



Medicinal Plant Diversity at Cham Chu Nature Reserve Area, Tuyen Quang Province

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Abstract: A total of 443 medicinal plant species were recorded in Cham Chu Nature Reserve Area belonging to 325 genera and 120 families. Most of the medicinal plant species in Cham Chu Nature Reserve Area are Angiosperms with 425 species (95.94%) (360 Dicotyledonae, 65 Monocotyledonae), 6 species belong to the Gymnosperms (1.35%), 10 species are Polypodiophyta (2.26%), Psilotophyta and Lycopodiophyta are only one species (0.23%). The richest 3 families are Euphorbiaceae with 22 (4.97%) species, Rubiaceae with 17 (3.83%) species and Asteraceae ranks third, with 16 (3.61%) species, respectively. When the medicinal plant of the area are analysed by Raunkiaer's life form system, the results are follows as: phanerophytes 311 (73.18%), chamaephytes 45 (10.59%), hemicryptophytes 10 (2.355%), cryptophytes 33 (7.76%), and therophytes 26 (6.12%) species, respectively.

Keywords: Medicinal plant, Cham Chu, Tuyen Quang.

Table 95. Introduction

Protected areas play an important role in sustainable use and conservation of biodiversity resource in Viet Nam. In many areas, conservation of biodiversity as well as medicinal plant resource and maintaining landscape productivity are being taken up on a priority basis, for restoration of degraded communities by planting fast growing, indigenous, and native plant species [1]. The high rate of extinction of tropical species is aggravated by the clearing of forestland and

conversion into agricultural cropland. Harvesting non-timber forest products, selective extraction of plants, medicinal plant and animals, biological invasion, and monoculture threaten to erode biodiversity seriously [2]. Reorientation of the attitudes of people towards maintaining biodiversity is of utmost importance [3].

Cham Chu Nature Reserve Area in the Tuyen Quang province of Vietnam's, is an area of steep mountains and dense rainforest. Cham Chu region has a tropical monsoonal climate with two clear seasons: the winter is cold – dry and summer is hot and a lot of rain with the high humidity.

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Topography and hydrology: Cham Chu Nature Reserve Area is a large limestone mountain area with many peaks such as Cao Duong peak (989 m), Pu Loan peak (1.154 m), Khau Vuong peak (1.218 m) and highest Cham Chu peak (1.587 m). The system of rivers and streams is dense and the rainfall is high, average annual rainfall reaches 1661 mm.

The purpose of this study was to determine the medicinal plants resources of the area, which is floristically noteworthy. This is thought to be a valuable contribution for understanding Vietnam's flora.

2. Materials and methods

The research materials were obtained during the vegetation seasons from 2015 to 2017. Efforts were made to collect both flowering and fruiting specimens. The plant samples were prepared according to the established herbarium techniques. Subsequently, the Flora of Vietnam [4-7] and the other related floras [8] and monographs [9-10] were used in the identification of the specimens.

Moreover, some of the specimens were compared with the type specimens which have been keeping at the Herbarium of National University of Hanoi (HNU) during study period. The specimens belonging to genera which were

difficult to determine had been sent to specialists to minimize the errors. All the specimens are kept at the Herbarium of Vietnam National University of Hanoi (HNU) at Hanoi.

3. Results and discussion

3.1. Diversity of medicinal plant properties of Cham Chu nature reserve area

There are up to 2000 vascular plant specimens collected from the study area, in of them is represented by 443 medicinal plant species, belonging to 325 genera and 120 families. Among these species are belong to Polypodiophyta (10 species), the phylum with smallest number of species is Psilotophyta and Lycopodiophyta with one species. Other while, Gymnospermae and Angiospermae comprised 6 and 425 species, respectively. Of the Angiospermae, 360 species are Dicotyledonae and 65 species are Monocotyledonae. The dispersion of the plant species that were defined in the study area according to large taxonomical groups is shown in Table 1, 2.

The differences are shown not only in division but also in classes of Angiospermae. The ratio of species of dicots/monocots is 5.54: 1 (Table 2).

