FLORA DIVERSITY IN DEO CA SPECIAL USE FOREST PHU YEN PROVINCE

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ABSTRACT

The Deo Ca Special Use Forest flora is quite diverse with 492 species belonging to 329 genera and 117 families of 4 vascular plant phyla. Of which, Magnoliophyta is the most dominant with 453 species (92.07%), 302 genera (91.79%), and 95 families (81.2%); the next Polypodiophyta with 32 species (6.5%), 21 genera (6.38%), 17 families (14.53%); the Lycopodiophyta has 4 species (0.81%) belonging to 3 genera (0.91%) of 2 families (1.71%); the last Pinophyta has 3 species (0.61%) belonging to 3 genera (0.91%) and 3 families (2.56%). In the Magnoliophyta, Magnoliopsida is more dominant than Liliopsida. The ratio of Magnoliopsida to Liliopsida in terms of the species, genus, and family are 8.44, 7.16, and 4.94, respectively. The ten most diverse plant families have 161 species, accounting for 32.72% and the ten most diverse genera have 56 species, representing 11.38% of the total species in the study site. The forest plant resources in the Deo Ca Special Use Forest area have a high diversity of use values and can be classified into 15 different groups of uses. There is a total of 28 threatened plant species in the study area, of which 17 are listed in the Vietnam Red Data Book and 18 are listed in Decree No. 84/2021/ND-CP, which need to be preserved.

Keywords: Deo Ca, flora, Phu Yen, special use forest.

1. INTRODUCTION

Deo Ca Special Use Forest was established under Decision No. 194/CT dated August 9, 1986, located in the administrative territory of Hoa Xuan Nam and Hoa Tam communes, Dong Hoa district, Phu Yen province, far from the Tuy Hoa City about 27 km to the south. According to Decision No. 584/QD-UBND of the People's Committee of Phu Yen province on April 11, 2014, the Deo Ca Special Use Forest is named Deo Ca cultural, historical, and environmental forest.

The Deo Ca Special Use Forest is an area that is well-known for scenic landscapes ranked as national relics such as the Da Bia Mountain scenic landscape area, the Vung Ro legendary historical site associated with the Ships without an ID number, and the Ho Chi Minh Trail at Sea in the war against the American Empire to save the country. Deo Ca - Da Bia - Vung Ro areas are also known as the typical historical, cultural, and tourism areas in Phu Yen province.

In addition, the Deo Ca Special Use Forest is also a place with high biodiversity, characterized by a tropical closed evergreen broad-leaved rain-season forest ecosystem, which also preserves many genetic resources of precious and threatened plant and animal species at the national level. In terms of flora, there are several threatened species such as *Cinnamomum parthenoxylon*, *Sindora tonkinensis*, *Afzelia xylocarpa*, *Telosma procumbens*, *Chukrasia tabularis*, *Calamus poilanei,* etc. In terms of animals, some threatened species that need to be conserved include *Nycticebus benganlensis*, *Nycticebus pygmaeus*, *Macaca arctoides*, *Macaca fascicularis*, *Macaca leonina*, *Nomascus annamensis*, *Viverra zibetha*, *Viverricula indica*, *Lophura nycthemera*, *Naja kaouthia*, *Ophiophagus hannah*, *Bungarus fasciatus,* etc.

The Deo Ca Special Use Forest also plays a very important role in maintaining ecological balance, environment and landscape protection, climate regulation for the region, watershed protection, genetic resources, and biodiversity protection of tropical forest flora and fauna.

Although there are many important values, the biodiversity resources in the area are seriously threatened by pressure from local communities with impacts at various levels in and around the forest. The awareness of the

local people about biodiversity conservation is still limited, along with the economic conditions of the local communities in the buffer zone are still difficult, their livelihoods are mainly based on agricultural production and are heavily dependent on forests so the phenomenon of coal burning, birds and wild animals hunting, illegal forest products exploiting, cattle grazing in the forest, etc. is continuing. That puts the forest resources in danger of being exhaustedly exploited.

Therefore, conducting plant biodiversity evaluation in the Deo Ca Special Use Forest for conserving them is very necessary. This paper presents some research results on flora diversity in the study area.

