

# Selected Monocot Plants of Northern Thailand and Southeast Asia

## A FIELD GUIDE





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# Table of Contents

Introduction.....	<b>iv</b>
The Palm Family – Arecaceae.....	<b>1</b>
Palms of Northern Thailand.....	<b>3</b>
Glossary.....	<b>6</b>
Description of the Family Palmae (Arecaceae).....	<b>8</b>
Illustrated Morphological Characters.....	<b>10</b>
Native Thai Palms in Northern Thailand.....	<b>14-35</b>
List of Palms in Queen Sirikit Botanic Garden.....	<b>36</b>
References.....	<b>38</b>
The Orchid Family – Orchidaceae.....	<b>39</b>
The Orchid Family of Northern Thailand.....	<b>40</b>
Illustrated Glossary.....	<b>41</b>
Orchids of Northern Thailand.....	<b>42-77</b>
References.....	<b>78</b>
The Grass Family – Poaceae.....	<b>79</b>
Common Grasses in Northern Thailand.....	<b>80</b>
Illustrated glossary.....	<b>82</b>
Glossary.....	<b>83</b>
Common Grasses of Thailand.....	<b>84-103</b>
References.....	<b>104</b>

# Introduction

This field guide book was developed as an output of the Internship Programme on the Taxonomy of Monocot Plants supported by the Japan-ASEAN Integration Fund (JAIF) and implemented by the ASEAN Centre for Biodiversity (ACB) through the assistance of the Office of Natural Resources and Environment Planning and Policy (ONEP), Ministry of Natural Resources and Environment of Thailand. The internship was conducted at the Queen Sirikit Botanic Gardens (QSBG) in Chiang Mai and the Ban Rom Klao Botanic Garden, a satellite botanic garden of the QSBG in Phitsanulok Province.

## Geography of Thailand

Thailand, also known as “land of the free”, has an area of approximately 513,000 km<sup>2</sup> and is located at the heart of the Indochina peninsula in Southeast Asia. The country has several distinct geographic regions. The northern part is mountainous, with the highest point being Doi Inthanon in the Thanon Thong Chai Range, at about 2,500 meters above sea level. The northeast Isan area, on the other hand, consists of the Khorat Plateau lowland that is bordered to the east by the Mekong River. The central part of Thailand is dominated primarily by the flat Chao Phraya river valley that runs into the Gulf of Thailand. The southern part of Thailand consists of the narrow Kra Isthmus that widens into the Malay Peninsula.

## The Queen Sirikit Botanic Garden (QSBG)

The Queen Sirikit Botanic Garden (QSBG) is situated at one corner of the foothill of the mist-shrouded Doi-Suthep-Pui Mountain Range in Chiang Mai, Thailand. It is Thailand's oldest botanic garden and a major center for scientific research. Dedicated to the conservation of Thai flora, it researches on and holds a collection of rare, endemic and endangered species. Although its main focus is on the Northern Thai flora and the surrounding areas, the QSBG has an integrated programme of research





and education amenities aimed at a global perspective.

The QSBG has an extensive research facility that houses the herbarium, micropropagation laboratories, and library. Research activities cover a wide spectrum of morphological, entomological, biochemical and molecular studies. Species recovery and *ex-situ* conservation projects include working with endangered native Thai orchids, cycads and palms. In addition, the QSBG protects a large area of the unique tropical deciduous forest with its associated wildlife as a conservation zone.

### **Ban Rom Klao Botanic Garden (RBG), Phitsanulok Province**

Ban Rom Klao Botanic Garden occupies an area of 221.6 ha and is situated at 750–1,250 meters above sea level. It was originally initiated as a plant collection center by Queen Sirikit when she visited the area (Rom Klao, Phu Kat, Phu Mein, Phu Soi Dao) in the Bo Pah District, Chatrakon county, Phitsanulok Province as part of a national security surveillance tour on 5 March 1998.

These areas located near the Lao PDR border in the north eastern part of Thailand are rich in plant diversity. Thus, one of the purposes of the plant center at Ban Rom Klao is to exhibit the plant diversity in these areas, as well as for the conservation of the biological resources and habitats, to improve the livelihood of the local people living there.

### **Purpose and How to Use the Field Guide**

This Field Guide is aimed at students, plant lovers, enthusiasts and tourists who visit the Queen Sirikit Botanic Garden (QSBG) and Ban Rom Klao Botanic Garden (RBG) to allow them to easily identify palms, orchids and grasses in Northern Thailand. This is an easy-to-use and richly illustrated field guide with high quality photographs by the authors for the enthusiasts to quickly identify the monocot plants.

Basic information such as the sections of floral inflorescence and the flower parts are illustrated. The brief descriptions and the illustrations of pictures also provide an easy guide to identify these species in the QSBG and RBG. Many of the species in this book can also be found in other countries of Southeast Asia. Additional information or interesting facts are also included.





**The Palm Family**  
*(Areaceae)*





# Palms of Northern Thailand

By Lowell G. Aribal and Paweena Taraksa

## INTRODUCTION

The Palm family *Arecaceae* is the most versatile plant family in the world in terms of overall usage ranging from food, ornamental and furniture purposes. Divided into five subfamilies, palms consist of 200 genera with 2,800 species, generally characterized by being erect and/or climbing. They are widely distributed from Madagascar, Africa to Southeast Asia with a wide range of habitats from mangrove ecosystems to serpentine soils and can grow in extreme environmental conditions (Dransfield *et al.* 2008).

The palm flora of Thailand is composed of 33 genera consisting of 161 species. The highest concentration is found in the Peninsula especially near the border with Malaysia. Thirteen species are endemic to the country: *Iguanura divergens*, *I. tenuis*, *I. thalangensis*, *Kerriodoxa elegans*, *Licuala distans*, *Licuala poonsakii*, *Maxburretia furtadoana*, *Pinanga badia*, *P. fractiflexa*, *P. watanaiana*, *Salacca stolonifera*, *Trachycarpus oreophilus*, and *Wallichia marianneae*. Four species are considered threatened: *Calamus manan*, *Trachycarpus oreophilus*, *Borassodendron machdonis* and *Cyrtostachys renda* (Dransfield *et al.* 2004). The floristic affinity of Thai palms is also varied and is composed of Indochinese, Himalayan and Malesian elements while several of the Malesian species occur as “disjuncts” in Borneo.

The high demand for palms for landscaping and furniture purposes has depleted the palm’s population in the wild. Rattan, the climbing palms, became the most vulnerable species since all the rattan species that are commercially traded have been collected from the wild, majority from the tropical rainforests of Southeast Asia. Rattan canes when harvested would lead to the death of the whole plant. For this reason, Thailand and other rattan-producing countries have lost most of their rattan resources, specifically the genus *Calamus*, as a result of deforestation and over-exploitation (Dransfield *et al.* 2004). The consequence of increased forest destruction is the very real shortage of rattan supply; hence, conservation is an utmost necessity.

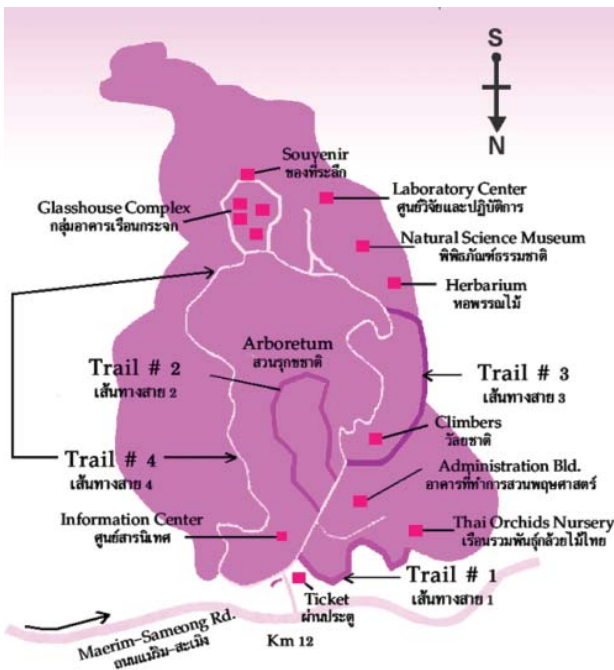


This field guide describes 11 species of native palms consisting of 10 erect palms mostly of high commercial value known for their beautiful and magnificent attributes and one climbing, the *Calamus palustris*.

All the illustrated palms herein are from the two gardens, the Queen Sirikit Botanical Garden (QSBG), Chiang Mai province and Ban Rom Klao Botanic Garden, Phitsanulok province, both of the Botanical Garden Organization of Thailand (Fig. 1,2). Moreover, at QSBG, 63 species, consisting of 22 indigenous Thai palms and 41 exotic species are cultivated.

This guide provides information for the hobbyist, enthusiast and other individuals who have a keen interest in palms. An illustration of the palm's morphological characteristics is provided for the reader to understand the terminologies used.

As the famous saying states, “A journey of a thousand miles begins with a single step.” Hence, it is hoped that this field guide could help raise awareness regarding the diminishing palm treasures and eventually would help conserve the palm flora of Thailand and Southeast Asia.



**Map of the Queen Sirikit Botanic Garden.**



1. สวนพฤกษศาสตร์สมเด็จพระนางเจ้าสิริกิติ์ อ. แกริม จ. เชียงใหม่
2. สวนพฤกษศาสตร์พระแม่ย่า อ. เมือง จ. สุโขทัย
3. สวนพฤกษศาสตร์บ้านร่มเกล้า อ. ขาดิระการ จ. พิษณุโลก
4. สวนพฤกษศาสตร์เมืองพล อ. พล จ. ขอนแก่น
5. สวนพฤกษศาสตร์ระยอง อ. แกลง จ. ระยอง
6. สวนพฤกษศาสตร์เกาะระ อ. คุระบุรี จ. พังงา
7. ศูนย์ประสานงาน กรุงเทพมหานคร

Map of all Botanic Gardens in Thailand.

# Glossary

**Acanthophyll** – a spine, often large, derived from a leaflet.

**Adventitious roots** – roots that are produced at the basal nodes of the stem. They take over root function already in the seedling stage and form a characteristic basal cone in mature palms.

**Armed** – bearing thorns, spines, barbs, or prickles.

**Cirrus, cirrate** – armed whiplike extension of the midrib of the leaf in the subfamily Calamoideae.

**Clasping** – wholly or partly surrounding the stem.

**Costa** – midrib of a leaf.

**Crownshaft** – a conspicuous cylinder formed below the crown by closely inserted tubular leaf bases of consecutive order. The immature tissues including the apical meristem are often extracted from the core of the crownshaft and eaten as cabbage. Palms with a crownshaft often produce infrafoliar inflorescences that are exposed when the subtending leaf is shed.

**Erect** – vertical, not declining or spreading.

**Flabellate** – fan-shaped.

**Flagellum, flagellate** – armed whiplike structure derived from inflorescences in the subfamily Calamoideae.

**Fibrous root** – a root system with all of the branches of approximately equal thickness as in the grass or other monocots.

**Hapaxanthic palms** – palms that finish a long vegetative adult phase by flowering and dying.

**Hastula** – a flap of tissue situated in the centre of the palmate lamina.

**Induplicate** – used to distinguish the folds of the lamina when these are oriented like a V as opposed to reduplicate.

