

Herbarium Bogoriense: present and future activities

Irawati

Abstract

Irawati (Herbarium Bogoriense, Ir. H. Juanda 22, Bogor 16122, Indonesia) 2003. Herbarium Bogoriense: present and future activities. Telopea 10(1): 29–34. A rehabilitation program at Herbarium Bogoriense supported by the World Bank was completed in September 2000. The main program focused on conservation and curation of specimens, human resources development and information system management. The changes in various aspects of the collection are presented. Taxonomists from different herbaria around the world supported all activities. Rehabilitation activity must be continued as only a part of the collection has been properly curated. Present activities, future programs and challenges faced by the herbarium are discussed.

Introduction

Although it represents a valuable scientific heritage from the previous generation, collections at the Bogor national herbarium have deteriorated over time. The Herbarium Bogoriense (BO) hosts about 2 million specimens of plants and fungi, and is a source of biodiversity information for the Malesian region, especially Indonesia. In 1995 Herbarium Bogoriense and the Museum Zoologicum Bogoriense (MZB) received a five-year grant from the World Bank, through the Global Environment Facility (GEF). This activity was called the Biodiversity Collections Project, which supports the implementation the National Biodiversity Action Plan in Indonesia. The initial development and support of the Biodiversity Collections Project involved five international institutions working together with the Bogor Museum and Herbarium, i.e. Arnold Arboretum of Harvard University, CSIRO–Canberra, The Nationaal Natuurhistorisch Museum – Leiden, the National History Museum–London and the Rijksherbarium/Hortus Botanicus–Leiden.

BO and MZB, with technical assistance from the Arnold Arboretum of Harvard University and the Royal Ontario Museum, assembled and coordinated the activities especially on the rehabilitation of the biodiversity collections and development of the herbarium. The rehabilitation focused on four main aspects:

1. The management system of the herbarium collections
2. The physical condition of the collections
3. Information systems of the herbarium collections
4. Human resources development

The management system of the herbarium collections

The previous herbarium management was under the Botany Development Facilities Section. With limited facilities, only a small part of the herbarium collections was maintained properly by dedicated staff. However the major part of the collections was almost neglected. During the implementation of the project, a Coordinator from the

Botany Division was chosen to take responsibility for the overall rehabilitation activities. The Botany Coordinator was assisted by three Curators.

At the end of the project these activities were transferred to the existing management of the herbarium, i.e. under the Botany Division. To maintain the sustainability of the improvements to the collections, the new curatorial system was continued, and all staff and technicians of the Taxonomy group are involved.

The physical condition of the collections

The main changes can be seen on the second and third floors of the herbarium building, because the tin boxes on wooden shelves were all replaced by cabinets. On each floor a taxonomic laboratory and database room were built.

Rearrangement of the collection was done by separating the monocotyledons from the dicotyledons. The collections were alphabetically arranged as before, according to family, genus, species and location. The collections were mounted on new acid-free papers with new Species Folders and Genus Folders.

The Type specimens were separated from the general collections, with new Type Folders and are stored in an air-conditioned room. During 2000, through the JICA program, a photography course for staff was conducted for the photography of herbarium specimens. This recording activity for all Type specimens has continued.

Mounting and remounting of the 'priority taxa' (Arecaceae, Dipterocarpaceae, Gymnospermae, Lauraceae, Orchidaceae, Sapotaceae), the Type specimens and fragile specimens (including non-priority taxa) were the main activities of the rehabilitation program. With the help of scientists working at the Herbarium Bogoriense, fragile collections were sorted for remounting. Restoration of the spirit collection focused on damaged collections and also on the 'priority taxa'. Some of the collections were transferred to new bottles.

However, at the end of the rehabilitation program only about 13 % of the total collection had been remounted. Therefore, this activity must be continued in the future. In this rehabilitation program, the Herbarium Bogoriense would like to acknowledge the support from Kew Herbarium, Nationaal Herbarium of the Netherlands, CSIRO and other organisations. This is not an easy task, as most of the herbarium materials have to be imported from other countries.

Major changes in the management of the collections were actually on the preservation methods. Mercuric chloride and Paradichlorobenzene were no longer used as preservatives and freezing the herbarium sheets is now used as the primary method of insect control. Without the use of poison, herbaria become vulnerable to insect attack, therefore Integrated Pest Management procedures were applied to monitor the collections for pest infestation. To control insects, fumigation of the specimens is conducted once a year using Phostoxin, the phosphate-based pesticide. Fumigation activity is not carried out on all floors of the herbarium building so the herbarium usually is closed to the public for one month each year, so that specimens can be moved into the fumigation areas and then back into the collection.

Database of the herbarium collections

The previous computer hardware facilities have been upgraded. One server functioning as a back-up domain controller, with seven desktop computers as clients, was provided. A network between the computer room on the first floor, second and third floors has been established. Recently an Internet connection was established between the Herbarium Building and other Indonesian Institute of Sciences offices in Bandung, Cibinong and Jakarta.

The information system team focused on maintaining the application of IBIS 2.0 for the herbarium collections. All information found on the herbarium sheets was entered into the system. The addition of BO number on the herbarium sheet means that the specimen has been recorded in the database. Now about 200 000 collections have been recorded in the database, only 10% of the total collection. Validation remains a slow process in the database activity. Soon part of the Type specimens will appear on the web-site: www.bio.lipi.go.id. Information from other taxonomists is welcome to improve the Type specimen information.

