THE ETHNOBOTANY OF SENSE DISEASE MEDICAL PLANT USED BY NGIS MANGGIS COMMUNITY KARANGASEM IN BALI, INDONESIA

Dewa Ayu Sri Ratnani[1], I Ketut Junitha[2], Eniek Kriswiyanti[2], and Desak Nyoman Budiningsih[1]

[1] Biology Department, Universitas Mahasaraswati Denpasar, Indonesia
[2] Biology Department, Universitas Udayana, Indonesia
E-mail: Sri.ratnani67@gmail.com, juneth@unud.ac.id, eniek@unud.ac.id, budiningsihdesak@gmail.com

ABSTRACT

The Ngis Manggis community has ethnobotanical knowledge in utilizing plants from the forest for traditional medicine. Local people have little knowledge of managing forests sustainably. This study aimed to identify plants used for sense disease medicinal by the Ngis Manggis community, including species, family, local names, parts of plants used, processing method, usage method, obtained sources, and the Index of Cultural Significance (ICS). Qualitative method to obtain data on the local names of plants used for the sense disease medicinal. Purposive and Snowball sampling methods were applied to collect key informants through semi-structured interviews and moderate participation. Data analysis was qualitative and quantitative. The results showed that 55 species were distributed in 32 families to treat 17 diseases dominated by Fabaceae (6 species). Most of them were harvested from wild 29 (52.72%). The most widely used part of the plants is the leaf. Crushing is the most widely used preparation method by the community. The greatest number of medicinal uses of Ngis Manggis community is smeared. Based on the results of the ICS analysis, the highest ICS value is *Arenga pinnata* L. (61).
Keywords: Ethnobotany, Ngis Manggis Community, Sense disease medicinal plant

INTRODUCTION

Balinese society still mostly uses plants in nature as traditional medicine, which has different wisdom and knowledge in medicinal plants. The practice of the use of medicinal plants in traditional Balinese medicine is based on a confidence and knowledge system (Arsana 2019). Since ancient times traditional medicine has been famous and popular among Balinese people in daily life. This is evidenced by the number of manuscripts written on lontar in the Balinese language and script, which is called the lontar USADA (Nala, 1993). Generally, traditional societies maintain a wealth of such local knowledge that they have prolonged interaction with plant resources and the environment (Fahrianoor et al, 2013). The plant resources are found in locally available plants, and their benefit from local knowledge that is simple to use and reachable. The utilization of potentially medicinal plant of Ngis, Manggis community be found some problems as follows: (i)The lack of information inheritance about the types of medicinal plants and techniques of their use by the parents to their heredities; (ii) The plant resources that play a role as traditional medicine by the Ngis Manggis Village has never been studied yet. Despite the moment that there has been rapid advancement in medical science, the disease remains a serious threat to public health in developing and developed countries, rural and urban areas, as well as all ethnic groups (Pan et al., 2014).

Medicinal plants have been the main ingredients of traditional medicine used from generation to generation by the community, either independently or through a healer. Traditional medicine requires knowledge and skills derived from local

wisdom in utilizing natural resources for prevention and medicating disease (Jaradat et al., 2016). Reasonable support for this study not only help bridge some of the gaps between the demand for and supply of modern pharmaceutical but also expand healthcare alternatives for posterity (Berkes, 2000).

Ethnobotany research was conducted to explore the indigenous plant knowledge on the management, utilization, and ecology of local importance. Ethnobotany has the potential to reveal traditional knowledge systems about the diversity of biological resources, conservation, and culture of an ethnic group (Pieroni et al., 2014 Tradition and local knowledge have the same goal: to protect the environment (Jopela, 2011). The values are mutually entangled and directly related to the social system of a community. As reflected by the practices of local wisdom, the value of the environment includes sustainable utilization, maintenance, and protection.

The local wisdom of the community has the potential for natural resources conservation. The local wisdom of the Ngis Manggis community in utilizing medicinal plants has not been published, whereas it can improve their welfare. In addition, the availability of data and information about sense disease medicinal plant species in the Ngis Manggis community is very important, especially to improve the sustainable management and utilization of natural resources. The majority population is the Ngis Manggis community, and it contributes to still utilizing medicinal plants and maintaining the tradition of medicine as one of local wisdom, but further related to public knowledge, the use of medicinal plants has not been known. Taking into account that ethnobotanical research plays a role in traditional medicine by the Ngis Manggis Village has never been studied yet. Therefore, this research needs to be implemented as a step early to analyze plant types used and how to use them. This research aims to document data types of sense disease medicinal plants, processing methods, and how to use them by the Ngis Manggis community.

