JISE 8 (2) 2019 : 116 - 122

Journal of Innovative Science Education

http://journal.unnes.ac.id/sju/index.php/jise

Species Richness of Medicinal Plants in the Dieng Plateau

Rokhiyani Herlina✉, Margareta Rahayuningsih, Retno Sri Iswari

Universitas Negeri Semarang, Indonesia

Article Info

Article History:
Received April 2019
Accepted May 2019
Published August 2019

Keywords:
Ethnobotany, Species richness of medicinal plants, Dieng Plateau.

Abstract

The Dieng Plateau is an active volcanic area in Central Java, which belongs to the Banjarnegara Regency and Wonosobo Regency. The Dieng Plateau has an abundance natural potency, such as of plants. This study aims to identify the plant species richness and its benefits by local people. The plants species richness data collected by exploration method. Data collection is done by means of exploration, identification, interview, literature, analyzes, and documentation. The results of the study found there are 29 species of medicinal plants originating from 22 families. The plant that is most widely used as a medicine comes from the family Solanaceae, which is Tamarillo (Solanum betaceum Cav.). The most common species of medicinal plants are found in Parikesit Village. The knowledge of the Dieng Javanese people about the benefits of medicinal plants is mostly influenced by generations (73.2%). The most widely used parts of plant organs are the leaves. The processing technology of plants that usually used is by pulverizing. The medicinal plants mostly found in the Dieng Javanese yard. It proves that the medicinal plants is still used by the Dieng Javanese people as knowledge that can be passed on to the next generation.

✉ Alamat korespondensi:
Kampus Pascasarjana Jl Kelud Utara III, Semarang 50237
E-mail: rokhiyaniherlina @gmail.com

p-ISSN 2252-6412
e-ISSN 2502-4523

INTRODUCTION

The Dieng Plateau is an active volcanic area in Central Java, which belongs to the Banjarnegara Regency and Wonosobo Regencies. The location of the Dieng Plateau is in the west of the Sindoro Mountain and Sumbing Mountain. The Dieng Plateau has an average height of around 2000 masl with temperatures ranging from 15-20 0C during the day and 10 0C at night, even in the dry season it can reach 0 0C in the morning which can cause frost (Fitriningrum et al., 2013) The Dieng Plateau is the highest plateau of Java Island due to the eruption of a volcano. The people who lived in the Dieng Plateau are part of the Javanese tribe.

Dieng Plateau has an abundance of natural resources, such as of plants. Plants have various kinds of benefits, one of them is being medicinal plants. Based on the results of interviews with several communities in the Dieng Plateau, Wonosobo, there are still many people who hold fast to the tradition. The tradition that is still maintained is to cure a disease by utilizing a certain species of plant. Tamarillo is one kind of medicinal plant that can be used to cure disease by the local people. Tamarillo is used to treat sprue, by being blended and consumed regularly. In line with the research conducted by Diantaris et al. (2015) about the tradition of treating a disease by using plants as ingredients of traditional medicine. The use of medicinal plants by the community (ethnobotany) is very important. Ethnobotany aims to identify the role of plants in people's lives, both in terms of economics and socio-culture (Setyowati, 2007). The use of plants as traditional medicine since ancient times has been widely used, especially the middle to lower societies (Abdullah et al., 2010). Knowledge of the use of medicinal plants is very important, because it can contribute to the conservation of natural resources (Ghorbani et al., 2006).

This study carried out by Abdiyani (2008), about the diversity of species of medicinal plants on Mount Alang and Mount Klaras, Dieng Plateau. This study has not been touched in all Dieng locations, so this study needs to be done in other locations, such as in Perikesit, Patak Banteng, and Sembungan Villages. This study is able to identify the benefits of plants used as medicine by the Dieng Javanese people, so as to facilitate the inventory and can be passed on to the next generation.

This study aims to identify the species richness of plants and its use by the Dieng Javanese people. The result of this study can be used as a references for another similar research and it can be used as a learning resources about medicinal plants.

