ຕົ້ນໄຮຜ່ າ - *Ficus (un-described), Moraceae*

Pha Tad Ke Botanical Garden

Newsletter Nr. 14 - October 2014

Pha Tad Ke - The Cliff to Untie and Resolve

In our last newsletter we talked about the on-going capacity building at Pha Tad Ke over the last years and especially the last six months and in this issue we would like to present some of the outcome of all these efforts. Three new book publications in the pipeline, fieldwork and plant identification with over 600 collected specimen of which 30 plus new records for Laos and 8 new species !

Rik Gadella, General Director - Pha Tad Ke

Content

The Pha Tad Ke Newsletter is distributed 3 times a year via e-mail.
Big thanks to our volunteer collaborators, and if anyone is interested to writing articles or help us with occasional translations please let us know.

ດອກເອື້ອງປາກມ່ວງ - *Nervilia sp., Orchidaceae*

Friends of Pha Tad Ke Botanical Garden

In January 2010 the Friends of Pha Tad Ke Association was created in France followed in July 2011 in the Netherlands and September 2011 in Laos. Each of these non-profit associations helps the creation of the Pha Tad Ke Botanical Garden with scientific support, fund raising efforts and educational projects. In addition the Luang Prabang Fund for Culture and Conservation that was created in 2011 in the USA accepts donations that are tax-deductible for the benefit of Pha Tad Ke Botanical Garden or other cultural and conservation projects in the Lao PDR.

Helping the Friends of Pha Tad Ke will allow you to follow the day-to-day evolution of the garden, look behind the scenes of its operations and participate in the Pha Tad Ke adventure !

Information: **www.friends-pha-tad-ke.com**

ດອກດິນທີ່ໆ - *Aeginetia (un-described), Orobanchaceae*

May / June, 2014

The teams from Pha Tad Ke and the Queen Sikirit Botanical Garden from Thailand joined forces on a field trip in Luang Prabang and Xainyaburi Provinces to survey new species. Information about the new species will soon be published in the Journal of Botany.

June 6 / 26, 2014 - *Chris Cole and Mark Viler from Sydney Royal Botanic Garden, Australia, visited Pha Tad Ke Botanical Garden for a field trip to the Phoupheung protected area, near Ban Xieng Meuak in Luang Prabang Province. They gave a training session for PTK nursery staff about caring for nursery plants and about transplanting specimens from the forest to the garden collection.*

July 6 / 11, 2014

PTK staff went on a field trip in Xieng Kuang Province and collected plants from 80 species, including conifers, ferns, gingers, and many other species for preservation at PTK.

July 18, 2014

Dr. Piya Chaluemglin and Dr. Pramote Triboun spent four days visiting Pha Tad Ke Botanical Garden, generously helping with the design of the palm garden and with identifying plants on the PTK Mountain, making a list of dominant plants They also helped coordinate a field trip along the Mekong River near Luang Prabang.

July 28 / 29, 2014

Phetsamone Manola, coordinator of the Friends of PTK Association, and PTK Office manager Insavai Sitthivohane, participated in a training on Grants Procurement and Management in Luang Prabang which was organised and supported by the International Republican Institute.

They also joined ten other representatives of Non-Profit Associations (NPA) and participated in a training on Financial Management on the 18th and 19th of September, 2014.

August 2014

PTK Director Rik Gadella, Kittisack Pouttavong (Botanist). Keooudone Souvannakhoummane (Botanist) visited the Queen Sikirit Botanical Garden in Chiang Mai, Thailand to check and identify specimens from field trips. They also attended the Regional Network Meeting on Zingiberaceae in Southeast Asia, presented a talk on ginger ex-situ conservation in the Lao PDR and at PTK.