2. RESEARCH METHODOLOGY

2.1. Research objects

This study was focused on vascular plant species in the Deo Ca Special Use Forest, Phu Yen province.

2.2. Research methodology

Data collection

*** Desk study**: Collect secondary data related to the study site such as a map of forest status, scientific reports, and data on natural and social-economic conditions to get an understanding of the study area.

*** Field survey**

- *Recce transect survey*: Six walk-through surveys crossing different forest types, forest status, and terrains were set up to gather information on the flora. On the walking routes, all vascular plant species observed were listed and noted. The information on habitat, plant species name, and life forms of all vascular plant species observed on the walking route was recorded. GPS was used to navigate the direction of the way, and the total way's length. Photos of plant species and/or their habitats were also taken during the survey process. Samples of plant species that can not be recognized in the field were collected for preparing specimens and species identification.

- *Sample plot survey*: Eight representative sample plots with dimensions of 40 x 25 m were established in different forest status, habitats, forest types, and altitudes in the research area to survey woody trees, regenerating trees, shrubs, herbs, and vines. A survey of sample plots in the project area was conducted according to the "Manual on biodiversity research" [1] and *Circular No. 33/TT-BNNPTNT* [2]. The information of all sample plots such as coordinates, elevation above sea level, slope, and direction of exposuration was defined. In each sample plot, the Vietnamese name and scientific name, diameter at the breast height (DBH), under branch height (ubH), canopy height (H), and crown diameter (CD) of all trees with DBH more than six centimeters were determined. In addition, five small sample sub-plots with dimensions of 5 x 5 m were set up to investigate regenerating trees, shrubs, herbs, and vines in each sample plot. Of which, four plots were established at four corners of the sample plot and the rest one was in the center of the sample plot. In each sub-plot, the Vietnamese name and scientific name, individual quantity, sizes, growth characteristics, and regeneration origin of all regenerating trees with DBH less than 6 cm were defined. Shrubs and herbs were also listed and noted about species composition, quantity, sizes, and ground percentage cover. Their specimen for species that cannot be recognized in the field, was collected for species identification. Instruments and equipment were used including GPS Map78CSx, digital camera, compasses, measurement tape, sample clips, pruning scissors, etc.

*** Interview**: Informal interviews were conducted with local people living in communes in the research site to collect further information about key plant species as well as their distribution.

Data analysis

*** Identification of plant specimens***:* Scientific names of plant species were identified by morphological comparison based

on the major literature such as "Handbook to reference and identification of the families of Angiospermae plant in Vietnam" [3], "Checklist of plant species of Vietnam" [4, 5], "Yunnan ferns of China" [6], "Vietnam forest trees" [7], "Flora of Hong Kong" [8], "An illustrated flora of Vietnam" [9], "Flora of China" [10], and "Flora of China Illustrations" [11].

* **Development of a plant species checklist:** The checklist of plant species of the flora in the study area was conducted according to "Vascular plant families and genera" [12] and "International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code)" [13].

* **Diversity evaluation of the flora:** Diversity of the flora in the study area was conducted according to the "Manual on biodiversity research" [1].

* **Analysis of use values of forest plant resources:** The use values of the forest plant resources in the study area were identified and classified according to "An illustrated flora of Vietnam" [9], "Medicinal plants and animals in Vietnam" [14], "Vietnamese medicinal plant dictionary" [15], "Useful plants in Vietnam" [16], "Medicinal plants and medicines in Vietnam" [17], "1900 useful plant species in Vietnam" [18], "Essential oil plant resources in Vietnam" [19], and "Plant resources of South-East Asia" [20].

* **Conservation value analysis of the flora:** Conservation values of the flora were assessed through the threatened plant species followed by "The IUCN Red List of Threatened Species" [21], the "Vietnam Red Data Book" [22], and the *Decree No. 84/2021/ND-CP* of the Vietnamese Government [23].

