

Traditional Knowledge About Medicinal Plants Of Tay Ethnic Community In South Vietnam: A Case Study At Lan Tranh Protection Forest, Lam Dong Province

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Abstract – This study was conducted at Lan Tranh Protection Forest in South Vietnam to investigate and record existing traditional knowledge about medicinal plants used by the Tay ethnic community. A total of 90 species, 87 genera belonging to 58 families of three phyla were recorded. Nine medicinal plants were listed in the Vietnam Red Data Book (2007), Vietnam Red List of medicinal plants (2019), and the Decree 06/ND-CP/2019 of the Vietnamese Government. Six life forms are used as a medicine, of which the highest is herbaceous (40%). It is mainly distributed around the village (34.44%), and the whole plant is the most commonly used part (18.89%). Most medicinal plants were harvested year-round by local people (87.89%). Three methods of preservation: dry storage, dry storage combined with fresh, fresh preservation was used to preserve medicinal plants before use and long-term preservation. Internal use is predominant (84.44%) in the community for health care and treatment of 13 treatment groups ranging from simple to incurable. This study also introduced several typical drugs of Tay people and proposed solutions to conserve and develop resources of drug plants in the Lan Tranh protection forest.

Keywords – Lan Tranh, Medicinal plants, Tay ethnic, Traditional knowledge, Vietnam.

I. INTRODUCTION

In the last few decades, traditional knowledge of primary healthcare has been widely acknowledged across the world. It is estimated that 60% of the world population and 80% of developing countries rely on traditional medicine, mostly plant drugs, for their primary health care needs [1, 2]. The large human population in developing countries is dependent on plant resources for healthcare because allopathic medicine can cure a wide range of diseases. Still, its high prices and occasional side effects are causing many people to return to herbal medicines, which tend to have fewer side effects [2].

Their ancient knowledge of using plants to cure many diseases has paved the way for discovering more lifesaving drugs [3, 4]. Indigenous knowledge plays a central role in diagnosing diseases and practising health care in traditional medicine systems worldwide [5]. Since ancient times, tribal people have had medicinal plants used traditionally and culturally.

Studies on the use and effects of medicinal plants have been conducted worldwide, with a marked increase in Asia. In Vietnam, ethnographic research projects on indigenous knowledge using traditional medicinal plants have been implemented in many localities and ethnic groups by the Institute of Ecology and Biological Resources. So far, 3948 traditional medicinal plant species have been recognized through indigenous knowledge of different ethnic groups in 63 provinces and cities of Vietnam [6]. Indigenous

communities' traditional plant's use reflects the cultural and biodynamic elements that have immense pharmacological potential to cure many diseases [7].

The Tay ethnic community in the Lan Tranh Protection Forest has a rich knowledge of medicinal plants. Plants are considered sacred by local people or have very high religious values, and their use as medicinal plants takes precedence over allergy and homoeopathic treatments for health care. However, in the Lan Tranh Protection Forest, knowledge of this Tay ethnic remains undocumented and is handed down orally.

Due to the development of society, most of the younger generation currently have little interest in traditional values of using medicinal plants to treat diseases and health care; traditional knowledge is afraid of getting lost. However, no research has been conducted on indigenous medical knowledge, so the current study has been conducted to determine the same thing in the Nam Ban Protection Forest. Therefore, there is an urgent need to record medicinal plants and aromatic plants related to traditional knowledge because this knowledge is transmitted from one generation to the next; therefore, there is a gap to erase [8]. The purpose of this study is to assess plant-based medical knowledge and record indigenous knowledge of this vulnerable community. This study provides profound information about the medicinal plants used by the Tay ethnic community and documenting the traditional knowledge of drug plants, the collection season, the method of preservation and processing variables, using medicinal plants, and practising traditional remedies of Tay people at Lan Tranh protection forests, southern Vietnam.

II. MATERIALS AND METHODS

2.1. Study sites

This study was conducted through many surveys from November 2017 to May 2018 and December 2020 in Lan Tranh Protection Forest, Lam Dong province (from 11°42'30" to 11°51'30" North latitude and 107°58'26" to 108°09'53" East longitude) (Now is Nam Ban Protection Forest). The total natural area was 122,75 km², altitude 950 to 1400 m above sea level, average slope 8°-15°. The study area was located in the subtropical monsoon climate, the rainy season from May to October, the dry season from November to April next year. The average annual temperature was 21.4°C; The average humidity was 80.5% per year; The average annual evaporation was 1070 mm [9]. In general, the climate is favourable for the growth and development of rich forest status, forming the characteristics of relatively rich vegetation, mainly broadleaf forest, evergreen, mixed wood forest, bamboo. Residents here are mostly Tay, Nung, Dao and Kinh people. The people's lives were purely dependent on shifting cultivation and forestry, so it has accumulated extensive knowledge about the use of forest resources, especially the experience of the Tay people about using medicinal plants to treat diseases and health care.

2.2. Materials and Methods

2.2.1. Fieldwork

A total of 6 investigation sites and 19 transects were established at the scene. At each survey site, 2-4 transects of investigation on medicinal plant composition were built according to the experience of traditional healers and experienced people who regularly collect medicinal plants for health care and treatment. The length of each transect was from 1-3 km. The method of investigation transects was used to survey fieldwork and collect the information. These transects were established in other types of habitats: villages, fields, streams, and forest edges fields. Besides, RRA and PRA were used to interview and collect information on the experience of using medicinal plants. Tay households, people with experience identifying medicinal plant names, medicinal users, traditional healers, etc., were selected for interviews. At the same time, they were also the object of choice to provide information and support fieldwork. The information on medicinal plants was collected, including standard and ethnic names, life-forms, habitat, parts used (stems, roots, flowers, fruits, seeds, etc.).

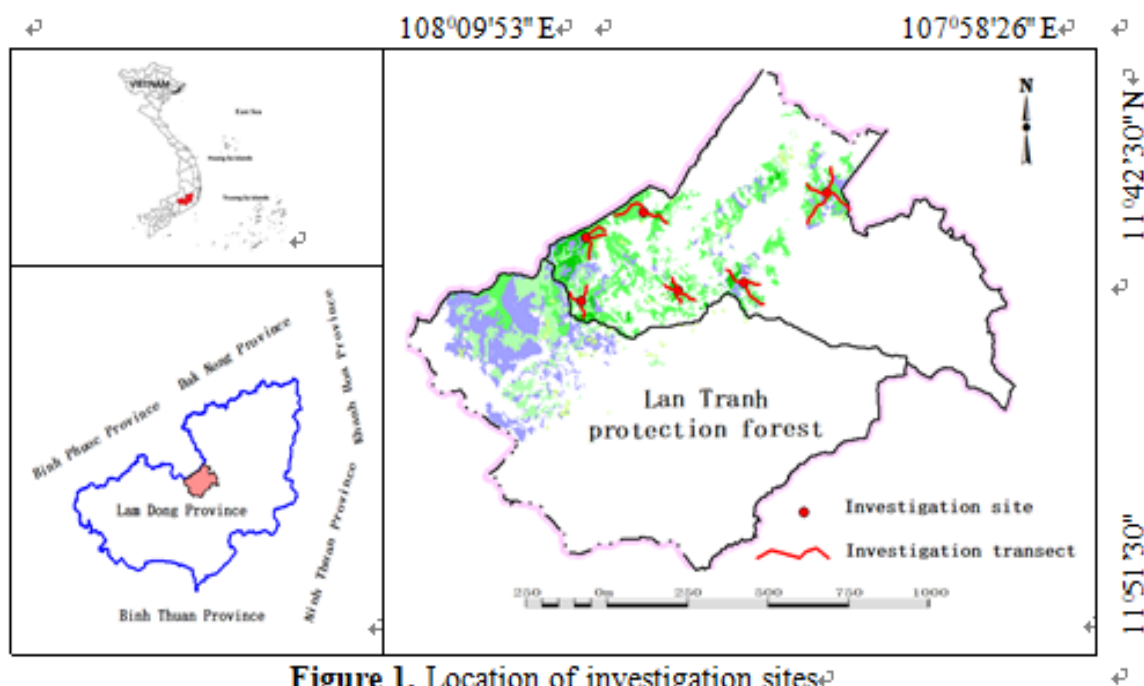


Figure 1. Location of investigation sites

2.2.2. Data analysis

The method of comparison morphology was used to identify the common name. The documents were used to identify species names: Dictionary of medicinal plants [10]; An Illustrated Flora of Vietnam [11]; Vietnamese medicinal plants and medicine [12]; Medicinal plants and medicinal animals in Vietnam [13]; List of Vietnamese plant species [14]. The names of medicinal plants in the Tay ethnic group were determined based on interviews combined with field investigations under the healer's guidance and those with experience in collecting medicinal plants. The species' scientific name was identified and regulated by Plants of the World Online [15], World flora online [16]. A species list was established by the Brummitt (1992) taxonomy systems [17]. The species diversity and life-forms of medicinal plants were assessed by Nguyen Nghia Thin (2007) [18]. The diversity of parts used, distribution according to habitat, and experience of using medicinal plants were identified based on interviews and surveys under Tay's people's instruction. The threatened medicinal plants were identified based on the Vietnam Red Data Book [19], Decree 06/ND-CP/2019 of the Government of Vietnam [20], Red list of Vietnamese Medicinal Plants [21].

