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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

### Advantages of networking at various levels among botanic gardens

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#### ABSTRACT

HERNÁNDEZ-BERMEJO, J. E. (1993). Advantages of networking at various levels among botanic gardens.

Comptes-rendus du colloque "Nature et Jardins botaniques au XXI<sup>e</sup> siècle", Genève, 2-4 juin 1993. *Boissiera* 47: 87-97.

Different patterns of association among botanic gardens have been repeatedly taking place at various levels specially during the last 40 years. All of them have aimed at finding a co-ordination of the different activities, forms of co-operation and the strength of an organized system to support every one of its members. Organizations of an international nature (the IABG and its European-Mediterranean, North-American, Asiatic, Latin-American and Caribbean sections), and of a regional or national nature (the French Association of Botanic Gardens, the Iberian-Macaronesian Association, the Association of Technical Administrators of Botanic Gardens of Switzerland, the Mexican Association of Botanic Gardens, etc.) were founded, as well as other associations of a sectorial nature that group together botanic gardens interested in a certain type of activities or objectives, as the Botanic Gardens Conservation International that associates the botanical gardens involved in conservation programmes world-wide.

All these levels are not exclusive one from another. They represent different ways of linking the botanical gardens through co-operation agreements and joint actions that also have different programmes of action or different geographical scopes. The author of this paper has acquired a wide experience as a result of the positive and negative aspects that he has faced in the management of a botanic garden that maintains several co-operation agreements with other botanic gardens of different countries. The Córdoba Botanic Garden forms a part of the BGCI, the IABG and the IMABG. Its director has been a member of the IABG Council Board (both world-wide and of its European-Mediterranean section), has collaborated in the promotion of the Latin-American and Caribbean Association of Botanic Gardens and he has also been a promoter of the Iberian-Macaronesian Association of Botanic Gardens (IMABG) and President of the IMABG for three elective periods. This work allows the author to outline some hypotheses concerning what we can await from each one of the levels of association and co-operation that have been described.

All the achievements obtained through the co-operation among the botanic gardens that constitute the IMABG are explained in detail. For example, the promotion of new botanic gardens and the reinforcement of the gardens already created, the organization of courses and monographic workshops, periodic symposia, publications, co-operation in new facilities, exhibitions, plant species exchanges, co-edition of an integrated "Index Seminum", methodological advances as regards conservation programmes, etc...

Several opinions that concern to the co-operation between pairs of botanic gardens through specific co-operation agreements are also stated. The experience obtained from the agreement between the Córdoba Botanical Garden and the Cuba National Botanical Garden is discussed as a model of co-operation and the results are explained.

The objectives of specific co-operation that correspond to each one of the possible levels or association are finally analysed and the creation of some new organization is suggested.

### RÉSUMÉ

HERNÁNDEZ-BERMEJO, J. E. (1993). Avantages des réseaux à différents niveaux entre jardins botaniques.

Comptes-rendus du colloque "Nature et Jardins botaniques au XXI<sup>e</sup> siècle", Genève, 2-4 juin 1993. *Boissiera* 47: 87-97.

Au cours des 40 dernières années, divers modèles d'association se sont développés parmi les jardins botaniques. Tous visaient à la coordination de leurs différentes activités, à promouvoir diverses formes de coopération et à tirer parti d'un système organisé soutenant chacun de ses membres. Les organisations de type international (comme l'IABG, et ses sections euro-méditerranéennes, nord-américaines, asiatiques, latino-américaines et des Caraïbes), et de type régional ou national (comme l'Association française des Jardins botaniques, l'Association des responsables techniques de Jardins botaniques en Suisse, l'Association mexicaine des Jardins botaniques, etc.) ont été fondées ainsi que d'autres associations de type sectoriel qui regroupent des jardins botaniques intéressés par certaines activités ou poursuivant des objectifs similaires, tel que le "Botanic Gardens Conservation International" (BGCI) qui regroupe tous les jardins botaniques engagés dans des programmes de conservation à travers le monde.

