

DIVERSITY OF MEDICINAL PLANT RESOURCES AND USE VALUES AT TAN PHU PROTECTIVE FORESTS, DONG NAI PROVINCE, VIETNAM

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SUMMARY

The article presents the research results on medicinal plant resources at Tan Phu Protective Forests, Dong Nai Province. Initially, 351 plant species have been identified for medicinal use, belonging to 83 families, 3 plant divisions; in which: Pinophyta has 1 species belonging to 1 family; Polypodiophyta has 11 species belonging to 4 families; Magnoliophyta has 339 species belonging to 78 families. The life form is very diverse with the woody group having the highest number of species 152 species (accounting for 43.3%), the group of herbs having 73 species (20.8%), the group of shrubs, having 72 species (20.5%); The liana has 40 species (11.4%) and the epiphytes has the least with 14 species (4.0%), respectively. Medicinal plants are mainly used to treat groups of pimples, rashes, inflammation with 155 species (accounting for 44.16%); the group used to treat colds and fever with 112 species (accounting for 31.9%); group used to treat dysentery, diarrhea with 107 species (30.5%); group used to treat low and painful anesthesia with 105 species (29.9%); in the digestive system with 104 species (29.63%), respectively. The most commonly used treatment is pounding for topical use and excellent for internal use. Recorded 07 species in Group IIA in Decree 06/2019/ND-CP; 06 species in the Vietnam Red Data Book (2007): 03 species classified as Vulnerable - VU; 03 species classified as Endangered - EN. The medicinal resources here are being over-exploited, so it is necessary to have measures for conservation and development.

Keywords: Dong Nai, diversity, medicinal plant resources, medicinal use, Tan Phu forest.

1. INTRODUCTION

Plant sources of valuable medicinal herbs are being exploited and cultivated, not only in Vietnam but also very popular in many countries around the world. According to the World Health Organization (WHO), 80% of the population in developing countries use drugs of natural origin as the first choice for disease prevention and treatment (WHO, 2002). Because of the fast acceleration of market demand for herbal medicines, and recent controversies related to access, benefit sharing and biopiracy, the documentation of indigenous knowledge is of urgent priority (Bhat et al., 2013). Indigenous knowledge, supplemented by the latest scientific insights, can offer new holistic models of sustainable development that are economically viable, environmentally benign and socially acceptable (Loreau, 2006; Shinwari SK, 2003). Ethnobotany explains the

holistic relationships between plants and people (Khumbongmayum, 2005). Rapid global biodiversity loss is an issue of critical concern, with approximately 5000 species of animals and 25000 species of plants currently listed as endangered, threatened, or at risk of overexploitation (Cites, 2003).

Tan Phu protective forest is located in Dinh Quan district, Dong Nai province, with a total area of 13,862.2 hectares. The natural forest is mainly concentrated in the territory of 2 communes Gia Canh and Phu Ngoc in the geographical coordinates 107°24'30" - 107°27'30" East longitude to 11°02'32" - 11°10'00" Northern latitude. Until recently, there was no research on medicinal plant resources here. Meanwhile, medicinal plants are still exploited uncontrollably by local people, creating the risk of depleting this important resource. To contribute to creating a basis for

the conservation and sustainable development of plant resources, we have conducted a record survey of medicinal plant species to build and supplement a list of medicinal plant species. At the same time, a list of tree species can be planted and replicated to limit exploitation in the area.

2. RESEARCH METHODOLOGY

2.1. Method of field investigation and survey

We used the investigation transect method. These transects are distributed in other types of habitats including villages, fields, streams, along forest edges, fields.

2.2. Interview survey

Each time a questionnaire was administered to the interviewee, a senior relative/friend and a representative of the local administration from the office of the area sub-chief who was familiar with interviewee, were requested to accompany the interviewer. The revised questionnaire was used for gathering data about medicinal plants of the study area. This composition formed a very productive interaction that provided an enabling environment for Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal (PRA) research to take place successfully.

