



**Living Collection Policy
of
the Botanical Garden Organization**

**The Botanical Garden Organization
Ministry of Natural Resources and Environment
2020**

Forward

The Botanical Garden Organization (BGO) envision to be an ex situ conservation institute and learning space for sustainable of plant resources and environment in Thailand. The living plant management system has been recognized as the importance basis for using plant specimens and supporting plant information to achieve the goal of the organization. Therefore the organization has a commitment to continuously develop a living plant management system that meets international standards by collecting the plants with clear objectives and scope support the implementation of the goals of the organization, conducting plant specimen management to comply with the relevant rules and regulations. Sufficient plant details are stored in a database system that can be efficiently retrieved. Plants are cultivated in the right condition, are located and can be tracked for easy use. Plant health and survival are declared as the main priority. The living plant specimens are cultivated according to the horticultural principles appropriate to the ecological condition to make vigor specimens ready to be a source of genetics for sustainable conservation, to support research programs efficiently as well as an example for education purpose.

To provide the resources necessary to carry out the management of living plants sufficient for the implementation of the organization's goals as well as to enhance the understanding of the living plant management process of the Botanical Garden Organization to all personnel of the organization to operate the task in the same direction in accordance with the goals of the organization, the Botanic Garden Organization has therefore developed a policy for living plant management in 2016 and updated in 2020 in order to provide clear standards and guidelines for plant collection. This has helped to make the plant collection process more systematic, able to collect most of the plant information of the Queen Sirikit Botanical Garden and start working in branch gardens in across Thailand. The policy provides aims, scope of the collection, and operational guidelines for decision-making in plant management. The policy is a further advice for daily working to the strategic planning of the organization.

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Part 1 Introduction

Botanical Garden is an institution where living plants are gathered cultivated and documented in a systematic way for the benefit of research, conservation, and educational purposes. The main activities of botanic garden are: collecting the plants for the specific purpose, taking a good care and monitoring of the plants, recording the plant information in a database system, publishing and distributing plant documents, install the plant labels appropriately, communicate and exchange plant species and information with other botanical gardens and academic institutions, carry out botanical researches especially the plants that are collected. Most of them are linked to the herbarium and the botanical library. There are plant conservation activities, especially ex situ conservation and the restoration of threatened plant populations and open to the public for learning and recreation.

The Botanical Garden Organization was established to be an important plant genetic resource of Thailand and a learning center on natural resources and the environment which is implemented according to international standards, by providing plant specimens and plant information to be the material for research programs, a base for the development of value added plant products, the example for education programs and plant sources for interpretive gardens and landscape development. To achieve the above objectives, it is necessary have a well-manage plant collection which can be efficiently access and use. The collection policy is a vital document for managing of living plant collection to ensure that the plant collection are executed according to the goals of the organization.

1.1 Objective of the Living Collection Policy

The policy is documented to be a guideline for the development and management of the living plant specimens to meet an international standard and to support the objective, vision and mission of the organization, to improve efficiency in the management operation of plant specimens, and development of a strategic plan and action plan for the collection of live plant specimens. It is also a communication

1.2 Objective of the Plant Collection

The plant collection have been managed to support the goal of the organization. The living plant specimens are collected the following purposes:

- 1) Ex situ Conservation
- 2) Supporting botanical research
- 3) Providing knowledge and raising awareness of the conservation of nature and environment

1.3 Scope of the Plant Collection

Living plant collection of the Botanic Garden Organization is the living plants collected and planted in all botanical gardens under the Botanic Garden Organization for a clear purpose, and record the registration data in the living plant database system. They are divided according to the main purpose of collection and management style into two categories as follows:

1.3.1 Collection for ex situ conservation and research

This category is align with the research and conservation strategy of the Botanic Garden Organization that aim to be an important genetic resource of native plant of Thailand supporting conservation research and development and to be the strength of the organization.

The plants of this group must be collect according the genetic diversity of the sample. All specimens must be registered and recorded in the database system, attached with permanent label, have good care and regularly checked for health and label condition. The information of the specimens must be sufficient for research and conservation activities. The exact source must be known, the scientific name is correctly identified, contains sufficient ecological information, distribution, etc.

The BGO research and conservation strategy have been focus on 4 plant groups which are Threatened Plants of Thailand, Thai Orchids (Orchidaceae), Thai Gingers (Zingiberaceae) and Medicinal Plants.

1.3.2 Public Display Collection

This category includes plants that are permanently displayed on site and in exhibition greenhouses of all gardens under the Botanical Garden Organization. The display collections have been grown with a primary purpose for providing knowledge and raising awareness of the conservation of nature and the environment, and further recreation and relaxation of the public. It may be a local plant species or a foreign plant species. The plant specimens are properly identified. The permanently cultivated plants must be registered and recorded in the database system. Permanent labels are attached and properly maintained. The relevant plant information to be used for the exhibition and education activities is provided.