**Infrafoliar** – inserted below the crown. Typical of palms with crownshafts.

**Interfoliar** – inflorescences inserted amongst the leaves in the crowns. Typical of palms without a crownshaft.

- Lamina** – the blade of the leaf as opposed to the leaf base and petiole.
- Leaflet** – used for leaf divisions of the first or rarely the second order (Caryota) in the pinnate leaves.
- Leaf sheath** – used for the leaf base typically, when referring to external features such as armature, mode of splitting, hair covering, etc.
- Orthotropic** – of, pertaining to, or exhibiting an essentially vertical growth habit.
- Margin** – the edge of a leaf blade.
- Midrib** – the central rib or vein of a leaf.
- Monoecious** – male and female flowers borne on the same palm.
- Palmate** – leaves where the major veins converge into a point or a short costa.
- Peduncle** – basal unbranched part of the inflorescence. Lateral axis (empty). Often abbreviated as PD bract.
- Petiole** – a leaf stalk.
- Pinna** – one of the primary divisions or leaflets of a pinnate leaf.
- Pinnate** – used for leaves in which the pinnae arise along the sides of an extended rachis like in a feather.
- Praemorse** – jaggedly toothed, as if bitten.
- Pleonanthic palms** – palms that produce inflorescences continuously throughout their adult stages. As opposed to hapaxanthic.
- Prop root** – adventitious roots arising from lower nodes and providing support to a stem.
- Prophyll** – the first bract borne near the basis of the inflorescence. Typically with two longitudinal ridges (carinae, bicarinate).
- Prostrate** – lying flat on, or immediately below substrate.
- Rachilla (pl: rachissae)** – flower bearing branch(es) of an inflorescence.
- Rachis** – main axis in a leaf or an inflorescence.
- Reduplicate** – used to distinguish the folds of the lamina when these are oriented like a reverse V as opposed to induplicate.
- Suprafoliar** – the subtending leaves of the inflorescences are reduced whereby these appear as a single unit elevated above the crown.
- Sympodial** – mode of branching whereby the apical meristem of lateral flowers of several successive orders contributes to the formation of the main axis.
- Spinose** – bearing spines.
- Unarmed** – lacking spines, prickles, or thorns.



# Description of the Family Arecaceae

*Palmae Juss.*

**Alternatively: Arecaceae Schultz-Schultzenst. (nom. altern.)**

**Including:** Borassaceae O.F. Cook, Chamaedoreaceae O.F. Cook, Geonomaceae O.F. Cook, Iriarteaceae O.F. Cook, Malortieaceae O.F. Cook, Manicariaceae O.F. Cook, Nypaceae (Engl. & Gilg) Tralau, Nipaceae Chadeff. & Emberg, Phoenicaceae Schultz-Schultzenst., Phytelephant(ac)ae Mart., Phytelephasi(ac)ae Chadeff. & Emberg, PPseudophoenicaceae O.F. Cook, Sabalaceae('ineae') Schultz-Schultzenst., Sagoaceae('-goineae') Schultz-Schultzenst., Synechanthaceae O.F. Cook

**Habit and leaf form:** Trees, or 'arborescent', or shrubs, or lianas (rarely diminutive undershrubs). Self supporting, or climbing; often scrambling (by means of hooks on prolonged rachides - leaflets modified as spines - armed sterile inflorescence axes, etc.). Pachycaul. Mesophytic, or xerophytic.

**Leaves:** Evergreen; small to very large; alternate; spiral; leathery; petiolate; sheathing. Leaf sheaths tubular; with joined margins (but often splitting at maturity). Leaves nearly always compound; (falsely) pinnate, or palmate, or bipinnate (rarely). Lamina without cross-venules. Leaves ligulate (often, in palmate and costa-palmate forms), or eligulate; without a persistent basal meristem (presumably). Vernation conduplicate. Leaves becoming compound by ontogenetically predetermined splitting.

**Reproductive type:** Pollination. Hermaphrodite (rarely), or monoecious, or dioecious, or polygamo-monoecious. Floral nectaries present, or absent. Nectar secretion when produced, from the gynoecium (via septal nectaries), or from the androecium (via nectaries associated with the stamen bases). Anemophilous, or entomophilous (more often).

**Inflorescence:** Flowers aggregated in panicles (usually, and usually complex). The terminal inflorescence unit cymose. Inflorescences axillary (usually), or terminal; usually complex panicles; usually spathate. Flowers small; more or less regular; 3 merous; cyclic (usually), or partially acyclic.

**Fruit:** Fleshy, or non-fleshy; multiple (occasionally), or not multiple. The fruiting carpel when apocarpous (i.e. rarely), indehiscent; drupaceous. Fruit indehiscent (usually), or dehiscent (rarely); nearly always a berry, or a drupe (sometimes with a fibrous mesocarp); 1 seeded. Seeds endospermic. Endosperm ruminant, or not ruminant; oily (usually), or not oily. Seeds usually without starch. Cotyledons 1. Embryo achlorophyllous (9/9).

**Geography:** Sub-tropical to tropical.

# Illustrated Morphological Characters





**Palmate**



**Entire (Palmate)**



**Praemorse**



**Flabellate**



## Habit



**Erect, Solitary**



**Climbing**



**Clustering**

## Infructescens (Fruiting)



Rachilla

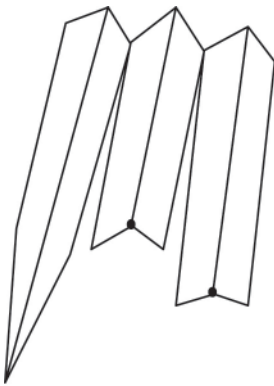
Peduncular  
bracts

Rachis  
bracts

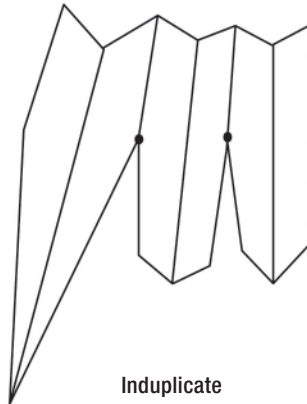


Spines

Knee



Reduplicate



Induplicate



**Habit**



**Stem**



**Inflorescens**



**Petiole**



**Leaf**



## *Arenga hookeriana* (Becc.) T. C. Whitm.

**Synonym:** *Didymos perma hookerianum* Becc.

**Common name:** Hooker Fishtail Palm/Hooker Sugar Palm Si sayam, Tao rang sisayam (Thai)

**Description:** Erect, clustering palm, 2 meters high. Leaves praemorse (jaggedly toothed, as if bitten) with whitish powder/dust, reduplicate. Infructescens very crowded, axillary, drooping, with fruits borne half of the peduncle's length. Petioles with brownish streak pattern. Stem diameter mostly 1 cm with fibrous leaf sheath.

**Distribution:** Peninsular Thailand to Northern Peninsular Malaysia.

**Habitat/Ecology:** *Arenga hookeriana* is infrequent in wet forests in south peninsular Thailand from 100-600 m elevation. It also occurs in north peninsular Malaysia.

**Flowering period:** October to November

**Uses:** Ornamental

**Conservation status:** Indeterminate (lacks information to describe its status).

**Notes:** *Arenga hookeriana* looks very similar with *Arenga caudata* but differ mainly in its simple leaves.

The species described is from Queen Sirikit Botanic Garden.



**Habit**



**Stem**



**Cirrus**



**Inflorescence**

# *Calamus palustris* Griff.

**Synonym:** *Palmijuncus palustris* (Griff.) Kuntze

**Common name:** Waikhring (Trang); Wai ling, Waipok (Narathiwat); Sa-kro-ai (Malay-Narathiwat)

**Description:** Climbing palm, clustering stems. Stem diameter 3-5 cm. Leaves: pinnate, reduplicate. Sheath: tubular, green, with slender, triangular, yellow or dark brown spines 3-5 cm long. Ochrea inconspicuous, knee prominent, no flagellum spines, cirrus <1-1 meter. Leaf rachis 2-3 meter. Stem and leaf rachis with armed.

**Distribution:** South China to Nicobar Island

**Habitat/Ecology:** Widespread but localized in moist, seasonally wet or wet forests and often found in marshy places in coastal areas or on the fringes of disturbed forest.

**Flowering period:** Indeterminate

**Uses:** Handicrafts, edible shoots and fruits.

**Notes:** Distinguishable for its leaves with a cirrus and leaf sheath armature.

The species described is from Rom Klao Botanic Garden.



**Habit**



**Crownshaft**



**Inflorescens**



**Leaflet**



**Stem**



## *Caryota obtuse* Griff.

**Synonyms:** *Caryota gigas* Hahn ex Hodel, *Caryota obtusidentata* Griff.

**Common name:** Giant Fishtail Palm, Tao rang yak (North-eastern)

**Description:** Erect, 15 meters high, praemorse leaves, stem diameter about 30 cm. Monoecious and hapaxanthic or monocarpic (dies after producing flowers and seed).

**Distribution:** India (Assam)

**Habitat/Ecology:** Restricted to moist, mountain forests on steep slopes in eastern north Thailand and extremely localized, occurring only over a several-square-kilometer area on one mountain.

**Flowering period:** Indeterminate

**Uses:** Ornamental

**Conservation status:** Indeterminate

**Notes:** May cause skin irritation or allergic reaction.

The species described is from Queen Sirikit Botanic Garden.



**Crown**



**Rachis**



**Crown shaft**



**Stem**



**Inflorescence**

# *Cyrtostachys renda* Blume

**Synonyms:** *Areca erythro carpa* H.Wendl., *Areca erythropoda* Miq., *Bentinckia renda* (Blume) Mart., *Cyrtostachys lakka* Becc.

**Common name:** Lipstick palm, Sealing wax palm, Makdaeng (Bangkok); Kapdaeng, Kadaeng (Nakhon Si Thammarat); Mak wing (Pattani).

**Description:** Erect, clustering palm by means of spreading rhizomes. Stem bamboo-like, greenish. Sheaths 70-100 cm long, tubular, forming a conspicuous reddish to pinkish crownshaft. Petiole reddish 2-10 cm. Rachis reddish to pinkish, 1.6-1.8 meters. Leaves pinnate, reduplicate. Inflorescence 2-3, infrafoliar, diffuse, spreading.

**Distribution:** Peninsular Malaysia, Sumatra and Borneo

**Habitat/Ecology:** Restricted to peat swamp forests near the coast in south Peninsular Thailand to W. Malesia.

**Uses:** Ornamental

**Conservation status:** Threatened

**Notes:** One of the most highly sought after ornamental palms due to its brilliant red sheaths.

The species described is from Queen Sirikit Botanic Garden.





**Habit**



**Rachis**



**Inflorescence (background)**



**Leaf**

# *Johannesteijsmannia altifrons* (Rchb. fil. & Zoll.) H.E.Moore

**Synonym:** *Teysmannia altifrons* Rchb. f. & Zoll.

**Common name:** Joey Palm, Diamond Joey Palm, Bang sun (Bangkok); Palm khao lam tat, Palm bang sun (Peninsular); Li-pae (Malay-Peninsular); Mak ta khap (Narathiwat).

**Description:** Erect, solitary palm, acaulescent, understory palm. Leaves 20-30, palmate, simple, diamond-shaped. Sheaths deeply split. Petioles 2-3 meters long, often with 2 longitudinal, yellow bands below, margins with spines. Inflorescences: 3-6, interfoliar, arising from mound of leaf litter.

**Distribution:** Peninsular Thailand from 600-800 meters elevation. Occurs also in peninsular Malaysia, Sumatra, and Borneo.

**Habitat/Ecology:** Infrequent in moist to wet forests on well drained slopes and ridges with abundant leaf litter.

**Flowering period:** Indeterminate

**Uses:** Ornamental

**Conservation status:** Indeterminate

**Notes:** A striking magnificent ornamental, easily one of the most sought-after and desired palms. Plants are tolerant to disturbance surviving in full sunlight.

The species described is from Queen Sirikit Botanic Garden.



**Habit**



**Leaf**



**Petiole**



**Inflorescence**

# *Kerriodoxa elegans* J .Dransf.

**Synonym:** *Teysmannia altifrons* Rchb. f. & Zoll.

**Common name:** White Elephant Palm, Prayathalang, Chao muangthalang (Central); Chinglangkhao, Tang lang khao (Phuket).

**Description:** Erect, solitary palm, flabellate (fan-shaped) leaves, petiole 3-4 cm. long, black and white or whitish streak at both side, induplicate, whitish underneath or chalk-like dust.

**Distribution:** Peninsular Thailand

**Habitat/Ecology:** Restricted to two localities on slopes in moist forests along the west coast of middle peninsular Thailand.

**Uses:** Ornamental

**Conservation status:** Indeterminate

**Notes:** Endemic to Thailand

The species described is from Queen Sirikit Botanic Garden.

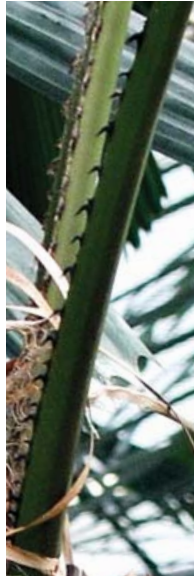




**Habit**



**Leaf base**



**Petiole**



**Leaf apex**

## *Licuala peltata* Roxb.ex Buch.-Ham.

**Common name:** Chao muangtrang (Trang); Kaphlo (Phichit); Ka pho (Bangkok); Ching (Satun); Ching (Peninsular)

**Description:** Erect, solitary palms, 5-6 m height. Leaf sheath prominently fibrous. Petiole 2 m, with spines. Leaves flabellate (fan-shaped), 1.5-2 m, reduplicate. Prop roots more than 5 inches. Inflorescence upright 3-4 m long.

