

FLORA DIVERSITY IN THE PROPOSED DELACOUR'S LANGUR SPECIES AND HABITAT CONSERVATION AREA, HA NAM PROVINCE

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ABSTRACT

The flora in the Proposed Delacour's Langur Species and Habitat Conservation Area is quite diverse with 562 species belonging to 373 genera, and 126 families of 6 vascular plant phyla. Of which, Angiospermae is the most dominant with 513 species (91.28%), 348 genera (93.3%) of 106 families (84.13%); the next Polypodiophyta with 38 species (6.76%), 18 genera (4.83%), 14 families (11.11%); the Lycopodiophyta has 5 species (0.89%) belonging to 3 genera (0.80%) of 2 families (1.59%) and the Gymnospermae has 4 species (0.71%) belonging to 2 genera (0.54%) of 2 families (1.59%); the last two Equisetophyta and Psilotophyta both have only one species, one genus of one family. In the Angiospermae, Dicotyledoneae is more dominant than Monocotyledoneae. The ten most diverse plant families have 215 species, accounting for 38.26% and the ten most diverse genera have 66 species, representing 11.75% of the total species in the study area. The forest plant resources in the Proposed Delacour's Langur Species and Habitat Conservation Area have a high diversity of use values and can be classified into 15 different use groups. In the research site, there is a total of 41 threatened plant species that need to be preserved, including 21 species listed in the Vietnam Red Data Book, 27 species listed in Decree No. 84/2021/ND-CP, and 7 species listed in the IUCN Red List.

Keywords: Delacour's langur, flora, Ha Nam, species and habitat conservation area.

1. INTRODUCTION

The Delacour's langur (*Trachypithecus delacouri*) is an endemic primate species in Viet Nam with the largest remaining population in Van Long Nature Reserve, Ninh Binh Province. In 2016, Fauna and Flora International (FFI) investigated and studied the current status of biodiversity in the forests of Kim Bang district, Ha Nam province. Here, FFI and authorities of Ha Nam province have discovered seven herds of Delacour's langur with a total of 40 individuals. That is the second largest population of Delacour's langur in Vietnam and the world.

FFI's studies have shown that the habitat of the Delacour's langur in Ha Nam province is facing serious threats caused by human activities, including hunting, quarrying and mining, logging and non-timber forest products exploitation, encroachment for cultivation, and cattle grazing leading to a decrease in forest area or habitat.

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Recognizing that the populations of the Delacour's langur in the area are currently at a high alert level and are at risk of extinction if it is not protected by appropriate measures. On May 18, 2017, the Ha Nam Provincial People's Committee issued Official Letter No. 1265/UBND-NN&TNMT on the policy of developing a project to establish a Delacour's Langur Species and Habitat Conservation Area in Kim Bang district, Ha Nam province to conserve and develop the Delacour's langur species and biodiversity in the region.

This study is conducted to assess the current status of biodiversity of higher vascular plants in the study area as a scientific basis for proposing to establish a Delacour's Langur Species and Habitat Conservation Area in Kim Bang district, Ha Nam province.

2. RESEARCH METHODOLOGY

2.1. Research object

The object of this study is higher vascular plant species in Thanh Son, Lien Son, Kha Phong communes, and Ba Sao town of Kim

Bang district, Ha Nam province.

2.2. Research methodology

Data collection

*** Field survey**

- *Recce transect survey*: Thirteen walk-through surveys crossing different forest types, forest status, and terrains were established to collect information on the flora. All vascular plant species observed on the walking routes 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 way's direction 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 cannot be recognized in the field were collected for preparing specimens and species identification.

- *Sample plot survey*: Ten representative sample plots of 40 m x 25 m in size were laid out in different forest status, habitats, forest types, and altitudes in the study site to study woody trees, regenerating trees, shrubs, herbs, and vines. Surveys on sample plots in the research site were carried out 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 exposure was determined. 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 identified. In addition, laid out five 25 sq. m. quadrats in each sample plot to survey regenerating trees, shrubs, herbs, and vines. Of which, four quadrats were located at four corners of the sample plot and the rest one was in the center of the sample plot. In each quadrat, 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 determined. Shrubs and herbs were also listed and noted in terms of 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 study area 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 developed 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 research site were determined 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 evaluated 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 area