Table 1. Diversity of plant division of medicinal plant at Cham Chu Nature Reserve Area

Division	Family		Genus		Species	
	No	%	No	%	No	%
Psilotophyta	1	0.83	1	0.31	1	0.23
Lycopodiophyta	1	0.83	1	0.31	1	0.23
Polypodiophyta	8	6.67	9	2.77	10	2.26
Gymnospermae	4	3.33	5	1.54	6	1.35
Angiospermae	106	88.33	309	95.08	425	95.94
Total:	120	100	325	100	443	100

The dispersion of the plant taxa belonging to Angiospermae that were defined in the study area according to the large taxonomical groups is shown in Table 2. The Dicotyledones group is contained by 360 (84.71 %) of species, 280

(86.15%) of genus and 99 (82.5 %) of family, meanwhile the Monocotyledones is included by 65 (15.29 %) of species, 45 (13.85 %) of genus and 21 (17.5 %) of family, respectively in the study area.

Table 2. Distribution of taxa in the two classes of Angiospermae of medicinal plant in the area

Class	Family		Genus		Species	
	No	%	No	%	No	%
Dicotyledones	99	82.5	280	86.15	360	84.71
Monocotyledones	21	17.5	45	13.85	65	15.29
Total	120	100	325	100	425	100

The largest families according to the number of species in this study (not show data). The family Euphorbiaceae is the largest group in the study area, with 22 (4.97%) species. The family Rubiaceae is the second-largest group in the study area, with 17 (3.83%) species. The family Asteraceae ranks third, with 16 (3.61%) species, respectively. It compared regions close and similar to Cham Chu and its surroundings. It was assumed that Euphorbiaceae is the family containing the most taxa. Others studies named Asteraceae as the family with the highest number of taxa [11].

3.2. Life forms of medicinal plant properties of Cham Chu Nature Reserve Area

Table 3. Life forms in the research area

Life form	Number of taxa	Rate (%)
Phanerophytes	311	73.18
Hemicryptophytes	10	2.35
Chamaephytes	45	10.59
Cryptophytes	33	7.76
Therophytes	26	6.12
Total:	425	100

Life forms of medicinal plant of Cham Chu Nature Reserve Area were determined based on the classification of Raunkiaer (1934) [12]. The existence of a variety of life forms reflects the typically tropical characteristics of the flora at Cham Chu Nature Reserve Area. Phanerophytes are the most dominant life forms with about 73.18 % (311 species) of total plant species in the area (Table 3).

3.3. Distribution of medicinal plant and conservation at Cham Chu Nature Reserve Area

Cham Chu Nature Reserve Area is situated in Ham Yen and Chiem Hoa districts of the Tuyen Quang province. The majority of the people who are living in Cham Chu Nature Reserve Area belong to the Tay, Dao, Nung, Muong, Cao Lan, Kinh, H'Mong ethnic groups. The majority of area species were used medicinally. Such plants contributed much towards the health care of indigenous people settled in the vicinity. There is no alternative to traditional health care for the majority of indigenous ethnic and rural communities, and so it plays a significant role in their health care. Most of medicinal plants recorded from the area as *Drynaria bonii* C. Chr.; *Rauvolfia cambodiana* Pierre ex Pitard; *Rauvolfia verticillata* (Lour.) Baill.; *Asarum caudigerum* Hance; *Codonopsis javanica* (Blume) Hook. f. & Thoms; *Ardisia silvestris* Pitard; *Embelia parviflora* Wall. ex A. DC.; *Melientha suavis* Pierre; *Disporopsis longifolia* Craib.; *Dendrobium fimbriatum* Hook.f.; *Amomum villosum* Lour.; *Smilax glabra* Wall. ex. Roxb...