3. RESULTS AND DISCUSSION

3.1. Diversity of plant taxa in the study site

3.1.1. Diversity of plant composition

The flora in the Deo Ca Special Use Forest is quite rich and diverse with 492 species belonging to 329 genera, and 117 families of 4 vascular plant phyla, including Lycopodiophyta, Polypodiophyta, Pinophyta, and Magnoliophyta (Table 1). Of which, Magnoliophyta is the most dominant in a number of species (92.07%), genera (91.79%), and families (81.2%), followed by Polypodiophyta with 32 species (6.5%), 21 genera (6.38%), 17 families (14.53%). Lycopodiophyta has 4 species (0.81%) belonging to 3 genera (0.91%) of 2 families (1.71%), and Pinophyta has 3 species (0.61%) belonging to 3 genera (0.91%) and 3 families (2.56%). In the Magnoliophyta, Magnoliopsida is more dominant than Liliopsida.

Table 1. Composition and percentage of taxa in the study site

Plant division	Family		Genus		Species	
	Number of families	Percentage (%)	Number of genera	Percentage (%)	Number of species	Percentage (%)
Lycopodiophyta	2	1.71	3	0.91	4	0.81
Polypodiophyta	17	14.53	21	6.38	32	6.5
Pinophyta	3	2.56	3	0.91	3	0.61
Magnoliophyta	95	81.2	302	91.79	453	92.07
- Magnoliopsida	*79*	*67.52*	*265*	*80.55*	*405*	*82.32*
- Liliopsida	*16*	*13.68*	*37*	*11.24*	*48*	*9.77*
Total	**117**	**100**	**329**	**100**	**492**	**100**

Although Magnoliophyta is dominant, but the dominant characteristics are different between Magnoliopsida and Liliopsida (Table 2). Of which, the families, genera, and species

of Magnoliopsida are more dominant than that of Liliopsida. The ratio of Magnoliopsida to Liliopsida in terms of family, genus, and species is 4.94, 7.16, and 8.44, respectively.

Table 2. Distribution of taxa in Magnoliophyta

Taxa	Family		Genus		Species	
	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
Magnoliopsida (A)	79	83.16	265	87.75	405	89.4
Liliopsida (B)	16	16.84	37	12.25	48	10.6
Magnoliophyta	95	100	302	100	453	100
Ratio A/B	**4.94**		**7.16**		**8.44**	

3.1.2. Diversity of plant families and genera

Ten most diverse plant families

Each flora is often characterized by families with rich species on the structure of species composition. The most diverse families are often common families, and these families usually have characteristics of that flora. The results of the survey show that there are 10 most diverse plant families in the study site, accounting for 8.55% of the total families of flora such as Euphorbiaceae, Rubiaceae, Lauraceae, Caesalpiniaceae, Moraceae, Asteraceae, Verbenaceae, Apocynaceae, Fabaceae, Sterculiaceae (Table 3). These families have the highest species number, more than 10 species. The total of species number of these ten families is 161 species, accounting for 32.72% of the total species of the flora. Among them, there are not any plant families which have a percentage of species number more than 10% of the total species of the flora. These ten families are also very diverse families of the flora of Vietnam.

Table 3. Ten most diverse families in the study site

No.	Families	Number of genera	Percentage (%)	Number of species	Percentage (%)
1	Euphorbiaceae	23	6.99	34	6.91
2	Rubiaceae	13	3.95	22	4.47
3	Lauraceae	7	2.13	17	3.46
4	Caesalpiniaceae	10	3.04	15	3.05
5	Moraceae	4	1.22	15	3.05
6	Asteraceae	13	3.95	13	2.64
7	Verbenaceae	6	1.82	12	2.44
8	Apocynaceae	10	3.04	11	2.24
9	Fabaceae	7	2.13	11	2.24
10	Sterculiaceae	6	1.82	11	2.24
A total of ten most diverse families (8.55%)		**99**	**30.09**	**161**	**32.72**

Diversity of plant genera

The flora in the study area is not only diverse in terms of plant families but also it is very diverse in terms of genera as shown in Table 4. The ten most diverse genera have 56 species, accounting for 11.38% of the total species and 3.04% of the total genera in the study area. The *Ficus* of Moraceae is the highest diverse genus with 10 species, followed by *Litsea* with 7 species, and *Lithocarpus* with 6 species. Five genera of *Diospyros, Archidendron, Syzygium, Pteris,*

and *Lygodium* have 5 species, while the remaining genera with equal numbers of 4 species, including *Elaeocarpus* and *Pterospermum*.

