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DIVERSITY OF MEDICINAL PLANTS FROM DONG NAI PROVINCE

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Summary

Diversity of Medicinal Plants from Dong Nai Province

A survey of the medicinal plant resources in Dong Nai province has been carried out from April 2019 to December 2021. A total of 1,086 species belonging to 591 genera, 163 families of seven phyla of vascular plants (Podypodiophyta; Pinophyta; Cycadophyta; Gnetophyta; Pteridophyta; Magnoliophyta) and Fungi were recorded. Among them, 18 species conservation were listed in the Vietnam Red Data Book, Decision No 84/2021/NĐ-CP and Red List of Medicinal Plants of Vietnam, 2019. Life forms are identified as: herbaceous plant (38.30%); shrub and subshrub (18.97%); vine (Lianas and nonwoody vines) (13.08%); Tree: (26.33%); palm-like plant: (0.65%), Epiphyte - parasitic (2.67%). The study highlighted the richness and importance of medicinal plant species in Dong Nai province.

Keywords: *Dong Nai, Medicinal plants, Diversity.*

1. Background

Dong Nai is a province with diverse and abundant plant resources and medicinal plant resources from the Southeast region as well as Vietnam. The research and conservation of natural medicinal plant resources have become an urgent need to serve the development goals of the socio-economic sectors and the local pharmaceutical industry. Investigating and researching diverse medicinal plant resources has important scientific and practical significance to provide new data to contribute to the protection and sustainable development of this resource.

This study documents valuable ethnobotanical information on the medicinal plants used by Dong Nai province.

2. Main methods

1,086 specimens of the medicinal plant were collected in the fieldwork from April 2019 to

December 2021). Transect lines research is applied in the field to identify and collect medicinal plant species in the study area: at each survey site, establishing the routes for specific topography types and ecological forms to collect data on species. The Collected specimens were kept at the National Institute of Medicinal Material Herbarium (NIMM)

The number of transect lines: Nature Reserve (6 route-based); Chua Chan mountain (2 route-based), Cat Tien National Park (3 route-based); Tan Phu guard forest (01 route - based).

Synthesize, analyze and use published data related to the research area on medicinal plants resources

Interview survey: Investigate the experience of using medicinal plants and remedies from people who are staff of National Park, Nature Reserve, healers, physicians

A standard method for the investigation of medicinal plants is based on Nguyen Tap (2006) [1].

Sample processing and scientific name assessment: The specimens were processed in the field survey, dried and identified using: “An Illustrated Flora of Vietnam” (Ho, 2000); “A Checklist of plant species in Vietnam” (Ban, 2003 & 2005); “Flowering Plants” (Thin, 2006) [2],[3],[4]; use-value of medicinal plants recorded according to: “Medicinal Plants and Herbal Remedies of Vietnam” (Do Tat Loi, 1991); “Medicinal Plants and Medicinal Animals in Vietnam” (Do Huy Bich, 2004 & 2013), “Dictionary of Vietnam Medicinal Plant” (Vo Van Chi, 2012), “Checklist of Medicinal Plants in Viet Nam” (National Institute of Medicinal Material, 2016) [5],[6],[7],[8].

Rare medicinal plants were identified according to “The Vietnam Red Data Book” (2007) and “The Red List of Medicinal Plants in Vietnam” (Nguyen Tap, 2019); “Decision No 84/2021/NĐ-CP” [9],[10],[11] Scientific names of the plant species were determined according to *World Flora Online (WFO)*, (<http://www.worldfloraonline.org>) [12]

3. Survey results

3.1. Diversity of taxa

A total of 1,086 vascular plant species were identified and recorded from our investigation area, belonging to 591 genera, and 163 families of 07 phyla of vascular plants and fungi: Lycopodiophyta; Polypodiophyta; Pinophyta;

