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NEWSLETTER

Number 04 **October, 1996**

QBG OPENING CEREMONY

On April 8, 1996, the Botanical Garden Organization received the honour from Her Majesty Queen Sirikit to preside over the opening ceremony of the Queen Sirikit Botanic Garden. On that auspicious occasion, Her Majesty indicated to Mr. Boonphan Khaewattana, the Minister to the Prime Minister's Office that she was pleased with the govenment's support for the Garden.

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HER MAJESTY THE QUEEN'S VISIT, APRIL 8, 1996

The Botanical Garden Executive Board received the highest honour for their picture to be taken with Her Majesty Queen Sirikit.

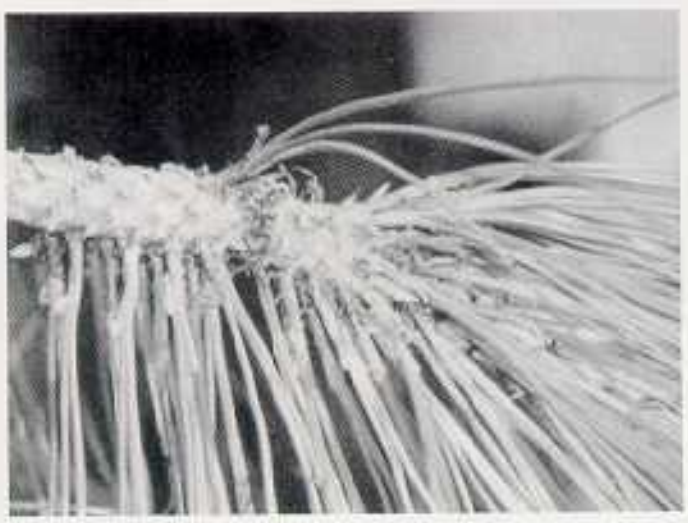
Her Majesty Queen Sirikit planted a ficus tree (*Ficus microcarpa*) to mark the occasion of her Royal visit at the Garden.

Professor Sanga Sabhasri, Chairman of the Executive Board; and Dr. Weerachai Nanakorn, Director of QBG, were attending Her Majesty's interest in the activities and progress of the Garden.

Ficus microcarpa Linn.f.

(Family Moraceae)

A trees with average size of 10 -15 m. Distribution throughout the country but mainly in the South, at the elevation of 300-600 m. Flowering and fruiting periods are from April to June. It is a fast growing species and widely used as landscaping material.



Pinus kesiya Royle ex Gordon

(Family Pinaceae)

Medium to large-sized tree, 10-30 m. in height, and 30-40 cm. in diameter. Normally with spreading or rounded crown.

Bark pinkish brown, reticulately cracked. Leaves are held in bundles of three. Cone rhomboid with woody scales.

Distribution in Thailand is mainly at high altitudes, about 800-1,400 m. Flowering and fruiting periods are from November to March. Wood used for making furniture, wood pulp, resin, and turpentine.

H.R.H. PRINCESS MAHA CHAKRI SIRINDHORN VISITED THE GARDEN

On January 16, 1996, Her Royal Highness Princess Maha Chakri Sirindhorn visited Queen Sirikit Botanic Garden and planted a pine tree (*Pinus kesiya* Royle ex Gordon) to mark the occasion of her Royal visit.

H.R.H. Princess Maha Chakri Sirindhorn showed her keen interest in botanic work and had a discussion on the topic with Professor Sanga Sabhasri and Dr. Weerachai Nanakorn.

THAI-SWEDISH SYMPOSIUM

During October 7-8, 1996, a joint Thai-Swedish Symposium on Biodiversity and Biotechnology was organized at the Siam Inter-Continental Hotel, Bangkok, Thailand; by the Embassy of Sweden, the Royal Swedish Academy of Sciences, the Swedish Academy of Engineering Sciences, the National Center for Genetic Engineering and Biotechnology (BIOTEC), and the National Science and Technology Development Agency (NSTDA)

The Symposium was held to commemorate the Golden Jubilee of H.M. King Bhumibol's Accession to the Throne, and to bring together scientists from both countries to enchange their views and experiences on issues concerning the environment, specifically biodiversity and biotechnology.

The organisers recieved the greatest honour from His Majesty King Carl XVI Gustaf of Sweden and Her Royal Highness Princess Maha Chakri Sirindhorn of Thailand to preside over the opening ceremony of the Symposium.

Dr. Weerachai Nanakorn, QBG Director, gave a presentation on the Botanic Garden and *ex situ* conservation. The successful event was sponsored by Volvo, Nordic Power Invest, and the Scandinavian Airlines System.

NEW DEPUTY DIRECTOR, QBG

Mr. Valobh Sukont was appointed the second Deputy Director of Queen Sirikit Botanic Garden, effective February 1, 1996.

Mr. Sukont received his B.Sc. (with Honour) from the Department of Forestry, Kasetsart University, Thailand, in July, 1969. He started his career as a Royal Forestry Department officer at the Thai-Danish Pine Improvement Center, Hod District, Chiang Mai.

