



INNspUB

RESEARCH PAPER

Journal of Biodiversity and Environmental Sciences (JBES)

ISSN: 2220-6663 (Print) 2222-3045 (Online)

Vol. 7, No. 6, p. 216-221, 2015

<http://www.innspub.net>

OPEN ACCESS

Biodiversity of medicinal plants in Ba Na Nui Chua nature reserves, Da Nang City, Vietnam

Pham Thi Kim Thoa¹, Hoang Thanh Son², NguyenThi Kim Yen^{3*}

¹*Faculty of Environment, Da Nang University of Science and Technology, Da Nang, Vietnam*

²*Silviculture Research Institute, Vietnamese Academy of Forest Sciences, Ha Noi, Vietnam*

³*Frankfurt Zoological Society in Vietnam, Vietnam*

Article published on December 29, 2015

Key words: Medicinal plants, Ba Na Nui Chua nature reserves, Da Nang city, Indigenous knowledge, Biodiversity.

Abstract

The medicinal species that reside in natural areas have received increasing scientific and commercial attention in recent years. This study focused on identifying medicinal plants, the current situation of medicinal plants utilization in Ba Na Reserves and conservation threats. The data was collected using interview and questionnaires by selecting 8 healers, 25 patients using purposive sampling method. A total of 280 species of medicinal plants (belonging to 106 families) were identified at our field site. Of those, 22 were threatened species found in the Vietnam Red List. Medicinal plants are mined primarily from natural forests (168 species - 60 %). Herbs were the most common form of medicinal plants used (35.36%), followed by trees (28.21%) and shrubs (20%). Based on indigenous knowledge, such plants were used to treat 15 different diseases. Medicinal plants were most commonly used to treat stomach, colon, inflammatory bowel, liver and kidney disease. Habitat destruction, monoculture, overharvesting were the main threat of medicinal plants in Ba Na nature reserve.

*Corresponding Author: Nguyễn Thị Kim Yến ✉ kimyen.07csm@gmail.com

Introduction

Ba Na Nui Chua Nature Reserve has a total area of 8,838 ha. It is centered on Mount Ba Na, a 1,487 metre-high mountain on the border between Da Nang city and Quang Nam province. The main natural vegetation types present at Ba Na-Nui Chua Nature Reserve are lowland evergreen forest and lower montane evergreen forest. The lowland evergreen forest is characterized by the presence of tree species in the Dipterocarpaceae, whereas the lower montane evergreen forest is dominated by species in the Lauraceae, Fagaceae and Podocarpaceae families. (Hill *et al.*, 1996).

Research about medicinal plants in Ba Na reserve was conducted in 1983 by the Quang Nam Medical Institute. Their research identified 251 species belong to 89 families, a result that identified this area as having a big potential to develop medicinal plants. Subsequently, data about the medicinal plants and their current status within the reserve have not be updated. Anecdotal information suggests that some species are being overexploited and possibly pushed to the brink of extinction (e.g. *Phaeanthusvietnamensis* Ban, *Rauvolfiaverticillata* (Lour) *Homalomenaocculata* (Lour.) Schott, *Paris polyphylla* Smith, *Drynariabonii* H. Christ).

Our study aimed to attain three goals:

- (1) Make a taxonomic survey of medicinal plants species distributed in the study areas with their relevant names and habitat distribution. Review the current situation of medicinal plants utilization in Ba Na reserves.
- (2) Identify the medicinal form, part used, percentage of use for each species.
- (3) Discuss the long-term challenges of harvesting and consumption of medicinal plants.

Materials and methods

In order to identify medicinal plants, habitat and

relevant ecological information, we have visited the forest to pick up medicinal plants with local communities. In depth interviews relevant to the utilization of medicinal plants were implemented in April, 2015..

Semi-structured interviews

25 Patients and 8 local healers were asked about the types of plants used to treat each disease state. Those plants that appear interesting are also collected for analysis. The information collected included the local name of the traditional medicinal plant, type (cultivated or wild), diseases treated, parts used, condition of the plant used, method of preparation, route of administration, ingredients added, other uses of the plant, and existing threats to medicinal species. The data were analysis using descriptive statistics (Excel 2007).