Cycadophyta; Gnetophyta; Magnoliophyta; Pteridophyta and Fungi. Include, Lycopodiophyta have 03 species, 02 general (*Selaginella doederleinii* Hieronymus; *Huperzia phlegmaria* (L.) Rothm; *H. squarrosa* (Forst.) Trevis); Polypodiophyta have 06 species, 01 general (*Lygodium*), 01 family (Lygodiaceae); Pinophyta 04 species, 04 generals, 04 families: (*Araucaria columnaris* (G. Forst.) Hook.; *Platycladus orientalis* (L.) Franco; *Pinus kesiya* Royle ex Gordon; *Podocarpus neriifolius* D. Don); Cycadophyta 03 species, 01 general (*Cycas*), 01 family (Cycadaceae) (*Cycas circinalis* L.; *C. inermis* Lour.; *C. siamensis* Miq.); Gnetophyta 03 species (*Gnetum gnemon* L. var *griffithii* (Parl.) Markgr.; *G. macrostachyum* Hook. f; *G. montanum* Markgr.), 01 general (*Gnetum*), 01 family (Gnetaceae); Pteridophyta 26 species, 22 generals, 15 families (Adiantaceae (01 species), Aspidiaceae (02 species), Aspleniaceae (02 species), Polypodiaceae (09 species),...); Magnoliophyta 1,039 species, 560 generals, 139 families (Table 1).

Out of a total of 1,086 medicinal plant species in the area, 124 species are commonly grown plants and other plants with medicinal parts in Dong Nai Province, such as: Xao tam phan” - (*Paramignya trimera* (Oliv.)); Do bau - *Aquilaria crassna* Pierre ex Lecomte; Xuyen tam lien - *Andrographis paniculata* (Burm. F.) Nees; Trinh nu hoang cung - *Crinum latifolium* L... There are 962 natural medicinal plants distributed in the study area.

Table 1. Survey result of medicinal plant and fungi species in Dong Nai

Phyla	Families		Generals		Species	
	Number	(%)	Number	(%)	Number	(%)
Fungi	1	0.61	1	0.17	2	0.18
Lycopodiophyta	1	0.61	1	0.17	3	0.27
Polypodiophyta	1	0.61	1	0.17	6	0.54
Pinophyta	4	2.44	4	0.68	4	0.36
Cycadophyta	1	0.61	1	0.17	3	0.27
Gnetophyta	1	0.61	1	0.17	3	0.27
Pteridophyta	15	9.20	22	3.72	26	2.34
Magnoliophyta	139	85.31	560	94.75	1,039	95.77
<i>Magnoliopsida</i>	112		468		861	
<i>Liliopsida</i>	27		92		178	
Total	163		591		1,086	

There are 163 families of medicinal plants and fungi recorded; the most frequently used families were Fabaceae (97 species); Euphorbiaceae (72 species); Rubiaceae (59 species); 31 families have from 10 to 30 species; the remaining families are represented by 08 species or fewer:

51 families have 01 species (31.28%); 78 families have 02 - 08 species (47.85%);.... The results show the diversity of medicinal plants at the family level as well as the clear difference between the more and less-used families (Table 2).

Table 2. Correlation between the Number of Medicinal Plants and Plant Family

No	Number of Medicinal Plant	Number of Family	(%)
1	01 - 03	96	58.90
2	04 - 09	33	20.24
3	10 - 19	24	14.72
4	20 - 29	06	3.68
5	30 - 97	04	2.456
Total	1.086	163	100

At the genus level, genera with many known medicinal plant species: Genus *Ficus* (Moraceae) with 21 species; *Dioscorea* (Dioscoreaceae) with 14 species; *Antidesma* (Euphorbiaceae) with 10 species. Statistical results have 317 genera with only 01 species (53.64%); 108 genera with 02 species (18.27%); 49 genera with 03 species (8.29%); genera with or more species have 03 genus (*Ficus*; *Dioscorea*; *Antidesma*) (0.50%)... Can be seen that the diversity of medicinal species for each genus is low.