Mr. Sukont received a scholarship from the Finnish Government to study at Helsinki University, Finland. He obtained his M.Sc. in Agro-Forestry in 1972. After returning to Thailand, he had a major role in the survey of some forest areas and also served as Superintendent of Tub Lan National Park (1988), Khao Luang National Park (1989), Mae Ping National Park (1990), and Khao Yai National Park (1990-1996). He attended various training programmes involving forest and wildlife management in Australia, Malaysia, New Zealand and U.S.A.

Mr. Sukont is married to Khun Prakaithip. The Sukonts along with their two daughters are presently residing in Chiang Mai.

We welcome Mr. Vallobh Sukont as the Deputy Director and wish him every success in this position.

WHO'S WHO OF THE GARDEN

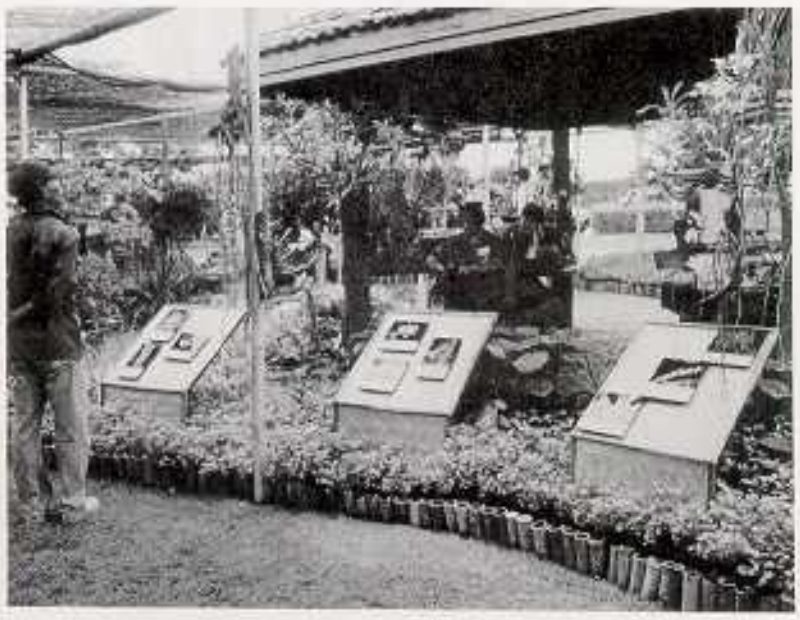
Mr. Sanan Kamsai, former Head of Forest Management Division , Chiang Mai Province, has been with QBG since 1995. Although he has a role as Garden Supervisor, Mr. Kamsai does not mind doing labour work when it is in need.

In the picture, Mr. Kamsai was cleaning the sidewalk in preparation for the visit of H.R.H. Princess Maha Chakri Sirindhorn, earlier this year.

QBG ACTIVITIES

FLORA OF QBG (Vol. 3) has been submitted to the publisher. All three volumes will be distributed in the near future to libraries and academic institutes involving botany.

During February 17-21, 1996, QBG participated in the International Orchid Exhibition organized by Mae Jo Institute of Technology, Chiang Mai. At the exhibition, QBG arranged a mixed garden of orchids and some rare plants; and also provided botanic information for the public.



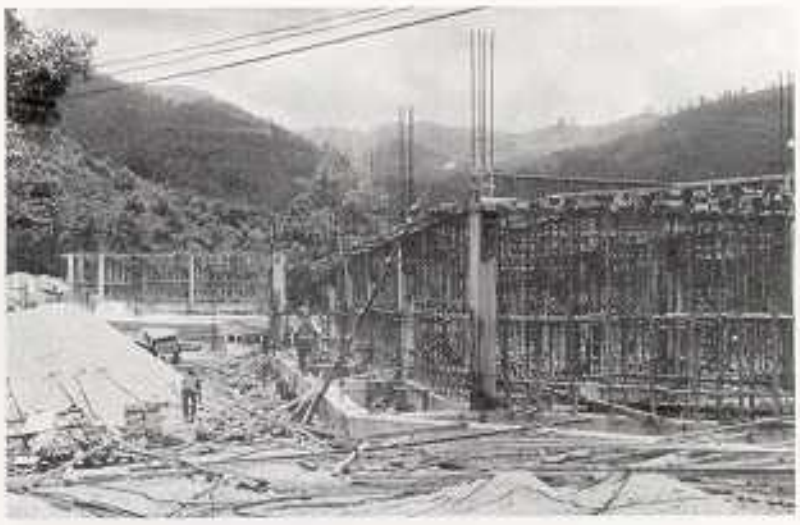
The second workshop on "Parataxonomy" was organized by QBG with the sponsorship of the National Center for Genetic Engineering and Biotechnology, Ministry of Science, Technology and Environment. The workshop was held during April 29- May 4, 1996 at QBG and Chiang Mai University. The participants, total of 50 in number, were ethnobotanists, secondary school teachers, university professors and staff members of QBG.

QBG ACTIVITIES

Recognizing the importance of World Environment Day, activities on soil and water conservation were organized at QBG on June 9, 1996. The staff members participated in planting Vetiver grass around the water basin, by roadsides and on mountain slopes in the Garden's area to help prevent the erosion.

