

# ***Zingiber album* Nurainas among Zingiberaceae family: a Review In the Traditional Uses**

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## **ABSTRACT**

**Aims:** To determine the potential for local use of *Zingiber album* Nurainas among Zingiberaceae family through an ethnobotanical approach.

**Study design:** Information about traditional uses of Zingiberaceae family collected through literature review. The data was analyzed quantitatively using the ethnobotanyR package in the R Studio software and visualized using a flow diagram with the ggalluvial formula

**Methodology:** Literature review

**Results:** From the research, it was found that the local use of *Z. album* as a vegetable and traditional medicines, namely the medicine for swollen uterus after childbirth, abdominal pain, internal heat.

**Conclusion:** *Zingiber album* Nurainas has potential as a food and traditional medicine. Ethnoalluvial analysis of the potential utilization of *Z. album* among other species in the Zingiberaceae family in West Sumatra showed that the species categorized as low importance.

**Keywords:** *Zingiberaceae*, *Zingiber album*, *Ethnobotany*, *Traditional use*

## **1. INTRODUCTION**

The Zingiberaceae family, or ginger plants, is known by the general public as a group of plants with various benefits. Ginger (*Zingiber officinale*), Turmeric (*Curcuma longa*), Galangal (*Alpinia galanga*), and Kencur (*Kaempferia galanga*) are the most commonly used as cooking spices, food ingredients, traditional medicine raw materials, and as ornamental plants. Some types of ginger plants have been cultivated and sold by the community while other types grow wild in the forest. Ginger plants are found in tropical and subtropical regions, with a distribution center in Southeast Asia, particularly in the Malesia region such as Sumatra and Borneo, with terrestrial habitats, montane, and live as epiphyte occasionally [1,2].

Sumatra, as one of the centers of distribution of Zingiberaceae, has a fairly diverse number of species, both wild and cultivated. [3] reported that at least 18 *Zingiber* species have been identified from Sumatra, including *Zingiber album* Nurainas. This species grows wild in nature in locations near agricultural land. [4] Reported that the young flowers of this species have been used by local communities as one of the food ingredients (vegetables). However, information on the use of this type is not well documented scientifically.

In West Sumatra, the use of *Zingiber album* is found in Nagari Simanau, Solok District. This plant, known locally as "Pangalan," is a wild type that is only distributed in the forest. *Z. album* is listed as an endangered plant (EN) by the IUCN Red List [4]. This is due to the decline in habitat quality due to agricultural activities and the arrival of visitors [4]. In addition, local communities have not carried out cultivation efforts for this plant, which can increase the threat to the plant in nature. In terms of its use, local communities in Simanau are known to use the young flowers of this plant as local vegetable and traditional medicines, particularly in the treatment of abdominal pain.

## 2. MATERIAL AND METHODS

**Forecast Area:** The utilization of *Zingiber album* in Simanau, Solok Regency, West Sumatra, Indonesia.

**Forecast Objects:** *Zingiber album* and Zingiberaceae family

**Forecast Methods:** Information about traditional uses of Zingiberaceae family collected through literature review. The data was then analyzed quantitatively using the ethnobotanyR package in the R Studio software and visualized using a flow diagram with the ggalluvial formula [5].

## 3. RESULTS AND DISCUSSION

*Zingiber album* belongs to the Zingiberaceae family, characterized by having species of great pharmacological and nutritional importance, such as the ginger *Zingiber officinale* Roscoe (*Z. officinale*), the cardamom *Elettaria cardamomum* (L.) Maton, and its many ornamental purposes.

### 3.1 *Zingiber album* Nurainas

#### 3.1.1 Geographical and altitudinal

*Zingiber album* is typically found around terrestrial tropical forest in 500 – 1200 masl. It can grow well in sandy soil on the edge of green forests and on the banks of rivers. It is endemic to Sumatra and distributed throughout West Sumatra province especially in Solok, Agam, Pasaman, Sijunjung Regency, and Batang Gadis National Park North Sumatra [3,4].

