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Ethnomedicines Medicinal Plant in Pujon District, Malang Regency, East Java

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ABSTRACT
Traditional medicine is currently being abandoned by the community, because its use is considered impractical and tastes bad. Traditional medicine usually uses medicinal plants obtained from the surrounding environment. This research was conducted in Pujon Sub-District, Malang Regency, East Java Province, which aims to document the knowledge of local people in Pujon Sub-District regarding the use of plants in their yards as traditional medicine. This study uses descriptive analysis techniques. Quantitative. Data on local knowledge about the use of medicinal plants was obtained from key informants and respondents selected by purposive sampling and snowball sampling techniques. The people in Pujon District still practice traditional medicine to cure several diseases. A total of 47 species of plants in the garden are used as medicinal plants. It consists of 26 families and 41 genera. The medicinal plants most liked by the community are ginger (*Zingiber officinale*) (PDM=8.39), turmeric (*Curcuma longa*) (PDM=7.94), suroh (Piper batle) (PDM=7.17) and dringu (*Acorus calamus*) (PDM=7.11). While the medicinal plants that are often used by the community in the Pujon sub-district are ginger (*Zingiber officinale*) (LUVI=0.427) and turmeric (*Curcuma longa*) (LUVI=0.348) and *Tepung otot* (*Plantago major*) (LUVI=0.308). From the results of the study it can be concluded that the people in the Pujon sub-district still use traditional medicines sourced from medicinal plants planted around their yards.

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1. INTRODUCTION

Traditional medicine has been started since humans lived nomads, a lot of evidence and records have been found. The use of plants as hallucinogens was discovered as far back as 10,000 years ago (Young 2007) ome of the earliest records of the medicinal use of plants are found in the Artharvaveda, which is the basis for Ayurvedic medicine in India. The classic Ayurveda texts Charaka Samhita and Sushruta Samhita were written around 1000 AD. The Ayurvedic Materia Medica contains 600 medicinal plants and their therapeutic methods. Other evidence of the use of medicinal plants are clay tablets in Mesopotamia dating from 1700 BC, and the Eber Papyrus in Egypt from 1550 BC. Another books that record traditional medicine are De Materia Medica written by Dioscorides between 60 and 78 CE and Pen Ts'ao Ching Classic Materia Medica written around 200 AD (Ramawat & Merillon 2008). When healing methods are found, descriptions of plants, their habitats and locations where they grow, and how they are used will be passed on to the next generation by story, this is what is called "folk medicine" (Young 2007). Folk medicine is studied specifically in ethnomedicine. Ethnomedicine is a branch of ethnobotany. Ethnomedicin is almost similar to ethnopharmacology. Ethnomedicine studies are based on ancient written sources and knowledge and practices that have been handed down orally for centuries, ethnomedicine studies the perceptions and contexts in which traditional medicines are used, including the diagnosis and ways of healing using drugs from medicinal plants (Peres Gutierrez, R.M. 2011; Schmidt 2017).

Medicinal plants are plants that are strongly suspected of having medicinal properties. Medicinal plants are very important because they contain ingredients that can cure suffering and disease in humans and have commercial value in trade (Mahunnah 2002; Silalahi 2015). According to the Decree of the Minister of Health number 149 of 1978 medicinal plants are: 1) Plants or plant parts used as ingredients for traditional medicine or herbal medicine. 2) Plants or plant parts used as starting materials for medicinal raw materials (procursors). 3)

Plants or plant parts extracted and said plant extracts are used as medicine. Whereas medicinal plants according to the Decree of the Minister of Health number 149 of 1978 are grouped into 3, namely: 1) Traditional medicinal plants, are types that are known or believed by the public to have medicinal properties and have been used as raw materials for traditional medicine. 2) Modern medicinal plants are plant species that have been scientifically proven to contain bioactive compounds or ingredients with medicinal properties, and their use can be justified medically. 3) Potential medicinal plants, are types of plants which are suspected to contain or have bioactive medicinal compounds or ingredients, but their use has not been proven scientifically-medically as medicinal ingredients and their use has not been known traditionally. The decree also explained that medicinal plants are plant species which part or all of their body parts can be used as medicinal ingredients.