III. RESULTS AND DISCUSSION

3.1. Medicinal plant species composition was used by Tay ethnic group

3.1.1. Medicinal plant species component

Based on the field investigation results under the healer's guidance and those who have experience collecting and using medicinal plants of the Tay ethnic group in the study area. We have recorded 90 species of 87 genera and 58 families belonging to 3 phyla, Polypodiophyta, Pinophyta, and Magnoliophyta, used as medicine according to the experience of Tay people in Lan Tranh protection forest. The results are summarized in Figure 2 and Appendix 1.

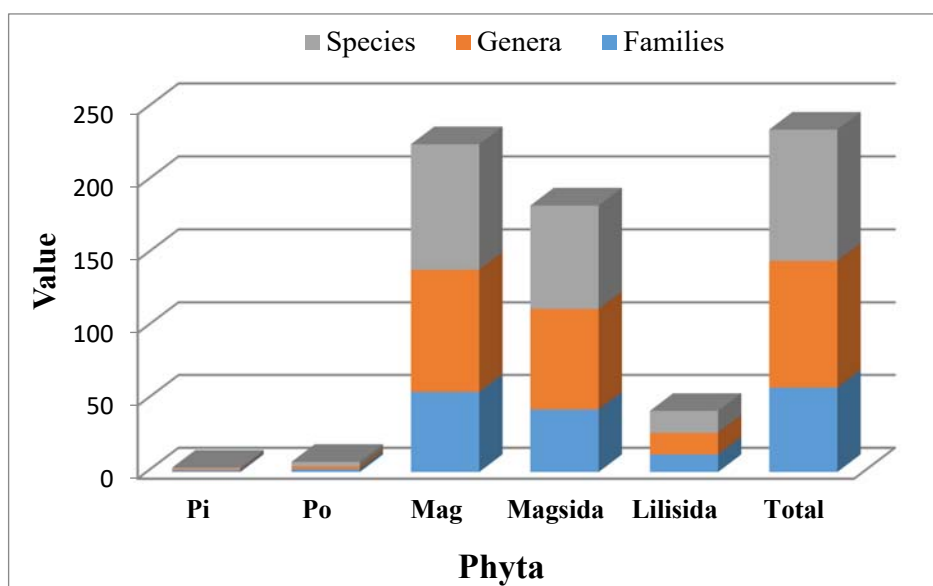


Figure 2. Medicinal plant species composition at taxonomic levels

Note: Pi: Pinophyta, Po: Polypodiophyta, Mag: Magnoliophyta, Magsida: Magnoliopsida, Lilisida: Liliopsida

Most of the medicinal plants used by local people belong to Magnoliophyta with 86 species (95.56%) of 84 genera (96.55%), 55 families (94.83%). In which, Magnoliopsida has 71 species (78.89%), belonging to 69 genera (79.31%), 43 families (74.14%); Liliopsida has 15 species (16.67%) belonging to 15 genera (17.24%), 12 families (20.69%). The rest is Pteridophyta with only three species (3.33%), two genera (2.27%), and two families (3.45%), including *Drynaria roosii*, *Drynaria bonii*, and *Angiopteris evecta*. Pinophyta has one species (1.11%), one genus (1.15%), and one family (1.75%), *Gnetum formosum*, which indigenous people widely used to treat Gout. The study also showed that the family diversity index and genera are 1.55 and 1.03. Meaning that each family has an average of nearly two species, and each genus has one species.

Table 1. Comparison of medicinal plants in Lan Tranh with other regions in Vietnam

Study	Study area	Area (km ²)	Ethnic community	No. of species
<i>This study</i>	<i>Lan Tranh</i>	<i>122,75</i>	<i>Tay</i>	<i>90</i>
Huong & Thin 2010 ^[22]	Dinh Hoa	521	Tay	351
Huong & et al., 2015 ^[23]	Van Quan	10,73	Tay	115
Huong & Thanh 2016 ^[24]	Thai Nguyen	3.534	Tay	255

Table 1 shows that the number of medicinal plants used by the Tay ethnic minority in Lan Tranh is smaller than in the areas of others (Table 1). The comparison results confirmed that the same Tay ethnic community resides in different ecological areas. The composition and the number of medicinal plants for treatment and health care are not the same.

3.1.2. Diversity of life-form of medicinal plants

Research results on the life-forms of medicinal plants used by indigenous knowledge of the Tay people in the Lan Tranh protection forest are shown in Figure 3 and Appendix 1.

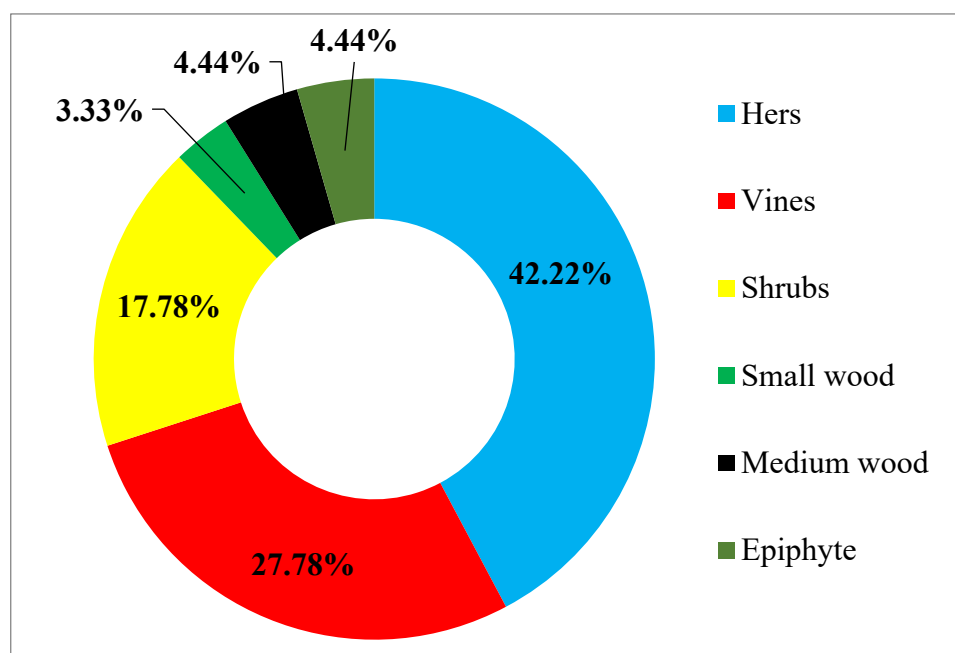


Figure 3. Diversity and proportion of each life form of medicinal plants

Figure 3 shows six life forms of medicinal plants used by the Tay people for health care and disease treatment. The proportion of species composition in each life form is different. Herbs dominate the rest with 38 species (42.22%). This result is consistent with previous studies of Huong & Thin (2010) [22], Huong & *et al.* (2015) [23], Huong & Thanh (2016) [24], followed by vines with 25 species (27.88%), shrubs with 16 species (17.78%), the lowest is a small wood with three species (3.33%). The woody plants are much lower than in other research areas. Especially, Huong & *et al.* (2015) [23] indicated that the small and medium wood plants accounting for 22,61% (Van Quan, Lang Son province).

The local people use the life form of medicinal plants quite diversely. These medicinal plants are mainly herbaceous, or vines or shrubs account for more than 87% of the total species. Because these are small-sized trees, often distributed under the forest canopy, so they are easy to collect. Moreover, the exploitation of life forms of medicinal plants does not affect the structure and regeneration of the forest. This also shows that the harvesting and harvesting methods of local people are relatively sustainable.