The collection and display of plants that are the highlight of each botanical garden are:

1) Queen Sirikit Botanic Garden

- a. Glass House Complex Collection
 - i. Arid Plants
 - ii. Tropical Rain Forest Plants
 - iii. Orchids and Ferns
 - iv. Aquatic Plants
 - v. Carnivorous Plants
 - vi. Medicinal Plants
 - vii. Ethnobotanical Plants
 - viii. Water lily and Lotus
 - ix. Foliage Plants
 - x. Bromeliads

- b. Aboretum
 - i. Annonaceae
 - ii. Dipterocarpaceae
 - iii. Ebenaceae
 - iv. Fabaceae
 - v. Bambusoideae-Poaceae
 - vi. Moraceae
 - vii. Arecaceae
 - viii. Gymnosperm
- c. Climber collection
- d. White flowers collection
- e. Medicinal plant garden
- f. Ginger garden
- g. Fern garden
- h. Rock garden
- i. Banana Avenue
- j. Giant Pill Millipede Nature Trail

2) Romklao Botanical Garden

- a. Magnoliaceae
- b. Annonaceae
- c. Aceraceae
- d. Ericaceae

3) Khon Kaen Botanic Garden

- a. Arid plants
- b. Saline tolerant plants
- c. Medicinal plant and ethnobotanical plant of northeastern Thailand

4) Rayong Botanic Garden

- a. Wet land plants
- b. Carnivorous plants

5) Pra Mae Ya Botanic Garden

- a. Cultural Plants
- b. Banana Collection
- c. Water Lily and Lotus Collection

Part 2

Legal and Ethical Consideration

Activities related to the management of living collection of the Botanical Garden Organization must be. Plant collecting, exchanging, giving, accepting donations, Importing and exporting are required to comply with all level of the relate rules and regulations and further obligations that the BGO has agreed to a contract. The examples of the main regulation are:

2.1 International Legislation

- 2.1.1 Convention on Biological Diversity (CBD)
- 2.1.2 The Nagoya Protocol on Access and Benefit-sharing
- 2.1.3 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- 2.1.4 Global Strategy of Plant Conservation (GSPC)

2.2 National Legislation

- 2.2.1 Plant Varieties Protection Act
- 2.2.2 National CITES regulations
- 2.2.3 National ABS of biodiversity resources regulations
- 2.2.4 Drug plants regulations
- 2.2.5 Invasive plants regulations

2.3 Organization Legislation

- 2.3.1 The Living Collection Management Practice of The BGO B.E. 2559
- 2.3.2 The Access and Benefit Sharing regulation of plant resources of the BGO

Part 3

Guidelines

3.1 Acquisition

Acquiring of plant specimens is the basis of the collection of living plants of the Botanical Garden. Introducing plants that meet the target together with a good information record will allow the collected plant specimens to be used to support each aspect of the organization's mission with full efficiency. The criteria for obtaining plants specimens to the gardens are:

3.1.1 The plants serves the purpose of the collection and the goal of the organization.

3.1.2 The plant sources must be known (field survey, purchase, donate, exchange, receive as a gift) and the acquisition and possession are in accordance with the relevant laws and regulations.

3.1.3 The plant origin should be known (wild collected /cultivate varieties/wild plant obtained from cultivation or other gardens, etc.)

3.1.4 The information is available such as locality, habitat, ecology and cultivation and other data according to information standards.

3.1.5 Reducing impact on the natural population of the plant must be taken into account.

3.1.6 Plant collection attention should be given to the genetic diversity, risk of extinction, rarity, endemism and the attractiveness of being an example for learning so that the plants can be efficiently used in conservation, research and education.

3.2 Accession

Plants collected for the purpose and scope of the Botanical Garden Organization to be permanently planted to use according to the mission of the organization will be registered. The same plant taxa gathered together in the same form (seed, branch, shoot or whole plant) and the same even number will be assigned as an accession. All registered accession must be recorded in the register book and import data into BG-BASE system and identify planting areas in the gardens and install permanent accession label.

An accession number will be assigned using a 4-digit year number followed by 4 digits order in that year. Duplicate of the accession will be assigned by plant number (qualifier) by using the order of planting place in English capital letters and the number indicating plant number in that place for example 20201234 A2.

In addition, plants collected and accessed prior to the policy and have different number system are allow until it have been changed to be in the form according to this policy. Seedlings propagated from seed of accessioned plant will be assigned a new accession number and specify the parent number in the database. The plants cultivated from asexual propagation will use the original accession number.

3.3 Plant Documentation

Maintaining plant information along with the plant specimens is one of the important tasks of the botanical garden. Consistency and accuracy information and plant caring quality determines the scientific value of the plant specimens. Therefore, the following information guidelines have been adopted.

3.3.1 Information Standard

1) New accession should be collected with as much detail as possible. At least, the specimen must have the collection locality, field plant name, type of specimens, source or collector number, collection date, note on habitat characteristic and growing recommendation, note of plant character, accession number, accession date. Geographic position, elevation, and photos of the plants and their habitat are recommended to record in the database system. When the plants have been quarantined and ready to grow permanently in the garden, the location of the plant in the garden must be recorded and the plant health and label condition are monitored and updated in the database system.