RESEARCH METHOD

1. Time and Location

This study was conducted from September 2020 to January 2021 at Ngis Manggis Village, Manggis District, Karangasem Regency, Bali, Indonesia. Ngis Manggis Village is located at an altitude of 98 to 500 a.s.l. The climate in Ngis, Manggis Village is tropical, with an average rainfall of 1638.50 mm/year, and temperatures ranging from 25-32^{o}C. Ngis Manggis Village is located in Manggis District, Karangasem Regency, with a distance of ± 22 km from the Regency City and ± 60 km from Denpasar. A circle of hills physiographically surrounds the village of Ngis Manggis. These hills border in the north with Macang Village, in the south with Sengkidu Village, in the east with Tenganan Pegringsingan Village, and in the west with Selumbung Village. Ngis Manggis Village has an area of ± 556,505 ha. With a rice field area = 0.5 ha, dry land = 404.25 ha. Total population = 1601 inhabitants. The location map of Ngis Manggis Village is shown in Figure 1.

2. Data Collection

The selection of key informants by purposive sampling was consulted with community leaders. Furthermore, the informants were obtained using the snowball sampling technique, carried out in a chain by asking for information from people who have been interviewed or contacted previously (Hariyadi and Ticktin, 2012). Snowball sampling was conducted to find key informants who had much information about the medicinal plant (Nurdiani, 2014), such as the healer, community leaders, and villagers who knew about the medicinal plant and its uses.

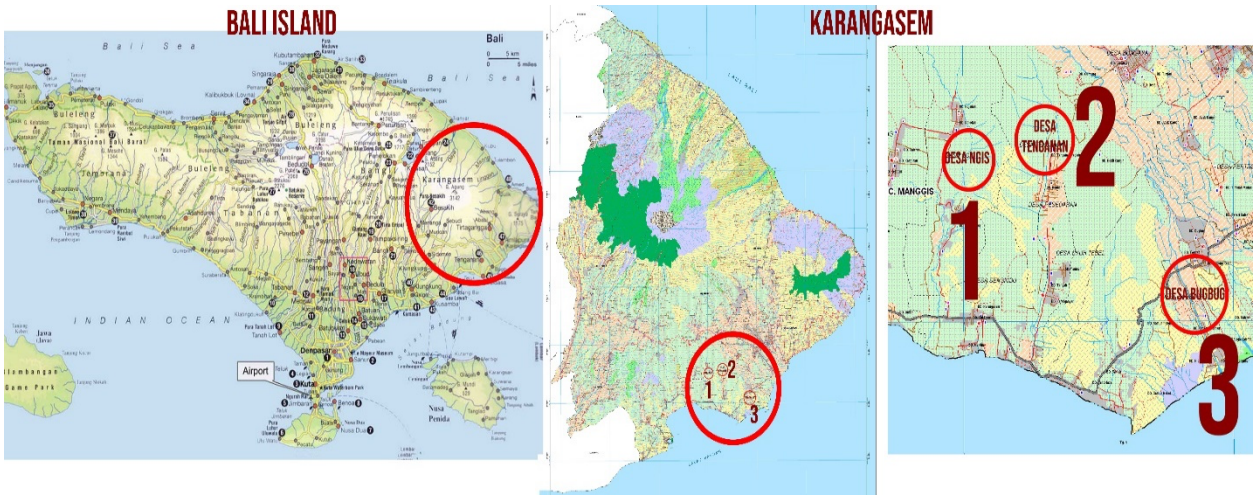

Figure 1. Research Location Map of Medicinal Plant

3. Data Analysis

Ethnobotany data were collected through semi-structured interviews and moderate participation. Data was collected in the form of species, family, local names, parts of plants used, and the Index of Cultural Significance (ICS) of plants. The data obtained were analyzed using qualitative and quantitative approaches. A descriptive narrative was carried out for qualitative data analysis through data reduction, data display, and data analysis (Sugiyono, 2017). Ethnobotany data for the system of the utilization of the plant's diversity could be calculated by the Index of Cultural Significance (ICS). ICS is the result of quantitative ethnobotany analysis that shows the value of the interest of each plant species. The calculation used the following formula (Revathi, 2010).