3.1.1. Diversity of plant composition

The flora in the Proposed Delacour’s Langur Species and Habitat Conservation Area is quite diverse with 562 species belonging to 373 genera, and 126 families of 6 vascular plant phyla, including Psilotophyta, Lycopodiophyta, Equisetophyta, Polypodiophyta, Gymnospermae, and Angiospermae (Table 1). Of which, Angiospermae is the most dominant with 513 species (91.28%), 348 genera (93.3%) of 106 families (84.13%), followed by Polypodiophyta with 38 species (6.76%), 18 genera (4.83%) of 14 families (11.11%). Lycopodiophyta has 5 species (0.89%) belonging to 3 genera (0.80%) of 2 families (1.59%), Gymnospermae has 4 species (0.71%) belonging to 2 genera (0.54%) and 2 families (1.59%), while Equisetophyta and Psilotophyta both have only one species, one genus of one family. In the Angiospermae, Dicotyledoneae is more dominant than Monocotyledoneae.

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

Plant division	Family		Genus		Species	
	Number of families	Percentage (%)	Number of genera	Percentage (%)	Number of species	Percentage (%)
Psilotophyta	1	0.79	1	0.27	1	0.18
Lycopodiophyta	2	1.59	3	0.80	5	0.89
Equisetophyta	1	0.79	1	0.27	1	0.18
Polypodiophyta	14	11.11	18	4.83	38	6.76
Gymnospermae	2	1.59	2	0.54	4	0.71
Angiospermae	106	84.13	348	93.30	513	91.28
- Dicotyledoneae	87	69.05	272	72.92	407	72.42
- Monocotyledoneae	19	15.08	76	20.38	106	18.86
Total	126	100	373	100	562	100

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 area,

representing 8.55% of the total families of the flora, including Euphorbiaceae, Poaceae, Fabaceae, Moraceae, Asteraceae, Verbenaceae, Orchidaceae, Araceae, Lauraceae, Rubiaceae (Table 2). These families have the highest species number, more than 10 species. The total number of species of these ten families is 215, accounting for 38.26% 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 2. Ten most diverse families in the study area

No.	Families	Number of genera	Percentage (%)	Number of species	Percentage (%)
1	Euphorbiaceae	22	5.90	35	6.23
2	Poaceae	27	7.24	33	5.87
3	Fabaceae	18	4.83	27	4.80
4	Moraceae	6	1.61	27	4.80
5	Asteraceae	23	6.17	25	4.45
6	Verbenaceae	6	1.61	15	2.67
7	Orchidaceae	13	3.49	15	2.67
8	Araceae	9	2.41	15	2.67
9	Lauraceae	7	1.88	12	2.14
10	Rubiaceae	8	2.14	11	1.96
A total of ten most diverse families (8.55%)		139	37.27	215	38.26

Diversity of plant genera

The flora in the research site is not only diverse in terms of plant families but also it is very diverse in terms of genera (Table 3). The ten most diverse genera have 66 species, representing 11.75% of the total species and 2.68% of the total genera in the study area. The *Ficus* of Moraceae is the highest diverse genus

with 10 species, followed by *Solanum* with 7 species, *Mallotus* and *Lygodium* with 6 species. Four genera of *Ardisia*, *Litsea*, *Callicarpa*, and *Syzygium* have 5 species, while the remaining genera with equal numbers of 4 species, including *Diospyros* and *Wrightia*.

Table 3. Ten most diverse genera in the study area

No.	Genera	Families	Numbers of species	Percentage (%)
1	<i>Ficus</i>	Moraceae	19	3.38
2	<i>Solanum</i>	Solanaceae	7	1.25
3	<i>Mallotus</i>	Euphorbiaceae	6	1.07
4	<i>Lygodium</i>	Schizaeaceae	6	1.07
5	<i>Ardisia</i>	Myrsinaceae	5	0.89
6	<i>Litsea</i>	Lauraceae	5	0.89
7	<i>Callicarpa</i>	Verbenaceae	5	0.89
8	<i>Syzygium</i>	Myrtaceae	5	0.89
9	<i>Diospyros</i>	Ebenaceae	4	0.71
10	<i>Wrightia</i>	Apocynaceae	4	0.71
Total (2.68%)			66	11.75

3.2. Diversity of use values of forest plant resources

Forest plant resources in the Proposed Delacour’s Langur Species and Habitat Conservation Area have 289 useful plant species, representing 51.42% of the total known species, and they can be classified into

15 different groups.

