid, *Coryanthes kaiseriana* and its euglossine bee pollinator, the second of *Paphiopedilum rothschildianum* on the slopes of Borneo's Mount Kinabalu, reduced to a handful of plants in remnant populations.

NGO's, Orchid Charities and Sources of Funding

From the above it is clear that there are a wealth of ways in which orchid conservation can be promoted, and of orchid conservation projects worth funding. Obtaining funding is of course a perennial problem. The Orchid Specialist Group lists possible sources on its website.

In addition to the long-standing commitment of the AOS, a number of orchid charities have been established recent years, including Orchid Conservation International (OCI), Orchid Conservation Alliance (OCA) and the Orchid Conservation Coalition (OCC) - 1% for orchid conservation. The specific aims may vary according to the organisation, but all aim to support a broad range of orchid conservation activities in one way or another. For instance, in addition to supporting the work of the Orchid Specialist Group (OSG), OCI has recently awarded grants both for an educational orchid programme and seed money for a field project conducted by WildShare at the El Cielo Biosphere Reserve in Mexico, and for a project monitoring epiphytic orchid distribution and population dynamics on a disturbance gradient in Andean cloud forests in Colombia.

Nor should it be forgotten that gifts in kind are always welcome from private individuals. Donations of microscopes and books may appear to be obvious, but also equipment such as scanners for scanning herbarium sheets. Of course orchid charities are themselves constantly searching for new sources of funding to allow them to continue their work.

Finally, the Orchid Specialist Group is itself a volunteer organisation. Made up of around two

hundred individuals with a wide range of expertise; botanists and other scientists, commercial growers and amateurs, it has an important educational role through its promotion of International Orchid Conservation Congresses, its web site and its on-line journal *Orchid Conservation News*. Together with the provision of advice and through the mobilisation of its membership it has the potential to have a large and positive impact on orchid conservation over the coming years.

Previously a biology lecturer, **Philip Seaton** now devotes himself full-time to orchid conservation. He is Secretary of Orchid Conservation International and the Orchid Specialist group, and runs a micropropagation laboratory at a local school. A past editor of *The Orchid Review*, he has written around one hundred popular and scientific articles on a wide range of orchid topics. He has illustrated and co-authored *Growing Orchids from Seed*. He received the degree of Master of Philosophy for his research into orchid seed storage, and is currently working to promote the establishment of a global network of orchid seed banks.