3.1.3. Medicinal plants component threatened

Based on survey results, Vietnam Red Data Book (2007), Decree 32/CP/2006, Red list of medicinal plants (2019), We have identified nine endangered, precious and rare medicinal plant species (accounting for 10% of the total species) that need to be prioritized for conservation. (Table 2 and Figure 4).

Table 2. Medicinal plant components are threatened

No.	Scientific name	Vietnamese name	Conservation status		
			VNRDB (2007)	Decree 06/ND-CP	RLMVN (2019)
1	<i>Anoetochilus setaceus</i> Blume	Lan kim tuyến	EN	IA	
2	<i>Myrmecodia tuberosa</i> Jack	Ồ kiến gai	VU		VU
3	<i>Drynaria bonii</i> Christ	Tắc kè đá	VU		VU
4	<i>Codonopsis javanica</i> (Blume) Hook.f. & Thomson	Đẳng sâm	VU	IIA	EN

5	<i>Coscinium fenestratum</i> (Gaertn.) Colebr.	Vàng đắng	IIA	
6	<i>Ardisia silvestris</i> Pit.	Khôi nhung	VU	
7	<i>Homalomena occulta</i> (Lour.) Schott	Thiên niên kiện	VU	VU
8	<i>Drynaria roosii</i> Nakaike	Cốt toái bổ	EN	
9	<i>Stephania rotunda</i> Lour.	Bình vôi	VU	IIA

Note: VNRDB (2007): Vietnam Red Data Book (2007); Decree 06/ND-CP: Decree 06/2019 of the Government of Vietnam: RLMVN (2019): Red list of medicinal plants in Vietnam (2019); VU-Vulnerable; EN-Endangered; IA: Prohibit the exploitation and use for commercial purposes; IIA: Limit the exploitation, use for commercial purposes

There are seven species listed in the Red Book of Vietnam (2007), four species in Decree 06 /2019/ND-CP, including one species of group IA and three species of group IIA. In particular, two species are in the Vietnam Red Data Book (2007) and Decree 06/2019/ND-CP: *Anoectochilus setaceus* and *Codonopsis javanica*. These endangered, precious, and rare species have been overexploited by the Tay ethnic group and people living in the near forest, not only for use but also for trading, so they are becoming increasingly endangered and scarce. According to an elderly healer, "The orchid species, we picked and cooked soup as a nutritious vegetable ten years ago. However, for the last five years, people have been buying with high prices from 35 USD/kg to 70 USD/kg, and now only rich people can use them". Therefore, without conservation, solutions can lead to a very high risk of extinction. Determining conservation status will help develop an appropriate strategy for conserving important medicinal plant species of the Lan Tranh Protection Forest.

3.2. Indigenous knowledge of medicinal plants of Tay people

3.2.1. Distribution of medicinal plants according to habitat

According to the experience and knowledge of the Tay ethnic group, medicinal plants are distributed in 4 habitats: Around the village, in the forest, along the forest, along streams and fields. The results are shown in Figure 5 and Appendix 1.

Figure 5 shows that the medicinal plants are distributed quite similar in the habitats around the village, in the forest and at the edge of the forest. Only habitats along streams and fields account for a low percentage (6.67%). In the habitat around the village, there are 31 species (34.44%) represented by *Cordyline terminnalis*, *Talinum paniculatum*, *Ocimum gratissimum*, *Plantago major*; forest habitat with 27 species (30%) represented by *Erythrophalum scandens*, *Dracaena angustifolia*, *Pandanus kaida*, *Sargentodoxa cuneata*. At the edge of the forest and shifting cultivation, 26 species (28.89%) are represented by *Ampelopsis cantoniensis*, *Streptocaulon juvenas*, *Codonopsis javanica*, *Elephantopus mollis*. There are only six species (6.67%), mainly climbing and herbaceous plants such as *Homalomena occulta*, *Angiopteris evecta*, *Acorus calamus*, *Polygonum chinense*.



Stephania rotunda Lour.



Coscinium fenestratum (Gaertn.)
Colebr.



Myrmecodia tuberosa Jack



Ardisia silvestris Pitard



Homalomena occulta (Lour.)
Schott



Anoectochilus setaceus Blume



Codonopsis javanica (Blume) Hook



Drynaria bonii Christ



Drynaria roosii Nakaike

Figure 4. Some species of medicinal plants are threatened

Some species of medicinal plants have been domesticated from the wild and grown in home gardens by local people, such as *Dianella nemorosa*, *Ampelopsis cantoniensis*, *Stephania rotunda*, *Homalomena occulta*, *Acorus calamus*. Bringing medicinal plants to grow in the home garden is a necessary and beneficial job. It can be used right away when needed and can preserve and maintain the genetic resources of medicinal plants. However, not all plants can be brought home to grow because the tree may die or not grow due to changes in the living environment. Therefore, it is necessary to protect these species and their unique habitat in the wild.

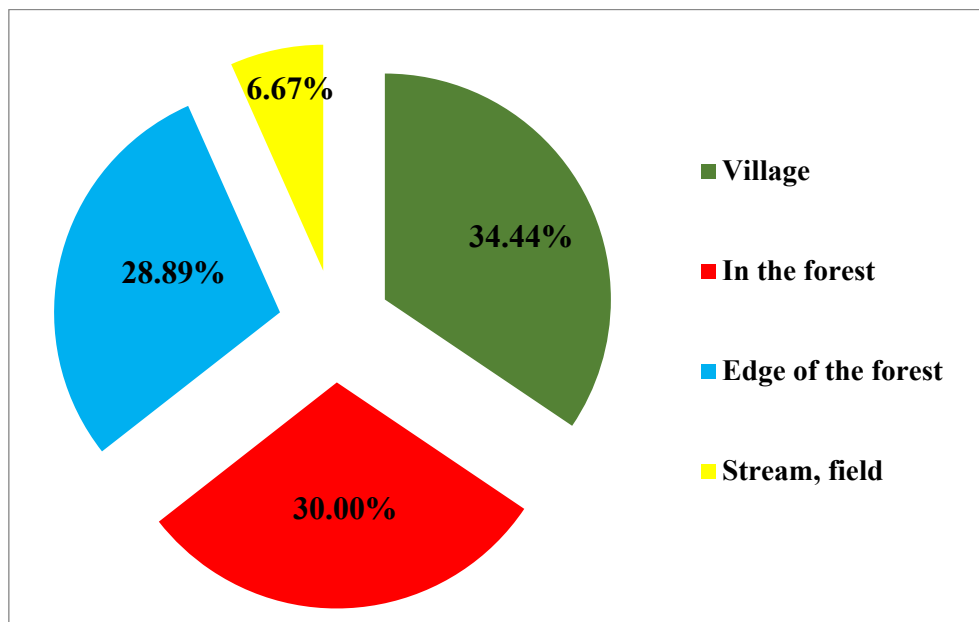


Figure 5. Distribution of medicinal plants by habitat

3.2.2. Experience in using medicinal plants parts

The composition of chemical compounds and pharmaceutical properties effective in treating diseases is often unevenly distributed in each part of medicinal plants. Therefore, Tay people's research on the use of parts of medicinal plants has practical and necessary meaning to maximize the effectiveness of remedies and treatment of medicinal plants. The frequency of using parts of medicinal plants is shown in Table 3 and Appendix 1.

Table 3. Frequency of using parts of medicinal plants

No.	Parts-used	No. of species	Percentage
1	Stem	24	26.09
2	Whole plant	17	18.48
3	Leaves	16	17.39
4	Roots	9	9.78
5	Tuber	9	9.78
6	Fruit	5	5.43
7	Bark	4	4.35
8	Seeds	3	3.26
9	Flower	3	3.26

10	Rhizome	2	2.17
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Note: The total percentage is more significant than the actual by one species with many different uses.

