THE STATUS OF CONIFEROUS PLANTS OF NAM NUNG NATURE RESERVE IN DAK NONG PROVINCE

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SUMMARY

In this study, we discovered additionally one species (*Cephalotaxus mannii* Hook.f.) and one family (Cephalotaxaceae) of coniferous plants for Nam Nung Nature Reserve in Dak Nong province. Therefore, the total of species and family of this area increased to seven and three, respectively (including *Cephalotaxus mannii* Hook. f., *Dacrydium elatum* (Roxb.) Wall. ex Hook., *Dacrycarpus imbricatus* (Blume) de Laub., *Podocarpus neriifolius* D. Don; *Keteleeria evelyniana* Mast., *Pinus massoniana* Lamb., and *Pinus merkusii* Jungh. & de Vriese. Especially, five species are listed in the IUCN Red as VU (two species) and LC (three species). There is one species listed in the Vietnam Red Data Book (2007) as VU (*Keteleeria evelyniana* Mast.). In addition, two species are listed in the Decree 32/ND-CP as IIA as *Cephalotaxus mannii* Hook. f. and *Keteleeria evelyniana* Mast. Therefore, that species distributed in altitude from 800 m to 1,535 m. These findings will significantly provide scientific data for biodiversity management especially for threatened coniferous plant species in Nam Nung Nature Reserve. Furthermore, the result from our research will promote the further study about biodiversity in this area.

Keywords: Coniferous, distribution, Nam Nung Nature Reserve, species composition.

I. INTRODUCTION

Nam Nung Nature Reserve (Dak Nong province) is located in five communes: Nam Nung, Nam N'Dir and Duc Xuyen (Krong No district); Dac Hoa (Dak Song district) and Quang Son (Dak Glong district), with 20,156 ha. Nam Nung Nature Reserve (Nam Nung NR) has special climate with four seasons in a day. Primary forests distribute from 800 m to over 1,200 m. Nam Nung NR also possesses a high biodiversity (Dak Nong Department of Forest Protection, 2011). There are 881 vascular plant species, which belong to 541 genera, 175 families, and six phyla (Dak Nong Department of Forest Protection, 2011). Many species have a scientific value, especially in conifer such as *Cephalotaxus mannii* Hook. f., *Dacrydium elatum* (Roxb.) Wall. ex Hook. However, by supporting economic development, especially due to disaster and human activities like over-exploitation, the coniferous species have been damaged seriously in recent years. Therefore, this study conducted necessary research on species compositions, conservation status and distribution of coniferous species in Nam Nung NR in order to provide sufficient scientific data for management and conservation of this area.

II. RESEARCH METHODOLOGY

2.1. Content

Research on species compositions and distribution of coniferous species

Research on natural conservation status of coniferous species

2.2. Methods

Secondary data collection

Desk study method was conducted, the secondary data of coniferous plant diversity in Nam Nung Nature were collected carefully from the previous studies.

Field work

We used the current vegetation types map to identify the distribution of all the vegetation types in this area and then decide the transect locations. Three transects were established from the base to the top of the hills so that the

samples of all vegetation types on different slopes and reliefs were recorded and identified. On each transect, there are systematically-spaced 15 plots of 25 m x 40 m size. All coniferous species were recorded in the 1000 m^2 plots. Also, the specimens were collected as well as took pictures. At each plot, GPS data were recorded for longitude, latitude and altitude. All plants were listed and annotated.

Indentification of specimens and conservation assessment

Identification of plant specimens were made based on the major literatures of Nguyen, T.H. et al. (2004), Nghia, N.H. (2004), and other recent reports. These specimens were deposited in herbarium of Vietnam National University of Forestry (VNUF). Conservation assessment of the threatened species were followed IUCN Red List, the Vietnam Red Data Book, and the Degree No 32 issued by Vietnamese government about list of threatened species need to be conserved. Besides, interviewing local people, forest rangers, and local authorities in the research site about natural distributed, the current situation as well as existing threats of coniferous in Nam Nung NR was analysed.