Medicinal plants play a major role as the main source of active substances in pharmacology, apart from that medicinal plants also have important economic value for a country because they can be used as medicinal ingredients as well as products for import and export. According to WHO, around 25% of modern medicine or conventional medicine comes from medicinal plants, such as artemisinin for malaria drugs which comes from the Artemisia annua plant. Local people obtain medicinal plants from various landscape units in the surrounding environment such as yards, gardens, fields, agroforests, and forests (Silalahi 2015). Ethnomedicine research is one of the accelerations to find potential sources of medicines. Plants that have been used as medicine by the community for generations can be a reference for the world of modern medicine to further research the efficacy of these plants. Traditional healers may not know the chemical composition of the potions they make, but the progress of their treatment is amazing despite the lack of scientific evidence. Medicinal plants around the human environment have succeeded in preventing their extinction due to outbreaks of infectious diseases (Aditama 2014).

Pekarangan ethnobotanical research was carried out to study the ecological characteristics, structure, function, diversity and nutritional dynamics of the local population. Local people have knowledge in utilizing and managing the yard. This traditional knowledge is passed down from generation to generation and not all family members are interested in learning it, so that knowledge, especially regarding medicine, is usually owned by certain people such as village healers. So that local knowledge regarding yard ethnobotany in Pujon Kidul Village is not lost, it is necessary to do.

2. RESEARCH METHOD

Research sites

The research was conducted in Pujon District, Malang Regency, East Java Province in April 2018 - November 2018. Geographically the research location is located at 1120 26' 113”-1220 28' 923” East Longitude and 70 52' 203”-70 49' 373 "Southern latitude (Muttaqin 2014), at an altitude of 1,100 masl to 2,500 masl with a slope of 0-40%. Administratively, it is bordered by Mojokerto Regency to the north, Ngantang District to the west, Dau District to the south and Blitar Regency to the east and Batu City to the east. The total area of Pujon District is 13,075,144 ha with a residential area, including its yard, of 454.20 ha (Badan Pusat Statistik Kabupaten malang 2018). The process of herbarium and identification of plant species was carried out at the Biology Laboratory, Faculty of Teaching and Education, University of Muhammadiyah Malang.

Determination of Key Informants and Respondents

The criteria for key informants used in this study are people who know about the ins and outs of the local culture of the community, have certain expertise, occupy a certain position in society, are considered to have advantages by the surrounding community, are able to speak well and are willing to provide information. Key informants were selected using purposive sampling, then key informants were selected using snow ball sampling (Musotsi & Onyango 2008; Djaelani 2013). A total of 6 key informants have been selected.

General informants/respondents are local people who are willing to share information about their local knowledge and culture (Martin 1995). The general informants/respondents in this study were the owners of the yards that were used as the research sample. For scoring activities, there were 45 informants/respondents, consisting of 15 respondents from the community group near the river, 15 respondents from the community group near the road and 15 respondents from the community group near the forest. Respondent criteria in scoring activities based on age category used by Idohou et al. (2014) and Gbedomon et al. (2015) the informants used were divided into three age categories, young informants aged <30 years, adult informants aged 30-60 years and old informants aged >60 years.

Local Knowledge Data Collection

Collecting data on the local knowledge of the community about the yard and the use of plants in the yard was carried out by interviewing the owner of the plot, using structural and semi-structural interviews (Martin 1995; Amberber 2014; Berihun & Mola 2017). Questions asked in semi-structured interviews were made before the interview but are flexible (Martin 1995; Hakim 2014). Questions asked in the semi-structured interviews included the length of stay as residents in the village, the use and origin of plants in the yard, the purpose of

building a yard (Carvalho 2013), the age and function of the yard, land use before it was turned into a yard, inputs and outputs from the yard, problems in yard management, the use of products from the yard (Kehlenbeck & Maass 2004).

