WILD ORCHIDS GROWING IN HAKHA EDUCATION COLLEGE CAMPUS AND THREATS TO THEIR EXISTANCE IN FUTURE

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Abstract

The campus of Hakha Education College has been explored to make inventory, identify and document the wild orchid species during flowering seasons from February to June 2020. The threats to their existence in future have been identified. A total of 27 species and one variety of wild orchids under 13 genera have been identified. Among the genera found in the campus genus *Dendrobium* is largest and comprising 12 species with showy and colorful flowers. The remaining species consist of only one species expect genus *Coelogyne* and *Vanda*. There are 3 species under genus *Coelogyne* and 2 species under genus *Vanda*. One variety is under *Thunia alba*. All orchid species growing in the campus are facing the habitat loss due to increasing development activities. The showy and colorful flowers of *Dendrobium* species make the discriminating collection of construction workers and people living in the campus and hence those species are more highly facing the habitat loss than other orchid species. To save the naturally growing orchid species in the study area, adequate attention is necessary to conduct in situ and ex situ conservation for their sustainable existence and development in the future.

Keywords: Wild orchid, habitat loss, indiscriminate collection, Hakha Education College

Introduction

Orchids belonging to family Orchidaceae are one of the most popular ornamental plants. They exhibit several peculiarities in vegetative and floral features. Their unique features and remarkable specialization make the scientists and amateurs to be highly interest. As some orchids have beautiful flowers and unique habitats they become popular resources for horticulture and man-made hybrid orchids. Although they can grow in such various habitats as on ground, decay matter and rock most orchids are epiphytes growing on trees. However, they are very sensitive to habitat change (Jalal 2012) because they are very site-specific and need optimum conditions to thrive in a given ecosystem (Jones et al 2005). The causes to be habitat change are majority due to anthropogenic activities such as indiscriminate collection and habitat destruction. The land use alternation, civilization, construction of roads and buildings imposed the habitat destruction highly influencing on rarity and e extinction of orchid species through the world including Myanmar.

Hakha Education College has opened on December, 2017 and is situated beside the road linking Hakha, capital of Chin State, to Falam. The area where the land is used to build Education College was a paradise of some species of wild orchid. Before Education College is established epiphytic orchids are plenty seen on the pine and some woody trees in this area where there is mountain pine forest under low human disturbance because epiphytic orchids are more diverse and more abundant under low human disturbance in primary forest than other region (Adhikari et al 2012). Nowadays, this area immediately changes into populated area and human disturbance become high. The orchids in this area become dramatically disappear due to the cutting of trees for building construction and indiscriminately collecting by the people living in the campus including construction workers. The cutting of the trees to be cleaning the land for construction also highly impact on the survival of epiphytic orchids owing to the loss of host and altering the relative humidity, light intensity and temperature. The wild orchids in this area are suffering from an uncertain future through indiscriminating collection and habitat destruction. It thus is urgently necessary to record and to conserve those wild orchids before totally disappearing due to their habitat loss and degradation. Although there is a little research on wild orchids growing in Chin State it is still lacking to study and survey the

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orchids growing in a particular area like Hakha Education College Campus. The present study is an attempt to provide a document concerning the native wild orchid growing in Hakha Education College campus and surrounding areas. The objectives of this study are to survey how many wild orchid species in Hakha Education College campus and surrounding areas, to identify the wild orchids species and to generate a full checklist of wild orchids in Hakha Education College campus and to provide scientific information for development of conservation research for the wild orchids.

Materials and Methods

Study Area

Hakha Education College is located beside the Hakha-Falam road between Chin state road No. 117/3 and 117/4 and about 7 miles far from center of Hakha town. It is situated between 93˚ 34' 28.5"E and 22˚ 41' 52.42"N and at altitude of 6100 feet. The total area of its campus is 97.95 acres. The dominant tree species within campus and surrounding areas is pine.

Field Survey

The field surveys were conducted during flowering seasons from February to June 2020 and some living plants were collected and planted in home garden within compound of Staff Quarter. All collected specimens were recorded by taking photographs while flowering. Description for these species was based on fresh specimens. According to comparisons of morphological characters, species was identified or keyed out by using the floristic literatures or references (Soon 1989; Rakpaibulsombat, 1992; Vaddhanaphuti, 2001 and Chen XQ, 2009). The online herbarium specimens providing from GBIF (Global Biodiversity Information Facility) and POWO (Plants of the world online) were reviewed to confirm the species. The species name was confirmed by checking in online database (www. The plantlist.org; www.ipni.org).