METHODS

This study has been carried out in Perikesit, Patak Banteng, and Sembungan Villages, Dieng Plateau, Wonosobo in 2018. This study use exploration and documentation methods. The population in this study is all plants in the Dieng Plateau, Wonosobo. The samples in this study are potentially medicinal plants in the Patak Banteng, Perikesit, and Sembungan Villages. The Data collection uses several methods, namely exploration, identification, interview, literature, analysis, and documentation. Interviews are conducted to find out how to obtain medicinal plants, curable diseases, parts of the plants used and how they were used by the Dieng Javanese people (Arum et al., 2012).

RESULTS AND DISCUSSION

The species richness of medicinal plants find in the Dieng Plateau is 29 species from 22 families (Table 1). It proves that people still know and believe in the efficacy of plants as medicine. Plants that are found are used to treat external wounds and internal wounds. External wounds are treated by attaching grinded plants to the surface of the wounded area. The internal wounds treated by drinking the plants extract. The use of plants as medicine has smaller side effects than using drugs from doctors, and minimizes the economic expenditure of the Dieng Javanese people.

Local people use the most herbs as wound healing properties, such as bruises or cuts. Plants that are used as wound medicine consist of 6 species of plants (Table 1). According to the Dieng Javanese people, treating wounds using plants is very practical because it only attaches medicinal plants that have been treated in the wound section.

Based on interviews with 97 Dieng Javanese people, the species most widely used as medicinal plants are tamarillo (Solanum betaceum Cav.), With a percentage of 15% (Table 1). The Tamarillo is most widely used by the Dieng Javanese tribe as a medicine because almost all the people interviewed have gardens planted with Tamarillo, making it easy to pick up and use Tamarillo as a medicine. According to Riyandini (2011) tamarillo contains active compounds such as anthocyanin, antioxidants and carotenoids so that it can accelerate the process of healing thrush and prevent cell damage.

The results of this study also shows that the use of plants as the drug is mostly found in Perikesit Village (Table 1), but the difference between the three villages is also small. The use of plants as medicine in the three villages shows that there are still many people who know and believe in the efficacy of plants as medicines, different from the research conducted by Hartanto et al. (2014), which still uses several plants as ingredients for rituals. The difference in the use of plants as medicine and as material for rituals is influenced by the region and knowledge of plants from generation to generation.

Table 1. The Species Richness of Medicinal Plants found in Dieng

No	Family	Local and Scientific Names	Benefits	Total (%)	Location		
					P	PB	S
1	Zingiberaceae	Ginger *(Zingiber officinale* Rosc.)	Cold medicine	2	√	√	
2	**Solanaceae**	**Tamarillo (*Solanum betaceum* Cav.)**	Sprue Medicine	15	√	√	√
		Habanero (*Capsicum chinense*)	Sprue Medicine	1		√	√
3	Caricaceae	Mountain papaya (*Carica papaya* Pubescens.)	Sprue Medicine	2		√	√
4	Selaginellaceae	Rane (*Selaginella ciliaris*)	Gout Medicine	1			√
5	Balsaminaceae	Garden balsam (*Impatiens balsamina*)	Anti-inflammatory Medicice	1			√
6	Plantaginaceae	Broadleaf plantain (*Plantago mayor* L.)	Diarrhea Medicice	5			√
7	Polypodiaceae	Duiteblad (*Drygmoglossum piloselloides*)	Sprue Medicine	3			√
		Fern (*Pteridium aquilinum*)	Cramp Medicine	1			√
8	Apiaceae	Purwaceng (*Pimpinella alpina*)	Enhancer Medicine	4	√	√	
		Indian pennywort (*Centela asiatica*)	Diarrhea Medicine	8	√	√	
		Celery (*Apium graveolens L.*)	Hyoertention Medicine	4	√	√	√
9	Asteraceae	Yacon (*Smallanthus sonchifolius*)	Diabetes Medicine	2	√		
		Wedelia (*Wedelia trilobata*)	Bruising and	2	√		