Focused Discussion

To assess plant species from each category for scoring. Scoring activities are carried out in groups using the Pebble Distribution Method (PDM) (Sheil e*t al.* 2004). A total of 45 respondents have participated in the Focus Group Discussion activities. The details are as table 1:

Table 1. Number of respondents in Focus Group Discussion (FGD) activities

Location of home garden	Man			Woman		
	Young <30 thn	Mature 30-60 thn	Old >61	Young <30 thn	Mature 30-60 thn	Old >61
Near river	3	3	2	2	2	3
Near road	3	3	3	2	2	2
Near forest	3	3	3	2	2	2

Focus Group Discussion emphasizes that the discussion addresses specific or important topics (Masadeh 2012). Focus group discussions provide a more natural environment than individual interviews because of the interaction between participants. Scoring activities are carried out in groups according to the gender and age category of the respondents that have been determined. The number of members in each group is 2-3 people.

Data analysis

Ethnobotanical data was carried out descriptively through the process of organizing data, sorting, evaluating, comparing, synthesizing and drawing conclusions about local community knowledge in utilizing plants (Silalahi 2014). Data regarding the use of plants based on categories to be quantified using the Pebble Distribution Method (PDM). The quantified data has been used to calculate the importance value of plants per category of use (Local User´s Value Index, LUVI).

Calculation of Local User´ Value Index (LUVI)

After the scoring activity, then calculate the scoring results using the Local User´s Value Index (LUVI). Scoring data is calculated using the formula Sheill *et al.* (2004), as follows:

$$LUVI = Gij = \sum \text{category j } Gij = RWj \times RWij$$

Information:

i = plant species determined through scoring activities
j = Use
Gij = Individual Value
RWj = Weight given to certain activities (j)
RWij = Relative weight of utilization of plant species j that meets the requirements of member j.

3. RESULT AND DISCUSSION

Communities in Pujon Subdistrict utilize 47 species of medicinal plants, consisting of 26 families and 41 genera (Figure 1). Medicinal plants that are used mostly come from the Zingiberaceae family which consists of 3 genera and 6 species, then the Lamiacae family which consists of 4 genera and 4 species and Rutaceae and Myrtaceae which each consist of 2 genera and 3 species (Figure 1.).