On August 12, 1996, the staff members of QBG paid tribute to Her Majesty Queen Sirikit to commemorate Her Majesty's 64th birthday anniversary.

QBG participated in the Northern Thai Flora Exhibition at King Rama IX, Lanna park, Chiang Mai, during August 9-12, 1996. The garden displays of QBG received high public interest, especially on *Grammatophyllum speciosum* Bl., the world's largest orchid, also an important economic species of Thailand.



The construction of the Herbarium Center of QBG is underway and expected to be completed by April, 1997.

During September 9-13, 1996, the Botanical Garden Organization with the collaboration of the Forest Herbarium, Royal Forestry Department; Prince of Songkla University, Thailand; and Institute of Biological Science, Aarhus University, Denmark; organized a symposium on Flora of Thailand at the Pearl Village Hotel, Phuket.

Dr. Weerachai Nanakorn, Director, led the team of QBG botanists to participate in the symposium. A poster presentation on the background and activities of QBG was displayed to help publicise the work of the Garden.

On the return trip after the symposium, the QBG team visited the Khao Chong Botanic Garden and Thung Kai Botanic Garden, Trang Province; and a limestone mountain in Pang Nga Province. The QBG botanists collected some 200 specimens representing vegetation of the southern part of Thailand.

VISITORS

Prof. Dr. F.S. Rowland, Nobel Laureate in Chemistry for the year 1986, visited Queen Sirikit Botanic Garden on October 9, 1995 with the International Council of Scientific Unions (ICSU) group.

Prof. Rowland expressed keen interest in the living collection of the Thai wild plants and the potential research developments on the plants in the Garden.

During January 19-20, 1996, Dr. Feargal Duff, Director of Biodiversity Project, UNEP, visited the Garden.

Twenty two delegates of Swedish environmentalists, led by the Worldview International Foundation-Southeast Asia Training Center, visited QBG on January 20, 1996. The visit was part of the trip to observe activities on environmental management in Chiang Mai and Chiang Rai Provinces.

Ms. Li Xuelan, Deputy Director, Institute of Medicinal Plants of China, Yunnan Branch, and delegates of China Yunnan International Culture Exchange Center, visited the Garden during February 15-21, 1996.

Mr. Chen Jihai, Director General of Yunnan Provincial Forestry Department, along with 14 international delegates paid a visit to the Garden on August 5, 1996.

On October 9, 1996, Professor William J. Chancellor of University of California, Davis Campus, visited the Garden. Mr. Charun Maknoi, a QBG Botanist, accompanied Prof. Chancellor during the sightseeing of the Garden and provided information on the wild plants of Thailand.

RESEARCH NOTES

PRODUCTION OF SUGAR FROM NIPA PALM IN PAK PHANANG BASIN, SOUTHERN THAILAND

Noparat Bamroomgrugsa[1] and Narit Kaewsinuan[2]

In Pak Phanang Basin of Southern Thailand, nipa palm (*Nypa fruticans* Wurmb.) grows naturally in an area of approximately 3,200 hectares. Gradual environmental degradation of the basin has caused considerable impact on nipa growth, and the palm is in urgent need of long-term conservation. Ecologically, nipa plays an active role in preventing shore erosion and acts as a nursery for marine animals. Economically, coastal villagers in the basin earn their income from the plant in several ways, most importantly in nipa sugar production. The production of about 1 kg/ha of sugar per month with 8 tappable months per year is a standard for this area.

Nipa sap is a source of sugar, its content is around 14 to 17 percent sucrose. Sap is collected from the mature fruit stalk (infructescence) after the almost full-grown fruiting head of the plant has been cut. Sap flow, however, depends on preparation of the stalk. Yield, is low and lasts only a few days if this is not done. To stimulate the flow, the stalk is beaten 45-50 times daily for 3 days and then stopped for 10 days. The beating cycles are repeated consecutively for the second and third time. Presumably, the beating prevents xylem vessel blockage before fruit abscission. Normally, a mature tree produces one tappable stalk at a time.

When tapping begins a thin end slice of about 1-2 mm thick is removed. The freshly-cut stalk end is inserted into a hole in a bamboo containers then transported to the processing depot. It is estimated that a tapped stalk can produce about 0.7 litre of sap daily. Sap yield is high when the temperature is low, particularly in the morning or at night. The production of sugar is done by sieving and then boiling the sap in a steel-pan which is placed over an earthen stove. Boiling takes about three hours and is stopped as soon as the sap begins to form a viscous syrup. The pan is then removed from the stove, and the syrup is stirred until brownish sugar is obtained. The conversion rate of the sap to sugar is usually 100 litres to 21 kg.