$$ICS = \sum_{i=1}^{n} (q \times i \times e)\, ni$$

Because each type of plant has several uses, the equation is as follows:

$$ICS = \sum_{i=1}^{n} (q1 \times i1 \times e1)\, n1 + (q2 \times i2 \times e2)\, n2 + \ldots + (qn \times in \times en)\, ni$$

Where:

ICS = the number of calculations the utilization of a plant species from 1 to n,

q = quality value; calculated by giving a score or value on the quality value of a plant species: 3 = the main medicinal plant ingredients; 2 = additional medicinal plant ingredients + primary materials, 1 = other medicinal plant ingrediants + secondary materials + primary materials

i = intensity value; describe the intensity of utilization of useful plant species by giving values: value 3 = high intensity; 2 = moderate intensity; 1 = low intensity.

e = exclusivity value, value 2 = most important, is the first choice and is second to none;1 = possibility of being a choice of secondary materials. (Turner, 1998; modified by and researchers).

Table 1. Number of Species (ICS Values)

ICS values	Category
100 and over	Very High Significance
50 - 59	High Significance
20 - 49	Moderate Significance
5 - 15	Low Significance
1 - 4	Very Low Significance

The plants were collected with the informants and then identified by matching the herbarium specimen of the Bali Botanical Garden, matching the Figure on the flora book, and images on plantNet. Scientific names of the plant species were verified using an online source [e.g., The Plantlist, 2013].

RESULT AND DISCUSSION

1. The Types of Plant Species as Sense DiseaseTraditional Medicine by Ngis Manggis Community

The Ngis Manggis people rely on local plant resources for various daily needs. They take in their knowledge of traditional medicine orally from their ancestors. Traditional knowledge is usually orally inherited and often person-specific (Sabran, 2016). Based on an interview with the informant obtained, the number of 55 species was distributed in 32 families to treat 17 diseases dominated by Fabaceae (6 species) and Zingiberaceae (5 species). The Types of Plant Species in traditional medicine are presented in table 2.

This result is greater than 29 species used by Dayak Sub Ethnic in West Kalimantan (Yusro, 2013); 48 species utilized by local people in Hiang Forest of Kerinci District, Jambi Province (Andesmora, 2017), although less than Wawonii islands community of Southeast Sulawesi recorded 73 medicinal plants species utilized (Rahayu, 2006). As in other studies held in Ngis Manggis, the Fabaceae family came up with a high number of species.

Table 2. The Diversity of Sense Disease Medicinal Plants of Ngis Manggis Community

Family/Scientific Name (1)	Local Name (2)	Part of Plants (3)	Source Obtained (4)	Mode of the preparation (5)	Usage method (6)	Ailment (7)	ICS (8)
Acanthaceae							
Avicenia alba Blume	Kayu api-api	bark	wild	roasted crushing	smeared	smallpox	3
Thunbergia grandiflora Roxb.	Ponggang	leaf	wild	squeeze	rubbed	itchy	3
Justicia adhatoda L.	Dausa Aya	leaf	wild	no processed	sticked	chicken pox	18
Achariaceae							
Pangium edule Reinw	Pangi	bark	wild	crushing	smeared	itchy	32
Amaryllidaceae							
Allium sativum L	Kesuna	tubers	market	crushing	smeared	leprosy	21
Apiaceae							
Coriandrum sativum L.	Ketumbah	seed	market	crushing	smeared	ringworm	7
Apocynaceae							
Plumeria alba L.	Jepun	flower	Semi wild	crushing	smeared	cough	17
Araceae							
Dieffenbachia seguine (Jacq)	Landak	stem, leaf	wild	Cut	smeared	itchy	3