**Distribution:** Bhutan to Peninsular Malaysia

**Habitat/Ecology:** Common in moist to wet forests in south peninsular Thailand and is common on limestone hills in northwest peninsular Malaysia.

**Uses:** Ornamental

**Notes:** Magnificent palm with its crown of huge, coarsely and deeply divided leaves and long, arching inflorescence and orange fruits.

The species described is from Queen Sirikit Botanic Garden.



**Habit**



**Leaf**



**Leaf base**



**Root**



**Stem**



## *Licuala spinosa* Thunb.

**Synonyms:** *Coryphapilearia* Lour., *L. pilearia* (Lour.) Blume, *L. ramosa* Blume, *L. horrida* Blume, *L. spinosa* var. *brevidens* Becc., *L. spinosa* var. *cochinchinensis* Becc., *L. acutifida* var. *Peninsularis* Becc.

**Common name:** Spiny Licuala Palm, Mangrove Fan Palm, Ka pho, Ka pho nam (Central); Ka pho khiao, Pho (Peninsular); Ku-wa (Malay-Narathiwat).

**Description:** Erect palms, fibrous roots 3–5 inches. Petiole 2–2.5 m long with spines. Leaf sheaths fibrous. Leaves palmate-shaped, deeply divided, reduplicate. Inflorescence 1.5 – 2 m long, upright or drooping

**Distribution:** China (Hainan), Indo-China to Philippines

**Habitat/Ecology:** Widespread with variety of habitats, including beach forest, swamp fringes, alluvial plains, and disturbed, often open, secondary forest.

**Uses:** Ornamental

**Notes:** Well adapted to diverse landscape situations.

The species described is from Queen Sirikit Botanic Garden.



**Habit**



**Leaf**



**Fruit**



**Inflorescens**

## *Livistona jenkinsiana* Griff.

**Synonym:** *Livistona fengkaiensis* X.W. Wei & M.Y. Xiao

**Description:** Erect, solitary palms height up to 15-20 meters. Leaves flabellate, reduplicate. Rachis with spines at both sides. Inflorescences axillary, 6-8. Fruits shiny, green, berry-like. Rachillae pale yellow.

**Distribution:** Peninsular Thailand near the Malaysian border. It is gregarious, forming extensive, conspicuous colonies on slopes and ridges. Occurs from Myanmar to peninsular Malaysia.

**Habitat/Ecology:** Moist forest on steep, rocky slopes in north and northern east Thailand.

**Uses:** Ornamental, leaves are used as thatch.

**Notes:** Very similar to *L. speciosa* but differs in its leaf blade with the basal segments overlapping; sheath with persistent, conspicuous, reddish brown ligules near petiole; inflorescences with longer, narrower, more tightly sheathing bracts.

The species described is from Rom Klao Botanic Garden.



**Habit**



**Inflorescens**



**Young fruit**



**Petiole**



## *Livistona saribus* (Lour.) Merr. ex A. Chev.

**Synonyms:** *Corypha saribus* Lour., *Livistona cochinchinensis* (Blume) Mart., *Livistona hasseltii* (Hassk.) Hassk. ex Miq., *Livistona hoogendorpii* Teijsm. & Binn. ex Miq., *Livistona hoogendorpii* Hort. ex André, *Livistona inaequisecta* Becc., *Livistona spectabilis* Griff., *Livistona tonkinensis* Magalon.

**Common name:** Rok (Trang); Chathang Surat Thani; Khosoi (Bangkok).

**Description:** Erect, solitary palms height up to 80-90 meters. Leaves flabellate, reduplicate. Rachis with spines at both sides. Infructescens axillary. Fruits shiny, green, berry-like. Rachillae yellow.

**Distribution:** Moist or dry forests throughout southeast, west, east, and peninsular Thailand from sea level to 600 meters elevation. It ranges from south China through Southeast Asia, Peninsular Malaysia, Java, and Borneo to the Philippines.

**Habitat/Ecology:** Widespread but infrequent in moist or dry forest and occurs in variety of habitats from dry rocky slopes, disturbed forest, open plains, and low, flat, seasonally flooded places.

**Flowering period:** Indeterminate

**Uses:** Ornamental, leaves are used as thatch.

**Conservation status:** Indeterminate

**Notes:** *L. saribus* resembles *L. speciosa* but differs in its leaf segments with pendulous tips, blades green below, sheaths lacking the distinctive ligules and fruits longer than wide.

The species described is from Rom Klao Botanic Garden.



**Habit**



**Stem**



**Leaflets**



**Leaf base & Leaf sheath**

## ***Wallichia disticha* T. Anderson**

**Synonyms:** *Didymos perma distichum* (T. Anderson) Hook. f., *Wallichia yomae* Kurz

**Common name:** Makna re suan (Bangkok); Khueang baikha nang, Khueang phat (Central).

**Description:** Erect, solitary palms with fibrous leaf sheath. Leaves pinnate, nearly opposite, reduplicate consisting of 3-4 leaflets. Fronds distichously arranged above each other on both opposite sides of the stem.

**Distribution:** West Thailand from 500-800 meters elevation and also occurs in India, Bangladesh, Bhutan, and Myanmar.

**Habitat/Ecology:** Rare in moist to wet forest on sandy granitic soils or limestone rocks.

**Uses:** Ornamental

**Notes:** This species was originally reported from Thailand growing on or among limestone rocks and have been found on steep heavily forested slopes composed of sandy, granitic soils.

The species described is from Rom Klao Botanic Garden.

# List of Palms in Queen Sirikit Botanic Garden

At present, 23 out of the 161 or about 14 percent of the palm flora of Thailand are in cultivation. The following is a list of palm species cultivated in QSBG:

- Acoelorrhaphe wrightii* (Griseb.&H.Wendl.) H. Wendl. ex Becc.
- Aiphanes aculeate* Willd. (Syn: *Aiphanesborrida* (Jacq.) Burret
- Archontophoenix alexandrae* (F. Muell.) H. Wendl. & Drude
- Areca catechu* L.
- Areca* sp.
- Arenga bookeriana* (Becc.) Whitmore\*
- Arenga pinnata* (Wurmb) Merr.
- Arenga westerhoutii* Griff.\*
- Beccariophoenix madagascariensis* Jum. & H. Perrier
- Bismarckia nobilis* Hildebr. & H. Wendl.
- Borassodendron machadonis* (Ridl.) Becc.\*
- Borassusflabellifer* L.\*
- Calamus siamensis* Becc.\*
- Calamu* ssp.
- Caryota kiriwongensis* Hodel\*
- Caryota mitis* Lour.\*
- Caryota obtuse* Griff.\*
- Chamaedorea tuerckheimii* (Dammer) Burret
- Chambeyronia macrocarpa* (Brongn.) Vieill.exBecc.
- Dypsis lutescens* (H.Wendl.) Beentje & J. Dransf.
- Coccothrinax argentata* (Jacq.) L.H. Bailey
- Cryosophila warszewiczii* (H.Wendl.) Bartlett
- Cyrtostachys renda* Blume\*
- Elaeis guineensis* Jacq.
- Hydriastele microspadix* (Warb. Ex K. Schum. & Lauterb.) Burret



*Johannesteijsmannia altifrons* (Rchb. f. & Zoll.) H.E. Moore\*  
*Johannesteijsmannia lanceolata* J. Dransf.  
*Johannesteijsmannia magnifica* J. Dransf.  
*Kerriodoxa elegans* J. Dransf.\*  
*Latania verschaffeltii* Lem.  
*Licuala grandis* H. Wendl.\*  
*Licuala peltata* Roxb. ex Buch.-Ham.\*  
*Licuala spinosa* Thunb.\*  
*Saribus rotundifolius* (Lam.) Mart.\*  
*Livistona* sp.  
*Livistona speciosa* Kurz\*  
*Dyopsisdecaryi* (Jum.) Beentje& J. Dransf.  
*Oncosperma horridum* (Griff.) Scheff.\*  
*Phoenix dactylifera* L.  
*Phoenix loureiroi* Kunth\*  
*Pinanga adangensis* Ridl.\*  
*Pinanga caesia* Blume  
*Pinanga kuhlii* Blume  
*Pinanga* sp.  
*Pinanga sylvestris* (Lour.) Hodel\*  
*Allagoptera caudescens* (Mart.) Kuntze  
*Ptychosperma macarthurii* (H. Wendl. ex H.J. Veitch) H. Wendl. ex Hook.f.  
*Rhapis excelsa* (Thunb.) A. Henry  
*Rhapis humilis* Blume  
*Rhapis multifida* Burret  
*Rhapis subtilis* Becc.\*  
*Roystonea regia* (Kunth) O.F. Cook  
*Salacca magnifica* Mogeia  
*Salacca wallichiana* Mart.\*  
*Syagrus romanzoffiana* (Cham.) Glassman  
*Thrinax parviflora* Sw.  
*Veitchia merrillii* (Becc.) H.E. Moore  
*Wallichia disticha* T. Anderson\*  
*Washingtonia filifera* (Linden ex André) H. Wendl. ex de Bary  
*Wodyetia bifurcata* A.K. Irvine

\* *Indigenous to Thailand*

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<http://eunops.org/content/glossary-palm-terms>



**The Orchid Family**  
*(Orchidaceae)*

# The Orchid Family of Northern Thailand

By Ong Poh Teck, Ina Erlinawati, Sunisa Sangvirotjanapat, Chak Sokhavicheaboth, Chew Ping Ting and Mohd. Yusop Abdul Rahman

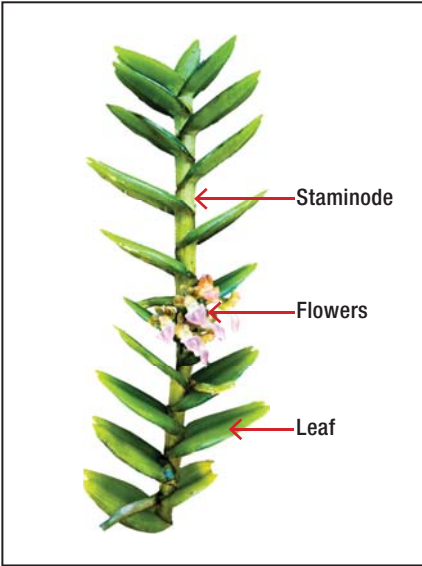
## Introduction

The Orchidaceae or the orchid family is one of the largest plant families in the world covering more than 22,500 species. They represent about 10 percent of all the world's flowering plants. Orchids are found in every part of the world except for Antarctica. They are highly diverse in their shapes, sizes, color and scent. The centre of diversity of orchids lies within the humid tropics, of which Southeast Asia is one of the richest orchid regions of the world, with a staggering 10,000 or more species.

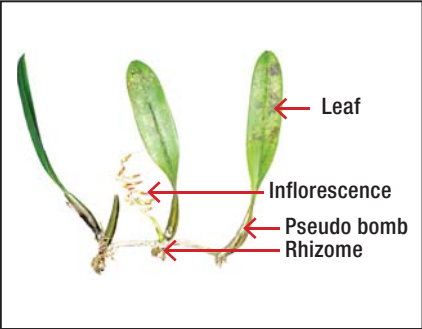
Within this region, Thailand is home to about 1,200 species of native orchids in 183 genera (groups of similar plant species within a plant family). Orchids in Thailand represent about 8 percent of all the flowering plants (totaling to about 15,000 species) found there. About 14 percent (about 170 species) of Thailand's orchid species are endemic and can be found nowhere else in the world. The number of orchid species is expected to increase as new species or new orchid records emerge due to active field research works carried out by various botanists in Thailand and Southeast Asia.