			Rheumatism Medicine				
		Billy goat-weed (*Ageratum conyzoides* L.)	Wound Medicine	4			√
10	Piperaceae	Pepper elder (*Peperomia pellucida*)	Burn Wound Medicibe	3			√
11	Moraceae	Hauli tree(*Ficus septica*)	Boils Medicine	2	√		
12	Oxallidaceae	Star fruit (*Averrhoa carambola* L.)	Hyoertention Medicine	2	√		
13	Campanulaceae	Kitolod (*Isotoma longiflora*)	Sore eyes Medicine	6			√
14	Marchantiaceae	Liverwort (*Marchantia polimorpha*)	Hair Grower Medicine	1		√	
15	Basellaceae	Heartleaf madeira vine (*Anredera cordifolia*)	Wound Medicine	3	√		
16	Cycadaceae	Cycas (*Cycas rumphii*)	Burn Wound Medicine	3			√
17	Anthocerotaceae	Hornwort (*Anthoceros* sp.)	Wound Medicine	2		√	
		Moss (*Fissidens nobilis*)	Wound Medicine	1		√	
18	Convolvulaceae	Morning glory (*Ipomea indica*)	Headhace Medicine	3		√	
19	Euphorbiaceae	Avelos (*Euphorbia tirucalli*)	Sore Medicine	5	√		
20	Rutaceae	Lime (*Citrus aurantifolia*)	Cough Medicine	5	√		
21	Myrtaceae	Guava (*Psidium guajava* L.)	Diarrhea Medicine	4	√		
22	Equisetaceae	Horsetail (*Equisetum sp.*)	Bone pain Medicine	2	√		
Total				**100**	**14**	**11**	**13**

The results of this study shows that the knowledge of the Dieng Javanese about the benefits of medicinal plants, was influenced by several factors, from the results of the interview analysis most influenced by generations (73.2%) in each family (Figure 1). Many Dieng Javanese know the benefits of a plant from their ancestors. The Dieng Javanese consider that inheritance of knowledge about medicinal plants is important, so many generations are still preserving the use of medicinal plants in treating a disease. This is different from the research that has been conducted by Shanthi et al. (2014), which states that knowledge and use of traditional herbs as medicine has decreased. This is different from the research of Lumpert & Kreft (2017), that the public knowledge of medicinal plants can be influenced by the media, especially popular books about medicinal plants published in the 20th century. It can be concluded that each region has different factors in influencing the knowledge of the medicinal plants community.

The most used part of plant organs is the leaf part (Figure 2). The speciess of plants used are rane (Selaginella ciliaris), garden balsam (Impatiens balsamina), brodleaf plantain (Plantago mayor L.), duiteblad (Drygmoglossum piloselloides), purwaceng (Pimpinella alpina), wedelia (Wedelia trilobata), Billygoat-weed (Ageratum conyzoides L.), pepper elder (Peperomia pellucida), hauli tree(Ficus septica), indian pennywort (Centela asiatica), celery

(Apium graveolens L.), liverwort (Marchantia polimorpha), heartleaf madeira vine (Anredera cordifolia), cycas (Cycas rumphii), Avelos (Euphorbia tirucalli), and moss (Fissidens nobilis).

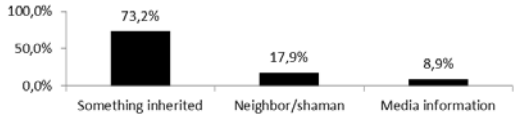

Figure 1. Factors Affecting the Dieng Javanese Tribe about the Benefits of Medicinal Plants

The most used part of plant organs is the leaf part (Figure 2). The speciess of plants used are rane (Selaginella ciliaris), garden balsam (Impatiens balsamina), brodleaf plantain (Plantago mayor L.), duiteblad (Drygmoglossum piloselloides), purwaceng (Pimpinella alpina), wedelia (Wedelia trilobata), Billygoat-weed (Ageratum conyzoides L.), pepper elder (Peperomia pellucida), hauli tree(Ficus septica), indian pennywort (Centela asiatica), celery (Apium graveolens L.), liverwort (Marchantia polimorpha), heartleaf madeira vine (Anredera cordifolia), cycas (Cycas rumphii), Avelos (Euphorbia tirucalli), and moss (Fissidens nobilis).

Leaves are part of plants which according to the Javanese Dieng are very easy to obtain and easy to process. The taking of leaves as medicine does not damage the plants because they are easy to grow back, so people prefer leaves as ingredients for making drugs. Leaves are easily obtained and the leaves accumulate secondary metabolites which are useful as drugs, such as flavonoids (Ojewole et al., 2008), tannin (Aiyelaagbe et al., 2008), and essential oils (Patimah, 2010). According to Setyowati (2010), the leaf part is most widely used because the method of processing is easier when compared to other plant parts.