Results

The diverse orchid species naturally growing in Hakha Education College campus have been explored and identified. The threats facing the orchid species for their existence have been also identified. A total of 27 orchid species with one variety distributed under 13 genera have been identified from Hakha Education College campus. All species found in the campus are epiphyte and scented. Many species have fragrant odor but some have unpleasant odor. The species along with scientific name, Myanmar name, growth pattern, some outstanding morphological characters and IUCN conservation status are listed in table 1. The 13 genera found in the campus with the number of species are shown in figure 1. The habitat and habitat destruction of some orchid species are shown in Fig.2. The habit and flowers of 27 species and one variety are shown in Fig.3. The major threats facing the orchid species found in the campus is habitat loss due to anthropogenic activities including log cutting for construction and indiscriminating collection.

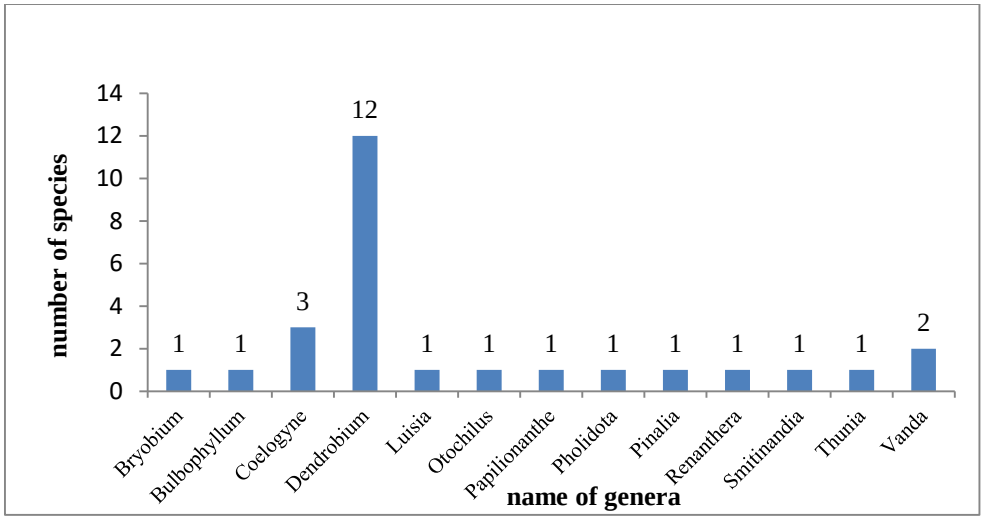

Figure 1 species composition of each genera found in Hakha Education College campus

Table 1 IUCN conservation status and some outstanding morphological characters of orchid pecies naturally growing in Hakha Education College campus

Scientific name	Myanmar common name	IUCN conservation status	growth pattern	Flowering time	Shape of pseudobulb	Leaf presence or absence on pseudobulb during flowering	Flower appearance	Flower color	Flower number per inflorescence	shape of labellum	color of labellum
Bulbophyllum odoratissimum (Sm.) Lindl. ex. Wall.	Thazin-Hmew	NE	s	June	oblong	P	I	yellowish white	many	falcate	pale yellow
Bryobium hyacinthoids (Blume) Y.P.Ng. &P.J.Cribb	-	NE	s	June	oblong elliptic	P	S	White	many	3-lobed	Yellow
Coelogyne prolifera Lindl.	Ngwe-nin-phyu (myo kwe)	NE	s	May	conical	P	I	greenish yellow	2-5	subquadrate	greenish yellow with deep yellow patch inside
Coelogyne schultesii S.K.Jain & S.Das	-	NE	s	May	conical	P	I	greenish brown	2-5	oblong	light brown to brownish white
Coelogyne stricta (D.Don)Schltr.	-	NE	s	June	conical	P	S	white	3-5	ovate	white with two reddish brown stripe on yellow patch
Dendrobium bensoniae Rchb.f.	Pale- hnit	LC	s	June	cane	A	S	white	1-3	infundibulate	white with with yellow patch and two reddish brown spot inside

