

**Zeitschrift:** Boissiera : mémoires de botanique systématique  
**Herausgeber:** Conservatoire et Jardin Botaniques de la Ville de Genève  
**Band:** 47 (1993)

**Artikel:** Session I : introduction  
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**DOI:** <https://doi.org/10.5169/seals-895430>

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175<sup>e</sup> anniversaire du Jardin botanique de Genève

Colloque international sur le thème

## Nature et Jardins botaniques au XXI<sup>e</sup> siècle

Genève — 2-4 juin 1993

### SESSION I — INTRODUCTION

Martin W. HOLDGATE

I am grateful for the opportunity of chairing this session on Nature Conservation: The Role of Botanical Gardens, because it allows me to emphasize the importance of botanical gardens in conserving the world's biological diversity, and the need for those concerned with conservation in situ especially in protected areas, to work very closely indeed with those who are specializing in maintaining species ex situ in gardens and zoos. It is I think now evident that both approaches to conservation are essential, and that they must be mutually supportive. The challenge for us in this session is to discuss how this self-evident goal is to be attained.

It is one of the duties of the Chairman of a session to provoke the audience, so that lively discussion follows. In thinking what I would say today I considered provoking you by arguing three points: first the botanical gardens have been established for the wrong reasons, second that they are in the wrong place, and third that many are following the wrong approach! However, since I am not a specialist in plant conservation, and have only a layman's knowledge of botanical gardens, I will make my three points more cautiously: I will argue that the role of botanical gardens has changed and is now changing perhaps faster than ever before; that we need to look at their geographical distribution and the support given to each in the context of the new demands on the world's conservation community; and that the technical approach of gardens also needs adjustment to take the new context into account.

It is not of course surprising that the role of botanical gardens is changing today, because it has done so down the centuries of their history. Many originated as herb gardens in which medicinal plants were cultivated, while others combined this role with botanical research and the education and enlightenment of the curious. Zoological gardens, of course, similarly pursued this dual role of education and enlightenment, but their contribution to medicine has been less significant (although you may be aware that at the last Conference of Parties of CITES, the Convention on International Trade in Endangered Species, one nation proposed the captive breeding of tigers so that their bones could be used in oriental medicine!).

The changing demands on botanical gardens arises because of the grave threats facing the world's flora. Many of you are aware of the calculations: if present trends continue up to 25%

of the world's vascular plant species could become extinct, or be reduced to tiny remnants, by the middle of the next century. Faced with this challenge, most conservation organizations, including IUCN, have emphasized the need for a combination of in situ and ex situ conservation to maintain species and genetic resources. If you look at "Caring for the Earth: A Strategy for Sustainable Living", launched by IUCN, the United Nations Environment Programme and the World Wide Fund for Nature in October 1991, you will see that this is the title of one of the actions proposed within the wider context of the conservation of the Earth's vitality and diversity. Action 4.12 of "Caring for the Earth" emphasizes that zoological and botanical gardens have a key role in maintaining populations of animals and plants. The need to pay particular attention to the wild relatives of domesticated crop plants is stressed. So is the need for close integration between the ex situ and in situ programmes, the management of captive populations to ensure that they are genetically and demographically viable, the management of such populations collaboratively by a number of institutions so as to maximize demographic security and genetic diversity, and the need in captive breeding programmes of threatened species to emphasize the benefit to the species themselves rather than the commercial nature of the transactions that could be based on them.

Many of these points were taken up again in Rio de Janeiro in June 1992. "Agenda 21", the world plan of action for the next century, has a section on conservation of Biological diversity. It emphasizes that the essential goods and services that support life on our planet depend on the variety and variability of genes, species, populations and ecosystems. It emphasizes biological diversity as the human life support system. It urges decisive action to conserve and maintain this diversity, and in this context stresses the need to protect both natural habitats and species and genotypes.

These points are taken up again in the Convention on Biological Diversity signed by over 150 countries in Rio de Janeiro, and now in process of ratification. That Convention also emphasizes this balance between in situ and ex situ action. It all adds up to that fact that the topics that concern us here today are firmly inscribed on the world agenda, endorsed by the largest meeting of heads of state and government that has ever been held.

Generalization is easy, but as we all know, the test is how effectively it is turned into practice. And as we approach that practice, may I emphasize again that it is pointless to argue about the relative merits of in situ and ex situ conservation because we need both. Wherever possible, in situ conservation must be pressed forward, through the establishment of protected areas that safeguard samples of the world's diverse ecosystems and large populations of a range of species in their natural habitats. This is unquestionably the best way of safeguarding as wide a genetic diversity as possible, and the establishment of protected areas is crucial for the survival of the wild relatives of crop and medicinal species as well as for the protection of those many plants and animals which are not directly useful for humanity. Let me pause here and say that the more we study human use, especially by indigenous peoples, the more we shift the balance between these two categories however. I am told that in some Amazonian forests, for example, some 90% of the vascular plant species are used by indigenous people in one way or another. As we conserve, we also learn about the values of the species in our care.

But in many parts of the world, as everyone here is well aware, pressures on natural habitats and the difficulties of maintaining protected areas in countries without the necessary resources to invest make ex situ conservation essential. There is no question that well managed botanical gardens can be a highly cost-effective way of safeguarding the species that we need to care for.