Family/Scientific Name (1)	Local Name (2)	Part of Plants (3)	Source Obtained (4)	Mode of the preparation (5)	Usage method (6)	Ailment (7)	ICS (8)
Arecaceae							
Arenga pinnata L.	Jaka	fruit	wild	Cut	smeared	itchy	61
Areca catechu L.	Buah	fruit	wild	Cut	dripped	conjungtivitis	19
Asteraceae							
Tagetes erecta L	Gumitir	leaf	Semi wild	crushing	smeared	leprosy	9
Caricaceae							
Carica papaya L	Gedang	leaf stalk	Semi wild	cut	dripped	blurry eyes	21
Convolvulaceae							
Cassytha filiformis L	Bun tan pejalaran	plant	wild	crushing	sticked	swollen ears	3
Euphorbiaceae							
Jatropa curcas L.	Jarak pagar	leaf stalk	wild	cut	smeared	sprue	6
Aleurites moluccanus L.	Tingkih	fruit	wild	crushing	smeared	skin disease	27
Fabaceae							
Cajanus cajan (L) Millsp.	Undis	leaf	wild	crushing burned	smeared	smallpox	3
Erythrina sububrans	dapdap	leaf	Semi wild	crushing	sticked	eye disease	15
Marantaceae							
Maranta ramosissima Wall.	Kayu telengisan	leaf	wild	no processed	dripped	eye disease	15
Moraceae							
Artocarpus heterophyllus Lamp.	Nangka	leaf	wild	chewed	sprayed	deaf	21
Artocarpus camansi Blanco	Timbul	leaf	wild	burned	rubbed	itchy	21
Musaceae							
Musa paradisiaca L.	Biyu	stem	cultivated	rotted	sticked	boils	25
Myristicaceae							
Knema glauca Warb.	Kayu jeleme	bark	wild	roasted crushing	smeared	smallpox	3
Myrtaceae							
Melaleuca cajuputi Powell	Kayu putih	leaf	wild	crushing	smeared	ringworm	3
Oxalidaceae							
Averrhoa carambola L.	Belimbing besi	leaf	Semi wild	chewed	sprayed	cough	18
Piperaceae							
Piper betle L.	Base/kapkap	leaf	Semi wild	crushing	sticked	nosebleed	31
				crushing	dripped	blurry eyes	
				crushing	sticked	wound	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Phyllathaceae							
Baccaurea racemose Reinw.	Kepundung putih	fruit	wild	cut	dripped	minus eye	19
Phyllanthus acidus Skeels.	Cermen	fruit	wild	cut	dripped	conjungtivitis	19
Poaceae							

Family/Scientific Name (1)	Local Name (2)	Part of Plants (3)	Source Obtained (4)	Mode of the preparation (5)	Usage method (6)	Ailment (7)	ICS (8)
Imperata cylindrica L.	Ambengan	leaf	wild	crushing	sticked	wound	30
Rutaceae							
Citrus hystrix DC	Juuk linglang	fruit	Semi wild	cut	dripped	eye disease	5
Santalaceae							
Santalum album L.	Cenana	stem	market	rubbed	smeared	cough	9
Solanaceae							
Capsicum annuum longum	Tabia ireng	fruit	wild	crushing	dripped	blurry eyes	3
Zingiberaceae							
Alpinia galanga (L) Willd	Isen	rhizome	Semi wild	crushing	smeared	ringworm	10
Curcuma longa Linn.	Kunyit	rhizome	market	crushing	smeared	ringworm	26
Kaempferia galanga L.	Cekuh	rhizome	market	chewed	eaten	cough	24
Zingiber zerumbet (L) Roscoe ex Sm.	Gamongan	rhizome	wild	chewed	sprayed	chicken pox	3

The number of locally used plant species in a village is determined by the diversity of plant species growing in the village and the local botanical knowledge of people (wiryono, 2019). Regarding habitat, most sense disease medicinal plants are distributed in different habitats, and their availability varies from place to place among species. Most of them were harvested from wild 29 (52.72%), semi-wild 18 (32.72%), market 7 (12.72%), and cultivated (3.63%). Most of the medicinal plants are obtained from the forest (Nasution et al., 2018).