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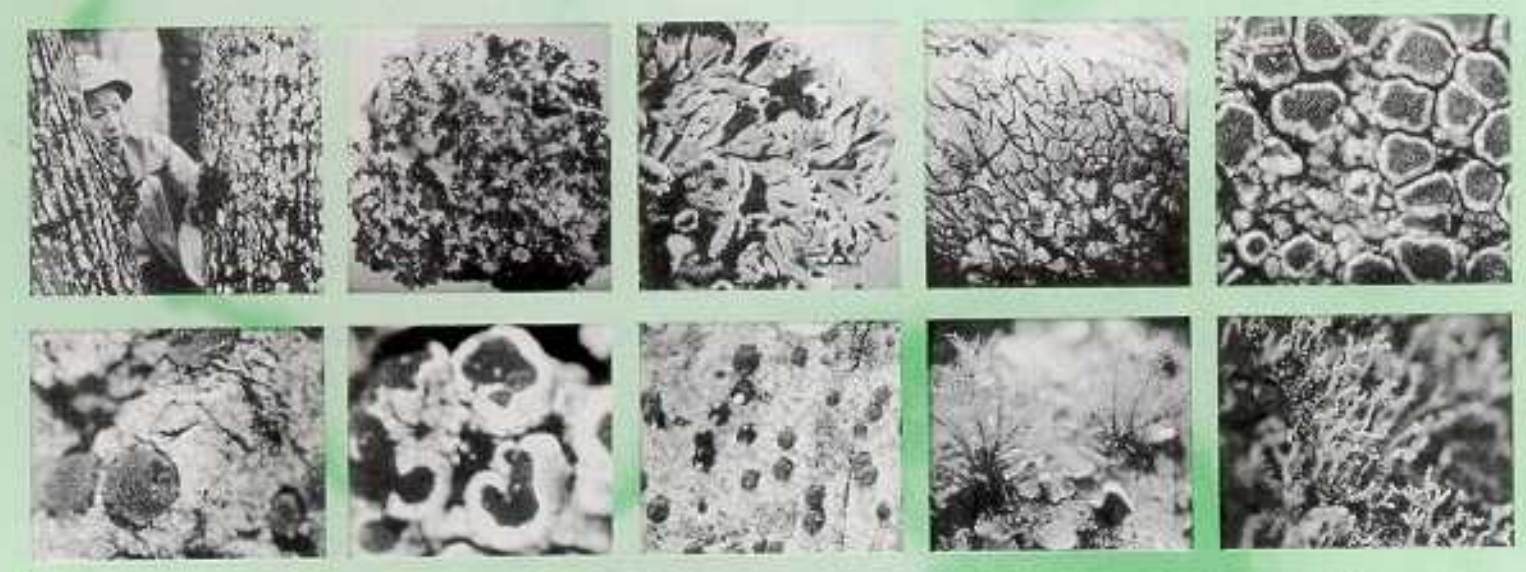
Diversity of the Lichens at Queen Sirikit Botanic Garden, Mae Rim, Chiang Mai

P. Mongkonsuk[1], K. Boonpragob[1], N. Homchantr[1] and W. Boonchai.[2]

English Translation by S. Vessabutr[2]

SUMMARY

A study was conducted on the diversity of the lichens at Queen Sirikit Botanic Garden, located at Mae Rim, Chiang Mai, northern Thailand. Lichen specimens were collected during 1994-95 from different habitats at 690 to 1,450 meters above the sea level. Identification of the specimens was done by the spot test technique, thin layer chromatography and observation of the spore structures. Collected specimens were identified as foliose, crustose, fruticose and squamulose types from 17 families and 34 genera. Among these, 29 species were identified. Further study on identification to species requires the cooperation of foreign institutes which have key/standard specimens and other useful information for chemical tests of the unknown material.



[1] *Biology Department, Faculty of Science, Ramkumhaeng University, Thailand.*

[2] *Botanical Garden Organization, Thailand.*

INTRODUCTION

Lichens are distinct from other plants by their characteristics and origin. A lichen is composed of a fungus living in symbiotic union with an algae. This composite organism behaves as a single independent plant with thallus growing in leaf-like, crust-like or branching form. The thallus has no resemblance to either a fungus or an algae growing alone (Ahmadijian and Hale, 1973; Hale, 1979; Frank, 1979). Classification of lichens can be done by observation of the spore structures and testing the chemical products containing in the thalli (Hale, 1974). Lichens are distributed in most climates, from arid lands to the tundra regions. The species of lichens in the extreme climatic regions are estimated to be higher than those in the tropics. However, this is not a conclusive fact since most of the tropical lichens grow at very high canopies, hence the observations are not complete.

Lichens are not parasitic to the plants they grow on. The algae part can manufacture its food, by photosynthesis, which the fungus utilises for making up the mass of the lichen's body. Lichens are extremely sensitive to air pollutants, therefore they can be useful as bioindicators. Species distribution in one city may be used as a measure of how much the city is polluted (Boonpragob and Nash, 1991). Natural products of some lichens are used as antibiotics. Some species are used as expectorant in Chinese medicine (Culberson, 1979; Hale, 1974). Extracts of some lichens were used by American Indians as dyes for cloth and wool. According to Hale (1979), litmus paper, the familiar acid-base indicator, was originally made with amphoteric dyes extracted from certain lichens.

