

# Thai Zingiberaceae : Species Diversity And Their Uses

**Puangpen Sirirugsa**

*Department of Biology, Faculty of Science, Prince of Songkla University, Hat Yai, Thailand*

*Abstract:* Zingiberaceae is one of the largest families of the plant kingdom. It is important natural resources that provide many useful products for food, spices, medicines, dyes, perfume and aesthetics to man. **Zingiber officinale**, for example, has been used for many years as spices and in traditional forms of medicine to treat a variety of diseases. Recently, scientific study has sought to reveal the bioactive compounds of the rhizome. It has been found to be effective in the treatment of thrombosis, sea sickness, migraine and rheumatism.

## GENERAL CHARACTERISTICS OF THE FAMILY ZINGIBERACEAE

Perennial rhizomatous herbs. Leaves simple, distichous. Inflorescence terminal on the leafy shoot or on the lateral shoot. Flower delicate, ephemeral and highly modified. All parts of the plant aromatic. Fruit a capsule.

## HABITATS

Species of the Zingiberaceae are the ground plants of the tropical forests. They mostly grow in damp and humid shady places. They are also found infrequently in secondary forest. Some species can fully expose to the sun, and grow on high elevation.

## DISTRIBUTION

Zingiberaceae are distributed mostly in tropical and subtropical areas. The center of distribution is in SE Asia. The greatest concentration of genera and species is in the Malesian region (Indonesia, Malaysia, Singapore, Brunei, the Philippines and Papua New Guinea)

## ZINGIBERACEAE IN ASIAN COUNTRIES

Area	Genera	Species
World (total)	52	1,500
China	21	200
India	18	120
Indochina	14	120
Malesia	25	650
Nepal	11	35
The Philippines	15	103
Thailand	20	200

## CLASSIFICATION

Zingiberaceae is divided into 4 tribes

- HEDYCHIEAE
- ZINGIBEREAE
- ALPINEAE
- GLOBBEAE

## ZINGIERACEAE OF THAILAND

		Total no. of sp.	No.of sp. in Thailand
HEDYCHIEAE	Boesenbergia	45	14
	Caulokaempferia	10	5
	Cautleya	5	1
	Curcuma	80	50
	Curcumorpha	1	1
	Haniffia	2	2
	Hedychium	60	20
	Kaempferia	50	15
	Scaphochlamys	25	2
	Stahlianthus	7	1
ZINGIBEREAE	Zingiber	90	35
ALPINIEAE	Alpinia	250	20
	Amomum	125	20
	Elettariopsis	30	3
	Etlingera	60	4-5
	Geostachys	16	3
	Hornstedtia	35	1-2
	Pomereschia	2	1
GLOBBEAE	Gagnepainia	3	3
	Globba	70	40

## THE STUDY OF ZINGIBERACEAE IN THAILAND

The taxonomic study of the family Zingiberaceae was first studied by Kai Larsen (1980) who proposed the key to genera of Thai Zingiberaceae. However, the study of Zingiberaceae has been going slowly due to the lack of adequate specimens. Old collections are useless as they consist of either sterile or spoiled material. The delicate flowers are often damaged during the drying process. The best way to collect specimens of this family is to preserve the flowers in 70% alcohol.

The aim of the study of Thai Zingiberaceae is to complete the taxonomic revision of the family and to be published in the Flora of Thailand. So far, five genera have been revised. They are: **Caulokaempferia** (Larsen, 1964) **Boesenbergia** (Sirirugsa, 1992) **Kaempferia** (Sirirugsa, 1992), **Scaphochlamys** (Sirirugsa & Larsen, 1991) and **Hedychium** (Sirirugsa, 1995). The genus **Curcuma** has been currently studied by the author. More than 50 species of this genus have been found to occur in Thailand, with only 26 of them being formally identified. The genus **Zingiber** has been treated by Theilade & Maersle - Moller (1991). In a preliminary study, 33 species were recognized.