Table 4. Ten most diverse genera in the study site

No.	Genera	Families	Numbers of species	Percentage (%)
1	*Ficus*	Moraceae	10	2.03
2	*Litsea*	Lauraceae	7	1.42
3	*Lithocarpus*	Fagaceae	6	1.22
4	*Pteris*	Pteridaceae	5	1.02
5	*Lygodium*	Schisaeaceae	5	1.02
6	*Diospyros*	Ebenaceae	5	1.02
7	*Archidendron*	Mimosaceae	5	1.02
8	*Syzygium*	Myrtaceae	5	1.02
9	*Elaeocarpus*	Elaeocarpaceae	4	0.81
10	*Pterospermum*	Sterculiaceae	4	0.81
Total (3.04%)			**56**	**11.38**

3.2. Diversity of use values of forest plant resources

Forest plant resources in the Deo Ca Special Use Forest area have 258 useful plant species, accounting for 52.44% of the total known species, and they can be classified into 15 different groups.

- **Timber trees**: There are 153 timber tree species, representing 31.10% of the total species. They are mainly concentrated in families of Lauraceae, Fagaceae, Euphorbiaceae, Moraceae, Clusiaceae, Caesalpiniaceae, Anacardiaceae, Mimosaceae, Annonaceae, Fabaceae, Elaeocarpaceae, Myrtaceae, Meliaceae, etc. Some valuable timber species in this area recorded are *Actinodaphne pilosa* (Lauraceae), *Albizzia lucidior* (Mimosaceae), *Amesiodendron chinense* (Sapindaceae), *Elaeocarpus* spp. (Elaeocarpaceae), *Syzygium wightianum* (Myrtaceae), *Canarium* sp. (Burseraceae), *Bischofia javanica* and *Endospermum chinense* (Euphorbiaceae), and *Choerospondias axillaris* (Anacardiaceae), etc.

- **Medicinal plants**: This medicinal plant group contains 92 species, accounting for 18.07% of the total species. They belong to families of Lamiaceae, Menispermaceae, Rubiaceae, Araliaceae, Caesalpiniaceae, Asteraceae, Euphorbiaceae, Convallariaceae, Costaceae, Amaranthaceae, Zingiberaceae, etc. Some common medicinal plants in the study area consisting of *Achyranthes aspera* (Amaranthaceae), *Ardisia silvestris* (Myrsinaceae), *Cibotium barometz* (Dicksoniaceae), *Costus tonkinensis* (Costaceae), *Drynaria fortunei* (Polypodiaceae), *Imperata cylindrica* (Poaceae), *Jasminum subtriplinerve* (Oleaceae), *Leea rubra* (Leeaceae), *Ophiopogon dracaenoides* (Convallariaceae), *Oroxylum indicum* (Bignoniaceae), *Sargentodoxa cuneata* (Sargentodoxaceae), *Senna tora* (Caesalpiniaceae), *Stemona cochinchinensis* (Stemonaceae), *Hedyotis capitellata* (Rubiaceae).

- **Ornamental plants**: This group includes 85 species (17.28% of the total species) such as *Ixora coccinea*, *Ficus* spp., *Arenga pinnata*, *Peltophorum dasyrrhachis*, *Bischofia javanica*, *Desmos cochinchinensis*, *Begonia* spp., *Cycas* sp., *Vitex* spp., *Saraca dives*, *Barringtonia* sp., *Adenanthera microsperma*, *Chukrasia tabularis*, *Barringtonia acutangula*, *Bombax ceiba*, etc.

- **Vegetable plants:** A total of 32 vegetable plant species, accounting for 6.50% of the total species are found such as *Schefflera heptaphylla*, *Diplazium esculentum*, *Piper lolot*, *Centella asiatica*, *Blumea lanceolaria*, *Elsholtzia ciliata*, *Amaranthus* spp., *Erythropalum scandens*, *Gynura ovalis*,

Houttuynia cordata, etc.

