

# *Ethnobotanical Study of the Genus Amomum SPP.* *(Zingiberaceae Lindl.) in Sumatra*

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**Abstract** – Amomum is the largest genus in the Zingiberaceae family with 150-180 species. This genus is known to produce various types of cardamom. The part of the plant that is most widely used is the fruit, namely as a spice to flavor food and medicine. Local knowledge about the use of plants is generally passed down orally from generation to generation, so the potential for this knowledge to be lost is very high if the plants become extinct. This research aims to identify the types and benefits of the Amomum plant by people in Sumatra. The method used in this research is Systematic Literature Review (SLR). The results of the research showed that there were 11 types of Amomum that were used by the community, namely *A. aculeatum*, *A. apiculatum*, *A. centrocephalum*, *A. dealbatum*, *A. exertum*, *A. hastilabium*, *A. longipes*, *A. mentawaiensis*, *Amomum sp*, *A. stenocarpum*, and *A. tephrodelphys*. Overall, the type of Amomum found in Sumatra has medicinal benefits. The organs used as medicine for each type are different. *A. aculeatum* uses fruit organs, stems and rhizomes, *Amomum sp*. uses rhizome organs, and *A. dealbatum* uses rhizome and leaf organs. Meanwhile, the other 3 types, namely *A. apiculatum* (stem) are used as an insecticide, *A. centrocephalum* (rhizome) as an antibacterial and *A. stenocarpum* (fruit) for consumption.

**Keywords** – Amomum; Ethnobotany; Sumatra; Zingiberaceae

## I. INTRODUCTION

Zingiberaceae Lindl. is a family of monocotyledonous, aromatic, herbaceous plants that have rhizomes [1]. The distribution area of this family is very wide, namely in pantropical areas, lowlands, highlands and especially in Indo-Malaya [2]. In general, Zingiberaceae's growing habitat is in shady and moist secondary forests. However, there are several types of Zingiberaceae that are able to adapt to living in open places and growing on high slopes [3]. Zingiberaceae has 98 genera and 2,299 species [4]. One of the genera that has the largest number of species is the genus Amomum. Amomum is the largest genus in the Zingiberaceae family with 150-180 species distributed in Sri Lanka, the Himalayas, China, Southeast Asia, Malesia and North Australia [5] [6]. Based on research by Newman et al., [7] reported 24 types of Amomum found in Sumatra, [8] reported that there are 7 types of Amomum endemic to Sumatra. Amomum is a genus known for producing various types of cardamom. These plant organs consist of tubers, stems, leaves, flowers and fruit. The part of the plant that is most widely used is the fruit, namely as a spice to flavor food [9]. Apart from being used as a cooking spice, cardamom fruit is also used as medicine. Traditionally, cardamom fruit has been widely used as a herbal therapy medicine to treat several types of diseases, such as gastric pain, hepatitis, malaria, inflammation and even cancer [10]. The local wisdom of the community in using plants as medicine is unique local knowledge possessed by each region. Generally, local knowledge is still traditional and simple. In an effort to explore the potential for sustainable use of natural resources from the Amomum genus, this can be done by conducting an ethnobotanical study of the use of the Amomum genus in society. Ethnobotany is a branch of ethnobiology that studies the relationship between

humans and plants with an emphasis on traditional tribal culture [11]. Ethnobotany studies the local wisdom of a community in the use of plants which includes indigenous knowledge from the life experiences of ancestors which is passed down to a community [12]. Local knowledge about the use of plants is generally passed down orally from generation to generation, so the potential for this knowledge to be lost is very high if the plants become extinct. Therefore, in order to maintain local knowledge of the Amomum genus, it is necessary to document local knowledge by conducting ethnobotanical studies of the Amomum spp. (Zingiberaceae) on the island of Sumatra. This research aims to identify the types and benefits of the Amomum plant for the community. It is hoped that the results of this research will provide new information regarding the local knowledge of the community in each region on the island of Sumatra which can be used as basic information for further research.