However, many more genera of Zingiberaceae still remain to be studied before finishing the entire family for the Flora of Thailand. The field collections as well as the research collaboration of this family are highly needed.

### REPRESENTATIVES OF THAI SPECIES

#### 1. **Curcuma longa L.**

Distinguished characters.- Rhizome branched, bright yellow. Flower bracts greenish yellow.

Coma bracts pale yellow.

Thailand.- Cultivated throughout the country.

Distribution.- Cultivated widely in Asia.

Uses.- Turmeric powder is used as cosmetics in India. It is also sacred in many social and religious rites. It is used as a coloring matter in pharmacy, confectionery and food industries. Fresh or dried rhizome is used as spice. The rhizome is stomachic, stimulant and carminative. It is used as a remedy for diarrhea, rheumatism and is also used to relieve cough and tuberculosis.

#### 2. **Curcuma parviflora Wall.**

Distinguished characters.- Rhizome small, white. Flower bracts green. Coma bracts and staminodes white. Labellum purple.

Thailand .- Common in the mixed forest of North and Northeast, rare in the Peninsula

Distribution.- Myanmar, India, Indochina, Indonesia, Malaysia.

Uses.- The inflorescence is eaten as vegetable. The pulp of the rhizome is scraped and applied to cuts.

#### 3. **Curcuma xanthorrhiza Roxb.**

Distinguished characters.- Rhizome large, ovoid, dark orangish-yellow.

Thailand.- NORTHREN: Chiang Mai, SOUTHEASTERN: Chantaburi, Trat; PENINSULA: Phang-nga.

Distribution.- India, Indonesia, Malaysia.

Uses.- it is used extensively in traditional medicine. For examples : Remedies for bloody diarrhea, dysentery, fevers, hemorrhoids, stomach disorder, infected wounds and skin eruptions.

#### **4. *Curcuma zedoaria* Rosc.**

Distinguished characters.- The rhizome pale yellow or white inside. The coma bracts dark red to purple.

Thailand.- NORTHERN: Chiang Rai, Chiang Mai; EASTERN: Nakhon Ratchasima, CENTRAL: Saraburi; SOUTHEASTERN: Trat.

Distribution.- India (Himalaya), Southeast Asia.

Uses.- Young rhizome is eaten as vegetable soup. Rhizomes are used in relief of stomachache and as a carminative. It is also used in perfumery. Leaves are used for flavoring fish and other food.

Many species of the genus *Curcuma* are the economic plants for the aesthetics of their flowers. For examples:

#### **5. *Curcuma alismatifolia* Gagnep.**

Distinguished characters.- Peduncle long, slender and stiff. The coma bracts pink, large and erect. The trade name for this species is known as “Siam Tulip”. Its bulbs are exported to Japan and Europe.

Thailand.- SOUTHWESTERN: Utai-Thani.

Distribution.- Cambodia.

#### **6. *Curcuma aurantiaca* van Zijp**

Distinguished characters.- The flower bracts greenish-orange. The coma bracts bright pink.

Thailand.- PENINSULA: Ranong.

Distribution.- Ceylon, Indonesia, Malaysia.

#### **7. *Curcuma petiolata* Wall.**

Distinguished characters.- The inflorescence large, may be the largest of the genus. The flower bracts greenish, the coma bracts pink.

Thailand.- NORTHERN: Uttaradit.

Distribution.- Myanmar.

#### **8. *Curcuma roscoeana* Wall.**

Distinguished characters.- The flower bracts bright orange. No coma bracts. It has been well known as ornamental plant and has become an important export of Thailand.

Thailand.- NORTHERN: Mae Hong Son, Phitsanulok; SOUTHWESTERN: Kanchanaburi.

Distribution.- Myanmar and commonly cultivated.

#### **9. *Hedychium coronarium* Koen.**

Distinguished characters.- Erect herb, about 1-2 meters tall. Inflorescence compact, ellipsoid. Flower pure white and fragrant.

