

การศึกษาชนิดและการกระจายตัวของกล้วยไม้ป่าที่เส้นทางเดินศึกษาธรรมชาติ
บริเวณอุทยานแห่งชาติเขานัน

Wild orchids species and distribution at Khao Nan National Park, Thailand

มัลลิกา เจริญสุธาสินี¹

วิทยา ภิระ¹

กฤษณะเดช เจริญสุธาสินี¹

พัฒนพร รินทจักร์²

Mullica Jaroensutasinee¹

Wittaya Pheera¹

Krisanadej Jaroensutasinee¹

Patanaporn Rintajak²

บทคัดย่อ

งานวิจัยนี้เป็นการศึกษาชนิดและการกระจายตัวของกล้วยไม้ป่าที่เส้นทางเดินศึกษาธรรมชาติของอุทยานแห่งชาติเขานัน จังหวัดนครศรีธรรมราช จำนวน 5 เส้นทาง ซึ่งได้แก่ เส้นทางศึกษาธรรมชาติบัวแดงใหญ่ ห้วยเลข ท่าทอน-ยอดน้ำ สันเย็น และท่าทอน-ยอดพันสี ในระหว่างเดือนมกราคมถึงเดือนธันวาคม พ.ศ. 2550 จากการสำรวจ พบกล้วยไม้ป่าจำนวน 58 ชนิดจาก 41 สกุล แบ่งตามที่อยู่อาศัยเป็นดังนี้ กล้วยไม้ที่พบบนต้นไม้ 35 ชนิด บนดิน 15 ชนิด บนก้อนหิน 2 ชนิด และมีกล้วยไม้ 6 ชนิดที่สามารถดำรงชีวิตในที่อยู่อาศัย 2 แบบ เมื่อพิจารณาถึงจำนวนชนิดและปริมาณของกล้วยไม้ป่า ที่พบในแต่ละเส้นทางสำรวจ พบว่า มีการพบจำนวนชนิดและปริมาณกล้วยไม้ป่ามากที่สุดในเส้นทางศึกษาธรรมชาติสันเย็น โดยพบกล้วยไม้ป่าจำนวน 30 ชนิด ซึ่งมีปริมาณกล้วยไม้ป่าในเส้นทางดังกล่าวโดยรวมทั้งหมด จำนวน 697 กอ และมีค่า Shannon-Weiner Index เท่ากับ 4.46

ABSTRACT

This study examined species diversity and abundance of wild orchids at five nature trails, Khao Nan National Park, Nakhon Si Thammarat province, peninsula of Thailand. Five nature trails were Bua ChakYai, Huai Lek, Thaton-Yodnum, Sanyen, and Thaton-1400m Peak. Data and specimens were collected from January to December 2007. From the study, 41 genera with 58 species of wild orchids were found along these five nature trails. Wild orchids were classified based on habitat types, 35 epiphytic orchids, 15 terrestrial orchids, 2 lithophytic orchids. Six species of orchids were found in more than one habits. Comparing between the number of wild orchid species and its abundance among five nature trails at Khao Nan National Park. It was found that Sanyen Nature Trail had the highest wild orchid species richness, abundance and biodiversity index with a total of 30 wild orchid species, 697 wild orchid individuals and Shannon-Weiner Index of 4.46.

¹ School of Science, Walailak University, 222 Thasala District, Nakhonsithammarat 80161

² Khao Nan National Park, M.8, T.Talingchan, Thasala District, Nakhonsithummarat 80160

Key words: Khao Nan National Park, Species diversity, Wild orchids

E-mail: jmullica@gmail.com, krisanadej@gmail.com

INTRODUCTION

Orchidaceae is the largest family of the flowering plant, including a lot of rare, threatened or endangered species. Orchids have a powerful attraction for many people, this probably due to their beauty, the variety of forms they have evolved, and their astonishing adaptations for facilitating pollination (Kull *et al.*, 2006). However, the abundance of wild orchid has been dramatically decreased from their natural habitats due to several reasons such as climate change, habitat loss or stealing. Detailed information on orchid population biology is needed to assist in appropriate management decisions and conservation (Janečková *et al.*, 2006; Tsiftsisia *et al.*, 2008). This work aimed at studying the number of wild orchid species, abundance, and distribution along five nature trails of Khao Nan National Park, Nakhon Si Thammarat. These data can be used for conservation planning of the orchid diversity in the area.