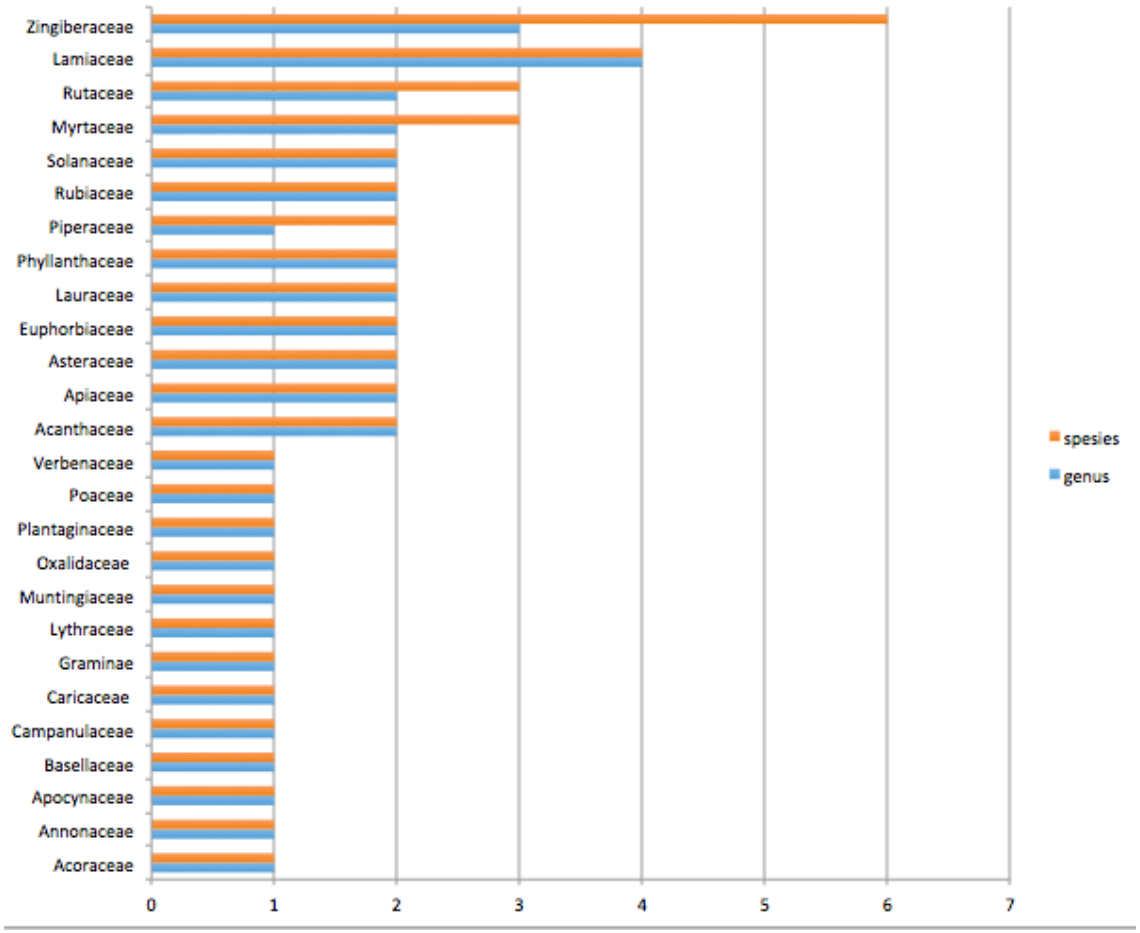

Figure 1. The families of medicinal plants and the number of genera and species used by the community in Pujon District.

Medicinal plants are plants that are strongly suspected of having medicinal properties (Silalahi 2015). Medicinal plants in the yard are usually deliberately cultivated or grow alone as wild plants (Bajpai *et al.* 2013). Based on PDM, 46 out of 47 plants have been selected as preferred medicinal plants. Some of them are ginger (*Zingiber officinale*) (PDM=8.39), turmeric (*Curcuma longa*) (PDM=7.94), suroh (*Piper betle*) (PDM=7.17) and dringu (*Acorus calamus*) (PDM= 7,11) (Figure 2.).