Despite their economic potential, little attention has been given to the study of lichens in Thailand. According to Hawksworth and Ahti (1990), who reviewed the world lichen bibliography, there were only three reports on lichens of Thailand, viz. Vainio (1909 and 1921), and Yoshimura (1978). Vainio (1909) described 93 species of lichens found in the country, while the 1921 report described only the species found in Doi Suthep area, in the North of Thailand. Yoshimura (1978) stated that a lot of lichen specimens, along with other plant species, were collected from Thailand during 1958 to 1968 by a group of Danish botanists. These lichen specimens were kept at the Batanisk Institut Arrhus Universiter, and at the Botanical Museum, University of Copenhagen, Denmark. In 1978, Yoshimura identified the specimens and reported a total of 27 species.

During 1992 and 1993, a study of lichens in the areas of Doi Suthep and Doi Pui, Chiang Mai; and Huay Kha Khaeng,Uthai Thani, was conducted by a team of botanists from England and Spain funded by the British Museum of Natural History. They estimated the number of lichens found in the areas to be 90 in genera and 200 in species (Wolesley and Aquirra-Hudson, personal communication). At present, major collections of Thai lichens are in Japan, Denmark and England.

While scientists at foreign institutes have been studying lichens of Thailand, local scientists have shown little interest. One exception is P. Davis of the Department of Chemistry, Prince of Songkla University, who started a project in 1993 to study lichens found in the southern part of Thailand.

Our study was initiated to investigate the diversity of lichens at the Queen Sirikit Botanic Garden, located in the North of the country. The objectives of this study were to collect, identify and conserve the specimens for future use.

MATERIALS AND METHODS

Lichen materials

Lichen specimens were collected from various habitats, e.g. tree canopies, trunks, soil and rocks, from the targeted areas (Fig 11)

Specimen identification

To identify the lichens, a combination of chemical and biological tests was done using the following methods:

1. Spot test

Each lichen has a constant chemical composition. When tested with certain reagent, the same species usually gives the same result.

The spot test was done by applying a drop of reagent on the thallus surface and observing the color change (Hale, 1974). Three chemicals used in the test were calcium hypochlorite, potassium hydroxide, and paraphenylenediamine.

2. Thin layer chromatography

The technique was used to compare the substances of an unidentified lichen with known compounds on the same chromatogram and compare the spots.

3. Observation of spore structures

There are only a few genera of algae which make up lichens, namely Trentepholia, Trebauxia, Nostoc and Anabaena. Lichens are diversified by the tremendous variation in the species of fungi. Therefore, spore character and anatomy can be used as criteria to identify lichens, largely to their genera (Frank, 1979).

Lichens collection

Dried specimens were mounted on 12 x 7 cm white paper and kept in paper or cloth sacks for long-term storage. The packets were labelled with useful information such as locations, hosts, scientific names, dates of collection, names of the collectors.

The dried collections were kept for future use at the herbarium of Queen Sirikit Botanic Garden.

Results

About 3,500 specimens were collected during the study period from rocks, soil and 28 genera of plant hosts. Classification of the specimens was after Fink (1961), Hale (1979), Roger (1988), and Swinscow and Krog (1992).

The types of lichens collected from the targeted areas were foliose lichens (Figures 1-4), crustose lichens (Figures 5-8), fruticose lichens (Figure 9), and squamulose lichens (Figure 10). The lichens which have been identified were:

I. Foliose lichens

Scientific name	Family
1. *Bulbothrix sp.* Hale.	Parmeliaceae
2. *B. goebelii* (Zenker) Hale.	Parmeliaceae
3. *Candelaria sp.* Massal	Candelariaceae
4. *Coccocarpia dissecta* Swincow & Krog	Coccocarpiaceae
5. *C. palmicola* (Sprengel) L. Arv.& D. Gall	Coccocarpiaceae
6. *Collema sp.* Wigg	Collemmataceae
7. *Dirinaria picta* (Swartz) Clements & Shear	Physciaceae

	Scientific name	Family
8.	*Heterodermia sp.* Trevisan	Physciaceae
9.	*H. albicans* (Pers.) Swinscow & Krog	Physciaceae
10.	*H. hypoleuca* (Ach.) Trevisan	Physciaceae
11.	*Hyprotrachyna* (Vainio) Hale	Parmeliaceae
12.	*Leptogium sp.* (Ach.) Gray	Collemataceae
13.	*L. burgessii* (L.) Hont.	Collemataceae
14.	*L. chloromelum* (Ach.) Nyl	Collemataceae
15.	*L. marginellum* (SW) Gray	Collemataceae
16.	*Pannoparmelia sp.*	Parmeliaceae
17.	*Parmelina quercina* (Willd.) Hale	Parmeliaceae
18.	*Parmelia saxatilis* (L.) Ach.	Parmeliaceae
19.	*Parmelia sp.* Hale	Parmeliaceae
20.	*Parmeliopsis placorodia* (Ach.) Nyl.	Parmeliaceae
21.	*Parmotrema crinitum* (Ach.) Choisy	Parmeliaceae
22.	*P. dilatatum* (Vain.) Hale	Parmeliaceae
23.	*P. enrysacum* (Hue) Hale	Parmeliaceae
24.	*P. Hypotropum* (Nyl.) Hale	Parmeliaceae
25.	*P. michauxianum* (Zahlbr.) Hale	Parmeliaceae
26.	*P. praesorediosum* (Nyl.) Hale	Parmeliaceae
27.	*P. rampoddense* (Nyl.) Hale	Parmeliaceae
28.	*P. robustum* (Degel.) Hale	Parmeliaceae
29.	*P. subtinctorum* (Zahlbr.) Hale	Parmeliaceae
30.	*P. tinctorum* (Nyl.) Hale	Parmeliaceae
31.	*Physcia sp.* (Scherber) Michaux	Physciaceae
32.	*P. americana* Merr	Physciaceae
33.	*Platismatia glauca* (L.) Culb & Culb	Parmeliaceae
34.	*P. lacunosa* (Ach.) Culb & Culb	Parmeliaceae
35.	*P. tuckermanii amanzonica* (Nyl.) Hale	Parmeliaceae
36.	*Pseudoparmelia amanzonica* (Nyl.) Hale	Parmeliaceae
37.	*P. caperatum* (L.) Hale	Parmeliaceae
38.	*Psoroma sp.* Michaux	Pannariaceae
39.	*Pyxine sp.* Fr.	Physciaceae

