Orchid Conservation News

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Saving the World’s Orchids

*Cattleya dowiana,* a flamboyant species from Costa Rica

photograph by Franco Pupulin

The Newsletter of the Orchid Specialist Group of the IUCN Species Survival Commission
Know Your Orchids
A botanical garden rich in information
serving a country rich in flora
by Franco Pupulin and Jorge Warner

Systematic botany is, essentially, a comparative science. A system of classification requires an ordering of organisms based on their affinities and similarities (morphological, anatomical, chemical, genetic, ecological and molecular) such that it ideally reflects their evolutionary history, and allows us to understand the phylogenetic relationships between different plant lines. The identification of the organisms and the correct application of their names within a system of classification both requires a precise knowledge of the limits of natural variation of individual species, and requires that those taxonomic units be compared with the types of each one of the groups, that is to say with the original documents required by Botany for each new taxonomic entity for its formal admission into the scientific world. Those identification documents are represented, in the majority of cases, by the published writings and by type specimens, which serve as reference for the application of scientific names. That one plant will correspond to a given name, will not depend on the reputation of a botanist, but on the precise correspondence with the “type” that was the basis of this name. The key to systematic botany along with the precision of the observations is a system of efficient information retrieval, that gives scientific credence to the comparisons.

Botany in Costa Rica

The history of botany in and of Costa Rica - even when you only consider the orchids - is full of distinguished explorers and scientists. Work done by Anastasio Alfaro, Alberto Manuel Brenes, Ignacio Acosta, Juvenal Valerio, Rafael Lucas Rodriguez, Dora Emilia Mora, and by resident foreigners such as Karl Wercklé, the Brade brothers, Henri Pittier, the mysterious A.R. Endres and Charles H. Lankester, among others, has been fundamental in disclosing the immense richness of the Costa Rican orchid flora. Their work permitted not only the recognition of the variety of native plants of the country, but also a start on the organization of new plants in a systematic manner. The Primitiae Flora Costaricensis of Pittier represented the first example of this in Costa Rica. Without doubt, if we examine the floristic and systematic publications about Costa Rican plants, the largest contributions have been by foreigners. The immense botanical treasures described by Professor Reichenbach of Hamburg, originated in systematic collections carried out by Endres (who also sent dried specimens to his German colleague with detailed botanical descriptions and fine illustrations). The monumental work of Rudolf Schlechter on the orchid Flora of Costa Rica was performed in Berlin, but it was only

Jorge Warner:
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possible due to the intimate knowledge of Costa Rican plants of Manuel Alberto Brenes. The dozens of new orchid species published by the Harvard botanists Oakes Ames and Charles Schweinfurth, were supported by the collections and precise annotations of Charles H. Lankester, an English naturalist resident in Costa Rica.

Was it possible that the Costa Rican botanists did not have adequate training to increase the level of systematic and floristic knowledge about our country? Probably, they did not have access to the information and documentation necessary for the taxonomic comparisons and to identify the organisms that they knew well. In recent years, the collaboration of Dora Emilia Mora (who was director of the Lankester Botanical Gardens for a long time) with prestigious foreign institutions was in a large part still necessary, as her observations relied on the scrutiny of materials and information not available in Costa Rica.

A wager

In general terms, in the international community, the scarcity of economic resources has been identified as the principal factor limiting the growth of the biological sciences in those countries rich in biological diversity. Rather than accept this premise, the University of Costa Rica's Lankester Botanical Gardens, has wagered that the major limiting factor has been the scarcity of information. The work done by investigators at this Experimental Station of the University of Costa Rica, and by associated researchers over the last 5 years, appears to confirm that with equal economic resources, better sources of information permit them to publish relevant papers in the botanical sciences, and to contribute substantially to the general pool of knowledge through contributions at the local level.

From 2000, when the process of transformation of the Garden into a Research Centre was begun, the activities carried out by the investigators at Lankester Gardens have led to the production of 45 publications in prestigious scientific journals in Germany, Austria, the United States, Colombia, Costa Rica, England and Italy: more than half in foreign journals. During this time, they have described 59 species of orchids new to science, the majority of them in Costa Rica, but also natives of Brazil, Colombia, Ecuador, Guatemala and Panama. And a similar number of species are under study today in the hope that they may be added to the sum of human knowledge.

New for Science and Humanity

Within these plants are found many miniature orchids, which have previously been passed over either because of their reduced size, or the difficulty in comparing them with other known species (those new species of the genus Lepanthes: L. casasae, L. cribbii, L. johnsonii subsp. costaricensis, L. rafaeliana, L. schugii, L. spadariae, L. whittenii, the miniatures Macrocilium allendantor, M. confertum, M. doderoi, M. escobarianum, M. generalense, M. exiguum, M. montis-narae and M. robustum, Myoxanthus vittatus, Ornithocephalus castelfrancoi, and O. montealegreae, Pleurothallis blancoi, and the species of Stellilabium with flowers resembling very small flies: S. anacristinae, S. smaragdinum and S. tsipiriense). Without a doubt species with large and showy flowers have also been described and published, including Dracula inexperata (perhaps the most showy member of the pleurothallids in Costa Rica), various species belonging to the genera Prosthechea and Brassia of horticultural value, and other miniatures with showy flowers (such as Trichocentrum dianthum). It is always interesting to try to understand the reason why so many species (and belonging to a single plant family) have been able to remain undiscovered until today.
IOCC 2007
International Orchid Conservation Congress
Are our orchids safe?
San José, Costa Rica
March 19–24, 2007
In concomitance with
2nd International Conference on Neotropical Orchidology
and
International Orchid Show
JARDÍN BOTÁNICO
LANKESTER
Universidad de Costa Rica
The reasons for the work