## II. RESEARCH METHODS

This research uses the Systematic Literature Review (SLR) method. The information in this review study was obtained online and offline. Offline is based on various literature books such as Plants Resources of South East Asia (PROSEA) 13 and other books. Meanwhile, online is based on the Web, Scopus, Pubmed, and on-line media from various scientific journals using the search term "Ethnobotanical Study of the Genus Amomum spp. (Zingiberaceae) on the island of Sumatra". The results of the article review were then analyzed descriptively.

## III. RESULTS AND DISCUSSION

### 3.1 Types of Amomum on Sumatra Island

Based on the results of a review of the inventory of Amomum types using the GBIF website, there are 11 types of Amomum distributed on the island of Sumatra, namely *A. aculeatum*, *A. apiculatum*, *A. centrocephalum*, *A. dealbatum*, *A. exertum*, *A. hastilabium*, *A. longipes*, *A. mentawaiensis*, *Amomum* sp, *A. stenocarpum*, and *A. tephrodelphys*. All types of Amomum are distributed in various regions on the island of Sumatra, can be seen in the following table:

Table 1. Types of Amomum in 10 Provinces on the Island of Sumatra

No.	Province	Number of Species	Species
1	Aceh	6	<i>Amomum</i> sp. Roxb. <i>Amomum aculeatum</i> Roxb. <i>Amomum centrocephalum</i> AD Poulsen.* <i>Amomum longipes</i> Valeton. <i>Amomum tephrodelphys</i> K. Schum. <i>Amomum</i> stenocarpum Valeton.
2	North Sumatra	5	<i>Amomum</i> sp. Roxb. <i>Amomum centrocephalum</i> AD Poulsen.* <i>Amomum longipes</i> Valeton. <i>Amomum tephrodelphys</i> K. Schum. <i>Amomum dealbatum</i> Roxb.
3	West Sumatra	6	<i>Amomum apiculatum</i> K. Schum.* <i>Amomum</i> sp. Roxb. <i>Amomum centrocephalum</i> AD Poulsen.* <i>Amomum hastilabium</i> Ridl. <i>Amomum longipes</i> Valeton.

<i>Amomum mentawaiensis</i> *			
4	Riau	1	<i>Amomum exertum</i> (Scort.) Skornick & Hlavata.
5	Riau islands	0	-
6	South Sumatra	0	-
7	Bangka Belitung	1	<i>Amomum</i> sp. Roxb.
8	Bengkulu	0	-
9	Jambi	1	<i>Amomum</i> sp. Roxb.
10	Lampung	1	<i>Amomum</i> sp. Roxb.

Description \* : Plant endemic to Sumatra

The results of data recapitulation using official plant distribution websites such as POWO (Plants of the World Online), GBIF (Global Biodiversity Information Facility) and IUCN Red List (International Union for Conservation of Nature) show that the types of *Amomum* in 10 Provinces on the island of Sumatra are different. different (Table 1). The provinces that have the highest number of *Amomum* types are Aceh and West Sumatra, each with 6 types. Then followed by North Sumatra with 5 types and the provinces of Riau, Bangka Belitung, Jambi and Lampung, with only 1 type each. Meanwhile, the provinces that do not have any type of *Amomum* at all are the Riau Islands Province, South Sumatra and Bengkulu. According to Rahmi, [13]. The number of plant species found in an area is directly proportional to the amount of field exploration carried out in that area. The more often exploration is carried out in an area, the more new data will be revealed, including types of *Amomum*. Apart from that, most types of the Zingiberaceae family are found as terrestrial plants in the lowlands, but some are also found in the mountains and can live as epiphytes [14]. Apart from revealing the distribution of *Amomum* on Sumatra Island, the results of data recapitulation using the website also provide new information about endemic *Amomum* types that are only found on Sumatra Island, namely *A. apiculatum*, *A. centrocephalum*, and *A. mentawaiensis*. Endemic plants are a group of plant species whose existence is unique and are only found in certain areas naturally [15]. Sumatran endemic plants are only found in Sumatra. The occurrence of endemism is the result of the speciation process of geographically isolated plants [16]. Based on the research results of Droop and Newman [8], in Rahmi, [13] the species *A. apiculatum* is an endemic species of Sumatra whose presence can be found in the Harau Valley nature reserve, Rimbo Panti nature reserve, Air Sirah Padang, Cyberut Island and in Berastagi, Sumatra North. Then *A. centrocephalum* is also endemic to Sumatra and is widespread in Aceh and parts of northern Sumatra. Likewise, *A. mentawaiensis* is an endemic species to Sumatra because it is recorded as only being found on the Mentawai Islands, West Sumatra.