I said that my first provocative remark would be that botanical gardens had been established for the wrong reasons. Although I shied away from it, let me explain what I meant. The majority were established for the limited range of uses perceived in the more affluent countries of the world, and especially as a basis for education and in order to inform curiosity. We now know that the

reasons for establishing and managing gardens are much more weighty than that. They are simply front-line areas in the battle against the erosion and destruction of the vital resources of the planet. You know that — but a lot of people in governments do not, and they still tend to dismiss botanic gardens therefore as somewhat archaic creations, frequented by a minority of enthusiasts and eccentrics. They need to be told of the overwhelming reasons why they are wrong, and why there are new, strong, reasons for increased investment in this form of conservation.

I also said that botanic gardens were in the wrong place. It is well known to everyone here that there are in fact about 1600 such gardens in the world, and that most are in the temperate zones. If you look at the match between plant diversity and botanic garden distribution, disparities are evident. There are about 30 botanic gardens in tropical and sub-tropical Africa, where there are around 35,000 native vascular plant species. Indonesia, with 10,000 tree species alone has five botanic gardens. Europe, with 12,000 vascular species, has over 500 botanic gardens and the continental United States, with about 20,000 species, has over 300 botanic gardens. About a quarter of the total tropical diversity in the world — some 40,000 species — are concentrated in the northern Andean countries of Columbia, Ecuador and Peru, where there are about a dozen botanic gardens in all. If you look at the species that are truly safeguarded in these various locations I think you would become even more concerned with the mismatch.

This does not mean that there are not excellent botanical gardens in some parts of the developing world. I recall my own astonishment when I visited that magnificent example in Harare — and many of you will know other outstanding, well-managed tropical sites. Nonetheless, is enough being done to support such centres? I know that the botanical garden in Harare is desperately short of resources, and this must be true for other developing country sites. Are the right alliances being forged between the botanic gardens in the north and south — like that which I believe exists between the Missouri Botanic Gardens and the garden in Madagascar? Should BGCI, as the world's network of botanic gardens, do more to promote such linkages? I hope that this is something we can discuss.

My third provocative point was that botanic gardens were not approaching their task in the right way. I am here of course on dangerous ground because of my admitted ignorance of the subject. But the links between botanic gardens and field conservation in many countries are far less strong than I believe the world needs, given the present imperatives to safeguard biological diversity. In many countries, there are good gardens, safeguarding many species, but not contributing to plant conservation as they should.

What approach should in fact be followed? I think the answer lies in two spheres — policy and technique. In the former, I do very strongly urge that those responsible for the conservation of biological diversity in a country should establish policies that embrace both *in situ* and *ex situ* conservation, making sure that resources are available both for national parks and protected areas and for the botanical gardens and animal captive breeding centres that perpetuate those species that cannot be safeguarded in the wild. I would urge those putting resources into conservation also to recognize the need to support both legs of this increasingly precarious structure.

So far as the technical aspects go, I believe that we need to start with the point that more than ever before, many plant species are known only from fragmented, tiny populations which may be below the minimum viable level in the wild. Some may even have ceased reproducing because of the extinction of some pollinator, excessive fragmentation, a genetic bottleneck or some other cause. Hence botanic gardens come into action as intensive care centres for these species, to multiply them and build them up with the ultimate aim of restoration to the wild. This means in turn that they must act as caretakers for plant germplasm in a genetically and scientifically sound manner — not simply as collectors seeking to have a display of the species in question.

There are models to follow both from the zoological gardens where stud books of certain endangered species have been maintained and captive breeding programmes have been very carefully worked out to preserve maximal genetic diversity, and of course in the sphere of genetic resource conservation of important food crops. It is true of course that those working on crops have a narrow focus on economically important species. But they have established the principle of conserving a wide genetic range, and looking to the ultimate viability of the populations in their care.

In this session we will listen to four detailed presentations, which while they focus on Europe and the Mediterranean Basin, will I hope also have wider implications. I hope that, moving to the future, Botanic Gardens Conservation International, which I am happy to recall was created through IUCN, gains ever widening acceptance for its essential role in establishing botanic gardens as major conservers of endangered plant species. I hope that all the gardens in the world will link through BGCI, and work in a coordinated fashion, as stud book keepers noting the genotypes that the various gardens hold, and operating so as to safeguard the most endangered plant species in the world and build their populations up to the point where, in partnership with those charged with in situ conservation, restorations to natural habitats can be achieved. I would also stress that one should not think of this as a simple linear sequence: the continuing interplay between in situ and ex situ conservation will be a feature of the future and needs to be planned through partnership between the botanic gardens and the parks and protected area authorities worldwide. This is perhaps the key role for IUCN, in its own Plant Conservation Programme, bringing BGCI and its component gardens together with the Commission on National Parks and Protected Areas, the Species Survival Commission, and the groups in our Secretariats working with both.

I look forward with keen interest to hearing the detailed case studies now to be presented, and I hope that in discussion you will respond to some of the points of provocation that I have listed.

Thank you for your attention.