Tous ces niveaux d'association ne sont pas exclusifs les uns des autres. Ils représentent différentes façons de tisser des liens entre les jardins botaniques au travers d'accords de coopération et d'actions communes, dont les programmes sont à la fois variés et concernent différentes régions géographiques. L'auteur de cet exposé a acquis une vaste expérience et a été confronté aux aspects positifs et négatifs dans la gestion d'un jardin botanique qui maintient plusieurs accords de coopération avec des jardins botaniques de différents pays. Le Jardin botanique de Córdoba fait partie du BGCI, de l'IABG et de l'AIMJB. Son Directeur a été membre du Comité directeur de l'IABG (au niveau mondial comme au plan de la section Europe-Méditerranéenne), il a par ailleurs collaboré à la promotion de l'Association des Jardins botaniques latino-américains et des Caraïbes et a été promoteur de l'Association ibérico-macaronésienne des Jardins botaniques (AIMJB) et Président de l'AIMJB pour trois mandats. Ce travail permet à l'auteur de décrire quelques hypothèses à propos de ce que l'on peut attendre de chacun des niveaux d'association et de coopération cités.

Tous les résultats obtenus au travers des relations développées entre jardins botaniques que compte l'AIMJB seront l'objet d'explications détaillées. Par exemple, seront abordés la promotion de nouveaux jardins botaniques, le renforcement des jardins qui existent déjà, l'organisation de cours et d'ateliers monographiques, de symposiums à intervalles réguliers, les publications, la coopération en matière de nouvelles installations, les expositions, les échanges d'espèces de plantes, la co-edition d'un "Index Seminum" intégré, les progrès concernant les programmes de conservation, etc...

Seront également fournies plusieurs opinions quant aux accords de coopération spécifiques entre deux jardins botaniques. L'expérience tirée de l'accord de coopération entre le Jardin botanique de Córdoba et le Jardin botanique national de Cuba fera l'objet d'un examen tout particulier d'un modèle de coopération, et les résultats qui en dérivent seront expliqués.

Enfin, les objectifs d'accords de coopération qui correspondent à chacun des degrés possibles d'association seront analysés, y compris la suggestion de mettre en place une nouvelle organisation.

## Introduction

The need of a joint action to face the objectives and activities of the Botanic Gardens in an interactive and coordinated way is a more and more extended feeling. In 1981, after the Congress held in Canberra, the International Association of Botanic Gardens (IABG) decided, in its ninth meeting and assembly, to become independent from the International Association of Plant Taxonomy (IAPT) and constitute itself as an Independent Association. The promotion of associations of a more regional nature was also decided in Canberra. The first regional section of the IABG, the European-Mediterranean Division, was created in Hamburg a year later. The first president of the newly independent IABG, Prof. Kai Larsen proposed an elementary network formed at least by sections such as the North-American, South-American, South-East of Asia and maybe the Australian and Tropical-African divisions.

### **IABG and BGCI: two very different experiences but the same conclusion**

Perhaps the IABG has not played so far the whole role that was expected after its foundation in 1981. Its by-laws, already drawn up in 1983, were not passed until the General Assembly held in Frankfurt in 1989. The IABG never got so elementary aims such as the cashing of the fees, the establishment and application of schedules or criteria to become members or leave the association, the edition of a Newsletter at a worldwide scale, etc. But at least the IABG convoked periodically its members and non-members, grouped together those who wanted to attend, promoted regional associations of a lesser scope, gave some members the opportunity to meet the others. Relations, exchanges, working groups were born thanks to these meetings. For the first time, problems and new prospects for the XXI Century's Botanic Gardens were set forth, traditional questions such as the "Index Seminum", Collectionism and Species Trading were criticized. We started to talk about the role of the Botanic Gardens in the Conservation of Endangered Species, their role in the Education, their social profitability, their linking to CITES, their relationship with other international institutions of scientific cooperation.

Our newly created Córdoba Botanic Garden and I myself had our first contact with an Association of Botanic Gardens through the IABG. Before that, we knew about the existence, design and experiences of Botanic Gardens as individualized and isolated elements. We had some experiences of cooperation and had received the help of some of them. I would like to express my gratitude to Dr. Hartmut Ern, to Prof. Ehrendorfer (Botanic Garden of the University of Vienna), and to many others who taught us to take the first steps in our project twelve years ago.