#### 3.1.2 Taxonomy and botanical description

*Zingiber album* is under Zingiberaceae family, Zingiberales order. Herbs 3–3.5 m. tall. Rhizomes near surface of ground, cream inside, fleshy, with tubers. Pseudostem erect, thick, basal sheaths green. Leaves 12–22 in one plant, petioles 0.7–1.5 mm, glabrous, ligule 0.4–1.0 cm long, apices rounded, hairy, green; laminae 50–55 × 10–12 cm, narrowly-lanceolate, base attenuate, tips long-acuminate, hairy. Inflorescences radical, many flower greenish-white, glabrous; spikes elongated, 20–40 cm long, 4–6 cm diam., rose-like at apex; bracts imbricate, revolute, thin, numerous, sterile bract 4.0–4.0 × 2.0–3.0 cm, spatulate, apices subapical-mucronate, bright white, fertile bract 5–7 × 3–6 cm, spatulate, apices subapical-mucronate, bright white, bracteoles small, 1.0–1.5 × 0.5–0.7 cm, lanceolate, transparent-white, glabrous. Flowers 1–3 flowers open at a time, tubular, 7–8 cm long; calyx 3.0–3.5 cm, tubular, acute, white, glabrous; corolla tubular, tube 4–4.5 cm long, pale yellow, glabrous, corolla lobes subequal, central 3.0–3.5 × 1.0–1.5 cm, lanceolate, apex acute, laterals 2.5–3.0 × 0.5–0.8 cm, glabrous; labellum 3.0–3.5 × 2.5–3.0 cm, subtrilobed, pale yellow, glabrous, apex rounded-undulate; anther 1.2–1.5 cm long with a beak shape appendage, appendage 1.5–1.7 cm long, pale yellow and bright yellow tip, thecae 2, parallel, pale yellow; style filiform, stigma pale yellow with an circular apical aperture surrounded by stiff hairs; epigynous glands, 1 pair, 0.6–0.8 cm long, linear; ovary 0.5–0.7 cm diam., glabrous, bright white. Fruit ellipsoid, trilobular, 3.0–3.5 cm long, 1.5–2.0 cm diam. glabrous, cream; seed black with white aril, 0.4–0.6 × 0.3–0.4 cm in clump, oblong to elongate; peduncles 25–40 cm long, scale oblong, 6.0–7.0 × 4.0–4.5 cm [3].

#### 3.1.3 Traditional Uses of *Zingiber album*

*Z. Album* has traditionally been used by local communities in Simanau, West Sumatra. Likewise, in traditional medicine, young *Z. album* cones are used to treat swollen uterus after childbirth. *Z. album* root is used as a hot medicine internally. Young shoots or *Z. album* sprouts ("umbuk" in local language) are used as medicine for stomach pain (stomach ulcer and stomach acid), abdominal swollen in men (swelling in the stomach), and abdominal swollen in women (swelling in the stomach). The use of traditional medicine is applied by mixing this type with other types consisting of pangalan (*Z. album*), red kincung (*Etlingera elatior*), white kincung (*Etlingera* sp), banana (*Musa balbisiana*), tibarau (*Saccharum spontaneum*), tabu udang (*Saccharum officinarum*), sitawa (*Cheilocostus speciosus*), and sidingin (*Bryophyllum pinnatum*). Furthermore, local communities consume *Z. album* by cooking it with other ingredients such as fish and potatoes. In addition, it can also be eaten as a condiment with "samba lado uok," a steamed chili sauce. The part of *Z. album* that is consumed is the young inner cone. The taste of this condiment processing is fresh and slightly sour [6].

### 3.2 Family Zingiberaceae

Zingiberaceae is the largest family in the order Zingiberales with 53 genera and over 1 200 species and is one of the leading families of tropical plants. The first family classification was proposed in 1889 and since then, it has been refined. Currently, there are four recognized tribes (Globbeae, Hedychieae, Alpinieae and Zingibereae) based on morphological characteristics, such as the number of cores and placentation in the ovary, staminode development, changes in fertile anther, and the orientation of rhizome. Vary in morphological characteristics indicates that Zingiberaceae has most species diversity. Recent study of Zingiberaceae study found out there are 100 species distributed in West Sumatra [7]. It suggests that West Sumatra was the center of distribution of Zingiberaceae in Sumatra island.