In area with the keystone species of *Drynaria* (Bory) J.Sm., *Fokienia* (A.Henry & H.H.Thomas), *Keteleeria* Carrieri, are functioning like a refuge for this rare, medicinal plant; its tuber is extensively used for the treatment of piles. There are some species which are usually occur in most of the recipes and medicine of indigenous people as *Scheffera* Forst. & Forst. f., *Dracaena* Vand. ex L. on the top of the mountains at elevation between 500 - 700 m.

A total of 32 plant species from Cham Chu Nature Reserve Area are listed in the Red Data

list of IUCN (ver 3.1, 2017) [13] such as *Aquilaria crassna* Pierre ex Lecomte (CR - Critically Endangered); *Cinnamomum balansae* H. Lecomte and *Excentrodendron tonkinense* (Gagnep.) Chang & Miau (EN - Endangered); *Taxus chinensis* (Pilg.) Redher, *Madhuca pasquieri* (Dubard) H.J.Lam, *Aralia chinensis* L. and *Amomum vespertilio* Gagnep (VU - Vulnerable). Otherwise, 30 species are listed in the Red Data Book of Vietnam (2007) [14], threat categories for taxa are listed as follows: *Cinnamomum parthenoxylon* (Jack) Meisn is CR; *Acanthopanax gracilistylus* W. W. Smith; *Berberis wallichiana* DC.; *Podophyllum tonkinensis* Gagnep.; *Stephania cepharantha* Hayata; *Madhuca pasquieri* (Dubard) H.J.Lam; *Aquilaria crassna* Pierre ex Lecomte; *Excentrodendron tonkinense* (Gagnep.) Chang & Miau; *Acanthopanax gracilistylus* W. W. Smith; *Dioscorea collettii* Hook. f.; *Paris polyphylla* Smith. are EN. Those species will soon be strongly threatened or extinct, at least locally, if no attempts are made to protect and replant them.

The populations of medicinal plants in the research area have been extensively destroyed by anthropogenic effects; therefore, plants try to survive under unsuitable conditions. Natural habitats have been destroyed during the fruit-tree culturing of indigenous people. Therefore, the biological diversity as well as conservation of medicinal plant resources has been need support by the project from Government and International Organization.

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Đa dạng nguồn tài nguyên cây thuốc ở Khu bảo tồn thiên nhiên Chạm Chu, tỉnh Tuyên Quang

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Tóm tắt: Khu Bảo tồn thiên nhiên Chạm Chu thuộc hai huyện Hàm Yên và huyện Chiêm Hóa, tỉnh Tuyên Quang. Tọa độ địa lý 22°04'25" đến 22°21'30" độ vĩ Bắc, 104°53'27"-105°14'16" độ kinh Đông. Phía Đông giáp các xã Minh Quang, Tâm Mỹ, Phúc Thịnh và Tân Thịnh thuộc huyện Chiêm Hóa; phía Tây giáp xã Yên Hương huyện Hàm Yên; phía Nam giáp xã Bình Xa huyện Hàm Yên và Yên Nguyên huyện Chiêm Hóa; phía Bắc giáp huyện Bắc Quang tỉnh Hà Giang.

Số lượng các loài cây thuốc rất đa dạng, bước đầu đã xác định được 443 loài thuộc 325 chi và 120 họ. Trong đó ngành Hạt kín (Angiospermae) có số lượng loài chiếm ưu thế với 360 (84,71%) loài, 280 (86,15%) chi, và 99 (82,5%) họ. Có 3 họ giàu loài, họ Euphorbiaceae đa dạng nhất với 22 loài (4,97%), tiếp đến Rubiaceae với 17 loài (3,83%), và Asteraceae 16 loài (3,61%). Phổ dạng sống cũng được xác định với tỷ lệ là: Nhóm cây chồi trên - Ph: 311 (73,18%), Nhóm cây chồi sát đất - Ch: 45 (10,59%), Nhóm cây chồi nửa ẩn - Hm: 10 (2,35%), Nhóm cây chồi ẩn - Cr: 33 (7,76%), Nhóm cây chồi một năm - Th: 26 (6,12%) số loài.

Từ khóa: Cây thuốc, Chạm Chu, Tuyên Quang.