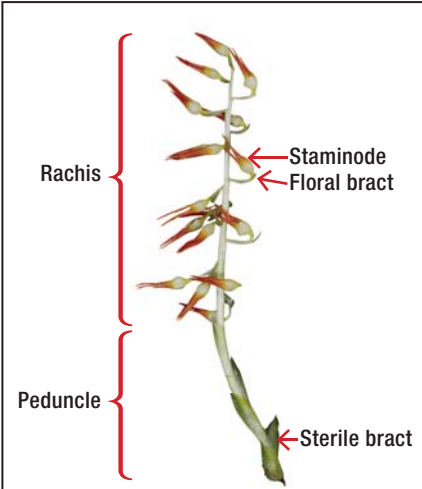
# Illustrated Glossary



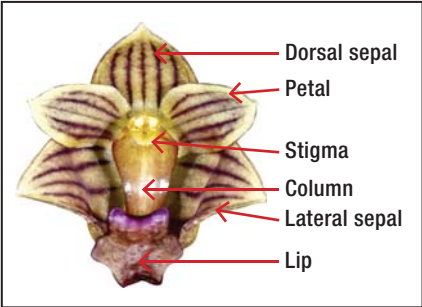
**Monopodial Growth**



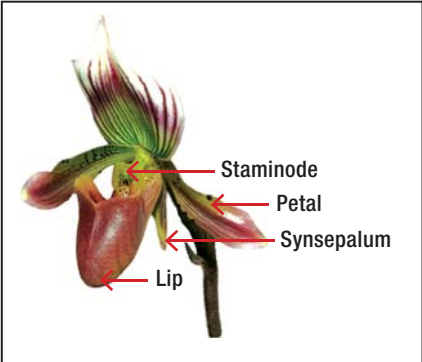
**Sympodial Growth**



**Parts of an inflorescence**



**Flower structure of *Bulbophyllum***



**Flower structure of *Paphiopedilum***



Photo by P.T.Ong

***Arundina graminifolia*, a widespread species.**

# Arundina Blume

*Arundina* (the bamboo orchid) is a terrestrial orchid. This genus, consisting of two species, extends from India, Nepal, Thailand, Malaysia, Singapore, South China to Indonesia and across the Pacific Islands. It has been introduced in Puerto Rico, Costa Rica, Panama and Hawaii.

## *Arundina graminifolia* (D. Don) Hochr.

**Synonyms:** *Arundina affinis* Griff., *Arundina chinensis* Blume, *Arundina densa* Lindl., *Arundina densiflora* Hook. f., *Arundina graminifolia* var. *chinensis* (Blume) S.S. Ying, *Arundina graminifolia* var. *revolute* (Hook.f) H.A. Lamb., *Arundina maculate* J.J. Sm., *Arundina meyenii* (Schauer) Rchb. f., *Arundina minor* Lindl., *Arundina philippi* Rchb. f., *Arundina pulchella* Teysmn. & Binn., *Arundina pulchra* Miq., *Arundina revolute* Hook. f., *Arundina sanderiana* Kraenzl., *Arundina speciosa* Blume, *Arundina speciosa* var. *sarasinorum* Schltr., *Arundina stenopetala* Gagnep, *Bletia graminifolia* D. Don, *Cymbidium bambusifolium* Roxb., *Cymbidium meyenii* Schauer, *Cymbidium speciosum* Reinw. Ex Lindl.

**Common name:** Ueang Phai

**Description:** Terrestrial, flowering with leaves being persistent. Stem 22–200 cm tall. Leaves linear, c. 13–32 × 0.5–2.5 cm. Flowers variable in size and color, c. 3.5 × 5.5 cm, peduncle c. 10–45.9 cm long, sepals and petals purple or white, flushed purple-pink, lip purple or purple, marked yellow near epichile, column and anther white. Capsules erect or drooping, c. 2.5–3 × 0.6–0.9 cm.

**Habitat/Ecology:** Terrestrials, wayside plants, lowland to lower montane forests

**Distribution:** Widespread

**Flowering Period:** Flowers throughout the year.

**Uses:** A popular ornamental plant as potted plant, or as hedges for landscape purposes.

**Conservation status:** Common



Photo by P.T.Ong

***Bulbophyllum capillipes* in the Rom Klao Botanic Garden.**



## ***Bulbophyllum* Thouars**

*Bulbophyllum* are epiphytic orchids, sometimes lithophytic. Each pseudobulb bears one to two terminal leaves. The significant character of this genus is that the inflorescence always arises from the base of the pseudobulb or from a node of the rhizome. Flowers are usually odorous but some are scentless to the human nose.

This huge genus consists of more than 1,000 species, in which it is distributed from South America, Africa to Asia, Australia and New Zealand. The genus *Bulbophyllum* belongs to the subtribe Bulbophyllinae Schltr. More than 150 *Bulbophyllum* species occur in Thailand.

## ***Bulbophyllum capillipes* E.C. Parish & Rchb.f.**

**Synonyms:** *Phyllorkis capillipes* (E.C.Parish & Rchb.f.) Kuntze and *Drymoda latisejala* Seidenf.

**Common name:** Sing To Kan Load

**Description:** Epiphytic orchid. Vegetative part glabrous. Rhizome long creeping. Pseudobulbs ovate, covered with fibrous at the base, light green, c.1.5–2 × 2–3 cm. Leaf 1 per pseudobulb, linear, c. 0.5–1.0 × 6–10 cm, thin, persistent when flowering. Flower solitary, pedicel red, c.8 cm long. Flower wide opening, c. 1.5 cm across, yellow to orange with red to violet stripes. Sepals slightly bigger than petals. Lip pink to violet. No smell.

**Habitat/Ecology:** Epiphyte. Lower montane forests

**Distribution:** India (Assam) to Indo-China

**Flowering period:** November to April

**Uses:** Ornamental plant

**Conservation status:** Threatened

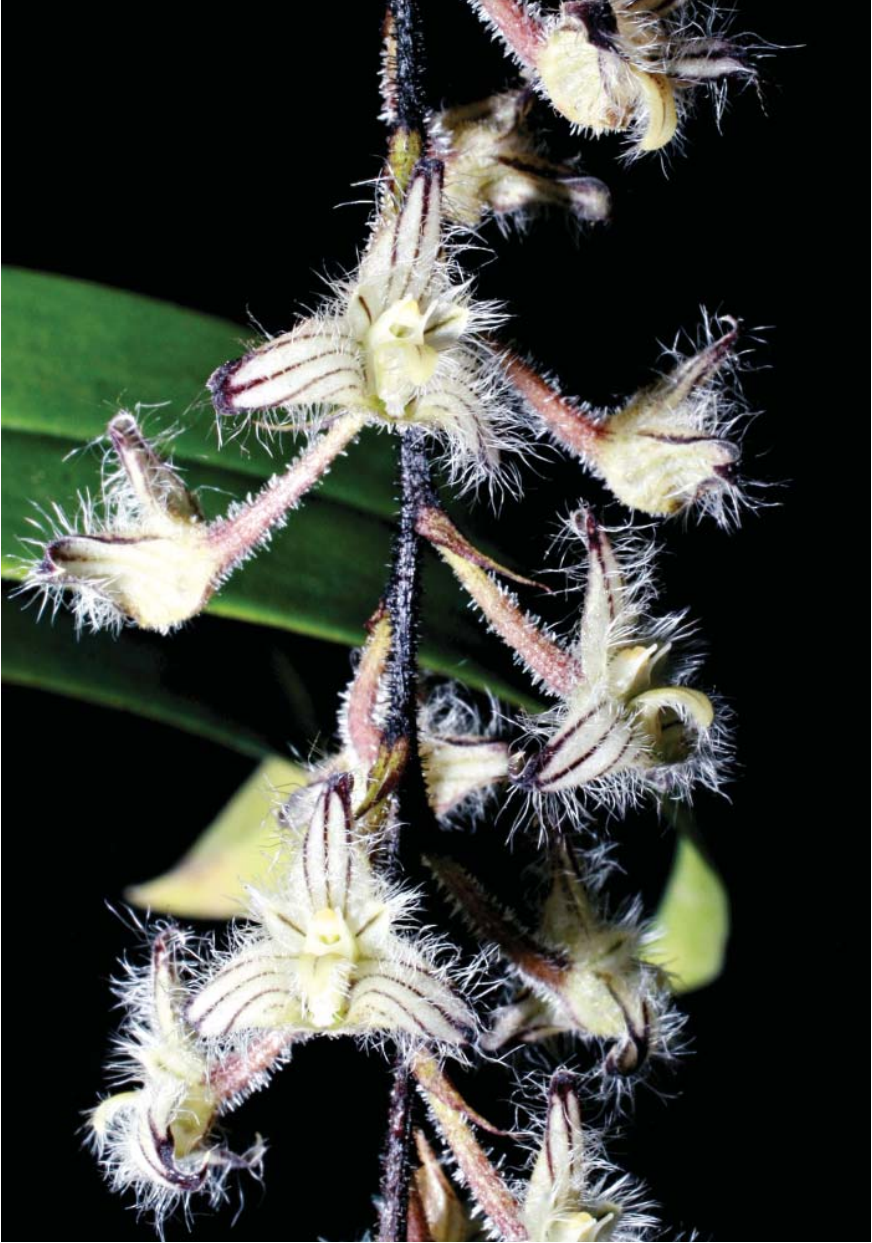


Photo by S. Sangvirotjanapat

***Bulbophyllum lindleyanum* in the Queen Sirikit Botanic Garden.**

# *Bulbophyllum lindleyanum* Griff.

**Synonyms:** *Phyllorkis lindleyana* (Griff.) Kuntze, *Bulbophyllum rigens* Rchb.f. and *Bulbophyllum caesariatum* Ridl.

**Common name:** Sing To Lind Lay

**Description:** Epiphytic orchid. Vegetative part glabrous. Rhizome shortly creeping. Pseudobulbs conical, c.3×4 cm. Leaf 1 per pseudobulb, leaf thin, persistent when flowering. Inflorescence pendulous, c.10 cm long, covered with short dark purple hairs. Bracts triangular, pale yellow, apex acute. Flowers pale yellow to white with dark purple stripes, covered with long white hairs, c. 20 flower per inflorescence. Sepals larger than petals. Lip pale yellow but darker than petals and sepals. No smell.

**Habitat/Ecology:** Epiphyte (tree dwelling)

**Distribution:** Myanmar to Thailand

**Flowering period:** November to January

**Uses:** Ornamental plant

**Conservation status:** Threatened



Photo by S. Sangvirojjanapat

***Bulbophyllum lobbii*, a highly variable species.**



## ***Bulbophyllum lobbii* Lindl.**

**Synonyms:** *Sarcopodium lobbii* (Lindl.) Lindl. & Paxton, *Sarcobodium lobbii* (Lindl.) Beer, *Phyllorkis lobbii* (Lindl.) Kuntze, *Sestochilos uniflorum* Breda, *Bulbophyllum henshallii* Lindl., *Bulbophyllum siamense* Rehb.f., *Bulbophyllum lobbii* var. *siamense* W.Saunders, *Bulbophyllum claptonense* Rolfe, *Bulbophyllum lobbii* var. *breviflorum* J.J.Sm., *Bulbophyllum polystictum* Ridl. and *Bulbophyllum sumatranum* Garay, Hamer & Siegerist.

**Common name:** Sing To Siam

**Description:** Epiphytic orchid. Vegetative part glabrous. Rhizome long and creeping, c. 5–12 cm long. Pseudobulbs ovate, covered with fibrous at the base, pale green, c. 2–3 × 2.5–3.5 cm. Leaf 1 per pseudobulb, elliptic, c. 3–4.5 × 8–14 cm, thick, persistent when flowering. Flower solitary. Pedicel yellow with dark red spots, c. 9 cm long. Flower wide opening, c. 5.5 cm across, pale yellow with red to violet stripes. Sepals more or less similar to the petals. Lip more or less similar with sepals and petals but smaller in size. No smell.

**Habitat/Ecology:** Epiphyte. Lowland to montane forests.

**Distribution:** Assam to Indo-China

**Flowering period:** November to January

**Uses:** Ornamental plant

**Conservation status:** Threatened



Photo by P.T. Ong

***Bulbophyllum morphologorum* with a compact inflorescence.**

## ***Bulbophyllum morphologorum* Kraenzl.**

**Synonym:** *Bulbophyllum dixonii* Rolfe.

**Common name:** Sing To Rung Kaoe

**Description:** Epiphytic orchid. Vegetative part glabrous. Rhizome shortly creeping. Pseudobulbs conical, c. 3×4 cm. Leaf 1 per pseudobulb, persistent when flowering. Inflorescence pendulous, oblong, peduncle with 2-3 sterile bracts, dark color with dark purple spots, c. 5-6 cm long. Bracts ovate, light green with dark purple spots, apex acute. Flower pale yellow with dark purple spots. Lateral sepals fused. Petals much smaller than sepals. Lip orange with a U-shape dark red marking. Smells like ripe banana.