Our incorporation to the programmes and tasks of the IUCN Botanic Gardens Conservation Secretariat was immediate. The Córdoba Botanic Garden started to collaborate with the B.G.C.S. since its foundation in 1984. The fact that the conservation of endangered wild species was one of the two main objectives of the newly created Andalusian Botanic Garden, coincided completely with the basic *raison d'être* at the new Secretariat of the IUCN, which later became the BGCI. That's why we took part in the 1st International Congress organized by the B.G.C.S. in the Canary Islands. That's why the General Director of the IUCN, Dr. Kenton R. Miller, was co-participant together with the local authorities of the University and the City Council and with the President of the IABG, represented there by Dr. Hartmut Ern, in the same official opening ceremony of the Córdoba Botanic Garden in April, 1987. That's why simultaneously to this inauguration, we celebrated a Symposium organized in collaboration with the B.G.C.S. that was presided by Prof. V. Heywood.



In these 9 years, we have collaborated with the BGCI attending Congresses and Workshops, following all its initiatives on education, conservation, CITES, information exchanges, twining, and collaborating in its publications and documents.

We have always had the help and collaboration of the BGCI, especially through the personal attendance of Prof. V. Heywood to multitude of courses (Biodiversity), congresses (Plant Conservation Techniques, Etnobotanica 92) and in the promotion of the Spanish Botanic Gardens (Valencia, Córdoba, Sierra Nevada, etc.). We have collaborated in many occasions and initiatives with all its staff: Peter Wyse Jackson, Etelka Leadlay, Julia Willison, etc. It has been, rather it is being, not only a extremely positive experience from a technical point of view, but also nice and rich at a personal level. We are proud of our level of integration in the BGCI.

Therefore, regarding this first point, we have to conclude that, independently to the more or less success, efficiency, scope of action or objectives of the two associations, our experience of integration and participation has been absolutely positive. What our botanic garden has achieved in this short period is due both to the effort done by us from inside and to the exchange of information and cooperation with gardens from all over the world. And this would not have been possible without the IABG and the BGCI.

### **Our role in the promotion and creation of the Latin-American and Caribbean Association of Botanic Gardens**

The participation of the Córdoba Botanic Garden in the Congress held in Nancy in 1984, organized by the European-Mediterranean Section of the IABG supposed the first international presentation of the new Botanic Garden that was still under construction. After the meeting I was included in the Board of this European-Mediterranean Division. I accepted two responsibilities with this appointment: to promote a Latin-American Division or Association of Botanic Gardens and to achieve a bigger cooperation among the Spanish and Portuguese Botanic Gardens increasing their participation in the IABG.

Regarding the first engagement, I immediately focused my efforts in the 4th Latin-American Congress of Botany. I proposed the President of the Organizing Committee, Dr. E. Forero, the inclusion of a Satellite Meeting on Botanic Gardens in the Congress. This Satellite Meeting took place during the Congress held in Medellín (Colombia) in July, 1986. The directors and technicians of several botanic gardens from Colombia, Brazil, Mexico, Cuba, etc., reunited there decided to promote the creation of the Latin-American and Caribbean Association of Botanic Gardens and ask for its recognition as a regional section. A commission constituted there was required to elaborate a directory of gardens of that geographical area, prepare the by-laws and the constitution act that would be presented in the next Latin-American Congress of Botany to be held in La Habana in 1990 and accomplish the inclusion of the Association as a Division of the IABG in the next General Assembly to be held in Frankfurt in 1987.

We went through all the steps. I had the opportunity, together with Dr. A. Leiva to present the proposal of inclusion of the Latin-American and Caribbean Association in the Congress held in Frankfurt. I also formed a part of the Presidency of the Satellite Meeting of the V Latin-American Congress of Botany in which the by-laws were passed and the association was definitely constituted. In this act and Congress, the new Association established intense links of collaboration with the BGCI, represented by Dr. P. Wyse Jackson. At this point, I realized that my task to reach that aim had finished.

# **Objectives, achievements and limitations of a regional association between two states: the Iberian-Macaronesian Association of Botanic Gardens (IMABG)**

As we said before, the second one of the specific engagements taken by myself in Nancy, was to achieve a greater cooperation between Spanish and Lusitanian botanic gardens and facilitate their integration into the IABG.