METHODOLOGY

This study was conducted at Khao Nan National Park in the Thai Peninsular. The geographical characteristic of Khao Nan is a high mountainous range in North-South direction which is a part of Nakhon Si Thammarat mountain range. The forest at Khao Nan is tropical mountain forest which is an important watershed source of Nakhon Si Thammarat. The area of the Khao Nan is 406 km². The highest peak is Khao Yai which is 1,438 m above mean sea level and it is a part of Nakhon Si Thammarat mountain range.

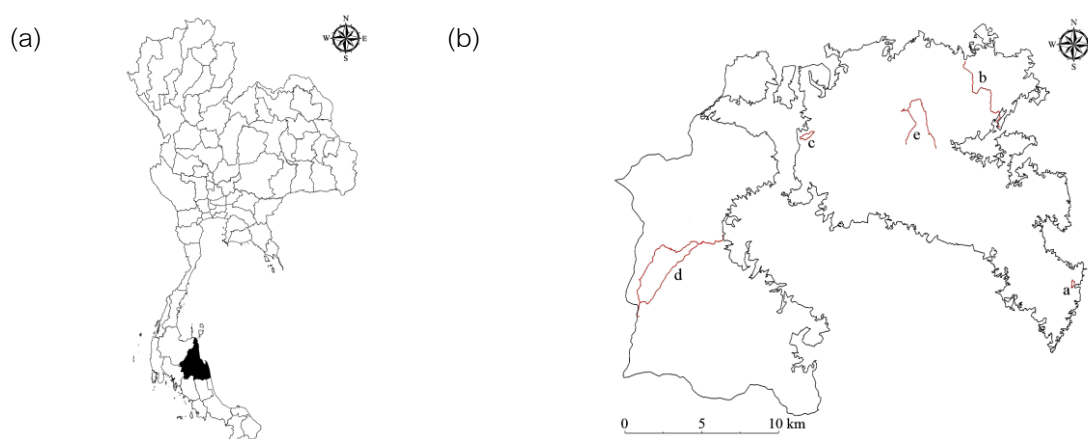


Figure 1. (a) Thailand map with the location of Nakhon Si Thammarat province (black) and (b) Study sites: five nature trails of Khao Nan National Park: a: Bua Chak Yai, b: Thaton-Yodnum, c: Hui Lek, d: Sanyen and e: Thaton-1400 m Peak trail.

Monthly wild orchid survey was carried out along five nature trails of Khao Nan National Park, Nakhon Si Thammarat in the Thai Peninsular (Figure 1a) during January-December 2007. Five nature trails were composed of Bua Chak Yai, Thaton-Yodnum, Hui Lek, Sanyen and Thaton-1400m Peak trails (Figure 1b). Study site description was collected from each nature trail such as co-ordinates and elevation using GPS Garmin model 76CSX. Wild orchids data collected were composed of common name, species name, habitat, canopy, forest type, orchid type, host plant, location found on tree, substrate type, crop cover, height above ground, percent of ambient light, the number of orchids, time of flowering, and time of seeding. The pictures of wild orchids were taken by using Fuji FinePix S9600 at 9 megapixels. Collected wild orchids were identified by using Thai Orchid Species (Rakpaibulsombat, 1992), Thailand Wild Orchids (Thaitong, 2000) and Wild Orchid of Thailand (Sittisatchadhum, 2006). These data were uploaded to the Network of Biodiversity Database System (NBIDS-BRT) website under the Khao Nan Cloud Forest Initiative project.

RESULTS AND DISCUSSION

A total of 1,465 individuals from 58 species of wild orchids were found ranging from 72 to 697 orchids per trail (Table 1). The number of orchid species was ranging from 7 to 30 species per trail (Table 1). Sanyen nature trail had the highest number of wild orchid species, abundance and biodiversity index. Thirty wild orchid species of 697 individuals found in this trail provided the Shannon-Weiner index of 4.462 (Table 1). Various habitats of orchids in Khao Nan National Park were found. The specimens were classified into three groups: epiphyte, terrestrial plant and lithophyte. There were 35 epiphytic species belonging to 22 genera, 14 terrestrial species belonging to 13 genera and 2 lithophyte species belonging to 2 genera (Table 2). This indicates that most of orchids at Khao Nan National Park were epiphytes.

Table 1. Number of wild orchid species, abundance and Shannon-Weiner index at Khao Nan National Park, Nakhon Si Thammarat province, during the survey period in January – December 2007.