Morphological characteristic comparisons

Samples (leaf, bark, fruits, flowers) were identified based on morphological characteristic comparisons with documents of the authors:

1. *Vietnam plants* (Pham Hoang Ho, 1999).

2. *Medicinal plants and medicine of Vietnam* (Do Tat Loi, 2006)

Results and Discussion

280 medicinal plant species belonging to 106 families were collected and identified by the researchers from the study area. In which, 22 medicinal plants were found in Vietnam's red list 2007.

Diversity life form of medicinal plants

Analysis of the diversity of life forms of medicinal plants will help orientation to the harvesting and sustainable utilization. The most used types of plants were herbs (35,36%), mainly in families such as: Asteraceae, Euphorbiaceae, Rubiaceae, Rutaceae, Fabaceae...

In terms of plant parts used in treatment

Leaves constituted 60% of the parts of the medicinal plant species used to treat ailments. Such wide harvesting of leaves for traditional medicine, compared to roots in the study area that are important for survival of the plants, has a less negative influence on the survival and continuity of useful medicinal plants, and hence does not affect

sustainable utilization of the plants. However, in the study area roots were the second most part used to treat different human ailment (49,29%). Comparatively, utilization of the root part highly affects the survival and ecological aspects of the plants.

Table 1. The most diverse families were identified in study area.

No	Family name	Number of Species	Percentage (%)
1	Asteraceae	17	16.04
2	Euphorbiaceae	14	13.21
3	Rubiaceae	14	13.21
4	Rutaceae	14	13.21
5	Fabaceae	13	12.26
6	Apocynaceae	8	7.55
7	Solanaceae	7	6.60
8	Moraceae	7	6.60

Table 2. 22 medicinal plants recorded in Vietnam's red list in 2007.

No	Local name of medicinal plants	Scientific name of medicinal plants	Plant life form	VietNam red list 2007
1	Ba gạc	<i>Rauwolfia vietnamensis</i> Ly.	Shrubs	EN B1+2b, c
2	Ba gạc lá to	<i>Rauwolfia combodiana</i> Pierre ex Pitard.	Shrubs	VU A1c
3	Bây lá một hoa	<i>Paris polyphylla</i> Smith.	Herbs	EN A1c, d
4	Bồ cốt toái	<i>Drynaria bonii</i> H. Christ.	Herbs	VU A1a, c, d
5	Củ don	<i>Stephaniadielsiana</i> C. Y. Yu.	Lianas	VU B1+2b, c
6	Đỗ trọng tía	<i>Euonymus chinensis</i> L.	Shrubs	EN A1b, c, d
7	Giảo cổ lam	<i>Gynostemma pentaphyllum</i> (Thumb.) Makino	Lianas	VU A1a, c, d
8	Hòe	<i>Sophora tonkinensis</i> Gagn.	Trees	VU B1+2c
9	Khôi Tía	<i>Ardisia silvestris</i> Pitard.	Herbs	VU A1a, c, d+2d
10	Lan Kim tuyến	<i>Anoetochilus setaceus</i> Bl.	Herbs	VU A1a, c, d
11	Lát hoa	<i>Chukrasia tabularis</i> A. Juss.	Trees	VU A1a, c, d+2d
12	Nắp ấm trung bộ	<i>Nepenthes annamensis</i> Mac.	Lianas	EN B1+2a
13	Ngải cau	<i>Curculigo orchoides</i> Gaertn.	Herbs	EN A1a, c, d
14	Nhọ đề rái chó lá thuôn	<i>Enicosanthellum plagiomerum</i> (Diel.) Ban	Trees	VU A1 a, c, d
15	Râu Hùm	<i>Tacca integrifolia</i> Ker-Gawl.	Herbs	VU A1a, c, d
16	Sâm cau	<i>Pelliosanthes teta</i> Andr.	Herbs	VU A1c, d
17	Tang kí sinh	<i>Taxillus gracilifolius</i> (Schult. f.) Ban	Shrubs	VU A1c, d
18	Thạch Xương Bò	<i>Acorus macrospadiceus</i> (Yam.) F. N. Wei & Y. K. Li.	Herbs	EN B1+2b, c
19	Thần Linh lá nhỏ	<i>Kibantalialaurifolia</i> (Rild.) Wooson.	Trees	VU B1+2b, c
20	Thiên niên kiện	<i>Homalomena pierriana</i> Engl.	Herbs	VU A1c, B1+2b, c
21	Trầm hương	<i>Aquilaria crassna</i> Pierre ex Lecomte	Trees	EN A1, c, d, B1+2b, c, e
22	Xá Xị	<i>Cinnamomum parthenoxylon</i> (Jack.) Mein.	Trees	CR A1a, c, d