**Habitat/Ecology:** Epiphyte. Lowlands.

**Distribution:** Indo-China

**Flowering period:** November to February

**Uses:** Ornamental plant

**Conservation status:** Threatened



Photo by P.T. Ong

***Bulbophyllum tripaleum*, an unusual species with sepals that flutter even with a slight breeze.**



## ***Bulbophyllum tripaleum* Seidenf.**

**Synonym:** *Hordeanthos tripaleus* (Seidenf.) Szlach.

**Common name:** Sing To Mu-ser

**Description:** Epiphytic orchid. Rhizome shortly creeping. Pseudobulbs nearly globular, c. 15–17 mm in diameter, surface noded. Leaves 2, deciduous when flowering. Inflorescence pendulous, globose, c. 1 cm in diameter. Peduncle dark green, c.5–6 cm long. Flowers dark greenish-purple, apex of sepals with palae, transversely banded red and white. Petals are much smaller than sepals. Lip black with a V-shaped concavity on upper surface. No smell.

**Habitat/Ecology:** Epiphyte. Montane forests.

**Distribution:** Endemic in Thailand.

**Flowering period:** November to January

**Uses:** Ornamental plant

**Conservation status:** Threatened



Photo by S. Sangvirojjanapat

***Bulbophyllum xylophyllum*, with attractive apple-green flowers.**

# *Bulbophyllum xylophyllum* E.C. Parish & Rchb.f.

**Synonyms:** *Phyllorkis xylophylla* (E.C. Parish & Rchb.f.) Kuntze and *Bulbophyllum agastyamalayanum* Gopalan & A.N. Henry.

**Common name:** Sing To Morakot

**Description:** Epiphytic orchid. Rhizome long and creeping, c. 3-4 cm long. Pseudobulbs not fully develop, covered with fibrous. Leaf 1 per pseudobulb, fleshy, elliptic, c. 5-9 × 2-3 cm, persistent when flowering. Inflorescence erect to arching, globose, c. 1 cm in diameter, peduncle red, c. 7-8 cm long. Flowers light green. Dorsal sepal ovate, apex acute. Lateral sepals, ovate, apex rounded. Lip darker green than sepals and petals. No smell.

**Habitat/Ecology:** Epiphyte. Lowland forests.

**Distribution:** S. India, Darjeeling to China (Guizhou) and Indo-China.

**Flowering period:** November to January

**Uses:** Ornamental plant

**Conservation status:** Threatened



Photo by P.T. Ong

**White form flowers of *Calanthe cardioglossa*.  
Note that flowers turn yellow with age.**



Photo by P.T. Ong

**Red form flowers of *Calanthe cardioglossa*.**



## ***Calanthe* R. Br.**

The genus *Calanthe* consists of about 230 taxa (WCSP, 2012) although about 350 names have been proposed (Seidenfaden, 1975). They are distributed from the tropical and subtropical Old World to the Pacific, Mexico to Colombia and the Caribbean. *Calanthe* orchids are terrestrials, found from the lowland forests to montane forests. Some *Calanthe* species are deciduous, meaning that they shed their leaves during the dry season but others are evergreen. Some species of *Calanthe* are cultivated as potted plants. Many *Calanthe* hybrids have been produced for ornamental purposes.

## ***Calanthe cardioglossa* Schltr.**

**Synonyms:** *Calanthe cardiochila* Kraenzl. and *Calanthe bossensiana* Kraenzl.

**Common names:** Ueang Liam, Ueang Nam Ton

**Description:** Terrestrial, usually flowers when leafless. Leaves 2–3 per pseudobulb, elliptic, c. 40 × 11 cm. Inflorescence erect to arching, hairy, c. 7–14 flowers per inflorescence, floral bracts persistent. Flowers c. 1.8–2 × 1.5 cm, flower pink when young turn to yellow when old, spur c. 2.5–3 cm long, straight, c. 45° away from ovary, tapering towards the apex.

**Habitat/Ecology:** Terrestrial

**Distribution:** Lao PDR, Thailand and Viet Nam.

**Flowering period:** November to February

**Uses:** Ornamental plant

**Conservation status:** Threatened in the wild.



Photo by P.T. Ong

***Calanthyroglossa*, a self-pollinating species.**

## *Calanthe lyroglossa* Rchb.f.

**Synonym:** *Alismorkis lyroglossa* (Rchb.f.) Kuntze.

**Description:** Terrestrial, flowering with leaves being persistent. Leaves c. 3-7 per pseudobulb, elliptic, c. 24-43 × 3.3-7 cm. Inflorescence erect, glabrous, c. 25-30 flowers per inflorescence, bracts falling off as flower opens. Flowers c. 1 cm across, yellow, not wide opening, usually self pollinating, spur more or less parallel to ovary, globular at apex.

**Habitat/Ecology:** Terrestrial. Lower montane forests.

**Distribution:** China, Japan, Taiwan, India (Assam), Cambodia, Lao PDR, Myanmar, Thailand, Viet Nam, Java, Peninsular Malaysia, Borneo and Philippines.

**Flowering period:** November-December

**Uses:** Ornamental plant

**Conservation status:** Threatened in the wild due to habitat loss and commercial collections.



Photo by P.T. Ong

***Calanthe rosea* with lovely pink flowers.**



## ***Calanthe rosea* (Lindl.) Benth.**

**Synonyms:** *Limatodis rosea* Lindl. and *Alismorkis rosea* (Lindl.) Kuntze.

**Description:** Terrestrial, usually flowers when leafless. Leaves 2-3 per pseudobulb, elliptic, c. 30 × 10 cm. Inflorescence erect to arching, hairy, c. 13-25 flowers per inflorescence, bracts persistent. Flowers c. 5.5 × 6 cm, peduncle and ovary hairy, flower pink to dark pink, marked white at the base of lip, spur more or less parallel with ovary, 0.8-1.1 cm long.

**Habitat/Ecology:** Terrestrial

**Distribution:** Myanmar and Thailand

**Flowering period:** November to December

**Uses:** Ornamental plant

**Conservation status:** Threatened



Photo by P.T. Ong

***Calanthe rubens*, usually flowers when leafless.**

## ***Calanthe rubens* Ridl.**

**Synonyms:** *Alismorkis rubens* (Ridl.) Kuntze, *Preptanthe rubens* (Ridl.) Ridl., *Coelogyne rubens* Ridl. and *Calanthe elmeri* Ames.

**Description:** Terrestrial, flowering with leaves being persistent. Pseudobulb distinctly angular, ovoid, constricted in the middle, c.  $9 \times 5$  cm. Leaves 2-3 per pseudobulb, elliptic, c.  $17-45 \times 7-11$  cm. Inflorescence erect to arching, densely hairy, c. 28 flowers per inflorescence, c. 53–90 cm tall. Flowers c.  $5.5 \times 5$  cm, wide opening, white, pinkish or purple with a dark purple marking on the lip base, spur curled forward, purple, hairy, c. 2–2.5 cm long. Fruit hairy, c.  $2.5 \times 0.6$  cm.

**Habitat/Ecology:** Terrestrial

**Distribution:** Cambodia, Thailand, Viet Nam, Peninsular Malaysia and Philippines.

**Flowering period:** December

**Uses:** Ornamental plant

**Conservation status:** Threatened



Photo by P.T. Ong

***Calanthe sylvatica*, a widespread species.**

## *Calanthe sylvatica* (Thouars) Lindl.

**Synonyms:** *Centrosia sylvatica* Thouars, *Bletia sylvatica* (Thouars), *Alismorkis centrosia* (Thouars) Steud., *Centrosia corymbosa* Thouars, *Centrosia plantaginea* Thouars, *Amblyglottis emarginata* Blume, *Bletia masuca* D.Don, *Zoduba masuca* (D.Don) Buch.-Ham., *Centrosia aubertii* A.Rich., *Calanthe emarginata* (Blume) Lindl., *Calanthe masuca* (D.Don) Lindl., *Calanthe purpurea* Lindl., *Calanthe sylvestris* Lindl. ex Steud., *Calanthe sylvatica* var. *natalensis* Rchb.f., *Calanthe natalensis* (Rchb.f.) Rchb.f., *Calanthe corymbosa* (Thouars) Lindl., *Calanthe nightii* Rchb.f., *Calanthe textorii* Miq., *Calanthe pleiochroma* Rchb.f., *Calanthe versicolor* Lindl., *Calanthe curtisii* Rchb. f., *Alismorkis emarginata* (Blume) Kuntze, *Alismorkis masuca* (D.Don) Kuntze, *Alismorkis natalensis* (Rchb.f.) Kuntze, *Alismorkis plantaginea* (Thouars) Kuntze, *Alismorkis pleiochroma* (Rchb.f.) Kuntze, *Alismorkis purpurea* (Lindl.) Kuntze, *Alismorkis textorii* (Miq.) Kuntze, *Calanthe sanderiana* Rolfe, *Calanthe delphinoides* Kraenzl., *Calanthe volkensii* Rolfe, *Calanthe masuca* var. *sinensis* Rendle, *Calanthe violacea* Rolfe, *Calanthe neglecta* Schltr., *Calanthe stolzii* Schltr., *Calanthe sylvatica* var. *pallidipetala* Schltr., *Calanthe longicalcarata* Hayataex Yamam., *Calanthe seikoensis* Yamam., *Calanthe schliebenii* Mansf., *Calanthe kintaroi* Yamam., *Calanthe okinawensis* f. *albiflora* Ida, *Calanthe furcata* f. *masuca* (D. Don) M. Hiroe, *Calanthe furcata* f. *textorii* (Miq.) M. Hiroe, *Calanthe masuca* f. *albiflora* (Ida) K.Nakaj., *Calanthe textorii* f. *albiflora* (Ida) Hatus., *Calanthe textorii* var. *longicalcarata* (Hayataex Yamam.) Garay & H.R. Sweet, *Calanthe masuca* var. *purpurea* (Lindl.) Rao & S.R. Rathore, *Calanthe candida* Bosser and *Calanthe sylvatica* var. *geerinckiana* Stévert.

**Description:** Terrestrial, flowering with leaves being persistent. Leaves c. 8–13 per pseudobulb, elliptic, c. 7.5–13 x 64–67 cm. Inflorescence erect, glabrous, c. 14 flowers per inflorescence, bracts persistent. Flowers c. 5 × 3.3 cm, wide opening, outer surface purple, inner surface white, tinged purple, lip purple, callus on the lip dark purple, column white flushed purple, anther white, peduncle and ovary hairy.

**Habitat/Ecology:** Terrestrial, lowland forests.

**Distribution:** Africa, tropical and subtropical Asia.

**Flowering period:** July to December

**Uses:** Ornamental plant





Photo by P.T. Ong

***Chrysoglossum ornatum*, an uncommon yellow form.**

# *Chrysoglossum* Blume

This genus consists of six species in which four species are distributed in tropical Asia to New Guinea and the Pacific islands whereas the other two species are distributed in China. They are usually found in shady places, growing in rich humus soil in mountain forests.

## *Chrysoglossum ornatum* Blume

**Synonyms:** *Ania maculate* hwaites, *Chrysoglossum cyrtopetalum* Schltr., *Chrysoglossum erraticum* Hook.f., *Chrysoglossum formosanum* Hayata, *Chrysoglossum gibbsiae* Rolfe, *Chrysoglossum hallbergii* Blatt, *Chrysoglossum maculatum* (Thawaites) Hook.f., *Chrysoglossum neocaledonicum* Schltr., *Tainia maculate* (Thawaites) Trimen.

**Description:** One leaf per pseudobulb. Inflorescence c. 41 cm tall. Flower without spur, sepals and petals yellowish-green. Lip white. Column yellow with white marking at the base. Anther-cap yellow.