### 3.2 Ethnobotany of *Amomum* on Sumatra Island

The following is a summary of the Systematic Literature Review (SLR) of *Amomum* plants used by communities in Sumatra.

Table 2. Types of *Amomum* and their use in 10 Provinces on the Island of Sumatra

No.	Species	Region Name	Cultivation Status	Location	Utilization
1.	<i>A. aculeatum</i>	parahulu, prahulu, trahulu	wild	Aceh	Fruit: Fever reducer, antioxidant and cancer. Stalk: Headache Rhizome: cleans postpartum blood.
2.	<i>A. apiculatum</i>	cardamom	wild	West Sumatra	Rod: natural insecticide against <i>Drosophila</i>

					melanogaster.
3.	<i>Amomum</i> sp. Roxb	roude cardemon, cardamom, Pelage Puwar	wild and can be cultivated	-Aceh -North Sumatra -West Sumatra -Bangka Belitung -Jambi -Lampung	Rhizomes: to treat coughs and improve the digestive tract.
4.	<i>A. centrocephalum</i>	ginger	wild	-Aceh -North Sumatra -West Sumatra	rhizomes: as antibacterial
5.	<i>A. dealbatum</i>	crack, restless	Wild and Cultivated	North Sumatra	rhizome: as a cough medicine leaves: as a medicine for diarrhea fruit: consumed
6.	<i>A. exertum</i>	ginger	wild	Riau	-
7.	<i>A. hastylabium</i>	ginger	wild	West Sumatra	-
8.	<i>A. longipes</i>	ginger	wild	-Aceh -North Sumatra -West Sumatra	-
9.	<i>A. mentawaiensis</i>	-	wild	West Sumatra	-
10.	<i>A. stenocarpum</i>	kaol haol	wild	-Aceh	fruit: consumed
11.	<i>A. tephrodelphys</i>	-	wild	-Aceh -North Sumatra	-

The use of *Amomum* as a cooking spice and medicine has long been carried out by the local people of Sumatra. However, this local knowledge has not yet been definitively documented and written down. Based on the results of research on the use of the *Amomum* genus by people on the island of Sumatra, only 6 types are known to be used by the public, namely *A. aculeatum*, *A. apiculatum*, *Amomum* sp. Roxb, *A. centrocephalum*, *A. dealbatum* and *A. stenocarpum*. Meanwhile, the other 5 types, namely *A. exertum*, *A. hastylabium*, *A. longipes*, *A. mentawaiensis* and *A. tephrodelphys*, their benefits and uses are not yet clearly known (Table 2). According to Ernawati [17] the *Amomum* genus has a natural habitat in hills or medium areas with high humidity, so not all types of *Amomum* can be explored by the public. The status of the existence of *Amomum* in Sumatra is generally found growing wild in the forest, but there are 2 types that have been cultivated, namely *Amomum* sp. Roxb and *A. dealbatum*. Overall, the types of *Amomum* found on the island of Sumatra have medicinal benefits. The organs used as medicine for each type are different. *A. aculeatum* uses fruit organs, stems and rhizomes, *Amomum* sp. Roxb uses rhizome organs, and *A. dealbatum* uses rhizome and leaf organs. Meanwhile, the other 3 types, namely *A. apiculatum* (stem) are used as an insecticide, *A. centrocephalum* (rhizome) as an antibacterial and *A. stenocarpum* (fruit) for consumption. In each region on the island of Sumatra, the use of *Amomum* plant types is different. This is because each region has its own local wisdom in utilizing nature. According to Dewantari et al., (2018) the use of various plant species is based on the properties or contents of the plant itself and has nothing to do with myths (magic) or people's opinions about plants which they consider to bring blessings. In contrast to the

opinion of Ibo and Arimukti, (2019) that differences in the use of plant types can be influenced by the modernization process and several problems such as changes in forest function due to economic pressure and population growth.