Scientific name	Myanmar common name	IUCN conservation status	growth pattern	Flowering time	Shape of pseudobulb	Leaf presence or absence on pseudobulb during flowering	Flower appearance	Flower color	Flower number per inflorescence	shape of labellum	color of labellum
Dendrobium chrysotoxum Lindl.	Mauk-cham-war	NE	s	June	club	p	S	orange-yellow	8-15	Round with wavy margin	yellow with darker golden yellow inside
Dendrobium crepidatum Lindl. &Paxton	Ganaing-na-be-pauk	NE	s	March	cane	a	S	pale purple	1-3	Round	pale purple with large yellow patch inside
Dendrobium crystallinum Rchb.f	Pan-setku-thit kwa	NE	s	April	Cane	a	S	white with pale purple patches	1-2	rounded	yellow with white margin and small pale purple patch
Dendrobium dickasonii L.O. Williams	-	NE	s	June	rod	a	S	dark orange	1-2	ovate oblong	orange with reddish veins
Dendrobium falconeri Hook.	Myat-thitkwa	NE	s	May	knobby	a	S	white with deep purple patch	1-3	infundibulate	White with purple and yellow patch, dark reddish purple inside
Dendrobium fimbriatum Hook.	Arme –let-tan- shae	NE	s	May	cane	a	S	golden yellow	2-10	subobicular	Yellow with deep brown patch inside
Dendrobium heterocarpum Wall. ex Lindl.	-	NE	s	March	cane	a	S	pale yellow to creamy yellow	1-3	infundibulate	Pale yellow with reddish brown stripe
Dendrobium infundibulum Lindl.	Taung-ngwe- tu	NE	s	March	cane	a	S	pure white	1-7	infundibulate	white with bright yellow patch
Dendrobium ochreatum Lindl.	Taung-nabe-pauk	NE	s	April	cane	a	S	golden yellow to bright yellow	1-2	Funnel-shaped	golden yellow with reddish brown inside
Dendrobium parishii Rchb. f.	Thazin-Hmew	NE	s	June	cane	a	S	reddish purple	1-2	rounded	pale purple
Dendrobium pulchellum Roxb. ex Lindl.	Ngwe-nin-phyu (myo kwe)	NE	s	April	cane	a	S	pale yellow to purplish pink	3-10	ovate oblong	pale yellow to purplish pink
Luisia trichorrhiza (Hook.) Blume	-	NE	m	March	nil	P	I	White	1-3	ovate triangular	dark purple
Otochilus fuscus Lindl.	pa-tee-sint	NE	s	March	Cylindrical fusi-form	p	I	White	8-15	narrowly oblanceolate	brownish white.
Papilionanthe vandarum (Rchb.f.) Garay		NE	m	April	nil	P	S	pale purple	1-3	3-lobed	Purple
Pholidota articulata Lindl.	Sin-pa-tee	NE	s	June	cylindrical	P	I	greenish white	many	bilobed oblong	whitish brown

Scientific name	Myanmar common name	IUCN conservation status	growth pattern	Flowering time	Shape of pseudobulb	Leaf presence or absence on pseudobulb during flowering	Flower appearance	Flower color	Flower number per inflorescence	shape of labellum	color of labellum
Pinalia obesa(Lindl.) Kuntze	-	NE	s	June	oblong elliptic	P	I	yellowish white	3-6	3-lobed	light yellow
Renanthera imchootiana Rolfe	Chin-thit-kwa-ni	NE	m	June	nil	P	S	orange-red	many	3-lobed	Red
Smitinandia micrantha (Lindl.) Holttum		NE	m	April	nil	P	I	pale purple	many	Oblong	deep purple
Thunia alba (Lindl.)Rchb.f.	Kyauk-thit-khwa	NE	s	June	cane	P	S	White	2-10	rounded	yellow with white margin
Thunia alba var. *marshalliana* (Rchb.f.)B.Grant	Kyauk-thit-khwa (Myo kwe)	NE	s	June	cane	P	S	White	2-10	rounded	purple with white margin
Vanda coerulescens Griff.	Moe -lone - Hmaing – galay	NE	m	June	nil	P	S	Pale blue	10-many	oblance olate	dark blue
Vanda motesiana Choltco		NE	m	April	nil	A	S	greenish yellow	5-10	bilobed ovate	brownish yellow