- **Timber trees:** This plant group consists of 121 timber tree species, accounting for 21.53% of the total species. Some valuable timber species recorded in this area are *Aglaia spectabilis*, *Actinodaphne pilosa*, *Albizzia lucidior*, *Dimocarpus fumatus*, *Duabanga*

grandiflora, *Heritiera macrophylla*, *Pometia pinnata*, *Amesiodendron chinense*, *Elaeocarpus* spp., *Syzygium wightianum*, *Canarium* spp., *Bischofia javanica*, *Choerospondias axillaris*, *Caryodaphnopsis tonkinensis*, etc.

- **Medicinal plants:** This medicinal plant group includes 90 species, representing 16.01% of the total species. Some common medicinal plants in the research site include *Achyranthes aspera*, *Ardisia silvestris*, *Cibotium barometz*, *Costus tonkinensis*, *Drynaria fortunei*, *Goniothalamus vietnamensis*, *Imperata cylindrica*, *Jasminum subtriplinerve*, *Leea rubra*, *Ophiopogon dracaenoides*, *Phyllanthus reticulatus*, *Oroxylum indicum*, *Sargentodoxa cuneata*, *Senna tora*, *Stemona cochinchinensis*, *Hedyotis capitellata*, *Gynostemma pentaphyllum*.

- **Ornamental plants:** This plant group contains 96 species, representing 17.08% of the total species, including *Ficus* spp., *Caryota* spp., *Peltophorum dasyrrhachis*, *Streblus asper*, *Bischofia javanica*, *Magnolia coco*, *Michelia figo*, *Desmos cochinchinensis*, *Begonia* spp., *Cycas* sp., *Ixora coccinea*, *Vitex* spp., *Saraca dives*, *Barringtonia* sp., *Dracontomelon duperreanum*, *Adenanthera microsperma*, *Chukrasia tabularis*, *Barringtonia acutangula*, *Bombax ceiba*, etc.

- **Vegetable plants:** A total of 28 vegetable plant species, accounting for 4.98% of the total species, are found, such as *Melientha suavis*, *Schefflera heptaphylla*, *Diplazium esculentum*, *Piper lolot*, *Centella asiatica*, *Artemisia vulgaris*, *Blumea lanceolaria*, *Elsholtzia ciliata*, *Alternanthera sessilis*, *Ampelocalamus patellaris*, *Amaranthus* spp., *Crassocephalum crepidioides*, *Erythrophalum scandens*, *Houttuynia cordata*, *Cucurbita pepo*, etc.

- **Edible fruits and nuts:** There are 22 species, representing 3.19% of the total species, including *Baccaurea ramiflora*, *Dracontomelon duperreanum*, *Canarium* spp.,

Garcinia cowa, *Rhodomyrtus tomentosa*, *Allospodias lakonensis*, *Tamarindus indica*, *Garcinia multiflora*, *Citrus grandis*, *Syzygium jambos*, *Ficus auriculata*, *Elaeagnus latifolia*, etc.

- **Spicy and drinking water:** This plant group has 21 species, accounting for 3.74% of the total species, including *Ilex kaushue*, *Vernonia cumingiana*, *Cratoxylum pruniflorum*, *Elsholtzia ciliata*, *Ocimum basilicum*, *Clausena indica*, *Cleistocalyx operculatus*, *Jasminum subtriplinerve*, *Centella asiatica*, *Amomum longiligulare*, *Senna tora*, *Adenosma caeruleum*, *Sargentodoxa cuneata*, *Ampelopsis cantoniensis*, etc.

- **Vegetable oils and fats:** This plant group includes 15 species recorded in the study site, representing 2.67% of the total species, such as *Eberhardtia aurata*, *Canarium album*, *Canarium tramdenum*, *Vernicia montana*, *Garcinia oblongifolia*, *Hodgsonia macrocarpa*, *Sterculia lanceolata*, etc.