**Habitat/Ecology:** Terrestrial. Lowland to lower montane forests.

**Distribution:** Nepal to Southwest Pacific.

**Flowering period:** December

**Uses:** Ornamental

**Conservation status:** Common



Photo by P.T. Ong

***Dendrobium scabrilingue* cultivated at the Queen Sirikit Botanic Garden.**

## ***Dendrobium Sw.***

The *Dendrobium* is a large genus with about 1,200 species of which most of them being epiphytic, others being either lithophytic or terrestrial. They occur in a diverse range of habitats throughout much of southern and eastern part of Asia, including Australia, New Guinea and New Zealand. They can be found from the high altitudes of the Himalayan Mountains, through the lowland tropical forests, to the dry Australian desert.

## ***Dendrobium scabrilingue Lindl.***

**Synonyms:** *Callista scabrilinguis* (Lindl.) Kuntze, *Dendrobium bedyosmum* Bateman ex Hook.f. and *Dendrobium galactanthum* Schltr.

**Common name:** Uaeng Sae

**Description:** Epiphytic, c. 15 cm tall, pseudobulbs c. 1-6 nodes, fleshy, greenish yellow, covered with black hairs. Leaves elliptic, c. 5-6 × 2 cm. Inflorescence short, arise from upper part of pseudobulb. Flowers one to two in number, c. 2.5 cm across, very fragrant, sepals and petals white; lip greenish yellow to orange – yellow, with green streaks or veins; stamen 1, opposite to dorsal sepals; column with conspicuous foot.

**Habitat/Ecology:** Epiphyte. Montane forests.

**Distribution:** Myanmar, Thailand, Lao PDR.

**Flowering period:** December to February

**Uses:** Ornamental plant

**Conservation status:** Endangered



Photo by P.T. Ong

***Paphiopedilum villosum*, a highly sought after species.**



## ***Paphiopedilum* Pfitzer**

The *Paphiopedilum* has about 80 species, some of which are natural hybrids. The species possesses a pouch-like lip that resembles a slipper, hence the name slipper orchids. Slipper orchids are found in South China, India, Southeast Asia and the Pacific Islands, and they form their own subfamily, Cypripedioideae. The slipper orchids are also extensively cultivated as ornamental plants.

## ***Paphiopedilum villosum* (Lindl.) Stein**

**Synonyms:** *Cypripedium villosum* Lindl. and *Cordula villosa* (Lindl.) Rolfe.

**Common name:** Roangthao Nari Inthanon

**Description:** Terrestrial, c. 30 cm tall, with 3 or more basal folded leaves per stem. Leaves several, oblong, c. 30 × 5 cm, with fine dark purple spots underneath at the base. Inflorescence stalk c. 30 cm long, green, hairy; bract green, 5 cm long. Flowers c. 10 cm across; dorsal sepal with purple central streaks, edge greenish; petals greenish above, with brownish-purple streaks below; lip pouch-like, pale brownish-purple green, sometimes collecting water inside; stamens opposite to lateral petals, on either side of the column.

**Habitat/Ecology:** Lithophyte. Limestone hills.

**Distribution:** Northeast India, Myanmar, Thailand, Viet Nam.

**Flowering period:** December to February

**Uses:** A popular ornamental plant among orchid enthusiasts. Some of the more rare and exotic species are able to fetch thousands of dollars per plant and are considered as collector's items among the orchid growers.

**Conservation status:** Endangered



Photo by P.T. Ong

***Phalaenopsis pulcherrima*, an easy to cultivate species and flowers freely.**

# *Phalaenopsis* Blume

*Phalaenopsis* is a genus that comprises approximately 60 species. They are popularly known as the moth orchids as supposedly, the flowers of some species resemble a group of large moths (*Phalaena*) in flight. *Phalaenopsis* is one of the most popular orchids in trade as potted plants, through the development of many hybrids. They are native throughout Southeast Asia, from the Himalayan Mountains, to the southern part of the Philippines, and northern Australia.

## *Phalaenopsis pulcherrima* (Lindl.) J.J. Sm.

**Synonyms:** *Doritis pulcherrima* Lindl., *Phalaenopsis Esmeralda* Rchb.f., *Phalaenopsis esmeralda* var. *albiflora* Rchb.f., *Phalaenopsis antennifera* Rchb.f., *Phalaenopsis esmeralda* var. *candidula* Rolfe, *Phalaenopsis esmeralda* var. *rubra* Stein, *Phalaenopsis mastersii* King & Pantl., *Phalaenopsis esmeralda* var. *punctulata* Cogn., *Doritis pulcherrima* f. *alba* O. Gruss & Roeth, *Doritis pulcherrima* f. *albiflora* (Rchb.f.) Roeth & O. Gruss, *Doritis pulcherrima* f. *caerulea* (Fowlie) O. Gruss & Roeth, *Phalaenopsis pulcherrima* f. *alba* (O. Gruss & Roeth) Christenson, *Phalaenopsis pulcherrima* f. *albiflora* (Rchb.f.) Christenson, *Phalaenopsis pulcherrima* f. *caerulea* (Fowlie) Christenson, *Doritis pulcherrima* f. *apiculata* Aver., *Doritis pulcherrima* var. *apiculata* Aver., *Doritis pulcherrima* var. *laotica* O. Gruss, *Doritis pulcherrima* f. *nivea* Aver. and *Doritis pulcherrima* f. *purpurea* Aver.

**Common name:** Ma Wing

**Description:** Terrestrial or lithophytic, c. 10 cm tall. Leaves several, oblong-elliptic, c. 5-12 × 2 cm. Inflorescence erect, c. 30 cm long, several to many flowers per inflorescence. Flowers c. 1.5 cm across, sepals and petals recurved, c. 1 cm long, pinkish white; lip clawed, 3-lobed, pink to red mid-lobe and orange-red side-lobes, adnate to column base; column c. 5 mm long, with conspicuous foot.

**Habitat/Ecology:** Epiphyte. Lowland to lower montane.

**Distribution:** Northeast India, South China, Southeast Asia.

**Flowering period:** Flowers throughout the year.

**Uses:** A popular ornamental pot plant and landscape plant.

**Conservation status:** Threatened



Photo by P.T. Ong

***Phaius tankervilleae*, flowers freely in cultivation.**

## ***Phaius* Lour.**

The *Phaius* is a genus of around 40–50 species, widespread in Africa, Madagascar, tropical Asia, China, Japan, the Philippines, Australia and the Pacific Islands. Most of them are shade loving terrestrial orchids.

### ***Phaius tankervilleae* (Banks) Blume**

**Synonyms:** *Limodorum tankervilleae* Banks, *Limodorum incarvillei* Pers., *Bletia tankervilleae* (Banks) R. Br., *Phaius incarvillei* (Pers.) Kuntze, *Limodorum tancarvilleae* L'Her., *Phaius grandifolius* Lour., *Limodorum spectabile* Salisb., *Pachyne spectabilis* (Salisb.) Salisb., *Limodorum incarvillei* Blume, *Tankervillia cantoniensis* Link, *Phaius blumei* Lindl., *Phaius grandifolius* Lindl. ex. Wall., *Dendrobium veratrifolium* Roxb., *Phaius veratrifolium* (Roxb.) Lindl., *Phaius grandifolius* var. *superbus* Van Houtte, *Phaius carronii* F. Muell., *Calanthe speciosa* Vieill., *Phaius grandiflorus* Rchb.f., *Phaius blumei* var. *assamica* Rchb.f., *Phaius giganteus* Hemsl., *Phaius tankervilleae* var. *mariesii* Rchb.f., *Phaius oweniae* Sander, *Phaius roeblingii* O'Brien, *Phaius blumei* var. *pulchra* King & Pantl., *Phaius sinensis* Rolfe, *Calanthe bachmaensis* Gagnep., *Phaius tankervilleae* var. *superbus* (Van Houtte) S.Y. Hu and *Phaius tankervilleae* var. *pulchra* (King & Pantl.) Karth.

**Common name:** Ueang Phrao

**Description:** Terrestrial, c. 50 cm-1 m tall including inflorescence. Leaves c. 5, oblong-elliptic, c. 50 × 10 cm, pleated. Inflorescence erect, c. 1 m long, up to c. 20 flowers per inflorescence, greenish; bracts yellowish green, c. 5 cm long. Flowers c. 8 cm across, fragrant; sepals and lateral petals whitish behind, brown in front; lip purplish pink, fading to white at edge, edge curved and slightly ruffled; column c. 2 cm long, pale greenish.

**Habitat/Ecology:** Terrestrial. Lowland to montane forests.

**Distribution:** India, Southeast Asia, Australia.

**Flowering period:** Flowers throughout the year.

**Uses:** Often planted as landscape plants.

**Conservation status:** Indeterminate (lacks information to describe its status).



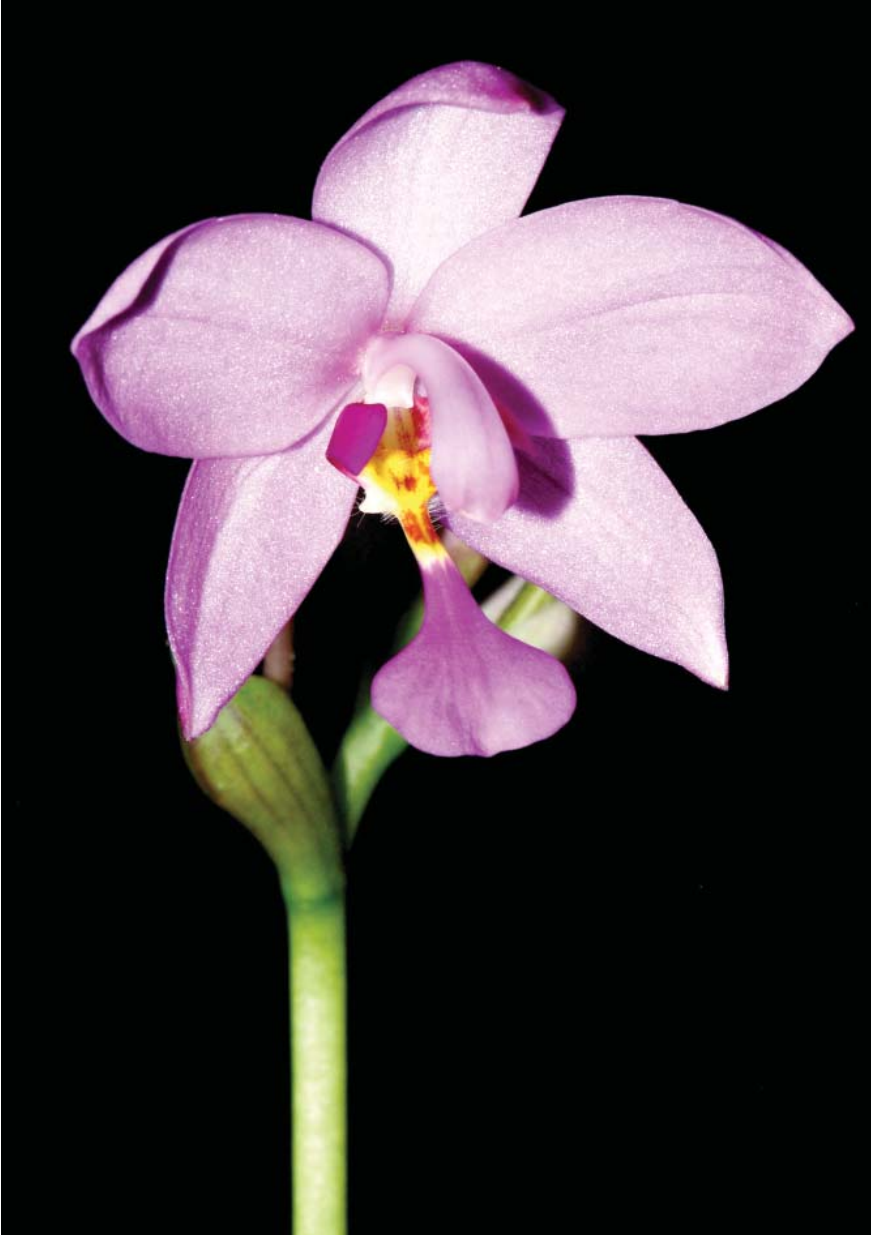


Photo by P.T. Ong

***Spathoglottis plicata*, commonly used as landscape plants.**

# *Spathoglottis* Blume

The *Spathoglottis* is a genus that has around 45 species growing in diverse habitats. There are both insect- and self-pollinated species. The pseudobulbs of these terrestrial orchids lie just below the ground surface. They can be easily grown and cultivated.