Accordingly, throughout the second half of 1984 a series of contacts with several directors and people in charge of the Iberian and Canary Island botanic gardens were established. From these contacts it was possible to organize a first meeting which was held in Córdoba in April, 1985. About 80% of the directors or representatives of the Spanish and Portuguese botanic gardens attended it. A general review on the current situation among the botanic gardens of the area was stated in that meeting, and the decision to constitute a new Association was taken. After this, the by-laws were discussed and approved and finally the board for the next two years was elected. This was the process followed for the creation of the Iberian-Macaronesian Association of Botanic Gardens.

Its objectives were:

- To organize meetings, congresses, seminars and conferences to deal with the problems of management of botanic gardens.
- To stimulate the collaboration among the Botanic Gardens through the promotion and coordination of joint projects, the exchange of knowledge, experiences, data and plant material.
- To promote the relationships between the Spanish and Portuguese Botanic Gardens and other Associations with similar objectives.
- To promote the existing botanic gardens and encourage the creation of new ones as well as outline the strategies and actions to achieve this.

As you can see, the promotion and help for the creation of new botanic gardens in the area were included among the objectives of the Association in a very specific way. The intention was to achieve a minimum network to compensate the small number of botanic gardens of Spain and Portugal. The name of Iberian-Macaronesian, besides being related to the phytogeographical nature of its territories, avoids to establish an order at the time of mentioning the names of both countries whose botanic gardens were associated.

Eight years have passed since 1985. It is convenient to make a study and check up to what extent the objectives that were designed have been accomplished.

## *Organizing meetings, congresses, seminars and conferences dealing with the problems of the botanic garden management*

Nine meetings have been held up to now, with the following nature:

### *Symposia:*

- Córdoba (1985): Creation of the Association.
- Vila Real (1988): 1st meeting, organized by the Botanic Garden of Lisboa.
- Gran Canaria (1990): 2nd meeting, organized by the Canary Islands Botanic Garden.

*Technical meetings and workshops:*

- Córdoba (1987): coincident with the Conservation Techniques in Botanic Gardens Symposium.
- Sesimbra (1989): germplasm banks.
- Córdoba (1991): educational programmes.
- Madrid (1991): database and register of information.
- Córdoba (1992): coincident with the International Congress Etnobotanica 92.
- Blanes (1993): recent technical meeting to promote the legalization of the Association, transmit agreements and information on CITES and promote a magazine for its diffusion.

*Stimulating the collaboration among the Botanic Gardens through the promotion and coordination of joint projects as well as through the exchange of knowledge, experiences, data and plant material*

*Species exchange*

We know that a certain number of considerable dispatches have been done among several Botanic Gardens of the Association such as the ones of Gran Canaria, Orotava, Valencia, Madrid, Córdoba, Barcelona and Blanes. The Córdoba Botanic Garden, for instance, has received plants from: Lisboa (University), Lisboa (Tropical) and Madrid, besides the very special dispatches from La Orotava and Blanes (in collaboration with Etnobotanica 92) and from the Canarian Botanic Garden, that made it possible to install the probably best collection of Canarian flora that exists today in the Iberian Peninsula.

*Index Seminum*

Possibly this is one of the most remarkable agreements and successes achieved so far, thanks to the joint work carried out by the Botanic Gardens associated to the IMABG.

The decision of carrying out a study on the viability of editing a global Index Seminum for all the botanic gardens wishing to be associated, was taken in the technical meeting held in Sesimbra (1989). This not only would save the edition and distribution expenses, but also the conservation costs, what was more stimulating. This way we would avoid the duplication of collects and offers, and the number and quality of the taxa to be offered would be rationalized. An Index integrating the germplasm offer of ten or fifteen Botanic Gardens would allow a quick localization and petition of the Iberian-Macaronesian germplasm by the demanding Botanic Gardens.