2.3. Collection and processing of specimens

Collect information on medicinal plants including common and ethnic names; distribution, life-forms, habitat, parts of use (stems, roots, flowers, fruits, seeds,...). Analyzing and classifying specimens: based on comparison on morphological characteristics of collected plant samples combined with the

experience of experts, conducting comparisons with the descriptions in the a set of specialized botanicals such as dictionary of medicinal plants (Vo Van Chi, 2012); An Illustrated Flora of Vietnam (Pham Hoang Ho, 1999-2000); Vietnamese medicinal plants and medicine (Do Tat Loi, 2005);

2.4. Identify the species name

Complete the scientific name and Vietnamese name (local name), the ethnic language of the species. Conduct scientific name identification and make a list of medicinal plants according to Brummit RK (1992). The list is ordered alphabetically A, B, C, etc. Assessing the species diversity and life-forms of medicinal plants: According to the method of Nguyen Nghia Thin (2007). Assesses of parts used, distribution of medicinal plants according to the habitat and experience of using medicinal plants: based on interviews and surveys under the people instruction. Assessment of threatened medicinal plants: Based on Vietnam Red Data Book (2007), the Decree 06/2019/ND-CP.

3. RESULT AND DISCUSSION

3.1 Diversity of medicinal plants

Through interviews and instructions of people who have experience in collecting and using medicinal plants, we have recorded 351 species, 249 genera, 83 families, belonging to 3 vascular divisions including Polypodiophyta, Pinophyta and Magnoliophyta used as medicine according to the experience of the people. The results are summarized in Table 1.

Table 1. Diversity of medicinal plants in Tan Phu protective forest

Taxon	Family		Genera		Species	
	number	%	number	%	number	%
Polypodiophyta	4	4.82	7	2.81	11	3.13
Pinophyta	1	1.21	1	0.40	1	0.29
Magnoliophyta	78	93.97	241	96.79	339	96.58
Total	83	100.0	249	100.0	351	100.0

Analysis of Table 1 shows that traditional medicinal plants used by the people for treatment and health care are quite diverse and abundant. Magnoliophyta accounts for 96.58% of species, 96.79% of genera and 93.97% of families. Of which, Magnoliopsida has 302 species (86.04%), 208 genera (83.54%) and 67 families (80.72%). Liliopsida has 37 species (10.54%), 33 genera (13.25%) and 11 families (13.25%). Meanwhile, Polypodiophyta has 11 species (3.13%), 7 genera (2.81%) and 4 families (4.82%). There are 11 plant families have more 8 species with a total of 162 species (46.15%), of which Fabaceae, Rubiaceae, Euphorbiaceae, Annonaceae, Moraceae, Poaceae, Scrophulariaceae, Clusiaceae, Rutaceae, Apocynaceae, Verbenaceae. These are plant families with a large number of

species, not only of medicinal value but also used as food, essential oils, etc., especially they are distributed very popular in different habitats: in the forest, roadside, around villages, along streams, etc.

3.2. The composition of medicinal plants is threatened

Based on the results of the survey, we have recorded 9 medicinal plants (2.56% of the total number of species) listed in the Vietnam Red Data Book (2007) and the Decree 06/2019/ND-CP (2019). In which, there are 6 species in the list of Vietnam Red Data Book (2007) including: *Drynaria fortunei*, *Markhamia stipulata*, *Elaeocarpus hygrophylus*, *Azelia xylocarpa*, *Pterocarpus macrocarpus*, *Fibraurea recisa*; 7 species in the list of Group IIA under Decree 06/2019/ND-CP (tabl. 2).