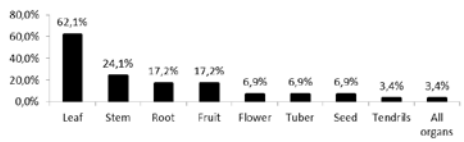

Figure 2. Parts of Plant Organs used for Medication

The technology/processing of plants into medicine is mostly done by pounding (Figure 3). The plants that are processed by pounding are ginger (Zingiber officinale Rosc.), broadleaf plantain (Plantago mayor L.), purwaceng (Pimpinella alpina), hauli tree(Ficus septica), celery (Apium graveolens L.), liverwort (Marchantia polimorpha), cycas (Cycas rumphii), tamarind (Ipomea indica), avelos (Euphorbia tirucalli), and Fern (Pteridium aquilinum). According to the Javanese Dieng tribe the use of plants as a medicine by means of mashing is more practical because it is only attached to the wound or it can be extracted as syrup. This is in accordance with research by Nurhaida (2015), which states that the method of processing plants is mostly crushed, because by way of pounding plants can be directly attached to the disease compared to other ways.

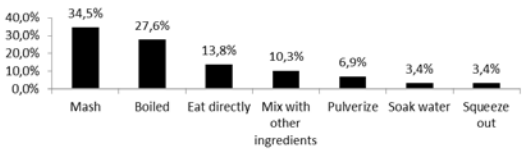

Figure 3. Technology / Processing of plants into medicine

The most common medicinal plants are found in the Dieng Javanese yard (Figure 4). Plants found include: ginger (*Zingiber officinale* Rosc.), indian pennywort (*Centela asiatica*), star fruit (*Averrhoa carambola* L.), celery (*Apium graveolens* L.), heartleaf madeira vine (*Anredera cordifolia*), cycas (*Cycas rumphii*), liverwort (*Fissidens nobilis*), tamarind (*Ipomea indica*), avelos (*Euphorbia tirucalli*), lime (*Citrus aurantifolia*), and guava (*Psidium guajava* L.). Plants in the yard prove that the Dieng Javanese are a tribe that still preserves plants. According to the Dieng Javanese, planting plants in the yard is more practical if one day is needed. The use of medicinal plants does not require a fee, considering the plants are available in the yard of the house. These efforts are very much needed by the community when they do not have costs, besides that they can also be sold, so they can increase income. This is in accordance with Sari

(2015), which states that the benefits of planting plants in the yard are to prepare plants that are used as medicine, for self-medication or for the need for sudden illness, for example if the pain occurs at night, as a first aid before seeing a doctor.

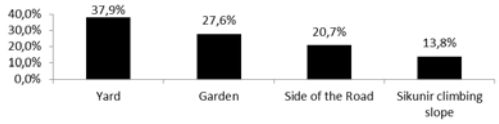

Figure 4. Location of Plant Discovery that was used by the Dieng Javanese

Factors that can influence the richness of plant species are biotic and abiotic factors. Biotic factors that affect humans, and animals. Abiotic factors that affect the richness of plant species in Dieng are climate, soil, and water. Factors that can influence the knowledge of the Dieng Javanese about medicinal plants are age, gender, occupation, and culture, as well as sources of information.

Plants that are used as medicine by the Dieng Javanese are known based on empirical experience obtained from generation to generation, neighbors/traditional healers, and media information. To find out the effectiveness and chemical content in it, further research is needed. The hope is to know the efficacy and chemical content in it can properly increase the potential of these plants to be used as raw materials for herbal medicines, and with the use of medicinal plants by the Dieng Javanese, can be used as knowledge that can be passed on to the next generation.

CONCLUSION

Based on this study that has been done, it can be concluded that there are 29 species of plants from 22 families used by the Dieng Javanese as a medicine, and the most dominant one is the Tamarillo (Solanum betaceum Cav.). Need to study more about the benefits of medicinal plants that are used by residents around Dieng with different locations.

REFERENCES

Abdiyani, S. (2008). Keanekaragaman Jenis Tumbuhan Bawah Berkhasiat Obat di Dataran Tinggi Dieng. Jurnal Penelitian Hutan dan Konservasi Alam, 5 (1), 79-92.