2. Parts of Plant Utilized of Sense Disease Medicinal Plant by Ngis Manggis

Ngis, Manggis community utilized all plant parts such as root, stem, bark, midrib, petiole, leaves, flower, fruit, seed, tubers, rhizome, and plant. The most widely part of the plant used as sense disease medicinal plants are leaf 28 (50.90%), followed by fruit 7 (12.72%), and Bark 6 (10.90%). The part of the plant used in percent showed in Figure 2. The results of this study are relevant to the results of previous research conducted by Addisie et al. (2012) who reported that leaves were the most commonly used plant parts in remedy preparations. The high number of uses of leaves as a medicinal plant appears to be associated with several advantages, such as greater productivity of leaves being easier to obtain than the other parts (Handayani, 2018). Traditional medicines are usually made from the leaves, barks, and roots of plants, and the results showed that people are generally utilized medicinal plants in the leaves (setyowati, 2010). The results of this research attest that people tend to use plants that are easily available to them. In addition, leaves have various medicinal chemical compounds. The utilization of leaves as traditional medicine has a positive impact on plant sustainability when compared to the utilization of roots. This is because if only the leaves are taken, then it will not lead to species loss of certain plants, but if part of the plant roots that are used will cause a decrease in plant species.

3. Utilization Based on Plant Processing Method

The various preparation methods well-known by the Ngis Manggis community include crushing, decoction, squeezing, roasting, burning, chewing, and decomposing. However, crushing is the most widely used by the community (61.81%), not processed (20%), and chewing (9.09%). This finding is consistent with the result of other (Megersa et al., 2013); which indicated crushing as the lead preparation method (Figure 3).

Whereas medicinal use methods were smeared, stacked up, dropped, gushed, rubbed, drunk, and swallowed. The greatest number of usage method of Ngis Manggis community is smeared (41.81%), followed by stacked up (27.27%), dropped (12.72%). The most popular apply method are to crush and smear a part of the plants (Supiandi et al., 2019). The usage method are presented in Figure 4.