- **Essential oil plants:** This plant group contains 25 species, accounting for 4.45% of the total species, such as *Cinnamomum* spp., *Litsea* spp., *Desmos cochinchinensis*, *Ocimum* spp., *Elsholtzia* spp., *Styrax tonkinensis*, *Liquidambar formosana*, *Desmos chinensis*, *Magnolia coco*, etc.

- **Fibre plants:** There are 29 fiber plant species found in the study area, representing 5.16% of the total species, for instance, *Broussonetia papyrifera*, *Trema orientalis*, *Brownlowia tabularis*, *Wikstroemia indica*, *Helicteres angustifolia*, *Helicteres hirsuta*, *Mallotus barbatus*, *Mallotus apelta*, *Mallotus paniculatus*, *Imperata cylindrica*, *Sida rhombifolia*, *Pterospermum heterophyllum*, *Sterculia lanceolata*, *Microcos paniculata*, *Vernicia montana*, *Sapium sebiferum*, *Boehmeria nivea*, *Calamus* spp., *Bambusa blumeana*, etc.

- **Tannin-producing plants:** This group consists of 23 species, accounting for 4.09% of

the total species, such as *Syzygium* spp., *Rhodomyrtus tomentosa*, *Dioscorea cirrhosa*, *Broussonetia papyrifera*, *Trema orientalis*, *Rhus chinensis*, *Senna siamea*, *Sapium sebiferum*, *Choerospondias axillaris*, *Toxicodendron succedaneum*, *Phyllanthus emblica*, *Adenantha microsperma*, *Archidendron clypearia*, *Castanopsis* spp., *Acronychia pedunculata*, etc.

- **Food plants:** This group includes 11 species, representing 1.96% of total species, such as *Dioscorea* sp., *Cibotium barometz*, *Castanopsis* spp., *Artocarpus tonkinensis*, *Gnetum montanum*, *Castanopsis indica*, *Ipomoea batatas*, *Solanum tuberosum*, etc.

- **Dye-producing plants:** There are 16 species of this group, accounting for 2.85% of the total species, such as *Strobilanthes pateriformis*, *Fibraurea tinctoria*, *Dioscorea cirrhosa*, *Adenantha microsperma*, *Oroxylum indicum*, *Peltophorum dasyrrhachis*, *Rhus chinensis*, *Peristrophe bivalvis*, etc.

- **Materials for making handicrafts and constructing houses:** 12 plant species of this group, representing 2.14% of the total species, are found, including *Bambusa blumeana*, *Neohouzeaua dullooa*, *Arenga pinnata*, *Caryota mitis*, *Imperata cylindrica*, *Dicranopteris linearis*, *Pennisetum* sp., *Bambusa nutans*, *Phrynium placentarium*, *Musa* spp., etc.

- **Plants producing exudates:** A total of 21 plant species, accounting for 3.74% of the total species, are recorded to produce exudates, such as *Horsfieldia amygdalina*, *Garcinia* spp., *Canarium* spp., *Toxicodendron succedanea*, *Ficus* spp., *Wrightia* spp., *Alstonia scholaris*, *Eberhardtia aurata*, *Cratoxylum cochinchinense*, *Cratoxylum pruniflorum*, *Liquidambar formosana*, etc.

- **Poisonous plants:** This group includes ten species, representing 3.91% of the total

species, such as *Nerium oleander*, *Toxicodendron succedanea*, *Derris elliptica*, *Lantana camara*, *Millettia ichthyochtona*, *Melia azedarach*, *Euphorbia pulcherrima*, etc.

3.3. Diversity of threatened plant species

The flora in the study area is diverse in threatened plant species. In the research site, there are 41 threatened plant species recorded (Table 4). Of which, there are:

- 21 plant species listed in the Vietnam Red Data Book (Part II-plant, 2007), including 05 endangered species (EN) such as *Excentrodendron tonkinense*, *Gynostemma pentaphyllum*, *Anoectochilus roxburghii*, *Madhuca pasquieri*, *Curculigo orchioides* and 16 vulnerable species (VU) such as *Calamus nambariensis*, *Ardisia silvestris*, *Chukrasia tabularis*, *Codonopsis javanica*, *Cycas balansae*, *Disporopsis longifolia*, *Melientha suavis*, *Nervilia aragoana*, etc.