Most of the parts medicinal plants on the ground (78.26%) were used by the Tay ethnic community to treat and take care of health. Among them, the stem was used most (26.09%), some species: *Anoectochilus setaceus*, *Desmodium styracifolium*, *Scoparia dulcis*, etc.; followed by the whole plant (18.48%): *Crinum latifolium*, *Amaranthus tricolour*, *Ardisia silvestris*, etc.; leaves (17.39%) including *Ampelopsis cantoniensis*, *Parabarium micranthum*, *Sargentodoxa cuneata*, etc. Parts of different underground medicinal plants, such as roots and rhizomes, also treat diseases (Table 5). In particular, root (9.78%) typical medicinal plants: *Urena lobata*, *Ficus altissima*, *Leea robusta*, *Argyrea nervosa*, etc.; Tubers (9.78%) including species *Dioscorea zingiberensis*, *Smilax perfoliata*, etc. Fruits (5.43%), Bark (4.35%), Flowers (3.26%), and the lowest is Rhizome (2.17%). In most cases, juices made from leaves and bark are used in medicines, while fruits are eaten raw. In this study, the Tay ethnic community mainly uses whole plants and stems. This will not guarantee the sustainable Harvest of medicinal plants. It is difficult to protect and maintain the wild medicinal plants, their habitats.

3.2.3. Experience in collecting medicinal plants of the Tay ethnic community

According to the experience of Tay people, the collection of medicinal plants at the right time (seasonal) is crucial because it determines the effectiveness of treatment. On the other hand, the rate of active ingredients in medicinal plants depends on each period of growth and development (Table 4 and Appendix 1).

Table 4. Experience in harvesting seasonal medicinal plants

No.	Harvest season	No. of species	Percentage
1	Year-round	72	80
2	Seasonal	18	20
Total		90	100

Table 4 showed that most medicinal plants were collected year-round (80%); some typical species are *Gynochthodes umbellata*, *Coscinium fenestratum*, *Codonopsis javanica*, etc. Harvest season is based on many factors, such as what disease? What medicinal plants? What parts are used etc.? For fruits and seeds ripe, it is harvested, this is a period of accumulation of many active ingredients to help the use of medication to achieve most effective such as *Pandanus kaida* collected during the rainy season from May to August, *Musa paracoccinea* from October to March, *Wurfbainia villosa*, *Alpinia roxburghii* from May to September. The tree's bark is harvested in the fall and winter; a characteristic that identifies the harvest time is that the stems turn from green to brown or purple and are collected at easy peeling: *Heptapleurum ellipticum*, *Ficus hirta subsp. roxburghii*, etc. Flowers are harvested in the summer (the rainy season): Harvest is the time to flower; if there are flower buds, it is collected when the tree has 30% flowering, some species as *Datura stramonium*, *Artemisia vulgaris*, *Acmella oleracea*, etc. For leafy, it can be harvested in the late spring and rainy season. For leaves of herbaceous are harvested when the tree stops growing: *Polyscias fruticosa*, *Anoectochilus setaceus*, *Acorus calamus*, etc.

3.2.4. Experience of Tay ethnic group about how to preserve and use medicinal plants

According to the survey and interviews of physicians, people with experience in collecting and using medicinal plants of the Tay ethnic group showed that the methods of preserving and using medicinal plants are quite diverse and abundant. Depending on the harvest season, parts used, diseases, and medicinal plants, there are different ways to preserve and use (Table 5 and Appendix 1).

Table 5. Method of preserving medicinal plants

No.	Storage method	No. of species	Percentage
1	Dry preservation	41	45.56
2	Dry and fresh preservation	34	37.78
3	Fresh preservation	15	16.67

The method of dry preservation, dry combined with fresh and fresh, was used by Tay people to store medicinal plants. In particular, the dry preservation method is the largest (45.56%); the characteristics of this group are the long-term preservation period, which can preserve season after season, even years, year after year to use. Before preserving, it is chopped, crushed, or exposed (the stem, leaves, flowers, etc.) in the sun or dried in the shade depending on the species, parts used. People in the primary fall season use this method; it can be harvested once, stored, and use when needed. This group includes medium, small wood, shrubs, vines, and herbaceous plants focusing on stems and roots, notable species such as *Stephania rotunda*, *Dracaena angustifolia*, *Drynaria roosii*, *Drynaria bonii*, etc. The dry and fresh preservation (37.78%) is used fresh after harvesting or dryly as *Syzygium nervosum*, *Coix lachrymajobi*, *Taraxacum* sect. *taraxacum*, *Polyscias fruticosa*, etc. The fresh preservation method (16.67%), characteristics only occur quickly before processing, such as cooking, drinking water, or retiring used water, represented as *Centella asiatica*, *Oxalis acetosella*, *Acmella oleracea*, *Vitex trifolia*, etc.

Table 6. Method of using medicinal plants of Tay ethnic group

Methods of use	Using	No. of species	Percentage
Use outside	Crush it and apply it to the wound	15	16.67
	Boil water, then a shower	2	2.22
	Soak alcohol to massage	1	1.11
Total			20
Use in	Boil water to drink	76	84.44
	Cooking	14	15.56
	Squeeze drinking water	6	6.67
	Soak alcohol to drink	1	1.11
	Burning and smell	1	1.11
Total			108.89

Note: The total percentage is more significant than a species with many different uses than the actual one.

The method of internal use and external were used to treat diseases by Tay ethnic community. Most of the internal use method (108.89%) was used to treat diseases because the medicinal plants used directly are more effective than external ones. Five ways to use were determined in this group in which boil water to drink predominates (84.44%). This group is represented by *Sargentodoxa cuneata*, *Eurycoma longifolia*, *Coscinium fenestratum*, *Myrmecodia tuberosa*, etc. Followed by the group of plants for cooking (15.56%), the species were processed into different dishes and used as daily foods. Some species used combined in many different ways, such as putting medicine on the wound to exert an external effect and eating to treat the disease from inside. Typical species are *Erythralium scandens*, *Anoectochilus setaceus*, *Houttuynia cordata*, *Angelica sinensis*, etc., group of squeeze water to drink (6.67%): *Cissampelos pareira*, *Centella asiatica*, *Catunaregam spinosa*, *Oxalis acetosella*, etc. Group soaks alcohol to drink,

burning, and smell (1.11%). The medicinal plants used outside (20%). The use of crushing to cover the wound (16.67%), mainly the medicinal plants use leaves and stems such as *Drynaria roosii*, *Drynaria bonii*, *Dieffenbachia amoena*, etc. The bathing water plants (2.22%) use leaves for cooking water to treat scabies, foot, and chickenpox, such as *Vitex trifolia*, *Persicaria chinensis*. The only group of wine-soaked for massage is *Acmella oleracea* (1.11%).

3.2.5. Indigenous knowledge of Tay people on treatment of diseases

The survey result collected information showed that Tay's experience using medicinal plants is vibrant and unique. A medicinal plant species can be used to treat many different diseases. However, some diseases must be used in combination with many medicinal plants. The results are indicated in Table 7 and Appendix 1.

Table 7. Diseases group treated by Tay ethnic community with medicinal plants

No	Treatment group	No. of species	Percentage
1	Neurological diseases (<i>sciatica, sedation, insomnia</i>)	32	35.56
2	Digestive diseases (<i>diarrhea, constipation, abdominal distention, abdominal pain</i>)	30	33.33
3	Osteoarthritis disease (<i>joint pain, arthritis, bone pain, lumbar spine</i>)	26	28.89
4	Liver diseases (<i>hepatitis, hepatomegaly</i>)	11	12.22
5	Stomach disease (<i>stomach pain, stomach ulcers, colon</i>)	8	8.89
6	Women's diseases (<i>menopause, menstrual irregularities, pregnancy control</i>)	4	4.44
7	Supplement (<i>Kidney, blood, liver, health, tonic</i>)	6	6.67
8	Skin diseases (<i>boils, scabies, ulcers, rash, urticaria</i>)	5	5.56
9	Diseases caused by animal bites (<i>snake bite, centipede bite</i>)	5	5.56
10	Respiratory diseases (<i>cough, throat, bronchus, lung, cough, cough with sputum</i>)	3	3.33
11	Wound diseases (<i>hemostasis, hematoma, swelling, disinfection, sprain</i>)	3	3.33
12	Cardiovascular diseases (<i>heart failure, high blood pressure</i>)	3	3.33
13	Weather sickness (<i>flu, sunburn, headache, sickness, fever</i>)	1	1.11

The group neurological, digestive, osteoarthritis is a joint disease group that use medicinal plants to treat. In particular, the most is the medicinal plants treating neurological diseases (35.56% of total species) such as *sciatica*, *sedation*, *insomnia*, etc. Followed by digestive diseases (*diarrhoea*, *constipation*, *abdominal distention*, *abdominal pain*), 30 species accounted for a relatively high rate of 33.33%. Osteoarthritis disease (*arthralgia*, *arthritis*, *bone pain*, *lumbar spine*), 26 species of plants are used, accounting for 28.89%. Liver diseases (*hepatitis*, *hepatomegaly*) are 11 species (12.22%). Diseases of the stomach, women, skin, animal bases, etc., are pretty low. The community also has experience in using some medicinal plants to detoxify, especially toxins caused by animal species such as snake bites and centipedes. According to statistics, five species of plants are capable of poisoning, accounting for 5.56% of the total species. The group with the least number is the group of weather-induced diseases (*influenza*, *sunburn*, *headache*, *illness*, *fever*). Thus, the analytical results have shown that the Tay people's knowledge about disease groups and the use of medicinal plants to treat is quite diverse and abundant.