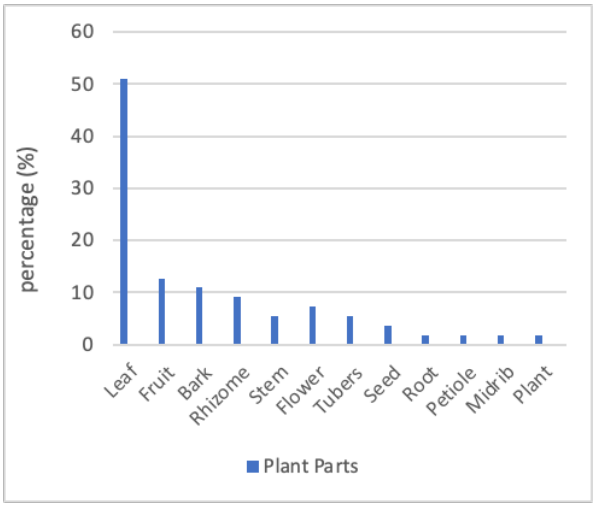

Figure 2. Percentage of sense disease medicinal disease parts of plant used

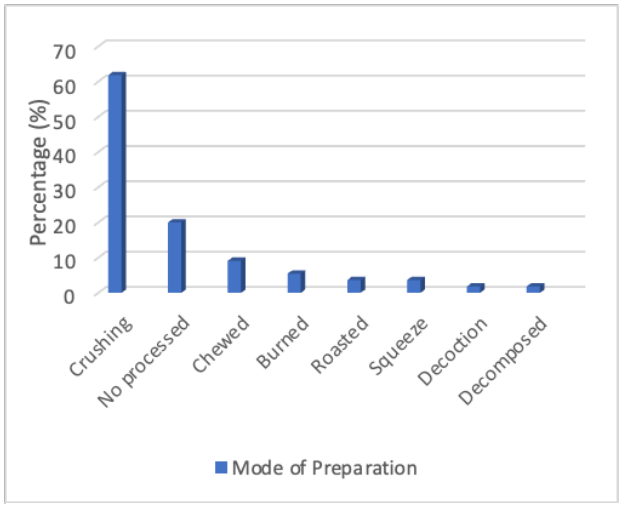

Figure 3. Percentage of mode of preparation of sense medical plant

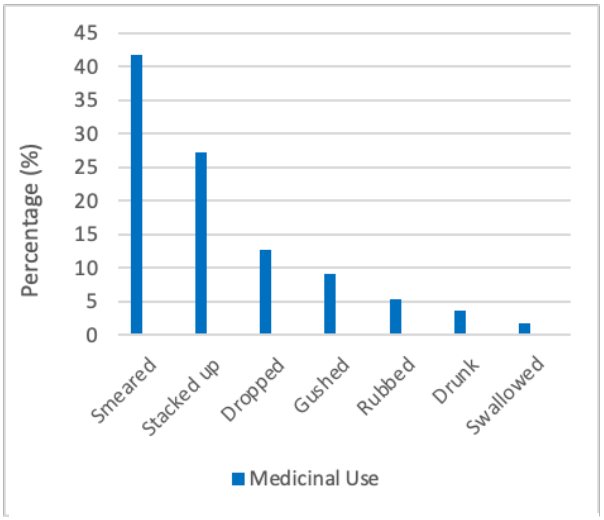

Figure 4. Medicinal usage method of sense disease medicinal plant

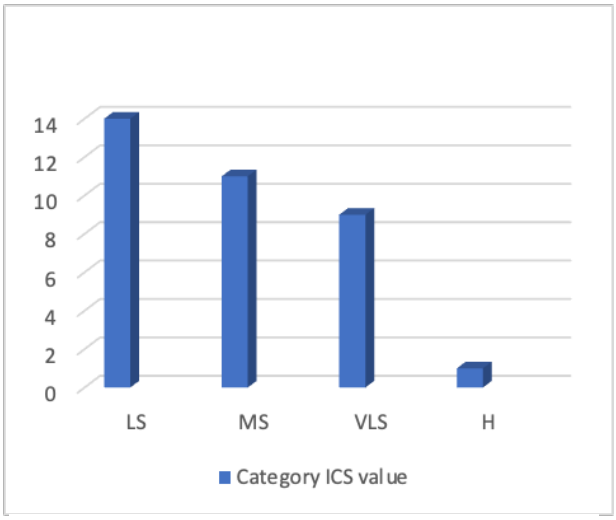

Figure 5. Figure 5. Category ICS Value of sense disease medicinal plant

4. Utilization based on the type of disease and the number of medicinal plants

In this study, as many as 17 types of sense diseases were treated using medicinal plants by the community, which are grouped into five groups. The types of sense disease are smallpox, itchy, chicken pox, leprosy, ringworm, cough, conjunctivitis, blurry eyes, swollen ears, sprue, skin disease, eye disease, deaf, boils, nosebleed, wound, minus an eye. A greater number of species in one category was found in dermatologic, as much as 30 species, followed by 10 species in ophthalmologic and six in mouth disease. Furthermore obtained, four species were used to treat more than one disease in different categories. For example, betel, in locally named *kapkap* (*Piper betle* L.) has been used to treat nose bleeding (nasal disease), blurry eyes (ophthalmologic), and itchy (dermatologic).

5. Index of Cultural Significance of useful plants (ICS)

The results showed that the range of ICS values of 55 medicinal plant species for sense diseases was 3-61. Based on the ICS calculation, it was found that the highest ICS was obtained from *Arenga pinnata* L. (61). While the lowest value is *Avicenia alba* Blume, *Thunbergia grandiflora* Roxb., *Dieffenbachia seguine* (Jacq), *Cassytha filiformis* L., *Cajanus cajan* (L) Millsp., *Knema glauca* Warb., *Melaleuca cajuputi* Powell., *Capsicum annuum longum., Zingiber zerumbet* (L) Roscoe ex Sm. The category ICS value is shown in Figure 5.

The highest ICS values are plant species widely used by the Ngis Manggis community, especially those with high levels of exclusivity and intensity. The high-intensity value in this study is because it is used for food, traditional medicine, fodder for livestock, and building as a staple and cannot be replaced (exclusive). Plants used by the community for more purposes will have a greater ICS value. Therefore, the people of Ngis Manggis placed *Jaka* (*Arenga pinnata* L.) plants at the highest level and as the most useful and valuable as food, drinks, building materials, ceremonies, and fodder for livestock.