Thailand.- NORTHERN: Chiang Mai, and widely cultivated.

Distribution.- India, Myanmar.

Uses.- The rhizome is stimulant and carminative. A decoction of the stem is gargled for tonsillitis. The flower is eaten as vegetable. It is also a source of perfume.

### **10. *Hedychium longicornutum* Bak.**

Distinguished characters.- Epiphytic on the tree. Inflorescence short and compact. Outside bracts densely hairy. Flowers yellow.

Thailand.- PENINSULA: Narathiwat.

Distribution.- Malay Peninsula.

Uses.- Roots are used to treat earrache. Pounded root or the whole plant is a remedy for intestinal worms.

### **11. *Kaempferia galanga* L.**

Distinguished characters.- Small herb. Leaves flat on ground. Flower white with a purple spot at the center.

Thailand.- NORTHERN: Chiang Mai, Tak; NORTHEASTERN: Loei; EASTERN: Nakhon Ratchasima, Ubon Ratchathani; SOUTHEASTERN: Prachin Buri, Chanthaburi; SOUTHWESTERN: Kanchanaburi, Prachuap Khirikhan; PENINSULA: Surathani.

Distribution.- India, Malaysia, Indonesia.

Uses.- Tuber and rhizome are used as a remedy for toothache or a wash for dandruff or scabs on the head. It is stimulant, stomachic, and carminative. The rhizome is externally used to treat abdominal pain, swelling and muscular rheumatism.

### **12. *Kaempferia rotunda* L.**

Distinguished characters.- Rhizome short and branched. Root tubers elongate. The inflorescence appears before the leaves. Flower pink to pinkish-purple.

Thailand.- NORTHERN: Chiang Mai, Uttaradit, Phitsanulok, Tak; NORTHEASTERN: Loei, khon Kaen; CENTRAL: Saraburi; SOUTHEASTERN: Chonburi; SOUTHWESTERN: Uthai Thani, Kanchanaburi.

Distribution.- Tropical Asia and cultivated in all tropical countries.

Uses.- The tuber is used to treat abdominal illness, gastric complaints. The rhizome is used to treat stomachache, and is also used for cosmetics. The leaves are used as body lotion.

Several species of *Kaempferia* are useful for ornamental plants. A few species are pretty pot herbs. For examples:

### **13. *Kaempferia pulchra* Ridl.**

Distinguished characters.- Leaves often variegated. Inflorescence short. Flower violet.

Thailand.- NORTHERN: Phitsanulok, Tak; CENTRAL: Saraburi; SOUTHEASTERN: Chantaburi; SOUTHWESTERN: Kanchanaburi, Prachuap Khiri Khan; PENINSULA: Chumphon, Surat Thani, Krabi, Nakhon Si Thammarat.

Distribution.- Indochina, Malaysia, Indonesia.

### **14. *Kaempferia elegans* (Wall.) Bak.**

Distinguished characters.- It is closely related to *K. pulchra* but the leaves are rarely variegated and the peduncle more elongate. The flower pink.

Thailand.- NORTHERN: Chiang Mai, Phitsanulok, Nakhon Sawan; SOUTHWESTERN: Kanchanaburi, Ratchaburi; PENINSULA: Chumphon, Surat Thani, Trang.

Distribution.- India, Myanmar, Malay Peninsula.

### **15. *Zingiber ottensii* Val.**

Distinguished characters.- Rhizome dark purple inside. Labellum pale yellow, mottled with pink.

Thailand.- Cultivated.

Distribution.- Malaysia, Sumatra, SE. Asia.

Uses.- The rhizomes are included in a sedative lotion as a remedy for convulsions. It is also used to treat lumbago.

#### **16. Zingiber purpureum Roxb.**

Distinguished characters.- Inflorescence ellipsoid or spindle shaped. Bracts dark purple. Rhizome bright greenish- yellow, bitter with a strong smell.

Thailand.- Cultivated.

Distribution.- India, Indochina, SE. Asia.