3.2. Diversity of life forms

Herbaceous plant: 416 species (38.30%)

Shrub and subshrub: 206 species (18.97%)

Vine (Lianas and nonwoody vines): 142 species (13.08%)

Tree: 276 species (26.00%)

Palm-like plant: 7 species (0.65%)

Epiphyte - parasitic: 29 species (3.60%)

Thus, Dong Nai province's medicinal plants are mainly herbaceous (38.30%), and tree (29,00%). Medicinal plants including palm-like plants and ones account for a small proportion.

Table 3. Diversity of life forms Medicinal plant in Dong Nai province

No	Life forms	Number of Species	Number of Genus	Number of Family
1	Herbaceous plant	416 (38.30%)	246	93
2	Shrub and subshrub	206 (18.97%)	143	51
3	Vine	142 (13.08%)	57	31
4	Tree	276 (29.00%)	203	68
5	Palm-like plant	07 (0.65%)	05	01
6	Epiphyte - parasitic	39 (3.60%)	27	12

3.3. The abundance of valuable genetic resources for conservation and use

The results have identified 38 species/ species groups of medicinal plant species for exploitation: Thanh nganh (*Cratoxylum* spp.); Cot toai bo (*Drynaria* spp.); Huyet dang (*Spatholobus* spp; *Butea* spp; *Cratylia* spp.);

Bach bo (*Stemona* spp.); Gam (*Gletum* spp); Ray gai (*Lasia spinosa* (L.) Thw); Lac tien (*Passiflora foetida* L.)... and 16 species/ species groups of development potential species include: Nhan tran (*Antidesma* spp.); Lac tien (*Passiflora foetida* L); Xao tam phan (*Paramignya trimera* (Oliv.) Guillaum); Nam linh chi (*Ganoderma* spp.)...



Lagerstroemia speciosa (L.) Pers.



Gnetum montanum Markgr.
(*G. scandens* Roxb.)



Eurycoma longifolia Jack subsp.
longifolia

Fig. 1. Some valuable medicinal plants for conservation and usage

3.4. Species of Medicinal Plants on the Conservation in Dong Nai

Out of 1,086 plants studied from this region, 08 plant species have been listed in Decree No. 84/2021 CP (*Azelia xylocarpa* (Kurz) Craib.; *Coscinium fenestratum* (Gaertn.) Colebr.; *Cycas siamensis* Miq.; *Dalbergia rimosa* Roxb.; *Fibraurea tinctoria* Lour.; *Fibraurea recisa* Pierre; *Pterocarpus macrocarpus* Kurz; *Sindora siamensis* Teijsm. ex Miq.; 07 species in Vietnam's Red Data Book (*Aeginetia indica* L.; *Aquilaria crassna* Pierre ex Lecomte; *Dioscorea*

colletii Hook. f.; *Drynaria bonii* H. Christ; *Peliosanthes teta* Andrews subsp. *humilis* (Andr.) Jessop; *Rauvolfia micrantha* Hook.f.;) and 09 species in the Red list of medicinal plants of Vietnam (2019) (*Aeginetia indica* L.; *Aquilaria crassna* Pierre ex Lecomte; *Arcangelisia flava* (L.) Merr.; *Camellia dormoyana* (Pierre ex Laness.) Sealy; *Dioscorea colletii* Hook. f.; *Drynaria bonii* H. Christ; *Peliosanthes teta* Andrews subsp. *humilis* (Andr.) Jessop; *Rauvolfia micrantha* Hook.f.; *Stemona pierrei* Gagnep.).