s= sympodium; m= monopodial; P= present, A= absent I= indistinct; S= showy

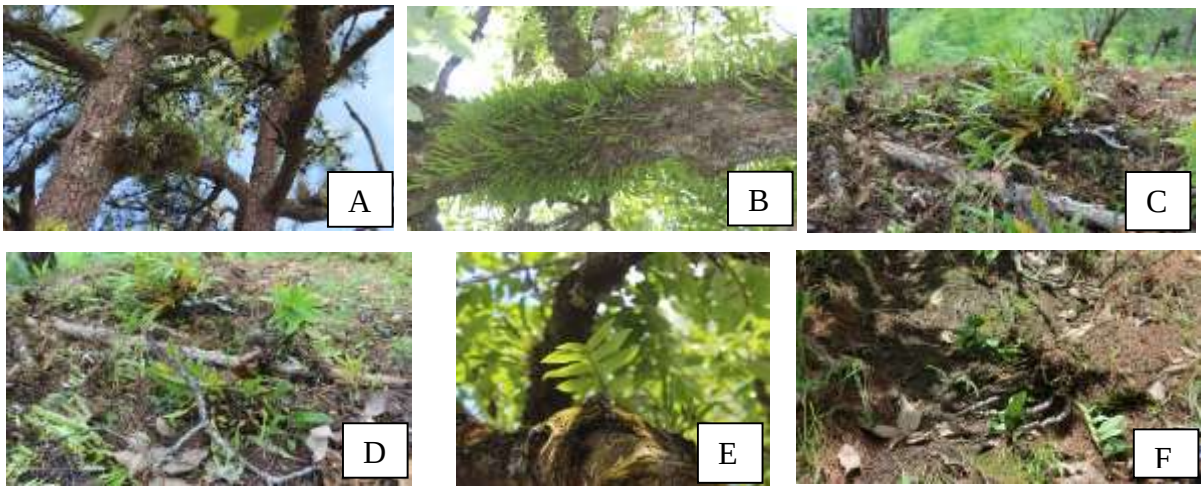

Figure 2 habitat and habitat losing status: A and B. natural habitat of epiphytic orchids, C and D. habitat losingepiphytic orchids on the cutting tree, E. *Dendrobium ochreatum* healthy surviving in natural habitat, F. *Dendrobium ochreatum* losing habitat due to tree cutting


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Figure 3 habit and flowers of all species found in Hakha Education Degree College campus: 1. *Bryobium hyacinthoids*, 2. *Bulbophyllum odoratissimum*, 3. *Coelogyne prolifera*, 4. *Coelogyne schultesii*, 5. *Coelogyne* stricta, 6. *Dendrobium bensoniae* 7. *Dendrobium chrysotoxum*, 8. *Dendrobium crepidatum*, 9. *Dendrobium crystallinum*, 10. *Dendrobium dickasonii*, 11. *Dendrobium falconeri*, 12. *Dendrobium fimbriatum*, 13. *Dendrobium heterocarpum*, 14. *Dendrobium infundibulum*, 15. *Dendrobium ochreatum*, 16. *Dendrobium parishii*, 17. *Dendrobium pulchellum*, 18. *Luisia trichorrhiza*, 19. *Otochilus fuscus*, 20. *Papilionanthe vandarum*, 21. *Pholidota articulata*, 22. *Pinalia obesa*, 23. *Renanthera imchootiana*, 24. *Smitinandia micrantha*, 25a. *Thunia alba*, 25b. *Thunia alba* var. *marshalliana*, 26. *Vanda coerulescens*, 27. *Vanda motesiana*

Discussion

A total of 27 orchid species with one variety under 13 genera have been identified from Hakha Education College. The number of species in 13 genera varies from 1 to 12. As shown in Fig. 1 the largest genus found in the campus is *Dendrobium* with 12 species and *Coelogyne* contain 3 species. The remaining genera consist of only one species except *Vanda* consisting of 2 species. One variety namely *Thunia alba* var *marshalliana* (Rchb.f.) B.Grant is a variety of *Thunia alba*.

In this study the species *Dendrobium infundibulum*, *Otochilus fuscus* and *Pholidota articulata* were very common found but the species *Dendrobium parashii* and *Renanthera imchootiana* were rarely found in the study area. In IUCN conservation status all species found in the campus were found to be listed under not evaluated (NE) category expect *Dendrobium bensoniae* listed under Least concern (LC) (IUCN 2020) as shown in table 1. However *Dendrobium bensoniae* and *Renanthera imchootiana* were found to be listed in CITES appendix I and the remaining species were found to be listed in CITES appendix II (UNEP-WCMC (Comps) 2014).

In the campus, different development activities, lack of knowledge of plant collection technique and lack of awareness on plant conservation are great threats to the existence of wild orchid species in future. The major threat is habitat loss due to tree cutting for construction and indiscriminating collection. Especially indiscriminating collection is a possibility of losing in number of orchid species which are hard to thrive outside the natural habitat such as *Dendrobium falconeri* and *Renanthera imchootiana*.

The tree cutting highly impacts the habitat destruction of the species with crowded growth as shown in Fig.2. When their habitat was destructed for some orchids with indistinct flower such as *Bulbophyllum odoratissimum*, *Coelogyne prolifera*, *Coelogyne schultesii* and *Smithinandia micrantha* the opportunity to get new habitat will be few because plant collectors are not interest to collect such species. Therefore their existence in the future is not certain if they do not receive the opportunity to get new habitat because they cannot thrive on ground. As shown in Fig.2 *Dendrobium ochreatum* is healthy growing on the tree (Fig.2.E) but the plants of this species are falling on ground due to cutting their host tree (Fig.2 C, D and F).

Conclusion

The population of all orchid species observed in the campus is dramatically declining day by day due to especially indiscriminate collection by people living and working in the Campus as well as land use changes due to increasing development activities within the campus. The habitat destruction resulted from land use alternation to construct the buildings enhance the reducing in population and species diversity of the orchids growing in the campus. To save the naturally growing orchid species in the study area, adequate attention is necessary to conduct in situ and ex situ conservation for their sustainable existence and development in the future.

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