Table 2. The composition of medicinal plants is threatened

No	Scientific name	Vietnam Red Data Book (2007)	Decree 06/2019/ND-CP
1	<i>Drynaria fortunei</i> (Kuntze ex Mett.) J. Sm.	EN	IIA
2	<i>Markhamia stipulata</i> (Wall.) Setô.	VU	
3	<i>Elaeocarpus hygrophylus</i> Kurz	VU	
4	<i>Azelia xylocarpa</i> (Kurz) Craib.	EN	IIA
5	<i>Pterocarpus macrocarpus</i> Kurz	EN	IIA
6	<i>Fibraurea recisa</i> Pierre	VU	IIA
7	<i>Cymbidium aloifolium</i> (L.) Sw.		IIA
8	<i>Dendrobium crumenatum</i> Sw.		IIA
9	<i>Pecteilis susanna</i> (L.) Raf.		IIA

*EN - Endangered; VU - Vulnerable;

IIA - Limit exploitation and use for commercial purposes

3.3. Diversity of life-forms of medicinal plants

The plant life-form is an expression of the plant's morphology and structure adapted to living environment conditions. It is closely related to the ecological factors of each region. Studying the life-form of plants will be the basis for comparing the vegetation of the study area with the vegetation of different regions (Nguyen Van Hop, 2020; Viet Hung Dang, 2020). The

analysis of the diversity of life forms of the medicinal plants shows us the source of raw materials for ease of exploitation and use. From there, make appropriate policies and measures for the effective exploitation and use of this resource. There are 5 life-forms of medicinal plants: woody, herbaceous, shrub, lianas, and epiphyte were used by the people in this area. The results are summarized in Table 3.

Table 3. Diversity of life-forms of medicinal plants

№	Life-forms	Number of species	Percentage (%)
1	Woody	152	43.3
2	Herb	73	20.8
3	Shrub	72	20.5
4	Liana	40	11.4
5	Epiphyte	14	4.0
Total		351	100

The life-forms of medicinal plants used by the people are quite diverse and abundant. In which, woody dominated with 152 species (43.3%); herbs has 73 species (20.8%); shrubs with 72 species (20.5%); 40 species of liana (11.4%); epiphyte has 14 species (4.0%). The analysis results show that the people mainly use small trees, herbs, shrubs, and lianas as medicinal plants because these are fast-growing, strong natural regenerating life-forms, capable of wide distribution, preferable adapt to many different habitats and easy to harvest. The use of small trees, herbs, shrubs, and lianas shows the sustainability of the harvesting methods of the people. Because these life-forms are mainly one-year trees, distributed mainly under the forest canopy or crawling on shrubs and trees, the exploitation of these life-forms has

little or no effect on the structure of forest resources.

3.4. Diversity of the parts used of medicinal plants

In medicinal plants, compounds and chemical components are often unevenly distributed in each part of their, they often have a different composition and active. Compounds that have a therapeutic effect are not always found in plants, possibly in fruits, flowers, or in seeds, leaves, roots, bark, etc. Therefore, researching the part of medicinal plants is very important, deciding on the effectiveness of disease treatment. Based on themselves experience, the people have different ways to exploit parts and application for each medicinal plant species (tabl. 4).

Table 4. Diversity of parts-used of medicinal plants

№	Part of use	Number of species	Percentage (%)
1	Leaves	152	43.3
2	Stem, Bark	150	42.7
3	Roots	147	41.9
4	Whole plant	83	23.6
5	Fruit, Seeds	76	21.7
6	Flower	22	6.3

Table 4 shows that the parts of medicinal plants used are quite diverse. Leaves are the most used part with 152 species (43.3%); followed by stem, bark parts with 150 species (42.7%); Roots with 147 species (41.9%); whole plant with 83 species (23.6%); fruit and seeds have 76 species (21.7%); flowers with 22 species (6.3%). It can be seen that the leaves, stems, bark and roots are the parts that are often used as medicine. In particular, the use of leaves

for the treatment of diseases and health care in large numbers does not affect the growth of medicinal plants, or the structure of forest resources. Besides, it also shows the sustainability and originality in the method of exploiting the medicinal plant resources. The people just exploited medicinal plants to treat diseases but still ensuring the stability of medicinal plant resources for future generations. On the contrary, flowers and seeds

are less exploited and used because flowers and seeds can only be harvested seasonally. In addition, the exploitation of flowers and fruits greatly affects the regeneration and recovery ability of medicinal plants. Therefore, the people do not use these parts of the medicinal plant for treatment and health care.