- Edible fruits and nuts: There are 35 species, accounting for 7.11% of the total species, such as *Baccaurea ramiflora*, *Rhodomyrtus tomentosa*, *Dracontomelon duperreanum*, *Bischofia javanica*, *Nauclea orientalis*, *Arenga pinnata*, *Averrhoa carambola*, *Choerospondias axillaris*, *Canarium* spp., *Tamarindus indica*, *Syzygium jambos*, *Ficus auriculata*, etc.

- **Spicy and drinking water**: This plant group has 12 species including *Centella asiatica, Cratoxylum pruniflorum, Elsholtzia ciliata, Ocimum basilicum, Cleistocalyx operculatus, Jasminum subtriplinerve, Senna tora, Sargentodoxa cuneata, Ampelopsis cantoniensis, Adenosma caeruleum,* etc. Those species represented 2.44% of the total species.

- Vegetable oils and fats: There are 15 species recorded in the study site, accounting for 3.05% of the total species such as *Rhus chinensis*, *Vernicia montana*, *Ricinus communis*, *Canarium* spp., *Garcinia oblongifolia*, *Hodgsonia macrocarpa*, *Sterculia lanceolata*, *Garcinia multiflora*, *Sapium* spp., etc.

- Essential oil plants: A total of 29 essential oil plant species, representing 5.89% of the total species are recorded in the study site such as *Cinnamomum* spp., *Litsea* spp., *Desmos cochinchinensis*, *Canarium* spp., *Ocimum spp*., *Elsholtzia spp.*, *Desmos chinensis*, *Magnolia coco*, *Zingiber zerumbet*, etc.

- Fibre plants: 59 fiber plant species are found in the study area. They are accounting for 11.99% of the total species, for instance, *Broussonetia papyrifera*, *Trema orientalis, Helicteres angustifolia*, *Helicteres hirsuta*, *Mallotus barbatus*, *Mallotus apelta*, *Mallotus paniculatus*, *Imperata cylindrica*, *Sida rhombifolia*, *Pterospermum heterophyllum*, *Sterculia lanceolata, Microcos paniculata*, *Dillenia indica, Vernicia montana*, *Sapium sebiferum*, *Rhapis* spp*., Calamus* spp., *Wikstroemia indica*, *Arenga pinnata*, etc.

- Tannin-producing plants: This group consists of 25 species, representing 5.08% of the total species such as *Syzygium* spp., *Rhodomyrtus tomentosa*, *Dioscorea cirrhosa*, *Broussonetia papyrifera*, *Trema orientalis*, *Rhus chinensis*, *Castanopsis* spp., *Senna siamea*, *Sapium sebiferum*, *Choerospondias axillaris*, *Toxicodendron succedaneum*, *Adenanthera microsperma*, *Phyllanthus emblica*, *Archidendron clypearia*, *Acronychia pedunculata*, etc.

- **Food plants**: This group includes 15 species, accounting for 3.05% of total species, such as *Dioscorea* sp., *Cibotium barometz*, *Castanopsis* spp., *Artocarpus tonkinensis*, *Gnetum montanum*, *Castanopsis indica*, *Arenga pinnata*, *Dioscorea persimilis*, etc.

- **Dye-producing plants**: There are 16 species of this group, representing 3.25% of the total species, such as *Strobilanthes pateriformis*, *Fibraurea tinctoria*, *Dioscorea cirrhosa*, *Adenanthera microsperma*, *Oroxylum indicum*, *Peltophorum dasyrrhachis*, *Rhus chinensis*, *Mallotus philippinensis*, etc.

- **Materials for making handicrafts and constructing houses**: 22 plant species of this group, accounting for 4.47% of the total species, are found including *Neohouzeaua dullooa*, *Arenga pinnata*, *Calamus platyacanthus*, *Imperata cylindrica*, *Dicranopteris linearis*, *Pennisetum* sp., *Phrynium placentarium*, *Musa* spp., etc.