August 18 / September 15, 2014

Insavai Sitthivohane, PTK office manager, and Phetsamone Manola, Coordinator of Friends of PTK Association had the opportunity to attend a training in capacity building for organisational management at the Vansana Riverside Hotel in Vientiane. 19 people from ten organisations attended the training, which was organised by Ethnic and Social Development Service (ESDC) and supported by Swiss Agency Development (SDC). While in Vientiane, they joined with PTK Science Adviser, Dr. Bouakhaykhone Svengsuksa to visit six institutions in Vientiane to update them on progress in the creation of Pha Tad Ke Botanical Garden.

September 30, 2014

Interview with Loong Chit (Gardener at Pha Tad Ke)

“In the old days, PTK Mountain was full of both big and small trees and many really useful plants in the area, like hardwoods, orchids, medicinal plants and more. And besides the plants there were animals - big and small like deer, muntjak deer, monkeys, civet cats, wild chickens and many birds - like peacock, stork crane, swan, hornbill and etc..., The climate was good and there was plenty of water for agriculture and for drinking, because it wasn’t like it is now. There is a big difference. Nowadays, so many useful plants have been taken by the people around here to sell, and the animals, too; they’ve been caught and sold. Now the weather is too warm and dry and there aren’t enough big trees to take the water and to give shade for people and animals. Streams and natural ponds now don’t have enough water, which is the direct effect of farming and of people using the streams for household water and now the water is full of chemicals from their farms, from their own hands.”

September 29 to October 4, 2014

PTK Staff, Kittisack Pouttavong (Botanist) and Xaisamone Inthavong, (Butterfly Specialist) were invited by Dr. Akihiro Nakamura to attend a seminar at Xishuangbanna Tropical Botanical Garden in China on "How tropical butterflies might escape the impact of climate change (and how they might not)" by Dr. Timothy Bonebrake from the University of Hong Kong. After the lecture Dr. Akihiro and Dr. Bonebrake demonstrated how to collect dry specimens from the field and how to do butterfly analysis. While in the field, they also set up new plots for butterfly study and worked in the collection for future reference. They created 5 transit butterfly plots, 350 meters long.

Playing Nature - *A Lao childhood between the rice fields and the forest*
by Biba Vilayleck

Playing in nature is the privilege of Lao children who mainly still live in the countryside. Playing in the outdoors, they discover taste, texture and colour. They learn about their physical capabilities and explore their relationships with others; they make herbs sing and crickets dance. From leaves, flowers and seeds they develop their imaginations, which then become part of their personalities. To inventory the games of the past thus contributes to both conservation of a natural heritage and also to understanding the relationship between a society and its floral and animal environment. Tiao Somsanith has made over 50 illustrations to accompany the text by Biba Vilayleck, her second book about ethno-botany in Laos. It presents over 50 games and as many plants in six chapters: Discovering, Movement, Competition, Capture, Budding Talents and finally, Singing Leaves.

Jouer dans la nature est le privilège des enfants laotiens dans une société majoritairement rurale. Ils y découvrent les goûts, les textures, les couleurs; ils y apprennent leur corps; ils y expérimentent la relation à autrui; ils font chanter les herbes et danser les sauterelles. A partir de feuilles, de fleurs et de graines ils construisent un imaginaire qui sera une composante de leur personnalité. Répertorier les jeux d'autrefois c'est donc œuvrer pour la conservation d'un patrimoine mais c'est également vouloir comprendre la relation qui lie une société à son environnement végétal et animal.Ce deuxième livre en milieu lao de Biba Vilayleck est mis en image et en valeur par les dessins de tiao Nith. Il présente une cinquantaine de jeux et autant de plantes à travers six étapes: la découverte, le mouvement, la compétition, la capture, l'art en herbe et enfin la musique verte.

Galanga shoot in Luang Prabang market

ABSTRACT

Surveys and collections of the Zingiberaceae plants have been undertaken between 2011 and 2014 in many provinces of the southern, central and northern parts of Laos. The total living collection number of ginger species obtained during this field study was 224, and among these, only 82% (i.e. 80 species) were identified, while the remaining 22% need to reach the flowering stage to be identified. Up to now, the whole living collection has been grown in the nursery at the Pha Tad Ke Botanical Garden for future planting of a Zingiberaceae Garden for conservation, research and educational activities.