Scientific name	Family
40. *Xanthoparmelia sp.* (Vainio) Hale	Parmeliaceae
II. Crustose lichens	
41. *Buellia sp*	-
42. *Bacidia sp.* De Notaris	Bacidiaceae
43. *Candelariella sp.* Mull-Arg	Candelariaceae
44. *Cyphelium sp.* Ach.	Caliciaceae
45. *Graphina sp.* Mull. Arg.	Garphidaceae
46. *Laurera bengualensis* Reichb	Trypetheliaceae
47. *Lecania sp.* A. Massal	Bacidiaceae
48. *Lecidia sp.* Ach.	Liecideaceae
49. *Lecidella sp.* Korber emend. Hertel & Leuckert	Lecanoraceae
50. *Letrouita sp.* Hafellner & Bellemere	Letrouitaceae
51. *Pertusaria sp.* Dc. nom. cons.	Pertusariaceae
52. *Placynthiella sp.* Elenkin	Trapeliaceae
53. *Tomasellia sp.* A. Massal	Arthopyreniaceae
III. Fructicose lichens	
54. *Usnea sp.* Hill ex Brown	Usneaceae
IV. Squamulose lichens	
55. *Cladonia sp.* Hill ex W.A. Weber	Cladoniaceae

Fig. 1-4 Foliose lichens:

1. *Bulbothrix goebelii* (Zenk) Hale
2. *Pyxin coccifera* (Fee) Nyl
3. *Heterodermia hypoleuca* (Ach.) Trew
4. *Coccocapia dissecta* Swinscow & Krog

Fig. 5-8 Crustose lichens:

5. *Plocopsis* sp.
6. *Letrouitia* sp.
7. *Lecania* sp.
8. *Buellia* sp.