3.5. The disease groups used medicinal plants to treat diseases

The results of the survey and information collection show that the experience of using medicinal plants of the people is very unique and rich with different disease groups. Medicinal plants are mainly used to treat groups of pimples, rashes, inflammation with 155 species (accounting for 44.16%); the group used to treat colds and fever with 112 species (accounting for 31.9%); group used to treat dysentery, diarrhea with 107 species (accounting for 30.5%); group used to treat low and painful anesthesia with 105 species (accounting for 29.9%); in the digestive system with 104 species (accounting for 29.63%). The disease groups with the domination number of medicinal plants are the common disease groups common in daily life.

4. CONCLUSION

Tan Phu protective forest is not only diverse in the composition of medicinal plants but also contains abundant indigenous knowledge of the people about life forms, distribution characteristics, parts used, harvesting experience, methods of preservation and the method of using medicinal plants to treat 19 groups different of diseases. The exploitation of medicinal plants takes place at a high frequency, resulting in the decline of medicinal plants, especially endangered, precious and rare species in danger of extinction in nature. Therefore, we need to take timely action to conserve medicinal plant resources before they disappear. At the same time, it is necessary to develop regulations stipulating measures to manage the exploitation, trading and use of medicinal plant resources in the area of Tan Phu protection forest.

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ĐA DẠNG TÀI NGUYÊN VÀ GIÁ TRỊ SỬ DỤNG CÂY THUỐC TRONG RỪNG PHÒNG HỘ TÂN PHÚ, TỈNH ĐỒNG NAI, VIỆT NAM

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TÓM TẮT

Bài báo trình bày kết quả nghiên cứu về tài nguyên cây thuốc thuộc Ban Quản lý rừng phòng hộ Tân Phú, tỉnh Đồng Nai, Việt Nam. Bước đầu đã xác định được 351 loài thực vật được ghi nhận sử dụng làm thuốc, thuộc 83 họ, 3 ngành thực vật; trong đó: Ngành Hạt trần (Pinophyta) có 1 loài thuộc 1 họ; ngành Dương xỉ (Polypodiophyta) có 11 loài thuộc 4 họ; ngành Mộc lan (Magnoliophyta) có 339 loài thuộc 78 họ. Dạng sống rất đa dạng với nhóm cây gỗ nhỏ có số lượng loài nhiều nhất 101 loài (chiếm 28,77%), nhóm cây bụi có 73 loài (chiếm 20,8%), nhóm cây thân thảo làm thuốc, có 72 loài (chiếm 20,51%), nhóm gỗ lớn với 51 loài cây thuốc (chiếm 14,53%); nhóm dây leo có 40 loài (chiếm 11,4%) và nhóm phụ sinh ít nhất với 14 loài (chiếm 3,99%). Các loài cây thuốc chủ yếu được sử dụng để chữa các nhóm bệnh về mụn nhọt, mẩn ngứa, sưng viêm với 155 loài (chiếm 44,16%); nhóm dùng chữa cảm sốt với 112 loài (chiếm 31,9%); nhóm dùng trị ỉa, tiêu chảy với 107 loài (chiếm 30,5%); nhóm dùng chữa tê thấp, đau nhức với 105 loài (chiếm 29,9%); nhóm chữa bệnh ở bộ máy tiêu hóa với 104 loài (chiếm 29,63%). Phương pháp chữa trị thường được sử dụng là giã đắp đối với dùng ngoài và sắc uống đối với dùng trong. Ghi nhận được 07 loài trong Nhóm IIA thuộc Nghị định 06/2019/NĐ-CP; 06 loài trong Sách Đỏ Việt Nam (2007): 03 loài được xếp ở mức Sẽ nguy cấp – VU; 03 loài xếp ở mức Đang nguy cấp – EN. Nguồn tài nguyên được liệu tại đây đang bị khai thác quá mức nên cần có các biện pháp bảo tồn, phát triển.

Từ khoá: cây làm thuốc, đa dạng, Đồng Nai, tài nguyên cây thuốc, Tân Phú.

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