INTRODUCTION

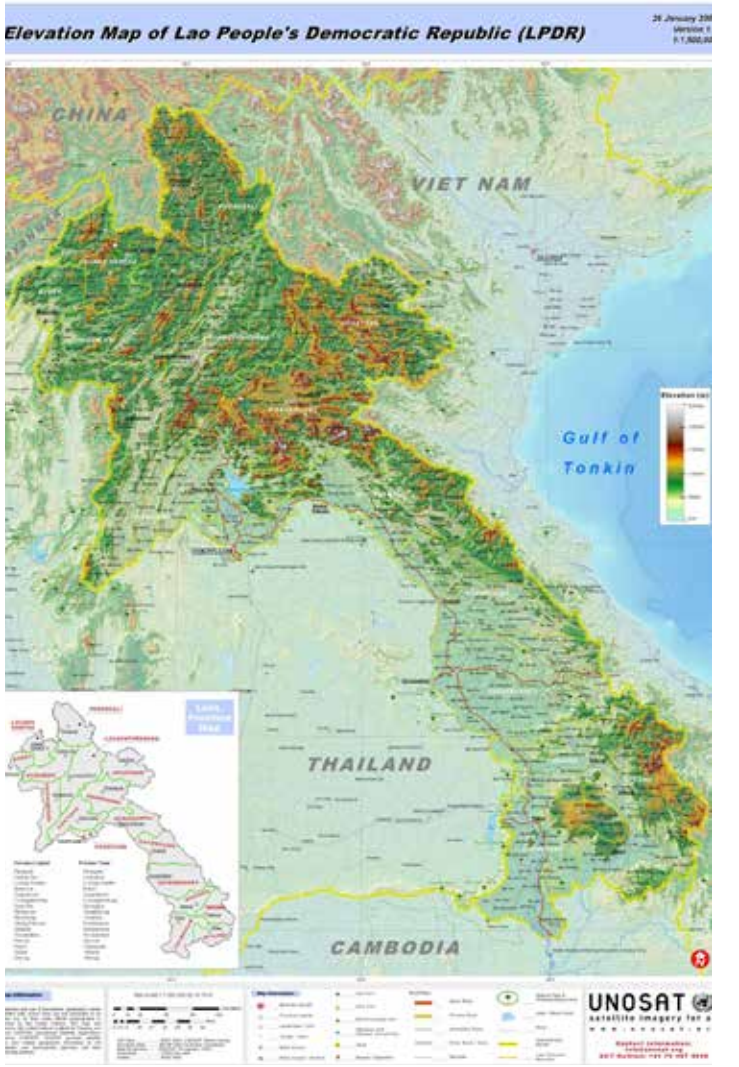
The family Zingiberaceae consists of over 1,400 species of rhizomatous perennial herbs, of which some genera have perennial pseudostems with a very strong and thick rhizome, such as *Alpinia, Amomum, Etlingera* and *Elettariopsis,* while a large number have deciduous pseudostems whose rhizome are tubers with rootstock, including *Curcuma, Zingiber, Gagnepainia, Globba, Hedychium, Kaempferia, Stahlianthus, Boesenbergia, Caulokaempferia.* They are pan-tropical with their centre of diversity in South and SE Asia and some species spread in America and in subtropical and warm temperate