The previous study of viability was carried out by M. Clemente Muñoz and P. Contreras, from the Córdoba Botanic Garden. This study was also accompanied by the experience and antecedents of previous works (CLEMENTE MUÑOZ & HERNÁNDEZ-BERMEJO, 1989; CLEMENTE MUÑOZ & HERNÁNDEZ-BERMEJO, 1989 and HERNÁNDEZ-BERMEJO & CLEMENTE MUÑOZ, 1991). The nature of the supply and demand of seeds resulting from the exchanging experiences of the Córdoba Botanic Garden was analyzed in these previous works. The results were alarming if we compared the collection, conservation, distribution and edition expenses of the Index with the low output derived from that effort: the seeds were mainly sent to a limited number of gardens of very few countries. These countries were the ones that made more orders and in a reiterative way, asking many times for the same taxa, year after year.

The project and the proposal of a coordinated Index was initially presented and subject to discussion in the V Latin-American Congress of Botany and finally in the II Symposium of the IMABG, held in Gran Canaria (1990), under the title "Towards a new concept of Index Seminum". That was the starting point. The responsibility of its edition corresponds consecutively to the different associated gardens. The three editions that have been published up to now have been edited successively by the Córdoba (1991), Blanes (1992) and Canarian Botanic Garden (1993). The next edition will be edited by the Barcelona Botanic Garden (1994) and the following one by the Madrid Botanic Garden (1995). Nowadays, this publication includes the seed catalogues from twelve institutions. Each catalogue is separated from the others and contains information about the corresponding botanic garden and the seed list that it offers. They are kept in a cardboard folder which describes the history and aims of the Association in three languages (English, Spanish and Portuguese) and how to use the seed lists. The taxa are always listed in alphabetical order according to families, genera and species. The localities are indicated only when the taxon was collected in nature. This work has not only been coordinated in which concerns to the form of edition. Each garden or institution offers a maximum number of 100 taxa. The species that are selected must:

- a) avoid duplications in the supply;
- b) minimize the impact of the collections on the natural populations, especially if we are dealing with rare or endangered species.

Despite the obvious advantages of this method of preparation and edition of a coordinated Index, there are still some problems to be solved: not all the gardens have the same resources to assume the responsibility of the edition; the character of independent and nearly competitive "presentation card" of the separate edition is lost. But there are more advantages and they can be summarized, according to CLEMENTE MUÑOZ & CONTRERAS GARCES (1990) with the following sentence: minimum effort, minimum economic cost, minimum sacrifice of nature.

#### *Educational programmes*

This has been one of the fields of work in which we have achieved a great success in the exchange of techniques, methods and experiences. Nowadays, seven gardens of the association carry out specific educational programmes. There is a joint report of activities. During 1992, 120,000 scholars have been directly involved in these educational programmes. Some gardens have also signed agreements with the local or regional educational authorities. As it has already been said, several monographic meetings have been organized within the IMABG as regards to education such as the workshop held in Córdoba in 1991 and 1992, and the collaboration in the one organized by the BGCI in the Canary Islands in 1993.

#### *Exhibitions*

Perhaps this is an outstanding subject. The possibility of organizing an exchange and joint financing of exhibitions has been set forth several times within the IMABG. Only a limited number of collaborations have been achieved in this sense up to now as the ones received by the Córdoba Botanic Garden for the installation of the Ethnobotanical Museum.

#### *Courses and technical advice*

Several gardens of the Association have exchanged their technical advice in very different occasions. Many others have collaborated in the promotion of their new projects of creation or extension. In Córdoba, the design and installation of the greenhouses dedicated to the Canarian Flora had not only the donations of the Canarian Garden, but also the advice from some of its technicians. The common problems for the different professional groups are not only discussed in

monographical workshops and biannual meetings, but also through a permanent communication: this occurs, for example, among the people in charge of germplasm banks, curators of gardens and herbaria, pedagogues, people in charge of their Gardening Schools, etc.

#### *Methodological advances*

The Simposia held in Sesimbra and Gran Canaria have been very positive experiences in this sense. A very remarkable methodological advance has been achieved in the conservation techniques, evaluation of the risk of extinction, micropropagation methods and restitution programmes of endangered species.