3.2.6. Typical remedies used by the Tay people

We have found and documented many valuable remedies used by indigenous people for health care and treating joint to complex diseases. Within the scope of this paper, we only introduce some typical and typical herbal remedies of the Tay ethnic group in the study area.

a. Remedy 1: Cure cirrhosis and ascites

Treatment phase	Type of medicine	Parts-used	How to prepare and use	Note
The first ten days	<i>Ficus altissima</i> (Mạy lũng)	Roots	Sliced or cut into short pieces, dried, dry roasted.	Drink all, continue to add more water, cook until the colour is light.
	<i>Lasia spinosa</i>	Roots	Take a cup of each type, get water to drink instead of filtered water every day.	
	<i>Chrysopogon aciculatus</i>	Whole plants		
Ten days later	<i>Streptocaulon juvenas</i> (Cu lək cək)	Tubers		Streptocaulon juvenas should be steamed nine times with <i>Vigna unguiculata</i> subsp. <i>unguiculata</i> and lower the earth nine times to detoxify the tubers.
	<i>Dioscorea hamiltonii</i> (Mần dền)	Tubers	Thinly sliced tubers, dried and roasted.	
	<i>Nelumbo nucifera</i>	Seeds	- Each type takes a cup to cooking drinking water.	
	<i>Polyscias fruticosa</i> (Co đúc lẳng)	Tubers	- Divide into two times, drink morning and evening	
	<i>Codonopsis javanica</i> (Mần cáy)	Tubers		
Last ten days	<i>Vigna angularis</i> (Thúa đeng)	Seeds	- Take two teaspoons, one cup each, dry roasted.	<i>Vigna unguiculata</i> subsp. <i>unguiculata</i> and <i>Vigna angularis</i> mixed, roasted until done, <i>Breynia androgyna</i> only dry roasted
	<i>Vigna unguiculata</i> subsp. <i>unguiculata</i> (Thúa đằm)	Seeds	- Mix, then cook drinking water instead of filtered water every day.	
	<i>Breynia androgyna</i> (Phắc bón)	Whole plants		

b. Remedy 2: Treatment of fractures, joint pain.

- *Drynaria bonii* or *Drynaria roosii*: Collect rhizomes, remove leaves and hairs. One part is thinly sliced, dried; the rest is pounded fresh. Then use the young banana leaves to heat on the fire until the banana leaves are soft, take the pounded fresh part to cover the broken or sore, cover the area with the heated banana leaf and fix it with a string for medicine not to spill out, change one time a day. The dried part takes about 1 cup of drinking water instead of filtered water every day.

- *Dissochaeta barbata* + *Gouania leptostachya*: Collect fresh leaves, pound them, then mix these two types and apply on broken or sore hands (legs).

c. Remedy 3: Treatment of rickets and growth retardation in children

- *Coix lachrymajobi*: Collecting dried fruit, separating the inner core into a powder
- *Centella asiatica*: collect roots and tubers, then wash, dry and grind.

Mix the two ingredients, take two teaspoons mixed with about 250ml of boiling water to warm, then add one tablespoon of honey. Drink twice a day, morning and evening.

d. Remedy 4: Treating boils

Tradescantia zebrina: Collect fresh leaves, clean, chew small, then apply to the boil, take a clean cloth to fix. Change the leaves once a day until the boil is gone.

e. Remedy 5: Cure snakebite wounds

Amaranthus spinosus var *inermis*: Collect the leaves, pound them, squeeze out the water to drink, and apply the rest to the wound. Repeat this 4-5 times a day.

f. Remedy 6: Treat stomach pain

Nekemias cantoniensis: Collect the whole body except the roots, wash, chop, then take a wet blanket to incubate overnight until white plastic spots appear on the leaves, then dry, take 1 cup with about 2 liters of water, cook until about 1 liter of water, then use it instead of filtered water every day.

g. Remedy 7: Treat chronic cough and asthma

Datura stramonium: Collect dried petals on the tree, use 2-3 flowers to roll into clean paper, smoke like a cigarette.

Note: Do not use other parts of the plant because they contain toxins.

h. Remedy 8: Treat toothache and tooth decay

- *Acemella oleracea*: Collect fresh flowers, soak in wine with the ratio of 1 cup of flowers (rice bowl) soaked with 0.5 liters of alcohol. Soak for at least two months. Take water to hydrate for about 2 minutes, then take the flower to cover the tooth's position with decay.

3.2.7. Some measures to preserve and develop medicinal plants

Based on the indigenous knowledge about medicinal plants of the Tay ethnic group, we propose the process of preserving them as follows:

Step 1: Preliminary identification of information on endangered, precious, and rare species, including nine species:

- Rarity of medicinal plants in nature: *Anoetochilus setaceus*, *Myrmecodia tuberosa*, *Drynaria bonii*, *Codonopsis javanica*, *Ardisia silvestris*, *Homalomena occulta*, *Drynaria frutnei*, *Coscinium fenestratum*, *Stephania rotunda*.

- Level of exploitation (little, medium, high, severe)

- Purpose of being exploited (use, commercial)

From there, select priority species that need to be conserved according to the above criteria.

Step 2: Propose some conservation solutions

- Solutions using models suitable to local conditions and characteristics

+ Model of medicinal plant garden

+ Conservation model of medicinal plants under the forest canopy

- Solution to preserve in situ: This is a form of zoning for in-situ conservation. This form applies to all objects that need to be conserved, not in danger of extinction or invasion. To well implement the protection of medicinal plants on the spot, it is necessary to determine the distribution of medicinal plants and mobilize local people's participation in the investigation, monitoring, and zoning for protection. This part provides essential information about the distribution area, quantity, and quality of medicinal plants.

- Solution to preserve in Ex-situ: Propagation to expand the area of medicinal plants under the canopy of planted forests and home gardens for *Codonopsis javanica*, *Stephania rotunda* because these are two very few species in the study area.

- Propaganda solution: Propaganda and guide local doctors and communities to properly exploit to recover precious medicinal species based on the following criteria:

- + Only mature medicinal plants with whole medicinal ingredients are collected
- + Retain regenerated trees, small trees that are not eligible for collection
- + Harvest according to the season, according to the distribution

Complete understanding of harvesting techniques and methods

- + Documenting folk remedies

The resources of medicinal plants and indigenous knowledge about the use of medicinal plants of the Tay ethnic group are incredibly diverse, rich, and valuable treasures of knowledge if they know how to preserve, discover and promote properly.

3.3. Discussion

The research results indicated that knowledge of the Tay ethnic community in the Lan Tranh protection forest of medicinal plants is rich. It includes medicinal plant species composition and life-form, parts used, harvest season, method of storage, and use of medicinal plants to the highest efficiency. The study's findings showed that herbal medicines have great potential to treat different types of diseases. Local people have a detailed and profound knowledge of the characteristics of species, parts of use, distribution, life-forms, harvesting time, storage methods, way of using medicinal plants for treatment 13 different groups of diseases are highly effective. However, when asked about the changing status of medicinal plants, the Tay community listed species that have been heavily exploited, reducing their numbers and threatening their distribution areas. The disappearance of these species is entirely possible due to unsustainable fishing practices.

For necessary remedies to treat incurable diseases, only traditional and experienced physicians can prescribe medicine for patients. Typically, treatments for cirrhosis are used very effectively, include three rules:

Stage 1: Use medicines to treat diseases.

Stage 2: Using medicine to treat the disease in combination with using medicinal plants to improve health.

Stage 3: Use a complete health recovery tonic.