Keooudone collecting Gingers in Phou Khao Khuay NPA

Curcuma cornicolata

Caulokaempferia alba

areas of Asia. Considering the richness of Zingiberaceae of the neighbouring countries, it seems safe to estimate that more than 200 species could be found in Laos (Škorničkova). In Laos, the Zingiberaceae plants are found in diverse habitats such as dry evergreen forest, mixed deciduous forest, evergreen forest, limestone forest, pine forest and dipterocarp forest where the pseudostems appear only during rainy season. They provide a wide scope of use eg. several Kaempferia species for medicinal purposes, *Etlingera elatior* are used as ornamental plants and *Alpinia* galanga and *Zingiber officinale* for cooking. More than a century ago, the Zingiberaceae of Indochina attracted the interest of French botanists, especially F. Gagnepain who argued that about 103 species of this family occurred in Indochina. The results of their research were published in the 'Flore generale de l'Indochine'. The existing trade of Zingiberaceae plants across neighbouring countries has developed more recent surveys and research. This is a group of new species and new records have been published: *Caulokaempferia burttii* K. Larsen & Jenjitt., Hedychium *chayanianum* Wongsuwan, Kaempferia champasakensis Pichean. & Koonterm, *Kaempferia gigantiphylla* Picheans.& Koonterm, *Kaempferia attapeuensis* Picheans. & Koonterm, Hedychium *champasakense* Picheans. & *Kaempferia sawanensis* Picheans. & Koonterm and *Laosanthus graminifolius* K. Larsen & T. Jenjitt.. Among the existing genera of Zingiberaceae, the Amomum is the most represented in Laos with 31 species out of 35 species occurring in Indochina (Lamxay, V. & Newman, M., 2012).



map of Laos

Curcuma petiolata from Phu Khao Khauy NPA

OBJECTIVES OF GINGER COLLECTION IN PTK

-To investigate taxonomical and ecological aspects of the Zingiberaceae

-To undertake the ex-situ conservation of Zingiberaceae

-To install a ginger garden in Pha Tad Ke Botanical Garden with over 200 species.

STUDY AREAS

Over a three-year period, surveys have been undertaken in 23 sites in the northern, central and southern parts of Laos from 14º22'19.6"N and 20°28'11.3"N, from 100°28'51.44"E to 107º11' 57.6"E (Houa Phanh, Bokeo, Xiengkhoueng, Luang Prabang, Vientiane, Bolikhamxay, Khammouane, Champasack and Attapeu provinces and Vientiane municipality as well) and from 113 m to 1253 m. altitude.

MATERIALS AND METHODS

All specimens used for this study were collected from these study sites. The discussion with local people, local healers, local traders and old women on their use was undertaken during the field work. The taxonomical aspects have been worked on as well as their conservation status. The cultivation of a living Zingiberaceae collection at Pha Tad Ke Botanical Garden provides information on their growth performance, their soil requirements and their flowering.

A database, including flowering period, growth performance, distribution, use, trade, local exploitation, cultivation, etc. was started. The whole living collection with related data base have been prepared for the creation of a Zingiberaceae Garden within the Pha Tad Ke Botanical Garden. Therefore a map of this garden has been prepared, based mainly on their growth performance, their affinity and their distribution. Besides the living collection, dried specimens were prepared as well and sent to the national herbarium located in Vientiane.

RESULTS

A living collection of 224 numbers has been obtained and planted at Pha Tad Ke nurseries for further taxonomical study and for a planned ginger garden.

A list of Zingiberaceae plants with their conservation status has been obtained. Among these 80 species or 82% (175 collection numbers) were identified while the remaining 48 numbers (22%) need to reach flowering stage to be identified properly. 13 genera were represented: *Alpinia 14%, Amomum 21%, Boesenbergia 3%, Caulokaempferia 1%, Curcuma 19%, Elettariopsis 2%, Etlingera 6%, Gagnepainia 2%, Globba 11%, Hedychium 10%, Kaempferia* 5%, Stahlianthus 2%, *Zingiber* 13%. Among this rich group, 15 species were newly recorded in Laos. (Figure 1.)