The ICS results of useful plants as a quantitative ethnobotany analysis showed each useful plant species' importance based on community needs (Munawaroh et al. 2011), hence determining the ones to be preserved (Supiandi 2019). Therefore, human culture can be understood as the knowledge that contains several sets of models used effectively to interpret, understand, and guide behavior in adapting to the environment. This indicates that traditional medicinal ingredients from plants are still an option for the treatment of the Ngis Manggis community. This situation is supported by the location, which is quite far from the health service center.

CONCLUSION

Present study revealed that many medicinal plant species are used by Ngis Manggis people of the study area to treat various ailments. The local community still depend on traditional medicine, although modern healthcare service is available, indicating the significance of traditional plant-based prescription. There are 55 species scattered in 32 families of medicinal plants to treat 17 types of sense disease by Ngis Manggis community. Most medicinal plants are obtained from the wild. Leaves are the most widely used part of the plant by crushing it; the most common way of using drugs is by smearing. A greater number of species in one category was found in the category of dermatologic, as many as 30 species. The highest ICS value is found in *Arenga pinnata* L. The high ICS value of medicinal plant species is an indication of

their preference by local inhabitants to treat particular ailments. There such popular plant species could be further analyzed for benefits that may lead to new and potential drugs.

ACKNOWLEDGEMENT

The author would like to thank the people of Ngis Manggis Traditional Village, the healer, and the Head of Ngis Manggis District, Karangasem, Bali, for their assistance in providing information in this research.

REFERENCES

Addisie, Y.D., Yared, P.A., Kumar, Z., Tomas, Awol, A. (2012). Traditional medicinal plants used by people in LiboKemkem District, South Gondar, Ethiopia. *Asian Journal of Agricultural Sciences*, 4(3), 171–176.

Andesmora, E.V., Muhadiono, Hilwan. I. (2017). Ethnobotanical Study of Plants Used by People in Hiang Indigenous Forest Kerinci, Jambi *Journal of Tropical Life Science*, 7(2), 95-101.

Arsana. I N. (2019). Diversity of Medicinal Plants in Lontar "Taru Pramana "and its use for Balinese Traditional medicine.*JKB*, 09(01), 241-262.

Berkes, F., Colding, J., Folke, C. (2000). Rediscovery of traditional ecological knowledge as adaptive management. *Ecol Appl.*, 10, 1251–62.

Fahrianoor, Windari T., Taharudin, Mar'i R, Maryono. (2013).The Practice of Local Wisdom of Dayak People in Forest Conservation in South Kalimantan. *J. Wetlands Env Manag,* 1(1), 37-46

Handayani, S., Lukitasari, M., Widiyanto, J. (2018). Ethnobotany study of medicinal plants (Ordo Rutales, Myrtales, Euforbiales) in Plaosan sub-district. *Symbiosis National Proceedings*, 3.

Hariyadi, B.,.Ticktin, T., (2012). Uras: Medicinal dan Ritual Plants of Serampas, Jambi Indonesia. *Jurnal ethnobotany research and applications*, 10, 133- 149.

Hasanah, U., Linda, R.., Lovadi, I . (2014). Utilization of plants at the Tumpang Negeri Malay traditional ceremony at the Ismahayana Landak Palace.*Protobiont Journal*, 3, 17-24.

Jaradat, N. A., Ayesh, O. I., Anderson, C. (2016). Ethnopharmacological survey about medicinal plants utilized by herbalists and traditional practitioner healers for treatments of diarrhea in the West Bank/Palestine. *Journal of Ethnopharmacology*, 182, 57–66. https://doi.org/10.1016/j.jep.2016.02.013

Jopela. A. (2011). Traditional Custodianship: a useful framework for heritage management in southern Africa? Special issue of Conservation and Management of Archaeological Sites on "Archaeological site management in sub-Saharan Africa"

Megersa, M., Asfaw, Z.,. Kelbessa, E., Beyene, A., Woldeab. B. (2013). An ethnobotanical study of medicinal plants in Wayu Tuka District, East Welega Zone of Oromia Regional State, West Ethiopia. *Journal of Ethnobiology and Ethnomedicine*, 9:68. dx.doi.org/10.1186/1746- 4269-9-68.

Mirawati, Y. E. (2014). Useful plants in mixed communities in North Lemo Village, Ampibabo District, Parigi Moutong Regency, Central Sulawesi. *Biocelebes*, 8(1), 29-36.