Indigenous knowledge about medicinal plants is formed by the ecological diversity along with the differences in cultural traditions of ethnic communities. The same ethnic group that resides in different ecological regions will form different understandings about nature and culture. These include knowledge in the use of wild plants to treat diseases and health care. Therefore, the study of indigenous knowledge uses traditional medicinal plants to provide a scientific database and brings tremendous significance. A species has many different uses. A disease may only need to use a medicinal plant to treat the disease. But there are also some cases to treat a disease with many medicinal plants combined to achieve efficiency. This knowledge is supplemented through experiences from healing practices and failures in the use of medicinal plants. Knowledge of medicinal plants is associated with the culture, beliefs, customs, habits of each ethnic community, locality, and even among members of the same ethnic community. This difference depends on experience resources, ecological conditions, and the ability to control resources.

Traditional medicinal plants play an essential role in the health care and treatment of the community. Most of the local people here still rely on traditional remedies for primary health care because the residential areas of the people here are often remote areas far away, health care facilities are challenging. Knowledge of the use of traditional plants in the younger generation is a barrier to the preservation and conservation from generation to generation. Because most of the knowledge about using medicinal plants is drawn from older people, while young people have very little knowledge. Moreover, a part of the local people tends to use medicine instead of traditional medicine. Therefore, knowledge about using medicinal plants and traditional healing methods is being lost quickly. Socio-economic development is also one of the significant issues affecting the overexploitation of forest resources, including medicinal plant resources that cause loss of residence and place where the distribution leads to decline firmly in ingredients, the number of valuable medicinal plants, this is a matter of concern that needs to be addressed promptly. Another reason is that the Tay ethnic group only transmits their knowledge to family members, and when older adults are dead, this knowledge is also lost. To protect and develop knowledge of traditional medicinal plants, their use should be encouraged, especially in the younger

generation. Therefore, this study will be helpful for managers, policymakers, conservation organizations to manage and sustainably use this resource.

IV. CONCLUSION

Indigenous knowledge of the Tay ethnic community in the Lan Tranh protection forest is diverse and rich in medicinal plants. They have a deep understanding of the composition of medicinal plants and have a unique experience in the distribution of medicinal plants, the harvest, methods of preserving, processing, and using medicinal plants most effectively. Besides, the rich knowledge of the Tay people on the use of life-forms of medicinal plants for health care and treatment of 13 different disease groups also were recorded. Knowledge of medicinal plant components and uses can help decision-makers manage and develop appropriate strategies to improve the management of medicinal plant resources in this area. These data will be helpful for forest managers to re-establish some of the forest blocks provided to local people in collecting medicinal plants. Moreover, it will help minimize conflicts between the forest management agency and the interests of local people. Also, this effort will be a step for the sustainable use of medicinal plants in Vietnam.

ACKNOWLEDGEMENT

We would like to express our sincere thanks for the help and valuable support from the Directorate and forestry staff of the Lan Tranh Protection Forest. I sincerely thank Tay people, especially healers, physicians, for their warm cooperation in the field survey. Last but not least, I would like to thank all those who participated in the comment, giving me many ideas during the process of completing this research.

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Traditional Knowledge About Medicinal Plants Of Tay Ethnic Community In South Vietnam: A Case Study At Lan Tranh Protection Forest, Lam Dong Province

APPENDIX 1

No	Scientific name	Vietnamese name	Local name	Family	Harvest season	Life forms	Habitats	Parts Used	Preservation	Processing	Disease group
1	<i>Acorus calamus</i> L.	Thủy xương bồ	Kíp mã ra	Acoraceae		Herb	2	Whole plant	Fresh and dry	Cook water to bathe	Digestive, Osteoarthritis
2	<i>Achyranthes aspera</i> L.	Cỏ xước	Pắc thất	Amaranthaceae		Herb	3	Roots	Dry	Cook water to bathe	Liver diseases
3	<i>Amaranthus spinosus</i> L. var <i>inermis</i> Lauterb. & K.Schum.	Dền xanh	Hom khóa	Amaranthaceae		Herb	4	Leaves	Fresh and dry	Cook water to bathe, Crush it, apply it to the wound	Snakebite, Sedation
4	<i>Amaranthus viridis</i> L.	Dền com	Hom hắc	Amaranthaceae		Herb	4	Leaves	Fresh and dry	Cook water to bathe, Crush it, apply it to the wound	Snakebite, Sedation
5	<i>Amaranthus tricolor</i> L.	Dền đỏ	Hom đeng	Amaranthaceae		Herb	4	Leaves	Fresh and dry	Cook water to bathe, Crush it, apply it to the wound	Snakebite, Sedation
6	<i>Crinum latifolium</i> L.	Trinh nữ hoàng cung	Cỏ may trinh nữ hoàng cung	Amaryllidaceae		Herb	4	Leaves	Fresh and dry	Cook water to bathe, Crush it, apply it to the wound	Osteoarthritis, Women's diseases
7	<i>Centella asiatica</i> (L.) Urb.	Rau má	Cỏ phác kền	Apiaceae		Herb	4	Whole plant	Fresh	pounding water	Liver, Sedation
8	<i>Angelica sinensis</i> (Oliv.) Diels, radix.	Đương quy	Cỏ may đương quy	Apiaceae	October to February	Herb	4	Tuber	Fresh and dry	Cooking, Cook water to bathe	Digestive, Osteoarthritis, Sedation
9	<i>Urceola micrantha</i> (Wall. ex G.Don) D.J.Middleton	Đỗ trọng dây	Thau pinh	Apocynaceae		Vines	1	Stem	Dry	Cook water to bathe	Liver diseases, Osteoarthritis disease

Traditional Knowledge About Medicinal Plants Of Tay Ethnic Community In South Vietnam: A Case Study At Lan Tranh Protection Forest, Lam Dong Province

10	<i>Streptocaulon juvenas</i> (Lour.) Merr.	Hà thủ ô trắng	Cu lək cək	Apocynaceae		Vines	3	Tuber	Dry	Cook water to bathe	Sedation, Digestive diseases
11	<i>Urceola polymorpha</i> (Pierre ex Spire) D.J.Middleton & Livsh.	Lá giang	Xỏm lum	Apocynaceae		Vines	3	Stem	Fresh	Cook water to bathe	Kidney stones
12	<i>Dieffenbachia amoena</i> Bull.	Vạn niên thanh	Co xiên bảo lục	Araceae		Herb	1	Leaves	Fresh	Mill and cover the wound, Cook water to bathe	Hemostasis
13	<i>Homalomena occulta</i> (Lour.) Schott	Thiên niên kiện	Vắc hương	Araceae		Herb	2	Stem	Dry	Cook water to bathe	Osteoarthritis, digestive, stomach
14	<i>Heptapleurum ellipticum</i> (Blume) Seem.	Chân chim lá bóng	May táng	Araliaceae	October to March	Vines	1	Bark	Dry	Cook water to bathe	Osteoarthritis disease
15	<i>Polyscias fruticosa</i> (L.) Harms	Đinh lăng	Co đúc lăng	Araliaceae		Shrubs	4	Whole plant	Fresh and dry	Cook water to bathe, Crush it, apply it to the wound	Sedation, hemostasis, digestive, tonic
16	<i>Dracaena angustifolia</i> (Medik.) Roxb.	Bồng bông lá nhỏ	Nhà hen	Asparagaceae		Herb	1	Roots	Fresh and dry	Cooking, Cook water to bathe	Improve health, Digestive diseases, Sedation
17	<i>Cordyline fruticosa</i> (L.) A.Chev.	Huyết dụ	Trương shrink	Asparagaceae		Shrubs	4	Stem	Dry	Cook water to bathe	Osteoarthritis disease
18	<i>Dianella ensifolia</i> (L.) Redouté	Hương bài	Xạ cang	Asphodelaceae		Herb	2	Leaves	Fresh and dry	Cooking, Cook water to bathe	Cough
19	<i>Elephantopus mollis</i> Kunth	Cúc chân voi mềm	Nét ty	Asteraceae	August to December	Herb	3	Stem	Dry	Cook water to bathe	Sedation, Digestive diseases
20	<i>Taraxacum sect. taraxacum</i> F.H.Wigg.	Bồ công anh lùn	Hắc pao	Asteraceae		Herb	4	Leaves	Fresh and dry	Cook water to bathe, Crush it, apply it to the wound	Sedation, Osteoarthritis disease