## *Spathoglottis plicata* Blume

**Synonyms:** *Bletia angustifolia* Gaudich., *Paxtonia rosea* Lindl., *Spathoglottis lilacina* Griff., *Phaius rumphii* Blume, *Spathoglottis spicata* Lindl., *Spathoglottis deplanchei* Rchb.f., *Spathoglottis vieillardii* Rchb.f., *Spathoglottis angustifolia* (Gaudich.) Benth. & Hook.f., *Spathoglottis angustorum* Rchb.f., *Spathoglottis rosea* (Lindl) G. Nicholson, *Spathoglottis plicata* var. *minahassae* Schltr., *Spathoglottis daenikeri* Kraenzl. and *Calanthe poilanei* Gagnep.

**Common names:** Ueang Din, Wan Chuk.

**Description:** Terrestrial, up to c. 1 m tall, pseudobulbs covered by leaf sheaths. Leaves oblong–elliptic, c. 1 m × 5–12 cm, pleated. Inflorescence erect, c. 1 m long, several to many flowers per inflorescence. Flowers c. 4–4.5 cm across, purplish pink, petals larger (wider) than sepals; pedicel c. 3 cm long, pink; ovary c. 2 cm long, purplish pink. Capsules c. 6 cm long, green, with persisting perianth.

*Distribution:* South India, Southeast Asia, Taiwan, Australia

*Habitat/Ecology:* Terrestrial. Wayside plant.

*Flowering period:* Flowers throughout the year.

*Uses:* A popular landscape plant.

*Conservation status:* Indeterminate (lacks information to describe its status).

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**The Grass Family**  
*(Poaceae)*

# Common Grasses in Northern Thailand

By Muhd Ariffin Abd Kalat, Kyi Kyi Khaing,  
Khamphouvanh Senamountry and Sounaly Somany

## Introduction

The *Poaceae* (also called *Gramineae* or true grasses) is a large and nearly ubiquitous family of monocotyledonous flowering plants. With more than 10,000 domesticated and wild species, the *Poaceae* represents the fifth largest plant family following the *Orchidaceae*, *Asteraceae*, *Fabaceae* and *Rubiaceae*. Though commonly called “grasses”, seagrasses, rushes and sedges are all outside this family. The rushes and sedges are related to the *Poaceae*, being members of the order *Poales*, but the sea grasses are members of the order *Alismatales*.

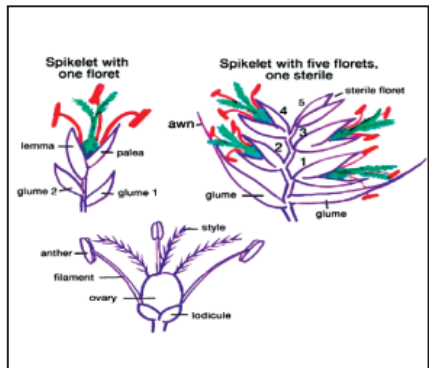
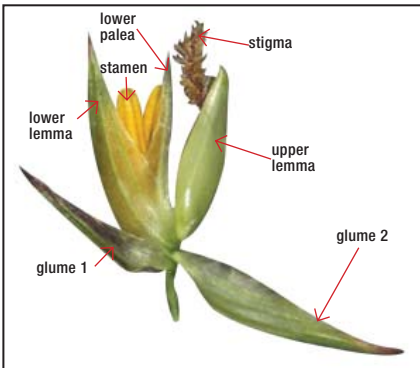
*Poaceae* have a hollow stem called culms plugged at intervals by solid leaf-bearing nodes. Grass leaves are nearly always alternate and distichously (in one plane), and have parallel veins. Each leaf is differentiated into a lower sheath hugging the stem and a blade with entire (i.e., smooth) margins. The leaf blades of many grasses are hardened with silica phytoliths, which discourage grazing animals. Some, such as sword grass, are sharp enough to cut human skin. A membranous appendage or fringe of hairs called the ligule lies at the junction between sheath and blade, preventing water or insects from penetrating into the sheath.

Flowers of *Poaceae* are characteristically arranged in spikelets, each spikelet having one or more florets. The spikelets are further grouped into panicles or spikes. A spikelet consists of two (or sometimes fewer) bracts at the base, called glumes, followed by one or more florets. A floret consists of the flower surrounded by two bracts, one external – the lemma, and one internal – the palea. The flowers are usually hermaphroditic being an important exception and anemophilous or wind-pollinated. The perianth is reduced to two scales, called lodicules, that expand and contract to spread the lemma and palea. These are generally interpreted to be modified sepals. This complex structure can be seen in the image on the right, portraying a wheat (*Triticum aestivum*) spikelet.

The fruit of *Poaceae* is a caryopsis, in which the seed coat is fused to the fruit wall.

A tiller is a leafy shoot other than the first shoot produced from the seed.

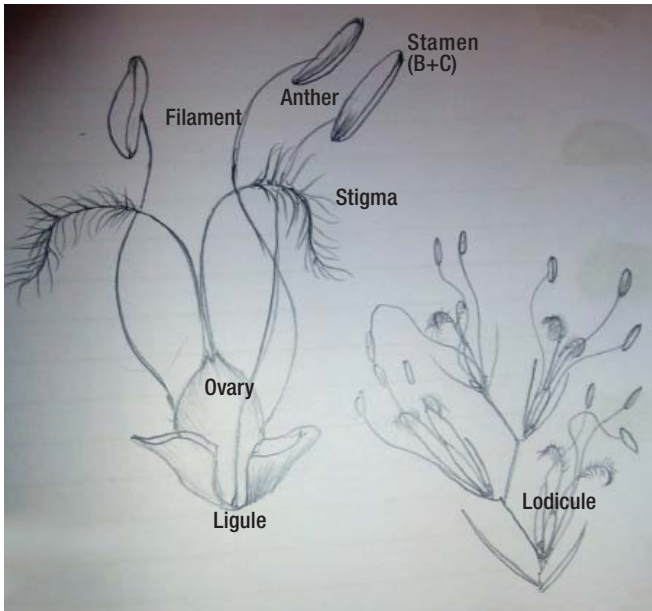




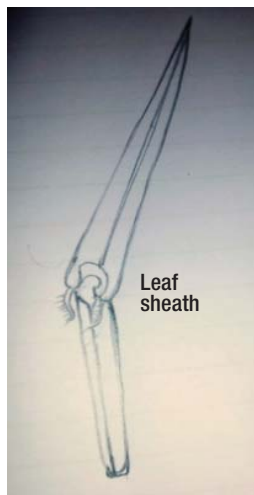
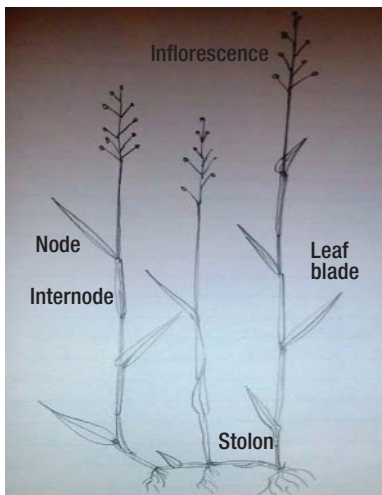
**Spikelets and Reproductive Parts**

# Illustrated Glossary

## The vegetative parts of grass



## Parts of a grass



# Glossary

- Annual** – plants which germinate from seed, flowers, set seed, and die in the same year, which complete their life cycle in one year.
- Auricle** – small appendages at the junction of the sheath and leaf blade of some grass, usually in pairs; may be modified or replaced by small hair tufts.
- Awn** – a fine bristle-like appendage that is attached to the seed.
- Caryopsis** – the grass fruit in which the seed coat is fused to the fruit wall.
- Culm internode** – part of the stem that is between nodes.
- Culm** – a stem, which is above-ground or aerial stems of grasses and sedges.
- Glume** – one of a pair of empty scales at the base of a grass spikelet.
- Floret** – the individual unit of a spikelet, comprising a lemma and palea.
- Hermaphrodite** – having the male and female reproductive organs in one plant.
- Inflorescence** – the flower of the plant.
- Leaf-blade** – the free portion of the leaf above the sheath. The blade is usually long and narrow and has a number of longitudinal streaks (erroneously referred to as ‘nerves’) which represent the vascular bundles along which food and water travel.
- Leaf sheath** – the basal part of the grass leaf, which normally encloses the stem.
- Lemma** – outer bract of a grass floret enclosing a palea and a flower.
- Ligule** – a thin outgrowth at the junction of a leaf, either membrane or row of short hairs at the junction of the sheath and blade of leaf.
- Lodicule** – a small scale-like or fleshy structure at the base of the stamens in a grass floret, usually two in each floret.
- Node** – swollen joint of a stem from which a leaf arises.
- Palea** – the upper husk enclosing the flower.
- Pedicel** – in grasses, the stalk of a single spikelet within an inflorescence.
- Peduncle** – the stalk of a raceme or cluster of spikelets.
- Perennial** – plants that complete their life cycle in a number of years; the flowering shoots are accompanied by a larger or smaller proportion of vegetative ones, depending on the duration of the particular grass. Perennials may form loose or dense tufts.
- Rhizome** – a horizontal stem growing close to the ground surface and rooting at the node.
- Spikelet** – the basic unit of a grass inflorescence; usually composed of two glumes and one or more florets on a rachilla.
- Ubiquitous** – present, appearing or found everywhere; omnipresent; constantly encountered.



**Whole plant**



**Culm**



**Leaf-blade**



**Spikelets**

# *Cyrtococcum accrescens* (Trin.) Stapf

**Synonym:** *Panicum accrescens* Trin

**Common name:** Myet-kyet-then (Myanmar); Rumpu (Brunei Darussalam); Yaa Ngad (Thailand); Yaa Kang Pa (Lao PDR)

**Description:** Annual grass. Culms creeping and ascending 48-87 cm high. Leaf-sheaths villous or ciliate, 3.5-5.5 cm long, margins membranous and hairy. Ligules membranous, 2 mm. Leaf-blades linear, 5-10 cm by 0.5-1 cm. Inflorescences open panicle, pedicle 15-30 by 10-25 cm, spikelets obovate-elliptic, 1.5-1.7 by 0.7-1.3 mm with hairy, pedicel slender 0.5-1.2 cm. Lower glumes membranous, ovate, ca. 0.77 mm long, 3-nerved, pilose, apex acute. Upper glumes membranous, obovate, ca. 1.0 mm, pilose with tubercle base hairs. Florets 2. Lower floret neuter. Lemmas membranous similar to upper glume, ca. 1.25 mm long, paleas absent. Upper floret hermaphrodite. Lemmas ca. 1.25 mm long, gibbous, 3-nerved. Paleas boat-shaped, as long as the lemma.

**Ecology:** In open areas, roadsides with gentle slopes and sandy clay soil about more than 1000 m altitude. Flowering from November to January.

**Distribution:** Throughout Southern Asia.

**Flowering period:** November to January





**Whole plant**



**Inflorescences**

## *Eragrostis tenuifolia* (A.Rich.) Steud.

Synonym: *Poa tenuifolia* A. Rich.

**Common names:** Love grass; Yaa Krok (Thailand); kaing-paungka (Myanmar); Gilang-Gilang (Brunei Darussalam); Yaa Ngad (Thailand); Yaa Kang Pa (Lao PDR)

**Description:** Perennial grass. Culms tufted, erect 18-35 cm high. Leaf-sheaths glabrous, 1.9-4 cm long, margin membranous and hairy. Ligules ciliate. Leaf-blades linear, 0.1-0.2 by 0.1-1 cm. Inflorescences open panicle, pedicle slender, 5-10 by 3-5.5 cm, spikelets elliptic-oblong, 1.5-1.7 by 0.7-1.3 mm glabrous. Pedicels slender, 0.4-1 cm. Lower glumes membranous, ovate, ca. 0.75 mm, 3-nerved, pilose, apex acute. Upper glumes membranous, obovate, ca. 1.2 mm, pilose with tablecle base hair. Florets 6-8. Lower floret neuter. Lemmas membranous. Paleas boat-shaped, hyaline.