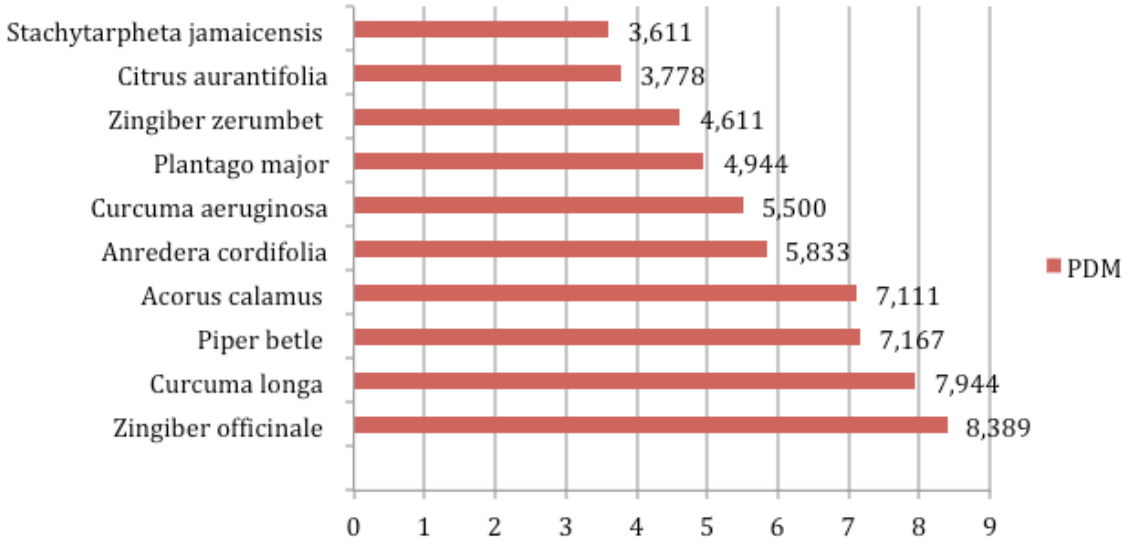

Figure 2. Ten medicinal plants most preferred by the community in Pujon District

Ginger, Turmeric, Temu ireng and puyang are rarely found in the yard. Several yard owners claimed to have these plants, but because of the dry season sampling, it was estimated that the plants had died and only the rhizomes remained. So, it was not recorded during the sampling process.

As much as 90% of the rainy season in Pujon District falls for 6 months, namely November to April, and less than 10% falls between May to October (Kurniawan *et al.* 2010). Even though adequate health facilities are available in Pujon District, some people still use plants for traditional medicine. Certain diseases, especially those believed to be caused by spirits, are still widely treated using traditional medicines.

Some plants used as medicine have other names. For example, chili leaves are used as a medicine for breasts that are hard and do not produce milk. Furthermore, these leaves are called Godong Sabrang. For certain types of disease, sometimes different plant parts are needed than usual. To treat leucorrhoea, women will take betel leaves without paying attention to other aspects. If betel leaves are used to treat people who are believed to have possessed spirits, then betel leaves are needed, which are called godong suroh temu ross. This type of betel leaf is a type of betel leaf in which all the leaf veins are pinnate parallel, not alternate like betel leaves in general.

Planting medicinal plants has become a habit of the people in the village, especially women. This method is effective for treating various diseases without having to incur high costs (Bajpai *et al.* 2013). Based on the research results of Sari *et al.* (2015) regarding the use and planting of medicinal plants in the yards of the provinces of West Java, Central Java, East Java and Bali stated that the planting of medicinal plants was usually carried out by mothers who had knowledge from generation to generation about medicinal plants, as for the types of plants that were planted the most namely betel, turmeric, curcuma, ginger, cat whiskers, binahong leaves, beluntas leaves, kencur, bitter and temu ireng. Furthermore, the 10 most preferred medicinal plants can be seen in Figure 2.

Of the 47 medicinal plants, 46 were liked by the community in Pujon District. Communities in Pujon District use traditional medicine rarely. Even so, some medicinal plants are still found in the yard. Based on the LUVI calculation, these plants also have high LUVI values. LUVI values for ginger (*Zingiber officinale*) (LUVI=0.427) and turmeric (*Curcuma longa*) (LUVI=0.348).

Rhizome plants such as *Zingiber officinale*, *Curcuma longa* and *Zingiber zerumbet* are usually used as herbal medicine to maintain endurance and health. In addition, these plants are also used as herbal medicine to increase the appetite of cows, so that the cows become fat and healthy. The family members who take care of cows and livestock are men. This can be one of the reasons why these plants are important to men. The *Suroh* plant (*Piper betle*) for the older male group is a medicinal plant that is not important with a value (LUVI=0), while for the old women, suroh is an important medicinal plant with a value (LUVI=0.270). Old women use suroh to maintain healthy teeth by means of nginangan every day. The young age group, both male and female, gave higher scores on dringu (Acorus calamus) compared to the adult and old age groups. This is because young age <30 years is the age at which someone has a baby. The dringu plant is usually used as a febrifuge in infants (Table 2).