#### *Promoting the relationships between the Spanish and Portuguese Botanic Gardens and other Associations with similar objectives*

#### *Relationships with CITES*

The Botanic Gardens are progressively getting involved in the accomplishment and collaboration with CITES. Some of them have even become the Plant Scientific Authority, representing officially their country as it is the case of Kew Royal Botanic Gardens in the United Kingdom. Others have been recognized by their National Authorities as advisers in plants, as it is the case, within the E.C., of the Botanic Garden of the University of Copenhagen (Denmark), the Meise Botanic Garden (Belgium) or the Leiden Botanic Garden (Netherlands). In Spain, the Córdoba Botanic Garden has become the Official Adviser in Plants of the Scientific Authority. After this collaboration, the Spanish Botanic Gardens start to study the possibility of becoming centres for the conservation of the confiscated material.

#### *Participation of the botanical gardens of the IMABG in the activities of other institutions: Congresses of the IABG, BGCI, LBA, etc.*

The participation of the Spanish and Portuguese Botanic Gardens in international events before 1984 had been very limited. That participation is intensified after the creation of the IMABG. Some of them such as the Canarian (1985, 1993) or the Córdoba Botanic Garden (1987, 1992) have celebrated several congresses or simposia and they have also organized other different workshops and courses of an international nature for the accomplishment of programmes of the IMABG, BGCI or IABG.

#### *Promoting the existing botanical gardens and encouraging the creation of new ones; outlining the strategies and actions to follow in order to achieve this aim*

The tendency and evolution of the Botanic Gardens of the Association has drastically changed during these years. We have the feeling that a decisive factor for this change has been the active role of promotion and encouragement, due to the atmosphere of cooperation created within the Association. Some of the actions that have taken place are as follows: restoration of the Valencia Botanic Garden, start of the extensions of La Orotava Botanic Garden, promotion and cooperation in training the new Botanic Gardens under construction in Santiago de Compostela, Málaga and Bilbao, inauguration of the Soller Botanic Garden (Balearic Islands), collaboration in the promotion and development of the new Barcelona Botanic Garden, and so on. The Córdoba Botanic Garden has played an important role in the coordination and advice of the Gardens that have been created "in situ" within the Network of Natural Areas of Andalucía as well as in the design of the University Altitude Garden of Sierra Nevada (BLANCA & al., 1990).



Nevertheless, probably the most ambitious objective planned by the Association has been the attempt of presenting this institution as a coordinated network as opposed to the institutions officially in charge of the conservation of nature at a national level. The Spanish Botanic Gardens within the IMABG have fought hard in this sense to achieve financing for the projects of conservation of the Iberian Plant Germplasm and some of them did get it. This is the first but insufficient step that, before being extended, seems to require the total legalization of the Association. Because this administrative and legal independence will permit the management of the corporative agreements in an unified way.

### **Possibilities of cooperation between pairs of botanic gardens or through cooperation agreements involving a reduced number of gardens**

One of the consequences that should arise from this cooperation framework is the establishment of specific programmes between pairs or very reduced groups of botanic gardens. The BGCI have been promoting this kind of twinings for the last few years. They can be either specific research or action projects or programmes for the exchange of experiences in some specific fields. Some of our experiences are as follows.

Maybe one of the simpler ones has been the joint and punctual action with some particular botanic garden. An example can be the reintroduction of *Lysimachia minoricensis*, an endemic and extinct species of Menorca Islands, carried out in November 1989 in a joint action between the Brest and the Córdoba Botanic Gardens with the institution in charge of the conservation of nature of the Balear Autonomous Government.

Another experience to be mentioned as an example of coordination, among an ex situ botanic garden with in situ gardens having less means, is the one carried out by the Córdoba Botanic Garden with some others created by the Environmental Agency of the Andalusian Autonomous Government within its network of Natural Areas. These gardens are included within Natural Parks and Reserves of the Community and play an important dissuasive and didactic role. Their conservation programmes are developed in cooperation with the Córdoba Botanic Garden.

Another pattern of cooperation is the one established through projects among gardens. In this sense we will mention as an example the newly finished project on aromatic species that we have maintained within a programme of the EC, in a joint work with the Botanic Gardens of Porquerolles and Pisa.