- Plants producing exudates: A total of 25 plant species, representing 5.08% of the total species, are recorded to produce exudates such as *Artocarpus borneensis*, *Broussonetia papyrifera*, *Ficus* spp., *Toxicodendron succedanea*, *Canarium* spp., *Horsfieldia amygdalina*, *Knema globularia*, *Garcinia oblongifolia, Wrightia* spp., *Alstonia scholaris*, *Cratoxylum cochinchinense*, *Cratoxylum formosum*, etc.

- Poisonous plants: This group includes 8 species, accounting for 1.63% of the total species, such as *Toxicodendron succedanea, Derris elliptica, Millettia ichthyochtona, Melia azedarach,* etc.

3.3. Diversity of threatened plant species

The flora in the study area is diverse not only in species composition but also in the use values of forest resources and threatened plant species. In the survey area, 28 threatened plant species are recorded (see Table 3.5). Of which, there are:

- 17 plant species listed in the Vietnam Red Data Book (plant section, 2007), including 1 critically endangered species (*Cinnamomum parthenoxylon*), 06 endangered species (EN), such as *Sindora tonkinensis, Afzelia xylocarpa, Aquilaria crassna, Telosma procumbens*, and 10 vulnerable species (VU) such as *Parashorea stellata*, *Rauvolfia verticillata, Chukrasia tabularis*, *Cycas rumphii*.

- 18 threatened plant species listed in Decree No. 84/2021/ND-CP dated September 22, 2021, by the Vietnam Government ranked as IIA such as *Cinnamomum parthenoxylon*, *Sindora siamensis, Sindora tonkinensis, Afzelia xylocarpa, Calamus poilanei, Cycas rumphii*, *Fibraurea tinctoria*, *Drynaria bonii*, etc.

Table 5. List of threatened plant species in the Deo Ca Special Use Forest

No.	Scientific name	Vietnamese name	Decree No. 84	Vietnam Red Data Book (2007)
1	*Cinnamomum parthenoxylon*	Vù hương, xá xị	IIA	CR A1a,c,d
2	*Telosma procumbens*	Cam thảo đá bia		EN B1+2b.
3	*Sindora siamensis*	Gụ mật, gõ mật	IIA	EN A1a,c,d
4	*Sindora tonkinensis*	Gụ lau	IIA	EN A1a,c,d+2d
5	*Afzelia xylocarpa*	Gõ đỏ, cà te	IIA	EN A1c,d
6	*Lithocarpus cerebrinus*	Sồi phảng		EN A1c,d
7	*Aquilaria crassna*	Trầm hương		EN A1c,d, B1+2b,c,e
8	*Calamus poilanei*	Song bột	IIA	EN A1c,d+2c,d
9	*Parashorea stellata*	Chò đen		VUA1,b,c+2b,c,
10	*Lithocarpus hemisphaericus*	Dẻ bán cầu		VU A1,c,d
11	*Rauvolfia verticillata*	Ba gạc vòng		VU A1a, c
12	*Cycas rumphii*	Thiên tuế	IIA	VU A1a,c
13	*Drynaria bonii*	Tắc kè đá	IIA	VU A1a,c,d
14	*Chukrasia tabularis*	Lát hoa		VU A1a,c,d+2d
15	*Ardisia silvestris*	Lá khôi		VU A1a,c,d+2d
16	*Quercus platycalyx*	Dẻ cau		VU A1c,d
17	*Dipterocarpus grandiflorus*	Dầu hoa to		VU A1c,d+2c,d
18	*Stephania dielsiana*	Củ dòm	IIA	VU B1+2b,c
19	*Cyathea latebrosa*	Dương xỉ mộc	IIA	
20	*Cibotium barometz*	Cẩu tích	IIA	
21	*Dalbergia rimosa*	Trắc dây	IIA	
22	*Dalbergia tonkinensis*	Sưa	IIA	
23	*Fibraurea tinctoria*	Hoàng đằng	IIA	
24	*Stephania rotunda*	Bình vôi	IIA	
25	*Aerides odorata*	Quế lan	IIA	
26	*Calanthe angusta*	Địa lan hoa tím	IIA	
27	*Calanthe triplicata*	Địa lan hoa trắng	IIA	
28	*Dendrobium nobile*	Thạch hộc	IIA	

4. CONCLUSION

1. The Deo Ca Special Use Forest flora is quite diverse with 492 species belonging to 329 genera and 117 families of 4 vascular plant phyla. Of which, Magnoliophyta is the most dominant in the number of species (92.07%), genera (91.79%), and families (81.2%).