Table 2. Medicinal plants and their LUVI value

No	Local Name	Scientific Name			
			Woman	Man	Mean
1	Jahe	*Zingiber officinale*	0,461	0,394	0,427
2	Kunir	*Curcuma longa*	0,366	0,331	0,348
3	Tepung otot	*Plantago major*	0,326	0,291	0,308
4	Dringu	*Acorus calamus*	0,200	0,358	0,279
5	Suroh	*Piper betle*	0,240	0,306	0,273
6	Kumis kucing	*Orthosiphon stamineus*	0,205	0,328	0,267
7	Sambiloto	*Andrographis paniculata*	0,230	0,213	0,222
8	Puyang	*Zingiber zerumbet*	0,185	0,208	0,196
9	Adas	*Foeniculum vulgare*	0,185	0,203	0,194
10	Pecut kuda	*Stachytarpheta jamaicensis*	0,220	0,158	0,189
11	Tapak limam	*Elephantopus scaber*	0,276	0,103	0,189
12	Temu ireng	*Curcuma aeruginosa*	0,200	0,125	0,163
13	Gondoruso	*Justicia gendarussa*	0,120	0,160	0,140
14	Binahong	*Anredera cordifolia*	0,085	0,175	0,130
15	Keji beling	*Clerodendrum calamitosum*	0,080	0,120	0,100
16	Laos	*Alpinia galanga*	0,080	0,065	0,073
17	Jambu biji	*Psidium guajava*	0,090	0,075	0,083
18	Jeruk nipis	*Citrus aurantifolia*	0,000	0,125	0,063

19	Godong sirsat	*Annona muricata*	0,065	0,065	0,065
20	Alang alang	*Imperata cylindrica*	0,080	0,063	0,071
21	Delimo putih	*Punica granatum putih*	0,080	0,015	0,048
22	Jeruk lemon	*Citrus x lemon*	0,030	0,095	0,063
23	Po'o	*Mentha × piperita*	0,065	0,023	0,044
24	Yodium	*Jatropha multifida*	0,050	0,033	0,041
25	Godong blimbing	*Averrhoa carambola*	0,060	0,043	0,051
26	Godong kersen	*Syzygium aqueum*	0,030	0,040	0,035
27	Pukat	*Persea americana*	0,080	0,010	0,045
28	Kayu manis	*Cinnamomum burmanni*	0,030	0,025	0,028
29	Kates gantung	*Carica papaya*	0,020	0,025	0,023
30	Tolop	*Hippobroma longiflora*	0,015	0,020	0,018
31	Pepino	*Solanum muricatum*	0,020	0,000	0,010
32	Kudu	*Morinda citrifolia*	0,020	0,000	0,010
33	Luntas	*Pluchea indica*	0,020	0,000	0,010
34	Sere	*Andropogon nardus*	0,010	0,000	0,005
35	Inggu	*Ruta graveolens*	0,000	0,010	0,005
36	Lampes	*Ocimum sanctum*	0,000	0,000	0,000
37	Kemangi	*Ocimum basilicum*	0,000	0,000	0,000
38	Kunir putih	*Curcuma mangga*	0,000	0,000	0,000
39	Ciplukan	*Physalis angulata*	0,000	0,000	0,000
40	Godong salam	*Syzygium polyanthum*	0,000	0,000	0,000
41	Suroh abang	*Piper ornatum*	0,000	0,000	0,000
42	Simbukan	*Paederia foetida*	0,000	0,000	0,000
43	Cowek gopel	*Centella asiatica*	0,000	0,000	0,000
44	Tapak doro	*Catharanthus roseus*	0,000	0,000	0,000
45	Patikan	*Euphorbia hirta*	0,000	0,000	0,000
46	Meniran	*Phyllanthus niruri*	0,000	0,000	0,000

4. CONCLUSION

Even though they have lived a modern life and usually used modern medicine, some of people in Pujon District still use traditional medicines made from plants. A total of 47 species of plants are used as medicinal plants grown in their homegarden. Based on Pebble Distribution Method (PDM) the most medicinal plant liked by Pujon community are ginger, turmeric and betel. Based on Local User Value Index the most important medicinal plant are ginger, turmeric and *Tepung otot.* Modern medicine that is practical and has a faster effect makes traditional medicine slowly become obsolete. But people in Pujon District will turn to traditional medicine if modern medicine doesn't work.

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