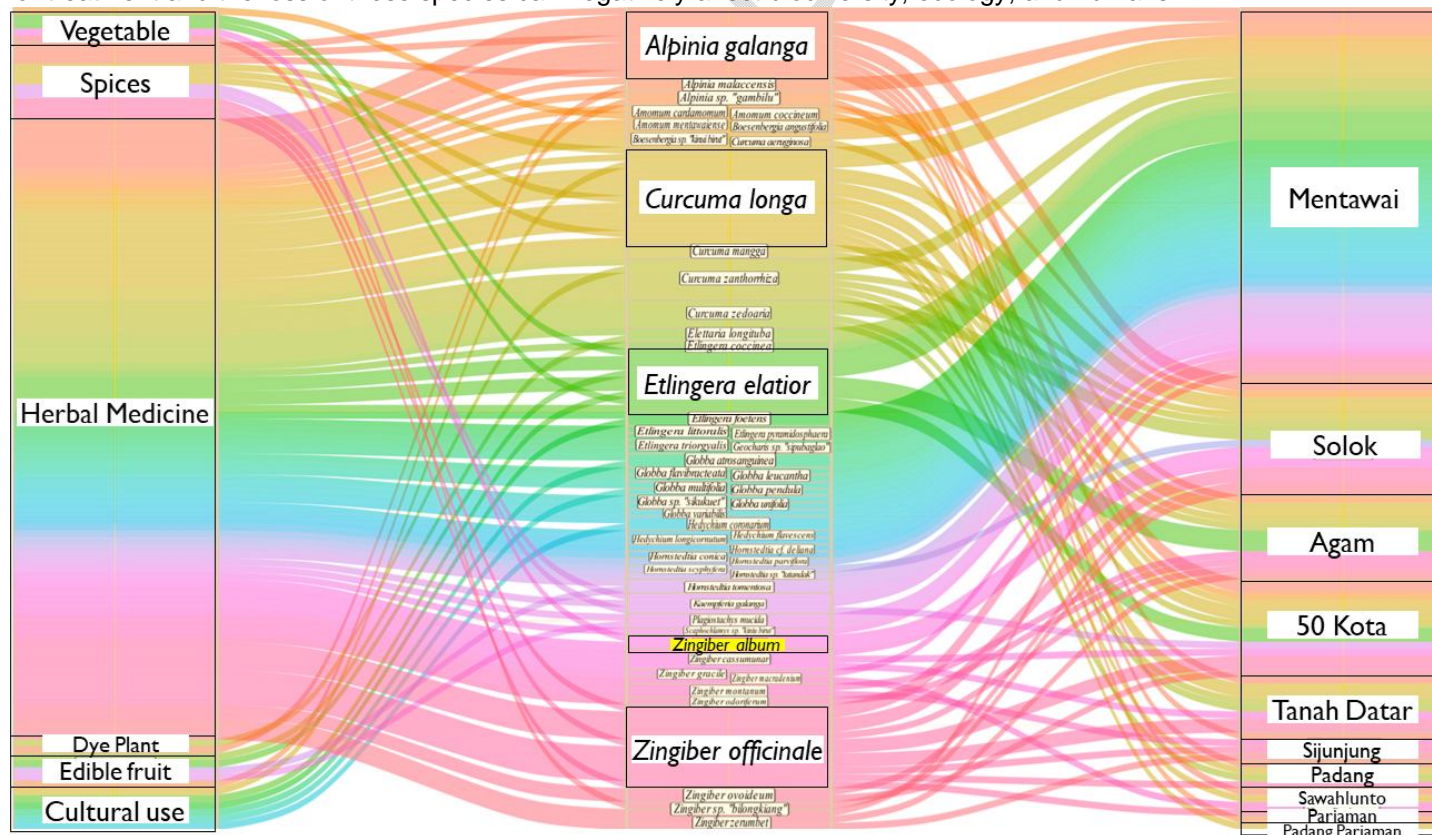
### 3.2.1 Traditional uses of Zingiberaceae

We found 51 species from 14 genera in the Zingiberaceae family have been utilized by the people in West Sumatra in six categories of utilization [8,9,10,11,12,13,14,15,16,17,18,19,20,21,22]. The flow chart shows that the most common utilization of Zingiberaceae in West Sumatra is as a medicine, followed by utilization as a spice, culture, fruit, vegetable, and natural dye (Figure 1). The processing of a herbal medicine to treat a disease varies according to the type of disease. Herbal medicine for internal diseases is usually processed by boiling until it boils, then the boiled water is drunk by the patient, which can affect the body's metabolism. Meanwhile, herbal medicine for external diseases is pounded until smooth, burned, ground, sliced into small pieces, baked, or just moistened with water, making this herbal medicine potentially antibacterial.