NURSERY AND GINGER GARDEN

A 900 m^2 area of land with necessary irrigation system has been set aside for a future Zingiberaceae garden for the purpose of ex-situ conservation. In this ginger garden the seedlings or adults plants from existing nurseries of the Pha Tad Ke Botanical Garden will be planted. This garden will be divided in two habitats: one less humid habitat for deciduous pseudostems species and one more humid habitat for receiving perennial pseudostems species. Seven groups of the Zingiberaceae plants will be included in the ginger garden with details as below:

1. Amomum walk
2. The ginger order area will show related families: Costaceae, Cannaceae, Heliconiaceae, Lowiaceae, Marantaceae, Musaceae and Strelitziaceae, etc...
3. Gingers of Indochina area will show gingers native to Indochina.
4. Endemic gingers of Laos
5. Edible and medicinal gingers
6. Asian ornamental gingers
7. Gingers native to Luang Prabang area

1 *Alpinia conchigera* from Nam Kan NPA, Bokeo
2 *Amomum villosum* from Nam Phouy NPA, Xayaboury
3 *Amomum sp.* from Nam Kan NPA, Bokeo
4 *Boesenbergia sp.* from Phu Khao Khouay NPA

Amomum dealbatum cultivation in home garden in Luang Prabang

CONCLUSION

The field work was quite difficult, because Zingiberaceae includes many species which grow and flower in the rainy season, so we need more time for surveying them, but in the field we had only a little time and some places have not been covered yet. Some species are growing well in the nursery, including *Alpinia spp. and Amomum* spp., and are easy to take care of. Making a ginger garden at Pha Tad Ke Botanical Garden is good for the conservation of ginger ex-situ. Some species in our collection were quite difficult to plant such as *Caulokeampferia and Globba,* because they don't need much water so the rhizomes were decaying because sometimes in the rainy season we could not control the amount of water they received. Some collections died, because the habitat was different from the original habitat. This means that it is difficult to do ex-situ conservation for these plants and if their original habitat is damaged, these species of ginger are vulnerable. We also need to give better training to our gardeners. For the herbarium specimens, we can get these from cultivation in nurseries. Now we have just a small grant to support field work close to Luang Prabang, but in the future when we have more funds, we will survey elsewhere in Laos.

Alpinia malaccensis from Luang Prabang

Kaempferia galanga from cultivation in Long Lunh village

Stahlianthus involucratus from cultivation in Long Lunh village

Amomum repoeense from Phu Khao Khouay NPA

ACKNOWLEDGEMENTS

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*Škorničková et al., Tw*o new Curcuma species and one new Zingiber (Zingiberaceae) from Laos (unpublished)