Nature trails	Trail distance (km)	Number of species	Abundance (Individuals)	Shannon-Weiner Index
Bua Chak Yai	13	15	353	3.642
Thaton-Yodnum	20	7	110	2.754
Hui Lek	12	12	72	2.897
Sanyen	34	30	697	4.462
Thaton-1400 m Peak	32	13	233	3.461

Table 2 Locality and number of wild orchids at Khao Nan National Park, Nakhon Si Thammarat province during the survey period in January – December 2007. (EO: Epiphytic Orchid, TO: Terrestrial Orchid, LO: Lithophytic Orchid)

Species	Habit Types (host plant)	No.	Trails				
			BCY	HL	TY	S	T
<i>Aerides odorata</i> Lour.	EO (พญาสัตบรรณ)	20	✓	-	✓	-	✓
<i>Acriopsis emarginata</i> Jones & Clements.	EO (ก่อ เสม็ดแดง)	25	✓	-		-	-
<i>Apostasia nuda</i> R. Brown	TO	40	✓	-	-	✓	-
<i>Arachnis flos-aeris</i> (L.) Rchb.f.	EO (อินทนิล)	20	-	✓	-	-	✓
<i>Arundina graminifolia</i> (D.Don) Hochr	TO	30	-	-	-	✓	-
<i>Bulbophyllum patens</i> King ex Hook.f.	EO (เสม็ดแดง)	50	✓	-	-	-	-
<i>Bulbophyllum sigaldiae</i> Guill	EO (ก่อ ไทร)	30	-	-	-	✓	-
<i>Bulbophyllum smitinandii</i> Seidenf. & Thorut	EO (เสม็ดแดง)	30	-	-	-	✓	-
<i>Calanthe lyroglossa</i> Rchb.f.	TO	10	-	-	-	✓	-
<i>Calanthe triplicata</i> (Willemet) Ames	TO	30	-	-	-	✓	-
<i>Cirrhopetalum skeatianum</i> (Ridl.) Garay, Hamer & Siegerist	EO (ก่อ)	1	-	-	-	✓	-
<i>Cleisostoma areitinum</i> (Rchb.f.) Garay	EO (เสม็ดแดง)	30	✓	-	-	✓	-
<i>Coelogyne cumingii</i> Lindl.	EO (เสม็ดแดง)	20	✓	-	-	-	-
	LO	1					
<i>Coelogyne lentiginosa</i> Lindl.	EO (ก่อ)	10	-	-	-	✓	-
	TO	20					
<i>Coelogyne rochussenii</i> de Vriese	EO (หว่า)	40	-	-	-	✓	-
<i>Coelogyne viscosa</i> Rchb.f.	EO (ก่อ)	50	✓	-	-	-	-
<i>Corymborkis veratifolia</i> (Reinw.) Blume	TO	70	-	-	-	✓	-
<i>Cymbidium finlaysonianum</i> Wall. ex Lindl.	EO (ประ)	3	-	✓	-	-	-
<i>Dendrobium ypsilon</i> Seidenf.	EO (อินทนิล กระดุกไก่อ)	45	-	-	-	✓	✓
<i>Dendrobium acerosum</i> Lindl.	EO (อินทนิล ยาง เสม็ดแดง ตะแบก ตะเคียน)	100	✓	-	-	✓	✓

Table 2 (Continue)

Species	Habit Types (host plant)	No.	Trails				
			BCY	HL	TY	S	T
<i>Dendrobium aphyllum</i> (Roxb.) C.E.C. Fisch.	EO (ตะแบก)	30	-	-	-	-	✓
<i>Dendrobium arcuatum</i> J.J. Sm.	EO (ชมพู่สามใบ)	10	-	-	-	✓	-
<i>Dendrobium ellipsophyllum</i> T. Tang & F.T. Wang	EO (ตะเคียน เสม็ดแดง)	10	✓	-	-	-	✓
<i>Dendrobium formerii</i>	EO (ก่อ)	4	-	-	-	✓	-
<i>Dendrobium linguella</i> Rchb.f.	EO (ประดู่ อินทนิล ประ)	40	-	✓	✓	-	✓
<i>Didymoplexis pallens</i> Griff.	TO	10	✓	-	-	-	-
<i>Eria densa</i> Ridl.	EO (ก่อ ตะแบก)	40	-	-	-	✓	✓
<i>Eria paniculata</i> Lindl.	EO (ก่อ)	20	-	-	-	✓	-
<i>Eria pannea</i> Lindl.	EO (ตะเคียน)	30	-	-	-	✓	-
	TO	30					
<i>Erica discolor</i> Lindl.	EO (ก่อ)	20	✓	-	✓	-	✓
	LO	60					
<i>Erythroides blumei</i> (Lindl.) Schltr.	TO	1	-	✓	-	-	-
<i>Eulophia spectabilis</i> (Dennst.) Suresh.	TO	55	-	-	-	✓	-
<i>Flickingeria</i> sp.	LO	1	✓	-	-	-	-
<i>Geodorum attenuatum</i> Griff.	TO	20	-	-	-	✓	-
<i>Goodyera thailandica</i> Seidenf.	TO	10	✓	-	-	-	-
<i>Grammatophyllum speciosum</i> Blume.	EO (ยาง)	20	-	-	-	✓	-
<i>Habenaria rhodocheila</i> Hance.	TO & LO	20	-	-	✓	-	-
<i>Kingidium deliciosum</i> (Reichb. f.) Sweet.	EO (แหะ อินทนิล)	25	-	-	✓	-	✓
<i>Ludisia discolor</i> (Ker Gawl.) A. Rich.	TO	10	-	-	✓	-	-
<i>Luisia thailandica</i> Seidenf.	EO (อินทนิล)	1	-	✓	-	-	-
<i>Monomeria barbata</i> Lindl.	EO (เสม็ดแดง)	40	-	-	-	✓	-
<i>Nervilia aragoana</i> Gaudich.	TO	50	-	-	-	✓	-
<i>Oberonia</i> sp.	EO (ชมพู่สามใบ)	5	-	-	-	✓	-
<i>Phaius flavus</i> (Blume) Lindl.	TO	40	-	-	-	✓	✓