Traditional Knowledge About Medicinal Plants Of Tay Ethnic Community In South Vietnam: A Case Study At Lan Tranh Protection Forest, Lam Dong Province

21	<i>Gymnanthemum amygdalinum</i> (Delile) Sch.Bip.	Lá đắng	Đi my	Asteraceae	June to September	Shrubs	4	Stem	Dry	Cook water to bathe	Liver
22	<i>Artemisia vulgaris</i> L.	Ngải cứu	Nhà ngải	Asteraceae		Herb	4	Stem	Fresh and dry	Cook water to bathe, Cooking	Stomach, Osteoarthritis disease
23	<i>Pluchea indica</i> (L.) Less.	Cúc tần	Sùng hao	Asteraceae		Shrubs	4	Whole plant	Fresh and dry	Cook water to bathe, Cooking	Osteoarthritis, digestive
24	<i>Acmella oleracea</i> (L.) R.K.Jansen	Cúc áo hoa vàng	Đầu ảo	Asteraceae		Herb	3	Flowers	Fresh	Pickled wine	Tooth decay
25	<i>Eclipta prostrata</i> (L.) L.	Cỏ mực	Lạc nak	Asteraceae		Herb	4	Stem	Fresh	mill and cover the wound, Cooking	Hemostasis
26	<i>Codonopsis javanica</i> (Blume) Hook.f. & Thomson	Đang sâm	Mần cáy	Campanulaceae	October to February	Vines	3	Tuber	Fresh and dry	Cooking, Cook water to bathe	Sedation, blood pressure, Digestive diseases, tonic
27	<i>Callisia fragrans</i> (Lindl.) Woodson	Lược vàng	Vi lương	Commelinaceae	April to September	Herb	4	Whole plant	Dry	Cook water to bathe	Reduce pain and swelling
28	<i>Tradescantia zebrina</i> Bosse	Hồng trai	Choáp pi deng	Commelinaceae		Herb	4	Stem	Dry	Cook water to bathe	Diuretic, Sedation
29	<i>Argyreia nervosa</i> (Burm.f.) Bojer	Bạc thau	Pắc hấp	Convolvulaceae		Vines	1	Roots	Dry	Cook water to bathe, Crush it, apply it to the wound	Lumbar
30	<i>Cuscuta chinensis</i> Lam.	Tơ hồng vàng	Thỏ ty xử	Convolvulaceae		Epiphyte	4	Whole plant	Dry	Cook water to bathe	Sedation, kidney tonic
31	<i>Momordica balsamina</i> L.	Mướp đắng	Mák khấy	Cucurbitaceae		Vines	1	Stem	Fresh and dry	Cooking, Cook water to bathe	Sedation, Digestive diseases
32	<i>Tetracera scandens</i> (L.) Merr.	Dây chiều	Phau lịn xư	Dilleniaceae		Vines	1	Stem	Dry	Cook water to bathe	Osteoarthritis disease

Traditional Knowledge About Medicinal Plants Of Tay Ethnic Community In South Vietnam: A Case Study At Lan Tranh Protection Forest, Lam Dong Province

33	<i>Dioscorea zingiberensis</i> C.H.Wright	Từ tam giác	Mần dền	Dioscoreaceae	October to February	Vines	3	Tuber	Dry	Cooking	Sedation
34	<i>Ricinus communis</i> L.	Thầu dầu	Co lòng chùng	Euphorbiaceae	February to August	Shrubs	4	Seeds	Fresh	pounding water	Postpartum disease, Osteoarthritis disease
35	<i>Euphorbia thymifolia</i> L.	Cò sữa lá nhỏ	Nhà nôm	Euphorbiaceae		Herb	4	Whole plant	Fresh and dry	Cook water to bathe	Digestive
36	<i>Grona styracifolia</i> (Osbeck) H.Ohashi & K.Ohashi	Kim tiền thảo	Xạ thua tum	Fabaceae		Herb	3	Whole plant	Dry	Cook water to bathe	Kidney stones
37	<i>Abrus precatorius</i> L.	Cam thảo dây	Co nam hủ	Fabaceae		Vines	3	Whole plant	Dry	Cook water to bathe	Diuretic
38	<i>Senna tora</i> (L.) Roxb.	Thảo huyết minh	Cóp pè	Fabaceae	June to September	Shrubs	4	Seeds	Dry	Cook water to bathe	Sedation, high blood pressure
39	<i>Gnetum formosum</i> Markgr.	Dây gắm	Thau muối	Gnetaceae		Vines	1	Stem	Fresh and dry	Cook water to bathe	Osteoarthritis disease
40	<i>Prunella vulgaris</i> L.	Hạ khô thảo	Co mây hạ khô thảo	Lamiaceae		Herb	3	Flowers	Fresh and dry	Cook water to bathe, Crush it, apply it to the wound	Skin diseases, Sedation, liver diseases, snake bite
41	<i>Ocimum gratissimum</i> L.	Hương nhu trắng	Co nhả mân khao	Lamiaceae		Herb	4	Stem	Fresh	Cook water to bathe	Fever
42	<i>Ocimum basilicum</i> L.	Húng quế	Co mây húng quế	Lamiaceae		Herb	4	Whole plant	Fresh and dry	Pounding water	Digestive, respiratory diseases
43	<i>Sargentodoxa cuneata</i> (Oliv.) Rehder & E.H.Wilson	Huyết đằng	Thau lượt	Lardizabalaceae		Vines	1	Stem	Dry	Cook water to bathe	Sedation, Digestive diseases, Osteoarthritis disease
44	<i>Urena lobata</i> L.	Ké hoa đào	Nhà phát byóoc đảo	Malvaceae		Shrubs	3	Roots	Dry	Cook water to bathe	Osteoarthritis disease

Traditional Knowledge About Medicinal Plants Of Tay Ethnic Community In South Vietnam: A Case Study At Lan Tranh Protection Forest, Lam Dong Province

45	<i>Angiopteris evecta</i> (G.Forst.) Hoffm.	Dương xỉ móng trâu	Co kép mạ	Marattiaceae		Shrubs	2	Roots	Fresh and dry	Cooking, Cook water to bathe	Stomach, digestive
46	<i>Dissochaeta barbata</i> (Triana ex C.B.Clarke) Kartn.	Mua ăn đắng	Mak nak	Melastomataceae		Shrubs	3	Leaves	Fresh	Mill and cover the wound, Cook water to bathe	Osteoarthritis disease
47	<i>Cissampelos pareira</i> L.	Tiết dê	Co mák chay	Menispermaceae		Vines	3	Leaves	Fresh	pounding water	Sedation, Digestive diseases
48	<i>Coscinium fenestratum</i> (Gaertn.) Colebr.	Vàng đắng	Co khém	Menispermaceae		Vines	1	Stem	Dry	Cook water to bathe	Digestive diseases
49	<i>Stephania rotunda</i> Lour.	Bình vôi	Cái phôm	Menispermaceae		Vines	4	Stem	Dry	Pickled wine	Sedation, Stomach
50	<i>Ficus altissima</i> Blume	Đa	Mạy lũng	Moraceae		Medium wood	1	Roots	Dry	Cook water to bathe	Liver diseases
51	<i>Ficus hirta</i> subsp. <i>roxburghii</i> (Miq.) C.C.Berg	Vú bò	Tam ca phi	Moraceae	October to March	Small wood	3	Bark	Fresh and dry	Cook water to bathe	Sedation
52	<i>Ficus pumila</i> L.	Sung thần lằn	Wà xộp	Moraceae		Vines	2	Whole plant	Fresh and dry	Cook water to bathe	Osteoarthritis, Women's diseases, digestive
53	<i>Musa paracoccinea</i> A.Z. Liu. & D. Z. Li	Chuối rừng hoa đỏ	Cuối đông	Musaceae	March to July	Herb	1	Fruits	Dry	Cook water to bathe	Sedation, Digestive diseases
54	<i>Syzygium nervosum</i> A.Cunn. ex DC.	Trâm vôi	Cao mạy xả	Myrtaceae		Medium wood	1	Leaves, Bark	Fresh and dry	Cook water to bathe	Digestive diseases
55	<i>Erythralum scandens</i> Blume	Dây bò khai	Khau hương	Olacaceae		Vines	1	Stem	Fresh and dry	Cooking, Cook water to bathe	Liver diseases
56	<i>Osmanthus fragrans</i> Lour.	Mộc hương ta	Tò mua	Oleaceae	October to March	Medium wood	1	Bark	Dry	Cook water to bathe	Digestive diseases, Stomach disease