- 27 threatened plant species listed in Decree No. 84/2021/ND-CP dated 22 September 2021 by the Vietnamese Government, including 1 species ranked as IA (*Anoectochilus roxburghii*) and 26 species ranked as IIA such as *Excentrodendron tonkinense*, *Cycas balansae*, *Nervilia aragoana*, *Disporopsis longifolia*, *Codonopsis javanica*, *Calamus nambariensis*, *Stephania dielsiana*, orchis plant, etc.

- 7 threatened plant species listed in IUCN Red List, including 2 endangered species (EN) such as *Cycas hoabinhensis*, *Erythrophleum fordii*, and 5 vulnerable species (VU) such as *Burretiodendron hsienmu*, *Dalbergia tonkinensis*, *Madhuca pasquieri*, *Canthium dicoccum*, *Knema tonkinensis*.

Among 41 threatened plant species recorded in the survey area, 3 plant species are cultivated, including *Erythrophleum fordii*, *Chukrasia tabularis*, and *Dalbergia tonkinensis*.

Table 4. List of threatened plant species in the Proposed Delacour's Langur Species and Habitat Conservation Area

No.	Scientific name	Vietnamese name	Vietnam Red Data Book (2007)	Decree No. 84	IUCN Red List (2021)
1	<i>Anoetochilus roxburghii</i>	Lan kim tuyến	EN	IA	
2	<i>Burretiodendron hsienmu</i>	Nghiên	EN	IIA	VU
3	<i>Curculigo orchioides</i>	Sâm cau	EN		
4	<i>Gynostemma</i>	Giảo cô lam	EN		
5	<i>Madhuca pasquieri</i>	Sến mật	EN		VU
6	<i>Aglaia spectabilis</i>	Gội nếp	VU		
7	<i>Ardisia silvestris</i>	Lá khô	VU		
8	<i>Calamus nambariensis</i>	Song mật	VU	IIA	
9	<i>Canthium dicocum</i>	Xương cá	VU		VU
10	<i>Castanopsis ferox</i>	Cà ôi vọng-phu	VU		
11	<i>Chukrasia tabularis</i>	Lát hoa	VU		
12	<i>Codonopsis javanica</i>	Đảng sâm	VU	IIA	
13	<i>Cycas balansae</i>	Tuế lá rộng	VU	IIA	
14	<i>Disporopsis longifolia</i>	Hoàng tinh cách	VU	IIA	
15	<i>Drynaria bonii</i>	Tắc kè đá	VU	IIA	
16	<i>Melientha suavis</i>	Rau sắng	VU		
17	<i>Nervilia aragoana</i>	Thanh thiên quỳ	VU	IIA	
18	<i>Stemona cochinchinensis</i>	Bách bộ nam	VU		
19	<i>Stemona saxorum</i>	Bách bộ đứng	VU		
20	<i>Stephania dielsiana</i>	Củ dôm	VU	IIA	
21	<i>Strychnos umbellata</i>	Mã tiền hoa tán	VU		
22	<i>Acampe rigida</i>	A cam cứng		IIA	
23	<i>Calanthe alismifolia</i>	Kiều lan		IIA	
24	<i>Cibotium barometz</i>	Cầu tích		IIA	
25	<i>Cleisostoma rostratum</i>	Mật khẩu mũi		IIA	
26	<i>Corymborkis veratrifolia</i>	Lan lá dừa trắng		IIA	
27	<i>Cycas hoabinhensis</i>	Tuế hòa bình		IIA	EN
28	<i>Cymbidium aloifolium</i>	Kiểm lô hội		IIA	
29	<i>Dalbergia tonkinensis</i>	Sưa		IIA	VU
30	<i>Dendrobium aduncum</i>	Bạch trúc		IIA	
31	<i>Dendrobium anosmum</i>	Giả hạc, Phi điệp		IIA	
32	<i>Dendrobium lindleyi</i>	Vây rồng		IIA	
33	<i>Erythrophleum fordii</i>	Lim xanh			EN
34	<i>Flickingeria</i> sp.	Phích lan		IIA	
35	<i>Knema tonkinensis</i>	Máu chó bắc			VU
36	<i>Liparis cespitosa</i>	Lan cánh bướm		IIA	
37	<i>Ludisia discolor</i>	Lan lá gấm		IIA	
38	<i>Renanthera coccinea</i>	Phượng vĩ bắc		IIA	
39	<i>Stephania japonica</i>	Thiên kim đằng		IIA	
40	<i>Stephania sinica</i>	Bình vô tán ngắn		IIA	
41	<i>Zeuxine strateumatica</i>	Lan cói		IIA	

4. CONCLUSION

1. The flora in the Proposed Delacour's Langur Species and Habitat Conservation Area is quite diverse with 562 species belonging to 373 genera, and 126 families of 6 vascular plant phyla. Angiospermae is the most

dominant, with 513 species representing 91.28%, 348 genera representing 93.3%, and 106 families accounting for 84.13%.