3.3.2 Database System

Information of the registered plant specimens will be stored in the database system to be used to trace, monitor, maintain and use of the plant specimens and suitable for analyzing the collection statistics. Currently, the BG-BASE system is used by staff involved in the management of living plants of the BGO.

3.3.3 Plant Catalogue

Each botanical garden of the BGO requires a continuous review of the plant information and publishing compiled plant lists at least every 5 years in order to update the information and to make stakeholders aware of the resources available in the BGO and facilitate access and use of the collected specimens for conservation, research, and education.

3.4 Plant Label

All accessioned plants must be attached with a permanent label and take care to be attached to the plant all the time. At least, there must be the accession number and plant number, scientific name so that plants can be linked to plant information in the databases. In addition, other information such as Thai name, common name, family name, area code, zone, sources, may be provided as appropriate for helping in management of the collection and other specific purpose. There are four kinds of labels used in the garden.

1) Label for greenhouse collection will be printed on waterproof laminate sticker, and stick on a thick plastic label.

2) Label for outdoor collection will be engraved on brown acrylic sheet, painted with the white color on the letters and installed on a tree or shrubs using coiled wire.

3) Temporary label used for an accession plant awaiting for a permanent label will be a white plastic label written clearly with pencil. Accession and plant number, scientific name are required on this type of label. It must be replaced by a permanent label within a period of not more than 3 months.

3.5 Caring and Stock Inventory

Plants that are cultivated and registered to the garden collection should be provided a suitable planting site and being taken care of in good health. Each collection must have a manager responsible for continuously monitoring and taking care of the plant health, plant information, and label condition. A full audit for the statuses of plants in the collection is planned systematically. Greenhouse collections are required to be monitored and updated the status at least twice a year. The outdoor collections will be followed up at least every 2 years.

3.6 Name Validation

Accessioned plants should have a valid scientific name especially when used as a specimen in research or conservation. A plan must be made to inspect the scientific name for each area and greenhouse at least every 2 years. When plants have flowers and fruits, the collection manager must take the voucher specimens to a botanist to verify the scientific name and keep the specimens as references in QBG herbarium and update the name in the database immediately.

3.7 Weed, Pest & Disease Management

Pest, disease and weed are managed under the integrated management approach and compliant with relevant regulations. Pest and disease control and measures plans should be develop as well as a management plans and measures to prevent and eliminate invasive alien plants.

3.8 Move

The plant in a collection can be with the aim to increase the overall quality of the plant collection, such as moving the plant specimens to more suitable planting location, arrangement to optimize management. When moving, the new planting location and reason for moving must be reported and updated in the database immediately.

3.9 Deaccession

Plant accession which cannot be used for the objective of the garden will be evaluated and deaccessioned. Plant accession assessed in the following criteria will be deaccessioned i.e. dead plant, does not support any goals of the organization, source of severe diseases and may threaten or spread to other plants, poisonous or dangerous to visitors and cannot be handled. Deaccession plant will be untracked and discarded to update more information. Sometimes plants may need to be removed from the collection site, or disposed.

3.10 Access and Use

The plants in the public area can be visited during business hours. Access to private collection for research and conservation must be authorized by the competent authority and under the supervision of the plant collection manager. Plant specimens in the collection can be used for conservation, research and educational purposes, not for commercial purposes. Specimens can be transfer after the permission and material transfer agreement are signed by authority and in accordance with the regulations on access and benefit sharing from biological resources of the BGO.

Part 4

Development of the Collection

The Botanical Garden Organization dedicated to continuously develop a living plant collection management system. The living collection management committee of the BGO is responsible for developing a standard for managing living plants, supervises the management task operation and improves the efficient living plant management system.

4.1 Review of the Policy

The living collection policy will be continuously reviewed, at least every 5 years, or when the organization changes its goals and strategies to ensure that the plant collection will be always aligned and support the organization targets.

4.2 Review of the Plan

Strategy and Action plan for living collection management will be reviewed every year to allow improvement and revision of the operation to be more efficient, in accordance with the policy, and to meets the goals of the organization.

4.3 Development of the Operation Manual

Procedures and practices in the process of living collection management according to the guidelines of the policy will be documented to be a standard manual to enable the relevant staff to perform their duties in accordance with the established guidelines and used as a standard for training a new staff and to communicate operations with related departments.

4.4 Capacity Building

The organization will prepare sufficient areas and greenhouses, materials and equipment to support the collection operations and make a development plan to expand the infrastructure capacity to support future operations. The staff take caring of each collection will be sufficiently trained to develop knowledge and skills in caring of the plants they are responsible for to become more proficient.

4.5 Future Perspectives

In the next five year, particular important tasks to improve the efficiency of the living collection management will be list as follow. Development of information technology to support the system for improving the field monitoring, keep plant information up to date and rapidly response to fix plant problems. Digital plant mapping will be developed to easily access, track and use of the plant specimens for the purpose of the garden. It also serves as a backup system when plant labels are dropped or damaged. A list of plants in all gardens under the organization will be compiled to realize the total plant asset of the whole organization.