Categories of medicinal plants in terms of habitats

Analysis of habitat of distribution of medicinal plants in Ba Na Nui Chua nature reserves that the natural forest constituted nearly 60 percent of the plant population distribution.

Medicinal plants are mainly harvested from the wild sources to be used locally, or trading purposes. Nevertheless, we found 117 species in gardens, most of which were herbs and popular distribution. Some rare species only found in the natural forest were faced with overharvesting.

The plants cited were used to treat 15 illnesses. The highest number of plant species was used for stomach, colon, inflammatory bowel disease, followed by liver disease, kidney disease – urinary. Generally all medications were a combination of many medicinal plants, with each medicinal plant used to treat many diseases.

The results of the 8 healers interview (Table 6) showed are spondent's harvest frequency > 3 times/week about 8%, from 1-3 times/week accounted for about 36%. Such a high frequency of harvesting causes considerable pressure on medicinal plants ability to regenerate.

Table 3. Diversitylife form of medicinal plants recorded in Ba Na- Nui Chua Nature Reserve.

Life form	Species richness	Percentage (%)
Trees	79	28.21
Shrubs	56	20
Herbs	99	35.36
Lianas	44	15.71
Woody vines	2	0.71

Table 4. Source of medicinal plants in Ba Na- Nui Chua Nature Reserve.

Habitats	The number of species	Percentage (%)
Natural forests	168	60
Home gardens	117	41.79
Grasslands, vacant land	70	25
Streams side	39	13.93
Plantation	31	11.07
Rice field	9	3.214
Total species	280	

The threats to medicinal plants in Ba Na Nui Chua nature reserves

Infrastructure: Expansion of roads and the resort in Ba Na hill have caused extensive damage to forests and medicinal plants.

Monoculture: Most of buffer zone of protected area have been planted with Acacia species. Monoculture plantation totally affects the organic productivity and reduces the natural stability and complexity resulting in loss of medicinal plants.

Table 5. Plants used against disease recorded in Ba Na- Nui Chua Nature Reserve.

No	Disease treated	Species number	Percentage (%)
1	Stomach, colon, inflammatory bowel disease	58	20.71
2	Liver disease, Kidney disease – urinary	41	14.64
3	Cough, asthma, cold	39	13.93
4	Muscle pain, Osteoarthritis	39	13.93
5	Botulism, furuncle	37	13.21
6	Digestive diseases, dysentery, deworming	31	11.07
7	Gynecological diseases – maternity	29	10.36
8	Tumor disease – Endocrine	26	9.29
9	Biting insect diseases, poisonous snakes	19	6.79
10	Teeth, eyes, Ear - nose – throat diseases	16	5.71
11	Sedation, insomnia cure	15	5.36
12	Hypertension, cardiovascular disease	14	5.00
13	Physical weakness disease	7	2.50
14	Hemostatic	5	1.79
15	Andrology	4	1.43
	Total species	280	

Table 6. Frequency of purchase and harvest of medicinal plants of the traditional healers.