Munawaroh, E., Saparita, R. Purwanto , Y. (2011) Community Dependence on Non-Timber Forest Products in Malinau, East Kalimantan: An ethnobotanical analysis and its implications for forest conservation.

Berk. biological research Special edition 7A, 51-58.

Mustofa, F.I., Rahmawati, N. (2018). Ethnopharmacological Study of Medicinal Plants Used by Traditional Healer for Diarrhea Treatment in South Sulawesi. *Indonesian Journal of Medicinal Plant*, 11(2).

Nala, N. (1993). *Usada Bali.* Edition II. Denpasar : PT Upada Sastra

Nasution, A., Chikmawati, T., Walujo, E.B., Ervizal, A.M.Z. (2018). Empirical Utilization of Medicinal Plants on Mandailing Tribe in Batang Gadis National Park North Sumatra. *Biotechnology & Bioscience*, 5(1), 64-74.

Ngis Manggis Village Monograph, Karangasem. 2020

Nurdiani, N. (2014). Snowball Sampling Techniques in Field Research.. *Comtech*, 5(2), 1110 – 1118.

Pan, S.Y., Litscher, G., Gao, S.H., Zhou, S.F.,Yu, Z.L., Chen, H.Q.,.Ko, K.-M. (2014). Historical Perspective of Traditional Indigenous Medical Practices: The Current Renaissance and Conservation of Herbal Resources. Evidence-Based Complementary and Alternative Medicine,1–20. https://doi.org/10.1155/2014/525340

Pieroni, A.A.N., Mustafa, A.H.B. Bruno, S., Kevin, C. Cassandra, L.Q.. (2014). Lokal Knowledge on Plant and Domestic Remedies In The Mountain Village of eshkopia (Eastern Albania).*J Mt Sci,* 11(1).

Purwanto, Y., Waluyo, E.B., Afriastini, J.J. (2009). Analysis of Cultural Importance of Non-Timber Forest Products (NTFPs) for Potential and Probability Valuation Its development. *LIPI,* Bogor. 123 – 149.

Rahayu, M., Siti, S. Diah, S., Suhardjono, P. (2006). Traditional use of medicinal plants by local people on Wawonii Island, Southeast Sulawesi. *Biodiversity*, 7(3), 245-250.

Revathi, P., Parimelazhagan, T. (2010) Traditional knowledge on medicinal plants used by the Irula tribe of Hasanur Hills, Erode District, Tamil Nadu, India. *Ethnobotanical Leaflets* 14, 1361-60.

Sabran, S.F., Mohamed, M., Abu Bakar, M.F. (2016). Etnomedical Knowledge of Plants Used for the Treatment of Tuberculosis in Johor, Malaysia. Evidence-based complementary and alternative medicine. *eCAM*, 2850845

Setyowati. F.M. (2010). Ethnopharmacology and the use of medicinal plants of the Dayak Tunjung tribe in East Kalimantan. *Health R&D Media*, 20, 104-112.

Sugiyono. (2017). *Quantitative, Qualitative, and R & D Research Methods.* Issue 26. Bandung: Alfabeta.

Supiandi,. M.I, Mahanal, S., Zubaidah, S., Julung, H. B.E.G.E. (2019). Ethnobotany of Traditional Medicinal Plants Used by Dayak Desa Community in Sintang, West Kalimantan, Indonesia. *Biodiversity,* 20(5), 1264-1270.

The Plantlist. E.g., (2013). http://www.theplantlist.org

Turner, N.J. (1998). The Importance of A Rose: Evaluating The Cultural Significance of Plants in Thompson and Lillooet Interior Salish. *American Anthropologist*, 90(2), 272-290.

Wiryono, Y.Wanandi, Y., Ilahi, A.K., Deselina, Senoaji,G., Siswahyono. (2019). The Local Knowledge of the Plant Names and Uses by Semende Tribe People in Kaur District, Bengkulu Province, Indonesia. *Biodiversity*, 20(3), 3599-3607.

Yusro, F., Fathul, F.,Yeni, M., Farah, D., Kazuhiro. (2014). Inventory of medicinal plants for fever used by four Dayak Sub Ethnic in West Kalimantan, Indonesia. *Kuroshio Sci,* 8**(**1).