Fig. 9 Fruticose lichens:
Usnea sp. Hill ex. Brown

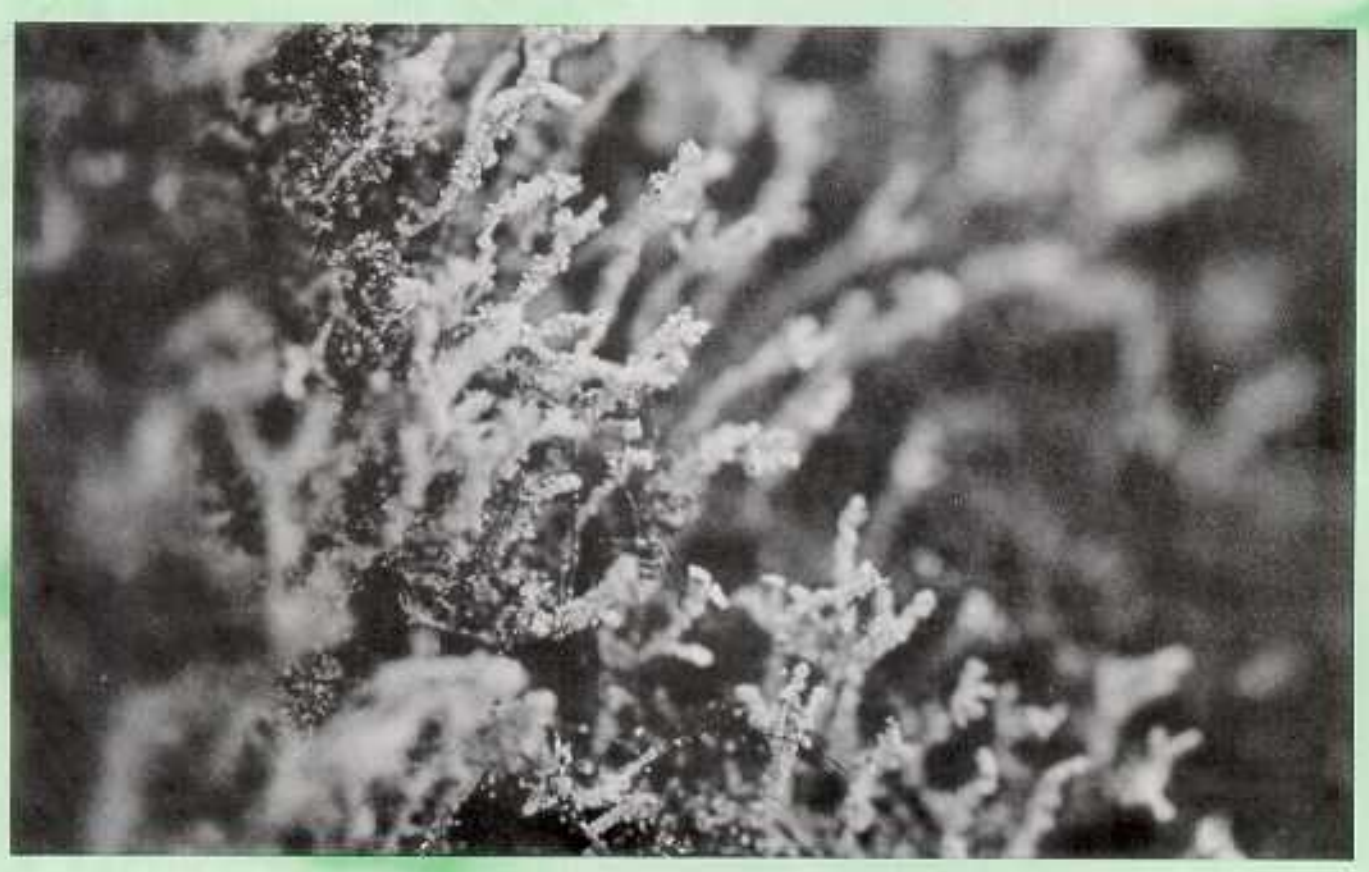


Fig. 10 Squamulose lichens: *Cladonia*
p. Hill ex. W.A. Weber

Map of Queen Sirikit Botanic Garden (QBG)
showing lichens collecting areas

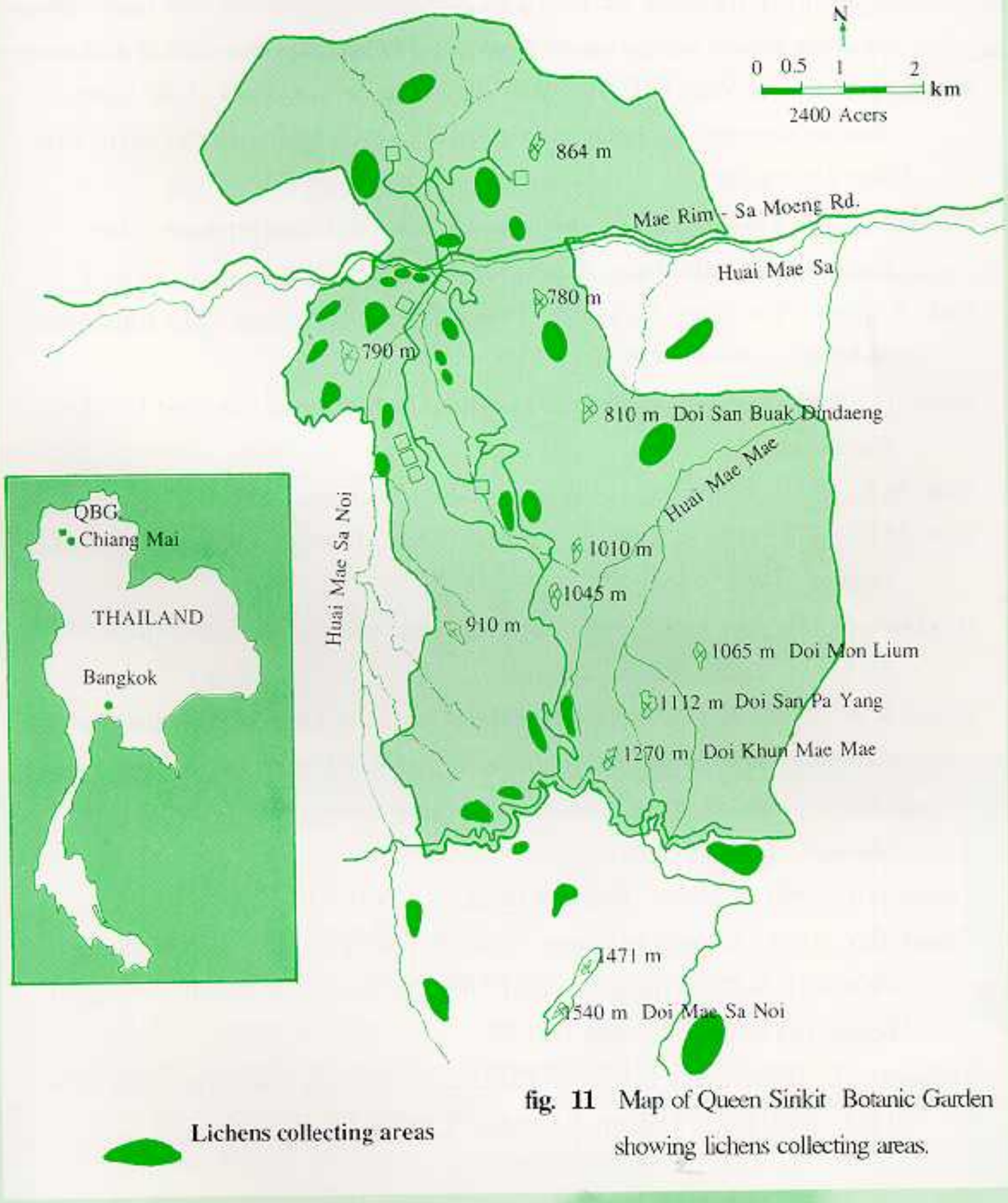


fig. 11 Map of Queen Sirikit Botanic Garden showing lichens collecting areas.