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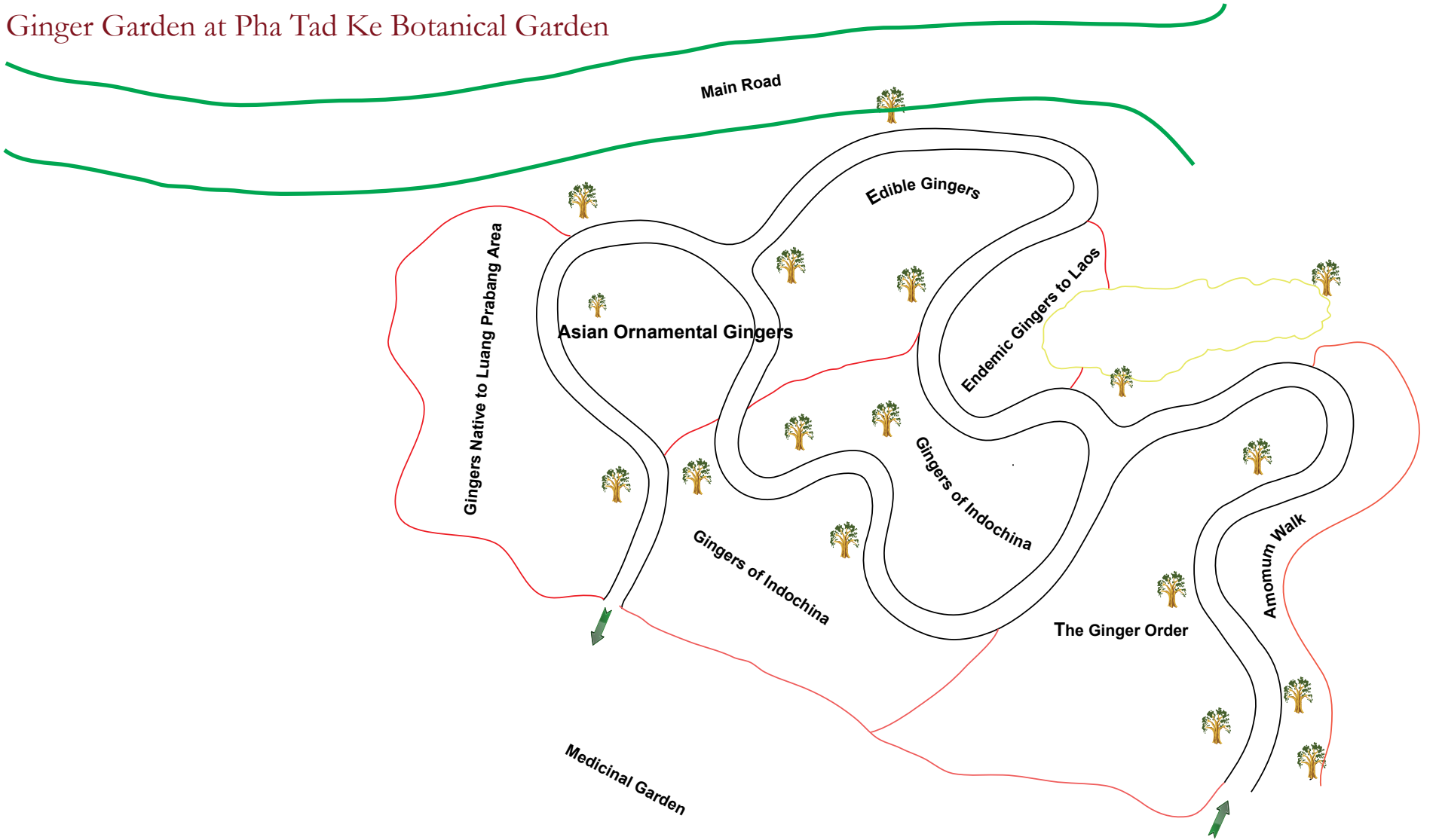
Gagnepainia godefroyi from Phu Khao Khouay NPA
Boesenbergia kingii from Luang Prabang area