III. RESULTS AND DISCUSSION

3.1. Diversity and distribution of coniferous species in Nam Nung Nature Reserve

a. Diversity of coniferous species

A total of seven coniferous species were found in Nam Nung NR belonging to three families including Cephalotaxaceae, Podocarpaceae, and Pinaceae. The family Podocarpaceae has three species such as *Dacrydium elatum* (Roxb.) Wall. ex Hook., *Dacrycarpus imbricatus* (Blume) de Laub., and *Podocarpus neriifolius* D. Don. Likewise, Pinaceae has three species (*Keteleeria evelyniana* Mast., *Pinus massoniana* Lamb., and *Pinus merkusii* Jungh. & de Vriese). By contrast, Cephalotaxaceae has only one species (*Cephalotaxus mannii* Hook.f.).

Table 1. Coniferous species compositions in Nam Nung Nature Reserve

No.	Scientific name	Vietnamese name	Collection number/Picture
I	**Cephalotaxaceae**	**Đỉnh tùng**	
1	*Cephalotaxus mannii* Hook. f.	Đỉnh tùng	NN160323001
II	**Podocarpaceae**	**Kim giao**	
2	*Dacrydium elatum* (Roxb.) Wall. ex Hook.	Hồng tùng	NN160323002
3	*Dacrycarpus imbricatus* (Blume) de Laub.	Thông lông gà	NN160323003
4	*Podocarpus neriifolius* D. Don	Thông tre	NN160323004
III	**Pinaceae**	**Thông**	
5	*Keteleeria evelyniana* Mast.	Du sam núi đất	Picture
6	*Pinus massoniana* Lamb.	Thông mã vĩ	Picture
7	*Pinus merkusii* Jungh. & de Vriese	Thông ba lá	Picture

b. Distribution of coniferous species

Most coniferous species in Nam Nung NR are distributed between 800 m to 1,535 m above sea level. *Pinus merkusii* Jungh. & de Vriese and *Pinus massoniana* Lamb. are located at elevations lower than 1,000 m while the remaining species are located from 1,200 m to 1,535 m. Especially, *Cephalotaxus mannii* Hook. f. was the first time recorded as naturally distribution in Nam Nung NR and its elevations from 1,200 m to 1,300 m.

Table 2. Distribution of coniferous species

No.	Scientific names	Vietnamese names	Altitude (m)	Located points
I	Cephalotaxaceae	Đỉnh tùng		
1	*Cephalotaxus mannii* Hook. f.	Đỉnh tùng	1200 - 1300	421123/ 1354809
II	Podocarpaceae	Kim giao		
2	*Dacrydium elatum* (Roxb.) Wall.ex Hook.	Hồng tùng	1535	420206/ 1355600
3	*Dacrycarpus imbricatus* (Blume) de Laub.	Thông lông gà	1200 - 1300	420708/ 1355313
4	*Podocarpus neriifolius* D. Don	Thông tre	1200 - 1300	421156/ 1355346
III	Pinaceae	Thông		
5	*Keteleeria evelyniana* Mast.	Du sam núi đất	1196	420993/ 1356373
6	*Pinus massoniana* Lamb.	Thông mã vĩ	800	419260/ 1348797
7	*Pinus merkusii* Jungh. & de Vriese	Thông ba lá	887	418340/ 1350190