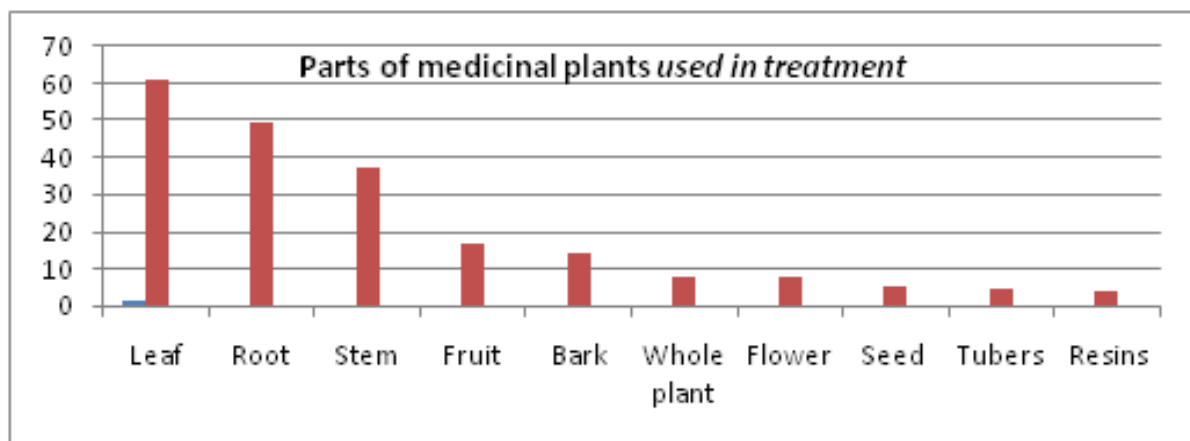
Frequency of	Number	Percentage (%)
Frequency of harvesting/collecting		
>3 times/week	2	8
1–3 times/week	9	36
Several times in a year	14	56
Total	25	100
Frequency of purchase		
>3 times/week	-	-
1–3 times/week	8	40
Several times in a year	12	60
Total	20	100

Overharvesting

The current situation population of some species in the region is declining.

Especially overharvesting some rare species is one of the main reasons that push those to brink of extinction. Some species usually are harvested such as: *Paris polyphylla* Smith, *Tetracera scandens* (L.) Merr, *Stemona pierrei* Gagnep, *Blumea balsamifera*

(L.) D C, *Ampelopsis cantoniensis* (Hook. et Arn) Planch, *Eurycoma longifolia* Jack, *Morinda citrifolia* L, *Andenosma caeruleum* R.Br, *Dioscorea persimilis* Prain et Burkill, *Homalomena pierriana* Engl, *Smilax glabra* Wall. ex Roxb, *Tacca integrifolia* Ker-Gawl, *Streptocaulon juvenas* (Lour.) Merr, *Acorus macrospadiceus* (Yam.) F. N. Wei & Y. K. Li..

**Fig. 1.** Part of medicinal plants used in treatment.

In addition, Forest fire (caused by collect honey from bees), firewood collection, logging etc. are the reasons for reduction in area under valuable forest.

Conclusion

We identified 280 medicinal plants in Ba Na Nui Chua nature reserves. Of those, 22 rare species were included on the Vietnam data red list. Local people have extensive knowledge of how to use medicinal

plants against 15 diseases. The most frequently cured disease category was stomach, colon, inflammatory bowel disease. Many rare species are facing to extinction in natural, so we need activities to conserve before they disappear forever.

Acknowledgement

The authors are thankful to the traditional healers of the study area for sharing their accumulative

indigenous knowledge. Giving many thanks to the Ba Na ranger staff to support us conducting research.

References

Hill M, Le Mong Chan, Harrison EM. 1996. Ba Na Nature Reserve: site description and conservation evaluation. London: Society for Environmental Exploration.

Do Tat Loi. 2006. Medicinal plants and medicine of Vietnam. Medical publisher.

Ministry of Science and Technology, Academic of Science and Technology of Vietnam. 2007. Vietnam's Red Book - Part II - Plants. Natural Sciences and Technology. Ha Noi, Vietnam.

National institute of medicinal materials Vietnam (NIMM). 2007. Medicinal plants in Vietnam, National institute of medicinal materials.

Pham Hoang Ho. 1999. Vietnam plants. Young publisher, Ho Chi Minh city, Vietnam. (in Vietnamese).

Upreti Y, Asselin H, Boon EK, Yadav S, Shrestha KK. 2010. Indigenous use and bio-efficacy of medicinal plants in the Rasuwa District, Central Nepal. *J Ethnobiol Ethnomedicine*. **6**, 3. BioMed Central Full Text.