2. In the Angiospermae, Dicotyledoneae is more dominant than Monocotyledoneae.

3. There are 10 most diverse plant families

in the study site, representing 8.55% of the total families of the flora such as Euphorbiaceae, Poaceae, Fabaceae, Moraceae, Asteraceae, Verbenaceae, Orchidaceae, Araceae, Lauraceae, Rubiaceae. These families have the highest species number, more than 10 species. The total number of species of these ten families is 215, accounting for 38.26% of the total species of the flora.

4. Ten most diverse genera have 66 species, accounting for 11.75% of the total species and 2.68% of the total genera in the research site. The highest diverse genus is *Ficus* of Moraceae with 10 species, followed by *Solanum* with 7 species, and *Mallotus* and *Lygodium* with 6 species. Four genera of *Ardisia*, *Litsea*, *Callicarpa*, and *Syzygium* have 5 species, while the remaining genera with equal numbers of 4 species, including *Diospyros* and *Wrightia*.

5. Forest plant resources in the Proposed Delacour's Langur Species and Habitat Conservation Area have a high diversity of use-values with 289 useful plant species and can be classified into 15 different use groups.

6. The flora in the study area has 41 threatened plant species. Of these, there are 21 species listed in the Vietnam Red Data Book, 27 in Decree No. 84/2021/ND-CP, and 7 in the IUCN Red List.

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TÍNH ĐA DẠNG HỆ THỰC VẬT Ở KHU RỪNG ĐỀ XUẤT THÀNH LẬP KHU BẢO TỒN LOÀI VÀ SINH CẢNH VOỌC MÔNG TRẮNG, TỈNH HÀ NAM

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TÓM TẮT

Hệ thực vật ở khu rừng đề xuất thành lập Khu bảo tồn loài và sinh cảnh Voọc mông trắng, tỉnh Hà Nam khá đa dạng, với 562 loài thuộc 373 chi và 126 họ của 6 ngành thực vật bậc cao có mạch. Trong đó, ngành Hạt kín (Angiospermae) chiếm ưu thế nhất với 513 loài (91,28%), 348 chi (93,3%), 106 họ (84,13%). Tiếp theo là ngành Dương xỉ (Polypodiophyta) có 38 loài (6,76%), 18 chi (4,83%), 14 họ (11,11%); ngành Thông đất (Lycopodiophyta) có 5 loài (0,89%), 3 chi (0,8%), 2 họ (1,59%); ngành Hạt trần (Gymnospermae) có 4 loài (0,71%), thuộc 2 chi (0,54%) của 2 họ (1,59%); cuối cùng là hai ngành Cỏ tháp bút (Equisetophyta) và Khuyết lá thông (Psilotophyta) có 1 loài, 1 chi, 1 họ. Trong ngành Hạt kín (Angiospermae) thì lớp Hai lá mầm (Dicotyledoneae) chiếm ưu thế. Mười họ đa dạng nhất có 215 loài, chiếm 38,26% tổng số loài và mười chi đa dạng nhất có 66 loài, chiếm 11,75% tổng số loài của khu vực nghiên cứu. Tài nguyên thực vật rừng ở khu vực nghiên cứu khá đa dạng, với tổng số 289 loài cây có ích, chiếm 51,42% 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 41 loài thực vật bị đe dọa tuyệt chủng, trong đó có 21 loài thực vật có trong Sách Đỏ Việt Nam, 27 loài trong Nghị định 84/2021/NĐ-CP và 7 loài trong Danh lục Đỏ IUCN cần được bảo tồn.

Từ khoá: Hà Nam, hệ thực vật, khu bảo tồn loài và sinh cảnh, Voọc mông trắng.

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