The model of cooperation proposed by the BGCI between pairs of botanic gardens has also been tested by us. We have started to develop several initiatives during these years, either through agreements garden-garden or through agreements of a bigger scale, between the Universities or City Councils of which the Botanic Gardens depend. Regarding the first case, we have signed agreements with Missouri Botanic Gardens and with the Cuba National Botanic Garden. As regards to the second one, we have attempted to take advantage of agreements with NAU of Mexico, and with other Latin-American Universities.

Some of these cooperation programmes have not come off yet, maybe because individuals with common interests have not been or remained in those institutions. In other cases, the success has been greater.

Finally, we would like to mention and to emphasize the example of cooperation with the Cuba National Botanic Garden. We have carried out a very efficient work for several years with this institution. Together, we have come to the following achievements.

- Exchange of researchers: six one month-stays of six researchers of each institution have travelled, stayed and worked in each one of the two gardens.
- The development of a research cooperative programme concerning plans for the restitution of endangered species. We have found the common points of the methodological research that have been applied to some species of Orchidaceae, Amaryllidaceae and Cycadaceae, using in-vitro culture techniques and programmes for the reintroduction in nature.
- The celebration of a course on conservation techniques in Botanic Gardens. This 15 days' course took place in September, 1991 in La Habana, Cuba. It was given by 8 teachers, and 25 students from nine Latin-American countries attended it. We are preparing a second course on educational techniques in botanic gardens.
- Exchange of experiences and materials (plants, publications, equipment, mutual advice in the installation of greenhouses, collections of tropical plants, in vitro culture chambers, educational programmes, exhibitions, preparation of audio-visual aids. Some specific examples are: the exhibition "Cuban Crafts of the Plant" held in Córdoba and the receipt of museum and plant materials for the Córdoba Ethnobotanical Museum.

### Conclusion

#### **An international network does not exclude different models of association with different scopes or objectives**

It is convenient to give some final conclusions of this experience of cooperation at different levels.

Firstly, it is obvious that the coordinated work offers a positive balance. Mutual knowledge encourages cooperation. And this cooperation is necessary at a scientific and technical level as well as in the social and cultural programmes. The botanic gardens are going through a crisis of identity in these last decades that can be saved not only by changing their objectives and bringing up to date their techniques, but also by appearing before their communities, their countries and their states, and before the whole world as an organized network in harmony to the problems and reality of this era.

Secondly, we have to admit the different possibilities of cooperation according to different levels. It would be desirable a much more efficient IABG. The BGCI carries out a great part of the needs of international integration of the botanic gardens, but it was created with a monographic nature: to join and coordinate the work of those botanic gardens involved in the conservation of wild flora. Step by step, some of its aims have been extended, for example, on education, propagation techniques, relationship with CITES, etc. However, there are still other fields of activity to be approached: gardening techniques, restitution of historical gardens, monographic plant collections, cultural activities and education. Should we go towards an integration of these institutions?

On the other hand, there is no doubt about the possibilities of the cooperation between pairs or very reduced numbers of botanic gardens, especially when there is a research project or common activity, with specific objectives and fixed dates and financing. Then, they work. In the same way, the cooperation agreements can go ahead satisfactorily when two circumstances are clearly given:

- 1) the existence of a common field of work in which either a certain complementarity is established or a clear agreement in methods and objectives exists;

- 2) perhaps a less academic but real requirement is the need to look for concrete individuals that get along with one another, and who have the human qualities and the authentic wish to work together.

Maybe we should also avoid a possible tendency from powerful botanic gardens to protect the weak ones.

And between these two levels of cooperation there is a great role reserved for the national and regional associations. Those associations that join a group of ten, twenty or a few tens of botanic gardens can be very efficient. That is the experience of the IMABG, not only because they can make easier the cooperation work and the mutual support, but also because its constitution as a local network involves the assumption of specific competences within its regional government, in subjects such as conservation of plant resources, environmental education, staff training in propagation methods, gardening, conservation techniques, etc. I think that we have a great challenge before us in this specific point. And the example given by some of us can be a great help for the others. By the way and to finish, could it be of any sense to promote an association of Botanic Gardens within the European Community to appear as an organized network before the authorities of the EC? It is just another idea.

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