2. In the Magnoliophyta, Magnoliopsida is more dominant than Liliopsida. The ratio of Magnoliopsida to Liliopsida in terms of the family, genus, and species is 4.94, 7.16, and 8.44, respectively.

3. There are 10 most diverse plant families in the study site, accounting for 8.55% of the total families of the flora such as Euphorbiaceae, Rubiaceae, Lauraceae, Caesalpiniaceae, Moraceae, Asteraceae, Verbenaceae, Apocynaceae, Fabaceae, Sterculiaceae. These families have the highest species number, more than 11 species. The total of species number of these ten families is 161 species, accounting for 32.72% of the total species of the flora.

4. Ten most diverse genera have 56 species, accounting for 11.38% of the total species and 3.04% of the total genera in the study site. The highest diverse genus is *Ficus* of Moraceae with 10 species, followed by *Litsea* with 7 species, and *Lithocarpus* with 6 species. Five genera of *Diospyros, Archidendron, Syzygium, Pteris,* and *Lygodium* have 5 species, while the remaining genera with equal numbers of 4 species, including *Elaeocarpus* and *Pterospermum*.

5. The forest plant resources in the Deo Ca Special Use Forest site are considered to have a high diversity of use values and can be classified into 15 different groups of uses.

6. The flora in the study area has 17 plant species listed in the Vietnam Red Data Book and 18 threatened plant species listed in Decree No. 84/2021/ND-CP that need to be conserved.

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TÍNH ĐA DẠNG HỆ THỰC VẬT Ở KHU RỪNG ĐẶC DỤNG ĐÈO CẢ, TỈNH PHÚ YÊN

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TÓM TẮT

Hệ thực vật ở Rừng đặc dụng Đèo Cả, tỉnh Phú Yên khá đa dạng, với 492 loài thuộc 329 chi và 117 họ của 4 ngành thực vật có mạch. Trong đó, ngành Ngọc lan (Magnoliophyta) chiếm ưu thế nhất với 453 loài (92,07%), 302 chi (91,79%), 95 họ (81,2%). Tiếp theo là ngành Dương xỉ (Polypodiophyta) có 32 loài (6,5%), 21 chi (6,38%), 17 họ (14,53%); ngành Thông đất (Lycopodiophyta) có 4 loài (0,81%), 3 chi (0,91%), 2 họ (1,71%); cuối cùng là ngành Thông (Pinophyta) có 3 loài (0,61%), 3 chi (0,91%), 3 họ (2,56%). Trong ngành Ngọc lan (Magnoliophyta) thì lớp Ngọc lan (Magnoliopsida) chiếm ưu thế. Tỷ trọng giữa lớp Ngọc lan (Magnoliopsida) và lớp Loa kèn (Liliopsida) lần lượt là 8,44 đối với số loài; 7,16 đối với số chi và 4,94 đối với số họ. Mười họ đa dạng nhất có 161 loài, chiếm 32,72% tổng số loài và mười chi đa dạng nhất có 56 loài, chiếm 11,38% tổng số loài của khu vực nghiên cứu. Tài nguyên thực vật rừng ở khu vực nghiên cứu khá đa dạng, với tổng số 258 loài cây có ích, chiếm 52,44% tổng số loài đã biết, có thể được phân loại vào 15 nhóm công dụng khác nhau. Ở khu vực nghiên cứu đã ghi nhận được 28 loài thực vật bị đe dọa, trong đó có 17 loài thực vật có trong Sách Đỏ Việt Nam và 18 loài trong Nghị định 84/2021/NĐ-CP cần được bảo tồn.

Từ khoá: Đèo Cả, hệ thực vật, Phú Yên, rừng đặc dụng.

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