*A. aculeatum* parahulu is a wild plant that is widely used by the community as a medicinal plant and ornamental plant. This plant grows wild in hilly areas, river banks, mountain valleys or in grasslands. This plant has a false stem that is round and green in color. The yellow rhizomes are odorless. The base of the leaf stalk is dark brown. The leaves are oval in shape with brown leaf midribs. The flowers have a tubular corolla and are light brown or orange in color. The spiny fruit is round with a hard skin texture and has round seeds (Gembong, 2011; Yuzammi et al., 2010). The organ of the *A. aculeatum* plant that is often used is the rhizome as a medicine that can be consumed to clean postpartum blood, while the fruit is eaten fresh and can be made into sweets or a mixture of fruit salad. Young leaves can be used as fresh vegetables (Yuzammi et al., 2010).

*A. apiculatum* is an endemic plant to Sumatra. This plant grows in shady places in primary or secondary rainforest, often near water, quite commonly; 20–1645 m. The morphological characteristics of this plant have a tall rooted rhizome, slender bright green leaves, wavy, ciliated edges. Bracteoles 2.3 cm long, glabrous, tubular. Flowers 4 cm long, no or almost no stems [8].

*A. centrocephalum* is also an endemic plant to Sumatra. This plant lives in primary forest 15–2180 m. The morphological characteristics of this plant are rhizomes with slender stilt roots, round leaf blades, short but clear leaf stalks. The flowers open individually and are dark red or pinkish red with white tips. Bracteoles spatheous-cymbiform short. The crown lobes are oval and the fruit is not visible [8].

*A. dealbatum* renggak/resak is a typical plant of Lombok Island. However, this plant is also found on the island of Sumatra, especially in North Sumatra. Morphological characteristics of renggak/resak, namely herb habitus. Pseudo stem. The leaves are oval, the upper surface is glabrous and the lower surface is finely hairy. Compound flowers in reddish yellow clusters that appear near the rhizome. The fruit is a box type, purplish green, egg-shaped, smooth hairy. The seeds are small, blackish brown and covered in seed coat. Fiber rooting system. The surface texture of the renggak fruit is rough and jagged, has a strong fruit aroma, slightly sour and sweet taste, the leaves are similar to turmeric leaves. This fruit grows outside the stem near the roots. This plant grows wild in forests and gardens, especially on moist soil rich in humus. For the people of North Sumatra, this plant is used as a cough medicine (rhizome) and diarrhea medicine (leaves), while the fruit is usually consumed directly (Mulasari et al., 2019).

*A. exertum* is a rare plant distribution in Peninsular Thailand and Peninsular Malaysia. The environmental conditions where this plant grows are under the shade of green forest at an altitude of around 300 meters above sea level. These plants often have two or three leaves, and may form pseudostems, and are usually not tall. The leaves are very complex, smooth and the veins are not prominent. Traditional use: Local villagers in southern Thailand are known to use this species as a medicinal plant and the young leaves are eaten fresh as a vegetable (Saensouk and Saensouk, 2021).

*A. hastylabium* This species is widespread in the forests of Thailand and Peninsular Malaysia. This plant lives in primary or secondary rainforest habitats in shade or partial sun; 330–739 m. This plant is a variable species, but is recognized by its very short bracteoles and long flower tube, as well as its reticulate leafy shoots. Rhizome underground, petioles 5–8 mm long. The leaves are elliptical in shape. The flowers open one by one. The fruit is round with elongated protrusions [8].