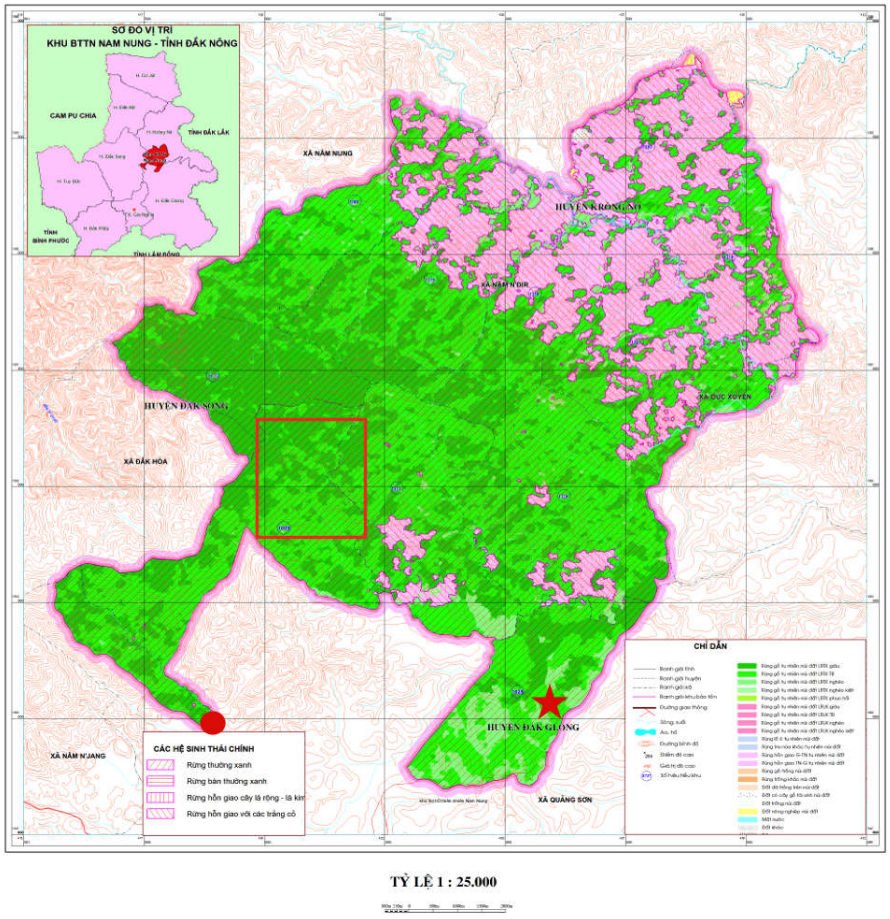

Figure 1. Distribution of coniferous plantsin Nam Nung NR

★*Pinus massoniana* Lamb.

●*Pinus merkusii* Jungh. & de Vriese

Cephalotaxus mannii Hook. f.; *Dacrydium elatum* (Roxb.) Wall. ex Hook.; *Dacrycarpus imbricatus* (Blume) de Laub.; *Podocarpus neriifolius* D. Don; and *Keteleeria evelyniana* Mast.

3.2. Natural conservation status of coniferous species in Nam Nung NR

Results from survey investigation indicated that seven coniferous species were found in Nam Nung NR. Of which five species are listed in the IUCN Red list (2001), two speices are listed in the Vietnam Red Data Book (2007) and one species is listed in Decree 32 o the Vietnamese government in 2006.

Table 3. The natural conservation status of coniferous species in Nam Nung NR

No.	Scientific names	Vietnamese names	Vietnam Red Data Book (2007)	Decree 32/CP/2006	IUCN, 2001
I	Cephalotaxaceae	Đỉnh tùng			
1	*Cephalotaxus mannii* Hook. f.	Đỉnh tùng		IIA	VU A2cd (ver 3.1)
II	Podocarpaceae	Kim giao			
2	*Dacrydium elatum* (Roxb.) Wall. ex Hook.	Hồng tùng			Least Concern (LC) (ver 3.1)
3	*Dacrycarpus imbricatus* (Blume) de Laub.	Thông lông gà			Least Concern (LC) (ver 3.1)
4	*Podocarpus neriifolius* D. Don	Thông tre			Least Concern (LC) (ver 3.1)
III	Pinaceae	Thông			
5	*Keteleeria evelyniana* Mast.	Du sam núi đất	VU A1a, c, d	IIA	VU A2cd; B2ab(iii) (ver 3.1)

Note: EN: Endangered; VU: Vulnerable; LC: Least concern; IIA: Restricting exploitation and use for commercial purpose.

Figure 2. Stem and leaves of *Cephalotaxus mannii* Hook. f.

Figure 3. Seedling of *Cephalotaxus mannii* Hook. f.

Table 4. The number of mature coniferous plants in Nam Nung NR

No.	Scientific names	Vietnamese names	Number of plants	Average DBH (cm)	Average Height (m)	Status
I	Cephalotaxaceae	Đỉnh tùng				
1	*Cephalotaxus mannii* Hook. f.	Đỉnh tùng	3	8.2	9.6	Good
II	Podocarpaceae	Kim giao				
2	*Dacrydium elatum* (Roxb.) Wall. ex Hook.	Hồng tùng	1	33	22	Good
3	*Dacrycarpus imbricatus* (Blume) de Laub.	Thông lông gà	5	12.6	8.4	Good
4	*Podocarpus neriifolius* D. Don	Thông tre	6	22	13.2	Good
III	Pinaceae	Thông				
5	*Keteleeria evelyniana* Mast.	Du sam núi đất	1	180	40	Good

DBH: Diameter at breast height.

The number of mature coniferous plants were few (16 plants). Especially, two species including *Dacrydium elatum* (Roxb.) Wall. ex Hook. and *Keteleeria evelyniana* Mast. have only one individual tree. Most trees of all species are growing well.