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EDITOR'S NOTE

Dear Readers,

This is the fourth issue of the Botanical Garden Organization (BGO) Newsletter. With this issue, I would like to introduce our new editorial team, whose names are given below.

We would like to add more feature articles and research notes, therefore, we urge you to send your contributions on topics related to plant science, in general, and applications to botanical gardens, in particular. Please submit your manuscripts (English or Thai) to:

BGO Newsletter, Queen Sirikit Botanic Garden
Box 7, Mae Rim, Chiang Mai 50180
THAILAND

I take this opportunity to thank our contributors in the past, and welcome any comments and suggestions from our readers.

Sincerely,

S. Vessabutr

Suyanee Vessabutr, Ph.D.

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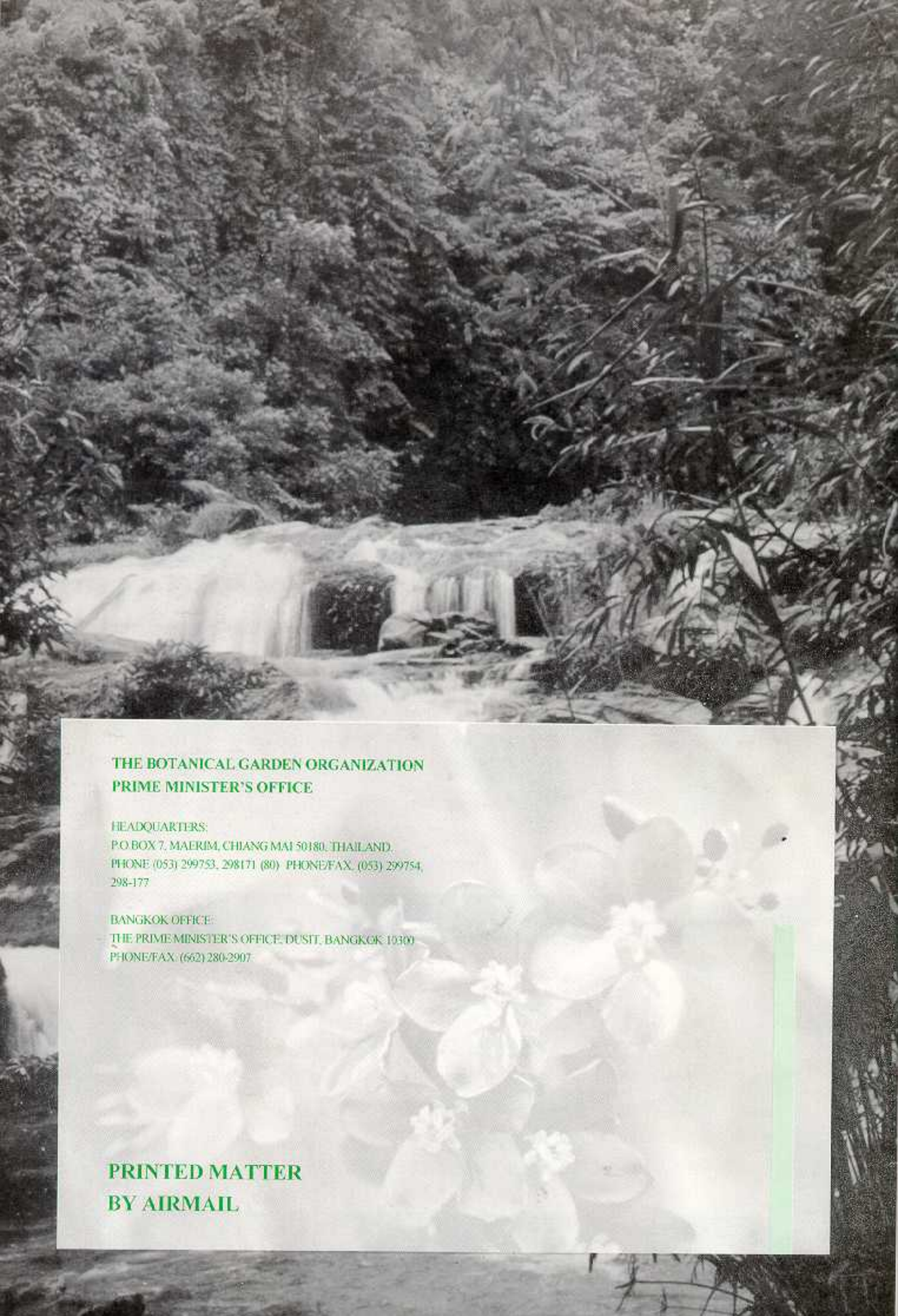

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