Human resources development

To manage the collection better, the Botany Coordinator and the Collection Managers had the opportunity to study the management systems at other Herbaria (Canberra, Edinburgh, Hawaii, Kew, Leiden, London etc). Some of the herbarium students were also sponsored by the project to attend short-term training programs overseas. Through the GEF scholarship program, Herbarium Bogoriense has successfully recruited 6 new staff and another 2 will be appointed in the future. The newly recruited staff are a significant addition of human resources, because for several years the government has imposed zero growth in government employee numbers.

A mentorship program was an important aspect in human resources development at the Herbarium Bogoriense. Prof. Egon Horak from Zurich started the first group of Agaricales mentorship, followed by Dr. Paul Kessler from the Nationaal Herbarium Netherlands, mentoring on Annonaceae; Dr. Henk van der Werff from Missouri Botanical Garden, St. Louis mentoring on Lauraceae; Mr. Lyn Craven from CSIRO Plant Industry, Australia, mentoring on Myrtaceae; Dr. John Dransfield from Kew Herbarium mentoring on Arecaceae; and Dr. Phillip Cribb from Kew Herbarium mentoring on Orchidaceae. Mentorship programs were also attended by students from the universities and the staff of the Botanic Gardens. Also, through the mentors' participation, many new references were added to the herbarium library.

During the implementation of the project, three internship programs were conducted with a total of 16 participants from universities in Indonesia. The interns studied the herbarium management and the curation of the priority taxa under supervision of the Herbarium Bogoriense senior taxonomists. Through this program Herbarium Bogoriense is trying to broaden the Herbarium's reach throughout the country.

The change from a centralised government system to one of local autonomy has also influenced the management systems for biodiversity collections in Indonesia. Through this program new herbaria in different universities, especially outside Java, were initiated.

Present areas of research of Herbarium Bogoriense staff

Ms. A. Retnowati & Ms. M.A. Rifai (Agaricales of Java & Bali); Dr. B. Sunarno (Myrsinaceae for Malesia); Ms. D. Arifiani (*Ediandra*); Ms. D. Sulistiarini (terrestrial orchids of Sulawesi); Dr. E. A. Widjaja (genetic variation in *Schizostachyum*); Ms. F. I. Windadri (bryophytes); Ms. H. Rustiami (*Daemonorops* sect. *Piptospatha*); Dr. H. Wiriadinata (begonia of Java; flora, charismatic medicinal plants of Lore Lindu); Dr. J.P. Moge (rattan from Lore Lindu and diversity of *Calamus manna*); Dr. K. Kramadibrata (mycorrhiza); Ms. L. Juswara (*Goodyera* & *Hibiscus*); Dr. N. Utami (Balsaminaceae & anatomy of *Eusideroxylon swageri* embryo); Dr. R. Nasution (Musaceae); Dr. Rugayah & Dr. E. A. Widjaja (the species of *Artabotrys* in Java); Ms. S. Sunarti (*Syzygium* of Java); Ms. T. Djarwaningsih (Solanaceae); Mr. T. Triono (interactive key for Malesian Sapotaceae); Mr. T. Uji (*Micromelum* in Malesia); Mr. U.W. Mahyar (orchids of Halimun Forest Reserve); Ms. Yulita (*Hopea* & *Shorea*).

Exploration activities in Indonesia in 2001 were conducted at Kendawangan (Kalimantan); Bentuang Kehirun (Kalimantan); Nusa Kambangan (Java); G. Ceremai (Java); Bukit Tigapuluh (Sumatra); Flores (East Nusa Tenggara).

Two guidebooks were published during the rehabilitation program, i.e. the *Management Policy of the Herbarium Bogoriense* and a guidebook on the *Processing and Management of the Herbarium Collections and Integrated Pest Management at the Herbarium Bogoriense* (in Indonesian language).

Future activities

Continued contact must be maintained even after the internship program is over. Therefore, during exploration activities in Indonesia, the researchers are encouraged to prepare extra sets of the collections for the local herbaria. We hope that each province in Indonesia will have its own herbarium and understand fully their local flora. I would like to take this opportunity to encourage the Flora Malesiana Foundation to supply references, especially Flora Malesiana, to these newly developed herbaria, which are usually attached to a university.

Improvement in the herbarium collection and additional new staff have put the Herbarium Bogoriense back on track. It is seen in the increasing number of scientists visiting the centre, as well as in the loan and exchange activities.

The Herbarium Bogoriense is known worldwide rather than in the country itself, therefore since 2000 'open house' activities have been conducted once a year during the Flora and Fauna days.

Plant identification services at the Herbarium Bogoriense also need better facilities to encourage students/visitors to learn to identify plants themselves and a Reference Collection was initiated.

Under the coordination of the Nationaal Herbarium Nederland, networking among Malesian herbaria, Leiden and Oxford University will be realized this [2001]year, funded by the European Union. To continue the rehabilitation activities, especially mounting/remounting of the specimens, restoration of the spirit collections and data entry, efforts have been made to raise funds.

Herbarium Bogoriense is open to students from universities especially for those who choose plant taxonomy as their main interest.

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