*A. longipes* is an endemic species on the island of Sumatra. This plant lives in damp or swampy, shady areas in primary forests, is scattered and not common; 30–500 m. The rhizome is underground. The leaves are elliptical, bright green in color. Petiole 6–12 mm long. Inflorescences are sparse, flower heads are ovate, flower color is yellow. Fruit shape is round. Seed diameter 3–6 mm, round or irregular shape, 5–6 in each locus [8].

*A. mentawaiensis* is an endemic species, which is only found on Siberut Island, Mentawai, West Sumatra. The status of this plant is Near Threatened (NT) and is included in the threshold for the Endangered list, all known collections are carried out within protected areas. Protected areas in Siberut have proven effective in reducing the rate of deforestation. This plant grows in forest habitats at a height of 20 m. The morphological characteristics of this plant are shallow rhizomes underground, up to 20 cm between nearby leaf shoots. High leafy shoot up to 1.7 m, first lamina 75–100 cm from base; the sheath is dark to dark green, smooth, shiny, glabrous and slightly pruinose; Base diameter up to 2.5 cm, pale green. The leaves are oval-elliptical, greenish yellow with prominent secondary veins. Flowers extend 3 cm above the bracts. Fertile bracts 3–3.2 × 1.2–1.4 cm, broadly ovate

with pointed apex, smooth, short-haired, white with purple apex, soon dries brown. Fruit shape is round, 4 cm in diameter, spiny, green, fruit stalk length up to 7 mm. Irregular round seed shape, 20–23 in each locus [8].

*A. stenocarpum* is a species found on Simaloer Island. The morphological characteristics of this plant are strong leafy shoots, 3 m high or more. Petiole 25 mm, slender, with small warts or glands, or corky crust, at the base next to the ligule. The shape of the leaf blade is linear-oval. Inflorescence arises from the base of leafy shoots. Peduncle short, 5 × 1.5 cm, dense with short scales. The fruit head is large, elongated to 15 × 5 cm. Ripe fruit is green. The laminae are very similar in shape to the laminae of *Amomum xanthophlebium*, although the leaf stalks are slightly longer than those of the Sumatran *A. xanthophlebium* collection. It should be noted that *Amomum stenocarpum* also has a rough, warty or corky area between the base of the petiole and the ligule. The fruit is similar in both species, and the leaves of both species are large, persistent, and oval. It appears possible that *Amomum stenocarpum* is closely related to *A. xanthophlebium* but further research and further collections from Simaloer Island are required before its status can be confirmed [8].

*A. tephrodelphys* is a species found on the island of Sumatra. This species grows in primary or cultivated forests, or riverside forests, in shady places; 1–500 m. The morphological characteristics of this species are that the rhizome is in the form of a clump, located at the surface of the soil or just below it, with many shoots standing close together. Petiole length 15 mm. The shape of the leaf blade is elliptical. The flower color is dark red to almost orange. The corolla lobes are ovate with a rounded apex, strongly curved and descending along the tube about half its length, pink with a few weak hairs. Fruits dark purple grey, almost black [8].

#### IV. CONCLUSION

Based on the results of an inventory of the use of the *Amomum* genus on the island of Sumatra, there are 11 types of *Amomum* that are used by the community, namely *A. aculeatum*, *A. apiculatum*, *A. centrocephalum*, *A. dealbatum*, *A. exertum*, *A. hastilabium*, *A. longipes*, *A. mentawaiensis*, *Amomum* sp., *A. stenocarpum*, and *A. tephrodelphys*. Overall, the types of *Amomum* found on the island of Sumatra have medicinal benefits. The organs used as medicine for each type are different. *A. aculeatum* uses fruit organs, stems and rhizomes, *Amomum* sp. uses rhizome organs, and *A. dealbatum* uses rhizome and leaf organs. Meanwhile, the other 3 types, namely *A. apiculatum* (stem) are used as an insecticide, *A. centrocephalum* (rhizome) as an antibacterial and *A. stenocarpum* (fruit) for consumption.

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