The most widely utilized species by the people in West Sumatra based on the flow chart are *Alpinia galanga*, *Curcuma longa*, *Etlingera elatior*, and *Zingiber officinale*, especially in traditional medicine. These species have the most utilization and various sources of information from many locations. *C. longa* has the highest utilization such as cooking spice, increasing appetite, skin disease medicine, allergies, rheumatism, gout, diarrhea, toothache, fever, and postpartum pain. The high utilization of *C. longa* is supported because this type contains Curcumin, which is a phenolic compound found in the genus *Curcuma*, especially in *C. longa* roots. It is known that Curcumin plays a role as a modulator of various signaling molecules such as inflammatory molecules, protein reductase, and transcription factors [21].

Regarding the use of Zingiberaceae, local people use different parts of the plant in mixtures for different types of diseases because each organ provides different effects on the human body. The plant organs from the Zingiberaceae family that are most commonly used are rhizomes (roots) [18,22]. Rhizomes are widely used because this part contains high levels of flavonoids and [23]. This is supported by research by [24] that roots and rhizomes are the parts most commonly used as ingredients in herbal medicine for various diseases.

*Zingiber album* is mainly used for medicinal purposes rather than food. It is important to further study and conserve this species and other wild species in the Zingiberaceae family due to their potential medicinal value and the threat to their existence in nature from land use changes. Lack of information on these species' nutritional content and phytochemical compounds is a concern. It is important to protect these plants because they have the potential to be used for treatment and the loss of these species can negatively affect biodiversity, ecology, and humans.



**Fig 1.** Alluvial plot of the potential use of *Zingiber album* among other species in the Zingiberaceae family in West Sumatra



#### 4. CONCLUSION

*Zingiber album* Nurainas has potential as a food and traditional medicine. Ethnoalluvial analysis of the potential utilization of *Z. album* among other species in the Zingiberaceae family in West Sumatra showed that the species categorized as low importance.