On the one hand it is certain that botanical exploration in Costa Rica, in spite of being one of the best realized in tropical America, is far from complete. From well-studied areas, such as Monteverde and the surroundings of the southern Panamerican Highway, numerous novelties have continued to appear during recent years, but there remain entire regions that are crying out for systematic examination/exploration. The Caribbean slopes of the Cordillera de Talamanca, the folds of the northern volcanoes and the mountainous areas close to the Panamanian frontier are good examples of areas yet to be known/studied, whose exploration has been initiated by personnel at Lankester Gardens, with the aim of improving the quantity and reliability of our information concerning plant distribution. The opportunity provided by a botanical garden to organize and maintain scientific collections (of living plants as a source of reference material) also allows us to have a better understanding of natural variation when compared with the study of a handful of herbarium specimens.

On the other hand, the search for and organization of the existing information relating to the diversity and distribution of species (necessary for the comparison with specimens of living populations) has been a little difficult because of lack of access to relevant historical documents. Today this information is nothing less than fundamental to the evaluation the state of conservation of the natural resources of an area that, to speak from a Central American perspective, would originally have included 1,155,000 square kilometres of natural forest (reduced today to a little less that 200,000) and from which there have been recorded around 3000 species of orchids, much of these endemic to particular regions.

Research at Lankester Gardens

The lines of investigation proposed for Lankester Gardens have as their primary objective to establish, in co-operation with other leading botanical institutions, a node of information for the study and conservation of the Mesoamerican epiphytic flora, with special emphasis on the orchids. This requires the collection and bringing up to date of all of the available information related to species identification, their variation, distribution, ecology, natural history, population dynamics and factors which may cause them to become endangered. It is this baseline documentation that is fundamental in establishing today's priorities for conservation in terms of genetic rarity and the sensitivity of the habitat, in order to generate credible and practical actions of conservation involving both scientists, politicians and the general public.

Based on this strategy, the researchers at Lankester Gardens are currently concentrating on the field of alpha taxonomy, evolutionary taxonomy, pollination biology, and the ecological relationships and systematics between orchids and other organisms. These projects have been carried out, as the opportunities have arisen, with the co-operation of investigators at other institutions. The Research Centre has established formal relations with the herbaria of the University of Harvard, Marie Selby Botanical Gardens, the Natural History Museum of Florida, the University of Florida (USA), the Royal Botanic Gardens, Kew (England) and its Jodrell Laboratory of Molecular Biology, the Nymphenburg Botanical Garden in Munich (Germany), the Natural History Museum of Vienna (Austria) and the University of Tuscia (Italy). In parallel, Lankester Gardens have carried out investigations directed towards the conservation of Costa Rica's epiphytic flora. These include studies of species and/or rare habitats, based on the available data about distribution and that generated by the explorations of the Centre, about the state of conservation and the causes of endangerment of selected taxa, and evaluations of populations of critically endangered species. By virtue of the achievements of Lankester Gardens in the studies completed for the conservation of the orchids of the neotropics, the Centre has been selected as the official seat of the Mesoamerican Group of the Orchid Specialist Group (OSG) of the Species The Newsletter of the Orchid Specialist Group of the IUCN Species Survival Commission
Survival Commission of the International Union for the Conservation of Nature (IUCN - the World Conservation Union). With four representatives of the OSG, Lankester Gardens is most probably the best represented botanical institution in Latin America.

An International Centre.

On the other hand, with the support of the University of Costa Rica, Lankester Botanical Garden has continued to develop one of the most active centres of botanical investigation in the Neotropics, with a wide base of reference collections from the resident investigators and visiting researchers. Its Orchid Identification Centre every year identifies hundreds of samples for other public and private institutions, producers and amateur growers. The specialists at the Garden act as official taxonomic consultants for foreign societies (American Orchid Society, German Bibliorchidea) and are members of the Historical Committee of the American Orchid Society.

As an integral part of the project for the repatriation of biological information, in recent years Lankester Botanical Gardens has been extremely active in the orchid community in the sharing of scientific information, organizing conferences and international congresses which have attracted the best-known experts in the study of orchid conservation in the orchid world to Costa Rica. At the Second Mesoamerican Seminar on Orchidology and Conservation, hosted in the University of Costa Rica in 2001, more than 40 international conference speakers attended, and 180 registrants from 14 countries. At the recent First International Conference Neotropical Orchidology, held at the City of Investigation at the University of Costa Rica, the scientific attendance was even better, with almost seventy presentations between presentations and posters, and 240 registrants from 24 countries. Thanks to these achievements, during the past month of October, Lankester Botanical Garden was chosen from amongst a number of other prestigious institutions around the world to organise, in March 2007, the Third International Orchid Conservation Congress, which in past editions was organised by the University of Perth (Australia) and the Marie Selby Botanical Gardens, Florida (USA). A vital product in this new stage of the Garden has been the production of Lankesteriana, the scientific journal specialising in botany, which has increased its international prestige in very little time.

Future projects

Within the most relevant projects of investigation which are being prepared, a number of projects are worth a special mention. Conservation of Epiphytes based on Systems of Geographical Information is directed at the conservation of plants of the Mesoamerican region by using predictive methods. The project: Establishment of places for the evaluation of populations of epiphytes over long periods is to be carried out in our National Parks. Its objective is to provide measurements of orchid biodiversity, to register changes and tendencies throughout time. The establishment of a reference collection of DNA of orchids would result in a bank of data of bar codes of DNA, for taxonomic purposes and forensics. The establishment of an internet site will make all of the information which has been compiled, and the knowledge generated by the investigators, available to a wider public.