**Ecology:** In open areas, along roadsides or swampy areas; 1000 m altitude.

**Distribution:** Tropical southern Africa, southern America, Madagascar, India, Papua New Guinea; also Australia.

**Flowering period:** October to February



**Whole plant**



**Leaf-blade**



**Inflorescence**



**Rhizome**



**Culm**

## *Imperata cylindrica* (L.) P. Beauv.

**Synonym:** *Lagurus cylindrica* (L.) Beauv.

**Common names:** Cogon grass; Yaa Ka (Thailand; Lao PDR); Thekke (Myanmar); Lalang (Brunei Darussalam)

**Description:** Perennial with long rhizome, culms erect up to 80 cm high. Leaf-sheath glabrous, 15-25 cm. long, glabrous and whitish hairs at the margins, whitish midrib and finely serrated margins. Leaves long 0.5-0.75 in. (1.3-1.9 cm) ligules membranous, 2 mm. Leaf-blades linear, 5-10 cm by 0.5-1 cm, inflorescences open pedicle 5.1-20.3 cm by 2-8 cm, spikelets obovate 2 elliptic 4-5 mm long spreading node hairy, pedicel often becoming loose 1.25-2.5 cm by 2-8 cm. Lower glumes membranous, ovate, ca. 0.77 mm, 3 nerved, pilose, apex acute. Upper glumes membranous, obovate, ca. 1.0 mm, pilose with tubercle base hair. Florets 2. Lower florets neuter, lower lemmas membranous and look like upper glume, 1.25 mm long; paleas absent. Upper florets hermaphrodite; lemmas 1.25 mm long, gibbous, 3-nerved. paleas boat-shaped, 1.25 mm long.

**Ecology:** In open areas, roadsides with gentle slopes and sandy clay soil about more than 1000 m altitude.

**Distribution:** Throughout Southern Asia, tropics and warm temperate region of Australia, Asia and Southeast Asia

**Flowering period:** November to January





**Whole plant**



**Inflorescence**



**Leaf-blade**



**Spikelets**



# *Centotheca lappacea* (L.) Desv.

Synonym: *Cenchrus lappacens* L.

**Common name:** Rumput lilit kain

**Description:** Perennial grass with loosely tufted. Culms and ascending 30-100 cm high. Leaf-sheaths glabrous, nerved. 3-4 cm long, margin membranous and hairy. Ligules 1.5-2 mm. Leaf-blades lanceolate-elliptic and with cross-nerved, 4-15 by 1-3 cm. Inflorescences open panicle, 15-30 by 10-25 cm. Spikelets obovate-elliptic 1.5-1.7 by 0.7-1.3 mm with hairy. Spikelets 3-7-flowered, 4-8 mm long. Pedicel slender, 2.0 mm long, apex acute. Lower glumes membranous, ovate, ca. 0.77 mm, 3 nerved, pilose, apex acute. Upper glumes subcoriaceous, elliptic, apex cuspidate, weakly (3)-5-nerved. Florets 2. Lower florets neuter, lower lemmas membranous and look like upper glume, ca. 1.25 mm long. Paleas absent. Upper florets hermaphrodite. Lemmas gibbous, 3-nerved, 3.5-4 mm long, subcoriaceous, 7-nerved, apex cuspidate, glandular hairy along the upper margin, the hairs retrorsely hispid when mature. Palea 2.8 mm long, 2-keeled. Caryopsis ca. 1 mm long.

**Ecology:** In open areas or nature trails or forest margins 600-1,000 m altitude.

**Distribution:** Throughout Southeast Asia.

**Flowering period:** November to January



**Whole plant**



**Inflorescence**



**Spikelets**



**Habit**

## *Melinis repens* (Willd.) Zizka

**Synonym:** *Rhynchelytrum repens* (Willd.) C.E. Hubb

**Common name:** Red Top Natal (Myanmar)

**Description:** Annual grass. Culms creeping and ascending 48-87 cm high. Leaf-sheaths villous, ciliate. 3.5-5.5cm long, margin membranous and hairy. Ligules membranous, 2 mm. Leaf-blades linear, 5-10 cm by 0.5-1 cm. Inflorescences open panicle, 15-30 cm by 10-25 cm, spikelets obovate-elliptic, 1.5-1.7 mm by 0.7-1.3 mm with hairy, pedicels slender, 0.5-1.2 cm. Lower glumes minute with reddish pilose. Upper glumes membranous, obovate, ca. 1.0 mm. Florets 2. Lower florets neuter, lower lemmas membranous and look like upper glume ca. 1.25 mm long; paleas absent. Upper florets hermaphrodite. Lemmas 1.25 mm long, gibbous, 3-nerved. Paleas boat-shaped, ca. 1.25 mm long.

**Ecology:** Common in open areas along the road, 1000 m altitude.

**Distribution:** Throughout Southeast Asia, introduced from Africa and wide spread in tropical regions.

**Flowering period:** November to January



**Whole plant**



**Leaf-blade**



**Culm**



**Inflorescence**



**Spikelets**

# *Setaria palmifolia* (Koen.) Stapf

**Synonyms:** *Panicum palmifolium* [palmaefolium] Koen.

**Common name:** Palm grass, Bristle grass, Kaing (Myanmar)

**Description:** Annual grass. Culms 100-170 cm high. Leaf-sheaths ciliate. 10-15 cm long, margin membranous and hairy. Ligules membranous, ca. 2 mm. Leaf-blades linear, 5-10 cm by 10-15 cm, plicate, apex acute. Inflorescences open panicle, 40-70 cm by 6-11 cm. Spikelets ovate. Pedicel slender 0.5-1.2 cm. Lower glumes membranous, ovate, ca. 1.25 mm, 3-nerved, pilose, apex acute. Upper glumes membranous, obovate, ca. 3.0 mm. Florets 2. Lower florets neuter or male. Lemma ovate, membranous, ca. 1.25 mm. Upper florets hermaphrodite. Lemmas crustaceous, ca. 1.25 mm long, gibbous, 3-nerved, apex acute. Paleas boat-shaped, ca. 1.25 mm long.

**Ecology:** In shady areas or bamboo thickets at 300-1000 m altitude.

**Distribution:** Throughout Southeast Asia; also tropical Asia, West Africa, Central America.

**Flowering period:** November to January





**Whole plant**



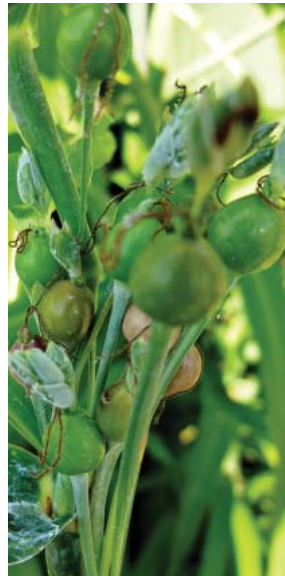
**Leaf-blade**



**Female inflorescence**



**Culm**



**Male inflorescence**

# *Coix lacryma-jobi* L. var. *puellarum* (Bal.) A. Camus

**Synonym:** *Coix puellarum* Bal.

**Common name:** Job's tear; Dueiy Hin (Thai; Lao PDR)

**Description:** Annual grass. Culms erect 65-80 cm high. Leaf-sheaths villous, ciliate. 3.5cm to 5.5cm long. Ligules globose 2 mm. Leaf-blades linear, 5-10 cm by 0.5-1 cm. Inflorescences spike like raceme pedicel 15-30 cm by 10-25 cm, spikelets obovate 2 elliptic 23-34 mm by 1.3-2.1 mm with hairy, spikelets terminal, and in the upper axils, unisexual, staminate spikelets two-flowered, in twos or threes on the continuous rachis; pistillate spikelets three together, one fertile, and two sterile. Pedicel slender 0.5-1.2 cm. Lower glumes membranous, ovate, ca. 0.77 mm, 3-nerved, pilose, apex acute. Upper glumes membranous, obovate, ca. 1.0 mm, pilose with tabeclle base hair. Florets 2. Lower florets neuter, lower lemmas membranous and look like upper glume, 1.25 mm long; paleas absent. Upper florets hermaphrodite; lemmas 1.25 mm long, gibbous, 3-nerved. paleas boat-shaped.

**Ecology:** In open areas, roadsides with gentle slopes and sandy clay soil about more than 1000 m altitude.

**Distribution:** Indochina, Thailand, Myanmar

**Flowering period:** November to January



**Whole plant**



**Culm**



**Spikelets**



**Inflorescence**

## *Pennisetum polystachyon* (L.) Schult.

**Synonym:** *Panicum polystachyon* (polystachion) L.

**Common name:** Missing grass; Thin napier grass

**Description:** Annual grass. Culms 97-108 cm high. Leaf-sheaths 7.5-9.5 cm long, margin membranous and hairy. Ligules membranous, 2 mm. Leaf-blades linear, 16.5-21 by 1.0-1.9 cm. Inflorescences open panicle, 11.5-13.5 by 3.0-4.0 cm. Spikelets obovate-elliptic 0.4-0.6 cm, hairy. Pedicel slender, sessile. Lower glumes membranous, ovate, 1-nerved, pilose, apex acute. Upper glumes membranous, obovate, ca. 3.0 mm. Florets 2. Lower florets neuter or male. Lemmas membranous and look like upper glume, ca. 2.75 mm long; paleas 2.70 mm. Upper florets hermaphrodite; lemmas 2.0 mm long, gibbous, 3-nerved. Paleas boat-shaped, 2.2 mm long.

**Ecology:** In open areas, frequent along roadsides or nature trails with gentle slopes, 600-1000 m altitude.

**Distribution:** Thailand, Philippines, Tropical Old World.

**Uses:** Young plant is considered to be good fodder.

**Flowering period:** November to January





**Whole plant**



**Culm**



**Inflorescence**



**Spikelets**



## *Sorghum nitidum* (Vahl) Pers.

Synonym: *Holcus nitidus* Vahl

**Common Name:** Sorghum

**Description:** Annual tufted grass. Culms erect, 60-90 cm high. Leaf-sheaths glabrous, 5.2-8.3 cm long, margin membranous and hairy. Ligules membranous, 2.7 mm. Leaf-blades linear, 9.5-14.0 cm by 0.5-1.7 cm. Inflorescences open panicle, 12-22 cm by 1.2-4.0 cm, spikelets elliptic, 0.3-0.5 mm. Pedicel slender 0.3 cm. Lower glumes membranous-crustaceous, ovate, ca. 4.0 mm, 3-nerved, pilose, apex acute. Upper glumes membranous, obovate, ca. 4.5-4.7 mm, pilose. Florets 2. Lower florets neuter. Lemmas membranous and look like upper glume. Paleas hyaline, 2.2-2.3 mm. Upper florets hermaphrodite. Lemmas gibbous, 3-nerved. Paleas boat-shaped.

**Ecology:** Common in open areas and roadsides, up to 1000 m altitude.

**Distribution:** India, Ceylon, Myanmar, Thailand, Philippines

**Flowering period:** November to January

**Uses:** This grass is abundant enough to be a valuable native fodder.



**Whole plant**



**Inflorescence**



**Culm**



**Spikelet**

# *Neyraudia reynaudiana* (Kunth) Keng ex Hitchc.

**Synonym:** *Arundo reynaudiana* Kunth

**Common name:** Kaem Haeng (Thai)

**Description:** A large perennial grass. Culms up to 5 m. high. Leaf-sheaths villous, ciliate. 15-19 cm long, margin membranous and hairy. Ligules membranous, 3.3 mm. Leaf-blades linear, 30-60 cm by 3-4 cm, apex acuminate. Inflorescences open panicle, elliptic in outline, 40-80 cm by 13-39 cm. Spikelets lanceolate, 1-1.2 cm, hairy. Pedicel slender, 2-6 mm long. Lower glumes membranous, lanceolate, ca. 1.25 mm, 3-nerved, pilose, apex acute. Upper glumes membranous, lanceolate, ca. 2.0 mm, pilose. Florets more than 6. All hermaphrodite. Lemmas lanceolate, membranous, apex acute-acuminate. Paleas hyaline ca. 3.5 mm.

**Ecology:** Common in open areas, roadsides with gentle slopes and sandy clay soil about more than 600-1000 m altitude.

**Distribution:** Indo-china

**Flowering period:** November to January

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