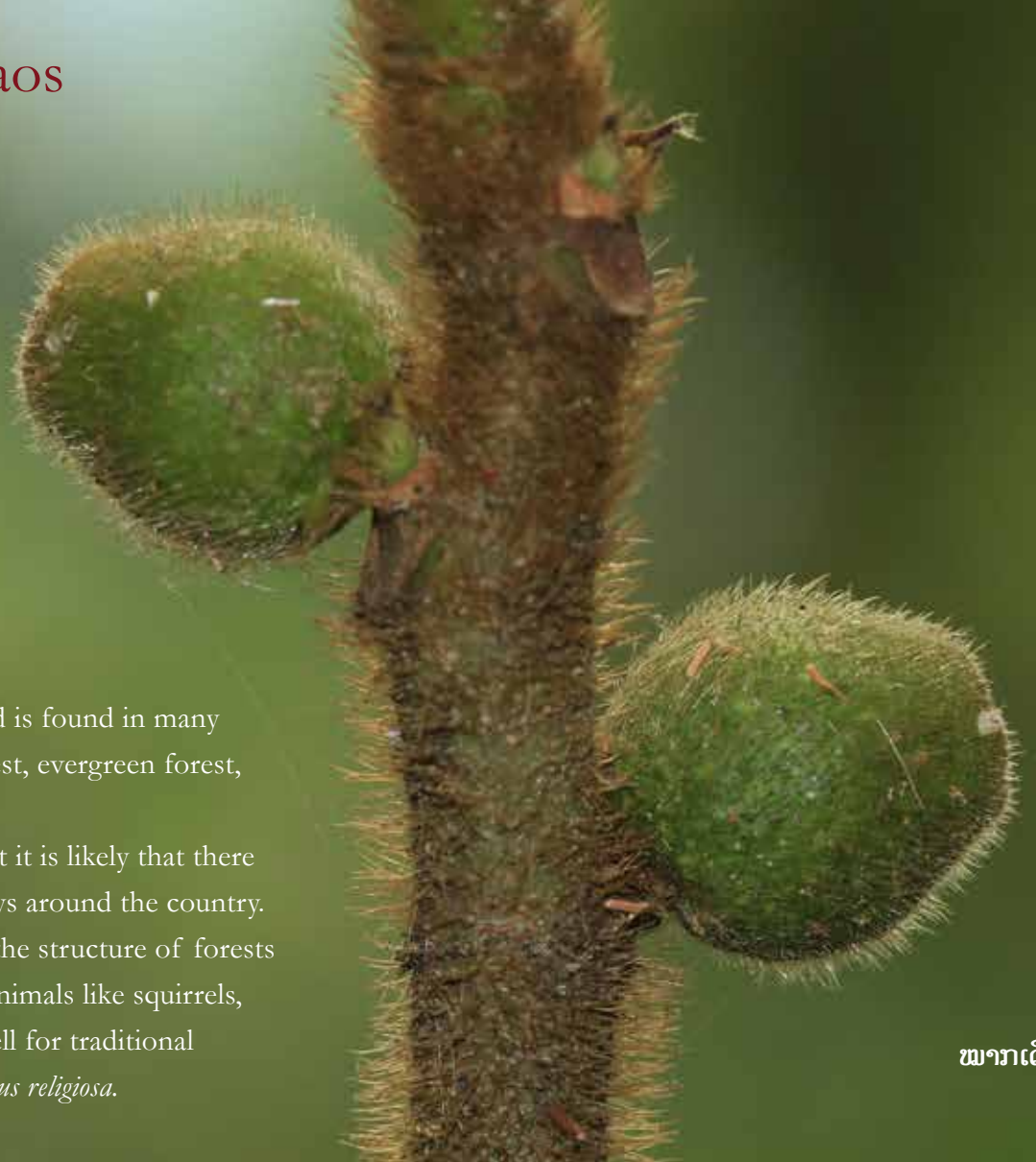
Map of Ginger Garden at Pha Tad Ke Botanical Garden



Some Photos of Moraceae in Laos

The Moraceae family contains a high diversity of species and is found in many different types of environment, including dry evergreen forest, evergreen forest, mixed deciduous forest and limestone areas.

This family consists of over 120 species in the Lao PDR, but it is likely that there are many more to be discovered through research and surveys around the country. Plants of the Moraceae family are vital to the formation of the structure of forests and their fruits are an important part of the diets of many animals like squirrels, monkeys, birds and many others. People use the plants as well for traditional medicine, decoration and even religious purposes, like the *ficus religiosa*.



ໝາກເດື່ອຂົນ - *Ficus hirta, Moraceae*
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ໝາກປ໋ສາ - *Broussonetia papyrifera, Moraceae*
© S. Suk-iaem

ໝາກໄຮຜາ - *Ficus altissima, Moraceae*
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ໝາກນອດຫ້ວຍ - *Ficus ischnopoda, Moraceae*
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ໃຮ໊ອຍ - *Ficus (undescribed), Moraceae*
© K. Phoutthavong

ສົ້ມພໍເໜືອ - *Streblus asper, Moraceae*
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ໜາມຊ້ອຍ - *Streblus ilicifolius, Moraceae*
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ໝາກໄຍ - *Ficus religiosa, Moraceae*
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