#### REFERENCES

- [1] Newman, M., Lhuillier, A. & Poulsen, A. D. (2004). Checklist of the Zingiberaceae of Malesia, Blumea Supplement.
- [2] Suhono & LIPI team. (2010). Flora Encyclopedia, Kharisma Ilmu, Bogor.
- [3] Nurainas, N. & Arbain, D. (2017). A New Species and A New Record of Zingiberaceae from Sumatra, Indonesia. Taiwania. 62(3), 94-298.
- [4] Nurainas. (2019). *Zingiber album*. The IUCN Red List of Threatened Species 2019: e.T132721576A132721585.
- [5] Whitney, C. (2019). Quantitative Ethnobotany Analysis with Ethnobotany R.
- [6] Syafira, F. (2022). Ethnobotanical Study of Pangalan (*Zingiber album* Nurainas) in Nagari Simanau, Solok Regency. (Undergraduate thesis), Andalas University, Padang.
- [7] Rahmi, N. (2022). Actualization of Information on Andalas Herbarium Specimens on Zingiberaceae Diversity in West Sumatra (Undergraduate thesis), Andalas University, Padang.
- [8] Ardan, A. S. (1996). Taxonomy Study of Traditional Medicinal Plants Used by Communities in Several Villages of West Sumatra (Undergraduate Thesis) Andalas University, Padang.
- [9] Imelda. (2004). Ethnobotanical and Taxonomic Studies of Plant Species in Three Districts in 50 Kota Regency (Undergraduate Thesis). Andalas University, Padang.
- [10] Purnama, Y.I. (2008). Ethnobotanical Study of Traditional Medicinal Plants in the Sianok Canyon and Surrounding Areas (Thesis). Andalas University, Padang.
- [11] Julianto, R. (2009). The Diversity of Medicinal Plants Used by Local Communities in the Highlands and Coastal Regions of West Sumatra (Undergraduate thesis) Andalas University. Padang.
- [12] Susanti, E. (2010). Diversity of Types of Medicinal Plants Utilized by the Community in Kanagarian Sungai Abu, Hiliran Gumanti District, Solok Regency (Undergraduate thesis). Andalas University. Padang.
- [13] Sundari, W.S. (2011). Comparison of Ethnobotany of the Batagak Pangulu Traditional Ceremony of the Minangkabau Community in West Sumatra (Undergraduate thesis). Andalas University. Padang.
- [14] Mulyati, R. 2013. Ethnobotanical Studies on the Balimau Tradition in Pariaman City, West Sumatra (Undergraduate thesis). Andalas University. Padang.
- [15] Putra, A. A., Syamsuardi, and Nurainas. (2015). Ethnobotanical Study of Medicinal Plants in the Musiduga Tourism Area, West Sumatra. Proceedings of the National Seminar on Indonesian Tropical Biodiversity and Ecology. September 19, 2015. Padang, Indonesia, 72-79.
- [16] Wanti, Z., Syamsuardi, & Nurainas. (2017). Diversity of Traditional Medicine Plants in the Malalak, Agam District, West Sumatra. Proceedings of Seminar and Annual Meetings (Semirata). Mei 12-14, 2017. Jambi, Indonesia, 2594-2606
- [17] Nurainas, Syukma, E. D., Chairul, & Mansyurdin. (2021). Ethnobotanical Aspects of Mentawai Traditional Agricultural System (Pumonean) and Its Implications for the Conservation of Local Germplasm in Siberut, Mentawai, Indonesia. In 3rd KOBICONGRESS, International and National Conferences (KOBICINC 2020). June, 176-181. Atlantis Press.
- [18] Nurainas, N., Sulekha, R., Syam, Z., Lee, S., & Syamsuardi, S. (2021). Ethnomedicinal Study of the Use of Zingiberaceae by the Mentawai People in Siberut, West Sumatra, Indonesia. UNAND Journal of Biology, 9(1), 25-29.
- [19] Agustin, L., Nurainas, N., Syamsuardi, S., & Chairul, C. (2021). *Zingiber Macradenium* K. Schum, an Endemic Ginger From Sumatra: Traditional use and Antimicrobial Potential. Eduvest-Journal of Universal Studies, 1(10), 1-36.
- [20] Nurainas, Suwardi, A. B., Yunita, R., Taufiq, A., Harmawan, T., Wulandari, R., Syafira, Faradilla, & Syamsuardi. (2022). Ethnobotanical Study of Minangkabau and Aneuk Jamee Traditional Food: Unique Traditional Cuisine from

Sawahlunto, West Sumatra. In IOP Conference Series: Earth and Environmental Science (Vol. 1097, No. 1, p. 012029). IOP Publishing.

[21] Gupta, S. C., Patchva, S., Koh, W., & Aggarwal, B. B. (2012). Discovery of Curcumin, A Component of Golden Spice, and Its Miraculous Biological Activities. *Clinical and Experimental Pharmacology and Physiology*, 39(3), 283-299.

[22] Elfrida, Tarigan, N. S., & Suwardi, A. B. (2021). Ethnobotanical Study of Medicinal Plants Used by Community in Jambur Labu Village, East Aceh, Indonesia. *Biodiversitas Journal of Biological Diversity*, 22(7), 2893-2900.

[23] Ghasemzadeh, A., Jaafar, H. Z., Ashkani, S., Rahmat, A., Juraimi, A. S., Puteh, A. & Mohamed, M. T. M. (2016). Variation in Secondary Metabolite Production as Well as Antioxidant and Antibacterial Activities of *Zingiber zerumbet* (L.) at Different Stages of Growth. *BMC Complementary and Alternative Medicine*, 16(1), 1-10

[24] Jima, T. T., & Megersa, M. (2018). Ethnobotanical Study of Medicinal Plants Used to Treat Human Diseases in Berbere District, Bale Zone of Oromia Regional State, South East Ethiopia. *Evidence-Based Complementary and Alternative Medicine*, 2018, 1-16.