Uses.- Rhizome is used to treat fevers and intestinal disorder. Various lotions and decoctions applied to swellings, rheumatism, bruise, numb feet, and painful parts.

#### **17. Zingiber zerumbet (L.) Smith**

Distinguished characters.- Inflorescence green when young, bright red when old. Rhizome and flower pale yellow.

Thailand.- NORTHERN; Chiang Mai, Mae Hong Son, Lampang; SOUTHWESTERN: Kanchanaburi, Phetchaburi; CENTRAL: Saraburi, Bangkok; PENINSULA: Ranong.

Distribution.- Ceylon, widely cultivated in SE. Asia.

Uses.- The rhizome is used to relieve stomachache, macerated in alcohol is regarded as tonic, stimulant and depurative. It is also used as the spice ginger. The flower buds are eaten boiling as vegetable.

#### **18. Zingiber spectabile Griff.**

Distinguished characters.- Inflorescence is the largest of the genus. All the bracts incurved. The lip dark purple, mottled with yellow.

Thailand.- PENINSULA: Trang, Songkhla, Narathiwat.

Distribution.- Malay Peninsula, Sumatra, India.

Uses.- Pounded leaves are made in poultices, an infusion is used to wash infection eyelids.

#### **19. Alpinia conchigera Griff.**

Distinguished characters.- Inflorescence slender. Flower small. The lip pink to red. The ripe fruit bright red, small, about 7 mm. in diameter.

Thailand.- Common in tropical rainforest.

Distribution.- Bengal, Indochina, Malaysia, Sumatra.

Uses.- The rhizome is stimulating, diaphoretic, regulating in uterine hemorrhage. It is used to treat bronchitis, jaundice, headache, vertigo, metritis. It is also used as external treatment for rheumatism and arthritis.

#### **20. Alpinia galanga (L.) Willd.**

Distinguished characters.- Rhizome pale yellow. Flower white.

Thailand.- Cultivated.

Distribution.- India, Indochina, The Philippines, Borneo and cultivated extensively in SE. Asia.

Uses.- The rhizome is used for indigestion, colic, dysentery and cancer of the

stomach. It is a remedy for food poisoning. The grated rhizome is prescribed for spleen trouble and herpes; an infusion of the leaves is for stimulant and antirheumatism. The fresh rhizome is also used as a spice for flavoring food.

### **21. *Etilingera elatior* (Jack) Smith**

Distinguished characters.- Peduncle 50-80 cm. long. Bracts Pink to red.

Thailand.- PENINSULA: Nakhon Si Thammarat, Narathiwat.

Distribution.- Sumatra, Malaysia, Indonesia and cultivated' throughout SE Asia.

Uses.- Young flower buds, in Malaysia, are an important ingredient of the spicy dish, "Laksah". In southern Thailand, flowers are eaten as vegetable. It has also become the economic plant for its beautiful flowers.

### **22. *Etilingera littoralis* (Koenig) Giseke**

Distinguished characters.- The plant is up to 3 m. tall. Flowers bright red at ground level.

Thailand.- PENINSULA: Phuket (type), common in the rainforest throughout the peninsula.

Distribution.- Malaysia, Indonesia.

Uses.- Fruit is edible. The young stem, after removing the outer parts, yields an aromatic, tender core, suitable for eating raw or cooked.

### **23. *Etilingera maingayi* (Bak.) Smith**

Distinguished characters.- This species is one of the largest plants in the genus *Etilingera*. The inflorescence short and compact. Bracts pink to red.

Thailand.- PENINSULA : Trang, Songkhla, Narathiwat.

Distribution.- Malaysia.

Uses.- Flowers are eaten as vegetables.

### **24. *Globba winitii* Wright**

Distinguished characters.- Inflorescence pendulous, bracts bright purple or white.

Thailand.- NORTHERN: Lampang (endemic).

Distribution.- Cultivated throughout Asia and Europe.

Uses.- It is an important ornamental plant.

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