Table 4. List of conserver medicinal plants in Dong Nai

No	Vietnam name	Scientific name	Family	Vietnam Red Data Book, 2007	Red List of Medicinal Plants of Vietnam, 2019	Decree No. 84/2021/ND-CP
1	Lệ dương	<i>Aeginetia indica</i> L.	Orobanchaceae	VU B1+2b,c	VU B2a,b(ii,iii,iv)	
2	Gỗ đỏ	<i>Azelia xylocarpa</i> (Kurz) Craib.	Fabaceae			IIA
3	Trầm dó	<i>Aquilaria crassna</i> Pierre ex Lecomte;	Thymelaeaceae	EN A1c,d B1+2b,c,e	CR A1a,c,d	
4	Cổ an	<i>Arcangelisia flava</i> (L.) Merr.	Menispermaceae		VU B2a,b(ii,iii,iv)	
5	Trà hoa vàng Dormoy	<i>Camellia dormoyana</i> (Pierre ex Laness.) Sealy	Theaceae		VU B2a,b(ii,iii,iv)	
6	Vàng đắng	<i>Coscinium fenestratum</i> (Gaertn.) Colebr.	Menispermaceae			IIA
7	Thiên tuế xiêm	<i>Cycas siamensis</i> Miq.	Cycadaceae			IIA
8	Trắc dây	<i>Dalbergia rimosa</i> Roxb	Fabaceae			IIA
9	Nân nghệ	<i>Dioscorea colletii</i> Hook. f.	Dioscoreaceae	EN A1a,b,c,d	VU B2a,b(ii,iii,iv)	
10	Tắc kè đá	<i>Drynaria bonii</i> H. Christ	Polypodiaceae	VU	EN A1c,d	
11	Hoàng đằng	<i>Fibraurea tinctoria</i> Lour.	Menispermaceae			IIA
12	Dây nam hoàng	<i>Fibraurea recisa</i> Pierre	Menispermaceae			IIA

No	Vietnam name	Scientific name	Family	Vietnam Red Data Book, 2007	Red List of Medicinal Plants of Vietnam, 2019	Decree No. 84/2021/ND-CP
13	Huệ đá	<i>Peliosanthes teta</i> Andrews subsp. <i>humilis</i> (Andr.) Jessop	Asparagaceae	VU A1c,d	VU B2a,b(ii,iii,iv)	
14	Dáng hương	<i>Pterocarpus macrocarpus</i> Kurz	Fabaceae			IIA
15	Ba gác lá mỏng	<i>Rauvolfia micrantha</i> Hook.f.	Apocynaceae	VU A1c,d	VU B2a,b(iii,iv,v)	
16	Gỗ mật	<i>Sindora siamensis</i> Teijsm. ex Miq.	Fabaceae			IIA
17	Bách bộ lá nhỏ	<i>Stemona pierrei</i> Gagnep.	Stemonaceae		VU B2a,c(ii,iii,iv)	
18	Bồ bèo đen	<i>Goniothalamus vietnamensis</i> Ban	Annonaceae	VU A1a,c,d, B1+2b,e		

4. Conclusions and recommendations

Conclusions

A total of 1.086 medicinal plants were identified, belonging to 163 families and 591 genera of 07 phyla of vascular plants and fungi, in which 3 families are used the most Fabaceae (97 species); Euphorbiaceae (72 species); Rubiaceae (59 species). 03 Genus are used the most *Ficus* (21 species); *Dioscorea* (14 species); *Antidesma* (10 species)

6 life forms of the plant were divided into: Herbaceous plant: 416 species (38.30%); Shrub and subshrub: 206 species (18.97%); Vine (Lianas and nonwoody vines): 142 species (13.08%); Tree: 286 species (26.33%); Palm-like plant: 7 species (0.65%); Epiphyte - parasitic: 29 species (2.67%).

The results have identified 38 species/ species groups of medicinal plant species for exploitation; and 16 species/ species groups of

development potential species.

18 species have been recorded in Vietnam's Red Data Book, Red list of medicinal plants of Vietnam (2019); and Decree No. 84/2021 CP; including 03 species endangered (*Dioscorea colletii* Hook. f.; *Aquilaria crassna* Pierre ex Lecomte; *Drynaria bonii* H. Christ) and 06 species vulnerable

Recommendation: The data generated from this study will provide a basis for phytochemical and pharmaceutical studies and the conservation of important medicinal plants including the endangered species in the study area.

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