Abdullah, M., Dewi, M., & Talitha, W. (2010). Inventarisasi Jenis-Jenis Tumbuhan Berkhasiat Obat di Hutan Hujan Dataran Rendah Desa Nyamplung Pulau Karimunjawa. Biosaintifika, 2 (2), 75-81.

Aiyelaagbe, O. O., B. J. Oguntuase., B. D. Arimah, & B. A. Adeniyi. (2008). The Antimicrobial Activity of Jatropha multifida Extracts and Chromatographic Fractions Against SexuaEy Transmitted Infections. University of Ibadan. Nigeria. Journal Medical Science, 8 (2): 143-147.

Arum, G. P. F., Amin, R., & Andin, I. (2012). Etnobotani Tumbuhan Obat Masyarakat Desa Keseneng Kecamatan Sumowono Kabupaten Semarang Jawa Tengah. Unnes J Life Sci, 1 (2), 126-132.

Diantaris, M. T. A., Rahayu, S., & Yustinus, U. A. (2015). Diversity and Utilization of Medicinal Plants by Sasak Ethnic at Central Lombok District, West Nusa Tenggara. Dalam: Prosiding International Conference on Mathematics, Science, and Education. Semarang, 5-6 september 2015. Semarang: FMIPA UNNES. Hlm 19-22.

Fitriningrum, R., Sugiyarto., & Ari, S. (2013). Analisis Kandungan Karbohidrat Pada Berbagai Tingkat Kematangan Buah Karika (Carica Pubescens) di Kejajar dan Sembungan, Dataran Tinggi Dieng, Jawa Tengah. Bioteknologi, 10 (1), 6-14.

Ghorbani, A., Farzaneh, N., & Mahmoud, M. (2006). Ethnobotany, Ethnopharmacology and Drug Discovery. Iranian Journal of Pharmaceutical Sciences, 2(2): 109-118.

Hartanto, S., Fitmawati., & Nery, S. (2014). Studi Etnobotani Famili Zingiberaceae dalam Kehidupan Masyarakat Lokal di Kecamatan Pangean Kabupaten Kuantan Singingi, Riau. Biosaintifika, 6 (2), 122-132.

Lumpert, M. & Kreft, S. (2017). Folk Use Of Medicinal Plants In Karst And Gorjanci, Slovenia. Journal Of Ethnobiology And Ethnomedicine, 13 (16), 1-34.

Nurhaida., Lestari., Fadillah, H. U., & Gusti, E. T. (2015). Studi Etnobotani Tumbuhan Obat Di Dusun Kelampuk Kecamatan Tanah Pinoh

Barat Kabupaten Melawi. Jurnal Hutan, 3 (4), 526-537.

Ojewole, J. A. O., Emmanuel, O. A., & Witness, D. H. C. (2008). Antidiarrhoeal Activity of Psidium guajava L. Linn. (Myrtaceae) Leaf Aqueous Extract in Rodents. Journal Smooth Muscle Res, 44 (6), 195-207.

Riyandini, Y. (2011). Uji Aktifitas Antioksidan Ekstrak Buah Terong Belanda (Cyphomandra botacea) Dengan Metode DPPH (2,2-Diphenil-1-pkrilhidrazil). Karya Tulis Ilmiah. Malang: Akademi Analisis Farmasi dan Makanan Putra Indonesia Malang.

Sari, D. I., Yuyun, Y., Selma, S., Riswati, & Muhammad, S. (2015). Tradisi Masyarakat dalam Penanaman dan Pemanfaatan Tumbuhan Obat Lekat di Pekarangan. Jurnal Kefarmasian Indonesia, 5 (2), 123-132.

Setyowati, F. M. (2010). Etnofarmakologi dan Pemakaian Tanaman Obat Suku Dayak Tunjung di Kalimantan Timur. Media Litbang Kesehatan, 20 (3), 104-112.

Setyowati, F. M. & Wardah. (2007). Keanekaragaman Tumbuhan Obat Masyarakat Talang Mamak di Sekitar Taman Nasional Bukit Tiga puluh, Riau. Biodiversitas, 8 (3), 228-232.

Shanthi, R. V., Jumari, & Munifatul, I. (2014). Studi Etnobotani Pengobatan Tradisional untuk Perawatan Wanita di Masyarakat Keraton Surakarta Hadiningrat . Biosaintifika, 6 (2), 85-93.