Traditional Knowledge About Medicinal Plants Of Tay Ethnic Community In South Vietnam: A Case Study At Lan Tranh Protection Forest, Lam Dong Province

57	<i>Anoectochilus setaceus</i> Blume	Lan kim tuyến	Mạ pèn kim tuyến	Orchidaceae	April to September	Herb	1	Whole plant	Fresh and dry	Cooking, Cook water to bathe	Liver diseases, Sedation
58	<i>Oxalis acetosella</i> L.	Chua me núi	Co ka túm	Oxalidaceae		Herb	4	Stem	Fresh	pounding water	Diuretic
59	<i>Pandanus kaida</i> Kurz	Dứa đại	Mác dự đông	Pandanaceae		Small wood	1	Roots, Fruits	Dry	Cook water to bathe	kidney stones, Sedation
60	<i>Passiflora foetida</i> L.	Lạc tiên	Co đào tiên	Passifloraceae		Vines	3	Whole plant	Dry	Cook water to bathe	Sedation, women's diseases
61	<i>Breynia fruticosa</i> (L.) Müll.Arg.	Bồ cu vẽ	Co mây bồ cu vẽ	Phyllanthaceae		Shrubs	3	Leaves	Dry	Cook water to bathe, Crush it, apply it to the wound	Skin diseases, Digestive diseases
62	<i>Breynia androgyna</i> (L.) Chakrab. & N.P.Balakr.	Bồ ngót	Phắc bón	Phyllanthaceae		Shrubs	4	Leaves	Fresh	Cook water to bathe	Diuretic, postpartum disease
63	<i>Phyllanthus amarus</i> Schumach. & Thonn.	Diệp hạ châu đắng	Kham nọng	Phyllanthaceae		Herb	4	Whole plant	Fresh and dry	Cook water to bathe, Crush it, apply it to the wound	Snakebite, liver
64	<i>Piper cubeba</i> L. f.	Tiêu thất	Co tiêu đông	Piperaceae		Vines	1	Fruits	Fresh and dry	Cooking, Cook water to bathe	Stomach, digestive
65	<i>Scoparia dulcis</i> L.	Cam thảo nam	Co cam thảo	Plantaginaceae	October to March	Herb	3	Whole plant	Dry	Cook water to bathe	Sedation
66	<i>Plantago major</i> L.	Mã đề	Su mã	Plantaginaceae		Herb	4	Stem	Dry	Cook water to bathe	Diuretic, liver
67	<i>Imperata cylindrica</i> (L.) P.Beauv.	Cỏ tranh	Nhà gà	Poaceae		Herb	3	Stem	Fresh and dry	Cook water to bathe	Sedation, Digestive diseases
68	<i>Coix lachrymajobi</i> L.	Ý dĩ	Pất tươi	Poaceae		Herb	4	Seeds	Fresh and dry	Cook water to bathe	Liver, digestive, diuretic
69	<i>Persicaria chinensis</i> (L.) H.Gross	Thồm lồm	Nók thườnk	Polygonaceae		Herb	2	Stem	Fresh	Cook water to bathe	Skin diseases

Traditional Knowledge About Medicinal Plants Of Tay Ethnic Community In South Vietnam: A Case Study At Lan Tranh Protection Forest, Lam Dong Province

70	<i>Drynaria bonii</i> Christ	Tắc kè đá	Giáo con san chà hou	Polypodiaceae		Epiphyte	1	Rhizomes	Fresh and dry	Mill and cover the wound, Cook water to bathe	Osteoarthritis disease
71	<i>Drynaria roosii</i> Nakaike	Cột toái bở	Co cây pòm	Polypodiaceae		Epiphyte	1	Rhizomes	Fresh and dry	Cook water to bathe	Osteoarthritis
72	<i>Ardisia silvestris</i> Pit.	Khôi nhung	Co mây khôi tía	Primulaceae		Shrubs	1	Leaves	Dry	Cook water to bathe	Stomach
73	<i>Myrmecodia tuberosa</i> Jack	Ồ kiến gai	Rằng mật	Rubiaceae		Epiphyte	1	Stem	Dry	Cook water to bathe	Liver diseases
74	<i>Gynochthodes umbellata</i> (L.) Razafim. & B.Bremer	Nhàu mặt quỷ	Màn sậy káy	Rubiaceae		Vines	1	Roots, leaves	Fresh and dry	Cook water to bathe	Osteoarthritis disease, Sedation
75	<i>Uncaria macrophylla</i> Wall.	Câu đằng lá to	Póc cau	Rubiaceae		Vines	3	Stem	Dry	Cook water to bathe	Blood pressure
76	<i>Catunaregam spinosa</i> (Thunb.) Tirveng.	Găng tu hú	Mây nghiên pa	Rubiaceae		Shrubs	3	Leaves	Fresh	Pounding water	Sedation
77	<i>Houttuynia cordata</i> Thunb.	Diếp cá	Phác vảy	Saururaceae		Herb	4	Whole plant	Fresh	Mill and cover the wound, Cooking	Digestive, Sedation
78	<i>Kadsura coccinea</i> (Lem.) A.C.Sm.	Na rừng	Mak pan oài	Schisandraceae		Vines	1	Roots	Dry	Cook water to bathe	Sedation
79	<i>Eurycoma longifolia</i> Jack	Mật nhân	Co hang lài	Simaroubaceae		Small wood	1	Tuber	Fresh and dry	Cook water to bathe	Digestive diseases, Osteoarthritis disease
80	<i>Heterosmilax gaudichaudiana</i> (Kunth) Maxim.	Khúc khác	Màn túc lăng	Smilacaceae		Vines	3	Tuber	Dry	Cook water to bathe	Osteoarthritis disease
81	<i>Smilax blumei</i> A.DC.	Dây Chông chông	Co kim tang	Smilacaceae		Vines	3	Tuber	Dry	Cook water to bathe	Osteoarthritis disease
82	<i>Datura stramonium</i> L.	Cà độc dược lùn	Co mây cà độc dược	Solanaceae	June to September	Shrubs	4	Flowers	Dry	Burn then smell	Respiratory diseases

Traditional Knowledge About Medicinal Plants Of Tay Ethnic Community In South Vietnam: A Case Study At Lan Tranh Protection Forest, Lam Dong Province

83	<i>Talinum paniculatum</i> (Jacq.) Gaertn.	Thỏ sâm	Cao lý	Talinaceae		Herb	4	Whole plant	Fresh and dry	Cooking, Cook water to bathe	Blood pressure, Osteoarthritis disease, tonic
84	<i>Vitex trifolia</i> L.	Quan âm	Sam tò	Verbenaceae		Medium wood	1	Leaves	Fresh	Cook water to bathe	Skin diseases
85	<i>Clerodendrum paniculatum</i> L.	Ngọc nữ đỏ	Puông pí dèng	Verbenaceae		Shrubs	3	Leaves, Roots	Dry	Cook water to bathe	Diuretic
86	<i>Nekemias cantoniensis</i> (Hook. & Arn.) J.Wen & Z.L.Nie	Chè dây	Khau trà	Vitaceae		Vines	3	Stem	Dry	Cook water to bathe	Stomach pain, Sedation
87	<i>Leea macrophylla</i> Roxb. ex Hornem.	Gỏi hạc lá to	Co mây chia	Vitaceae		Shrubs	1	Roots	Dry	Cook water to bathe	Osteoarthritis disease
88	<i>Wurfbainia villosa</i> (Lour.) Skornick. & A.D.Poulsen	Sa nhân đỏ	Mak nẻng	Zingiberaceae	May to September	Herb	3	Fruits	Dry	Cook water to bathe	Digestive diseases
89	<i>Alpinia roxburghii</i> Sweet	Riềng lá bắc	Tong kà	Zingiberaceae	May to September	Herb	3	Fruits	Dry	Cook water to bathe	Digestive diseases
90	<i>Kaempferia galanga</i> L.	Địa liên	Xạ khương	Zingiberaceae	October to February	Herb	4	Tuber	Fresh and dry	Cook water to bathe	Osteoarthritis disease, digestive

Note: 1: In the forest; 2: Along the stream; 3: Forest edge; 4: Around the village