Table 5. The number of seedling trees in Nam Nung NR

STT	Scientific names	Vietnamese names	Numbers of seedling	Height (m)	Growth	Origin
I	Cephalotaxaceae	Đỉnh tùng				
1	*Cephalotaxus mannii* Hook. f.	Đỉnh tùng	1	0.8	Good	Seed
II	Podocarpaceae	Kim giao				
2	*Dacrydium elatum* (Roxb.) Wall. ex Hook.	Hồng tùng	0			
3	*Dacrycarpus imbricatus* (Blume) de Laub.	Thông lông gà	30	1.2	Good	Seed
4	*Podocarpus neriifolius* D. Don	Thông tre	0			
III	Pinaceae	Thông				
5	*Keteleeria evelyniana* Mast.	Du sam núi đất	0			

Cephalotaxus mannii Hook. f. and *Dacrycarpus imbricatus* (Blume) de Laub. have natural regeneration gaps. However, *Dacrydium elatum* (Roxb.) Wall. ex Hook., *Podocarpus neriifolius* D. Don, and *Keteleeria evelyniana* Mast. have not had natural regeneration gap. The resrult in this research may give some evedences to propose solution in biodiversity conservation in study area.

IV. CONCLUSION

Seven coniferous species belong to three families Cephalotaxaceae, Podocarpaceae, and Pinaceae were found in Nam Nung NR. Most of them have high conservation values. Five

species are listed in IUCN Red List (2001), two species are listed in Vietnam Red Data Book (2007), and one species is listed in Decree 32/CP/2006 of the Vietnamvese government. The majority of coniferous species in Nam Nung NR are distributed from 800 to 1,535 m above sea level. *Cephalotaxus mannii* Hook. f. is the first time recorded and located from 1,200 m to 1,300 m.

ACKNOWLEDGEMENTS

Authors would like to thank Nguyen Van Huy (Vietnam National University of Forestry), Mai Van Tien (Nam Nung NR) for their kind help during the fieldwork. We also thank to Tran Ngoc Hai, Vuong Duy Hung, Pham Thanh Ha, and Ta Thi Nu Hoang (Vietnam National University of Forestry) for their kindly comments and contribution in plant idenification.

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THÀNH PHẦN VÀ PHÂN BỐ CỦA CÁC LOÀI LÁ KIM TẠI KHU BẢO TỒN THIÊN NHIÊN NAM NUNG - ĐẮK NÔNG

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TÓM TẮT

Trong quá trình nghiên cứu tính đa dạng khu hệ thực vật của Khu Bảo tồn thiên nhiên (KBTTN) Nam Nung (Đắk Nông), chúng tôi đã phát hiện 7 loài thực vật lá kim và 3 họ. Bổ sung 1 loài và 1 họ thực vật lá kim cho Khu Bảo tồn thiên nhiên Nam Nung (Đỉnh tùng - *Cephalotaxus mannii* Hook. f. thuộc họ Đỉnh tùng - Cephalotaxaceae). Đặc biệt, trong số 7 loài thực vật lá kim được phát hiện có 5 loài có tên trong danh lục đỏ IUCN (gồm 2 loài thuộc cấp VU và 3 loài thuộc cấp LC). Có 1 loài có tên trong Sách đỏ Việt Nam (2007) (thuộc cấp VU). Có 2 loài thuộc cấp IIA (Nghị định 32/NĐ-CP). Các loài thực vật lá kim phân bố ở độ cao từ khoảng 800 m đến 1.535 m. Trong đó, loài cây Thông mã vĩ được trồng ở khu vực vùng đệm của Khu bảo tồn, 5 loài còn lại có phân bố tự nhiên từ độ cao 1.100 - 1.535 m. Dẫn liệu bổ sung này không chỉ khẳng định giá trị tiềm năng của khu hệ thực vật lá kim Nam Nung, mà còn góp phần quan trọng trong công tác quản lý đa dang sinh học nói chung, nghiên cứu bảo tồn và phát triển nguồn gen thực vật có nguy cơ bị tuyệt chủng nói riêng tại KBTTN Nam Nung.

Từ khóa: Khu Bảo tồn Thiên nhiên Nam Nung, phân bố, thành phần loài, thực vật lá kim.

Received : 02/3/2018
Revised : 29/3/2018
Accepted : 05/4/2018