Table 2 (Continue)

Species	Habit Types (host plant)	No.	Trails				
			BCY	HL	TY	S	T
<i>Paphiopedilum callosum</i> (Rchb.f.) Stein var. <i>sublaeve</i> (Rchb.f.) Cribb.	LO	20	-	✓	-	-	-
<i>Phalaenopsis cornu-cervi</i> (Breda) Blume & Rchb.f.	EO (ตะแบก แหะ ปร๊ะ)	21	-	✓	✓	-	✓
<i>Pholidota imbricata</i> Hook.	EO (อินทนิล)	10	-	-	-	✓	-
<i>Pholidota recurva</i> Lindl.	EO (ชมพูสามใบ)	10	-	-	-	✓	-
<i>Pomatocalpa spicata</i> Breda.	EO (ปร๊ะ)	31	✓	✓	-	-	-
<i>Rhynchostylis retusa</i> (L.) Blume	EO (ตะแบก)	5	-	-	-	✓	-
<i>Sarcoglyphis mirabilis</i> (Rchb.f.) Garay.	EO (กระดุกไก่)	10	-	-	-	-	✓
<i>Spathoglottis plicata</i> Blume	TO	10	-	✓	-	✓	-
<i>Sunipia viridis</i> (Seidenf.) Hunt.	EO (เสม็ดแดง) & TO	30	✓	-	-	-	-
<i>Taeniophyllum obtusum</i> Blume.	EO (ปร๊ะ)	10	-	✓	-	-	-
<i>Tainia speciosa</i> Blume.	TO	1	-	-	-	✓	-
<i>Thrixspermum centipeda</i> Lour.	EO (ปร๊ะ)	10	-	✓	-	-	-
<i>Thrixspermum acuminatissimum</i> (Blume) Rchb.f.	EO (ปร๊ะ)	10	-	✓	-	-	-
<i>Trichotosia pulvinata</i> (Lindl.) Krzl.	EO	10	✓	-	-	-	-

Epiphytic orchids grown on the tree trunks and branches might expose to the sunlight more than on the forest floor. Light is a limiting factor for the growth of most orchids. The continuous wet and warm climate of Khao Nan National Park possibly makes the existence of epiphytes (Holltum, 1954). The most common epiphytic species found belong to genus *Dendrobium*. Wild orchids were classified based on their habitat, 62% (48 of 77 records) of them were the epiphyte which lived on the trees while 25% of them were lithophyte and the others lived on another types of habits. Bua Chak Yai trail is the nature trail having most diverse habitat types. At this nature trail, there were five habit types: epiphytes (E), terrestrials (T), lithophytes (L), epiphytes and terrestrial orchid (ET) and both of epiphytes and lithophytes (EL) (Figure 1a). There were four habit types at Thaton-Yodnum nature trail (E, T, EL and TL, Figure 2b) and three habit types at Hui Lek, Sanyen and Thaton-1400 m Peak nature trails (Figure 2c - 2e).

There were 12 only terrestrial orchids found at Khao Nan National Park nature trails. Terrestrial orchids grow on moist areas such as forest floor and moist rocks. Among these terrestrial

orchids, nine saprophytic orchids were found. Saprophytic orchids have no chlorophyll and grow on dead or decay organic matter. They must rely on fungi that attach their roots to provide nutrient. Because of the rather high species diversity, Khao Nan National Park is thus an interesting area for studying terrestrial orchids and mycorrhizal fungi that associate with their roots.

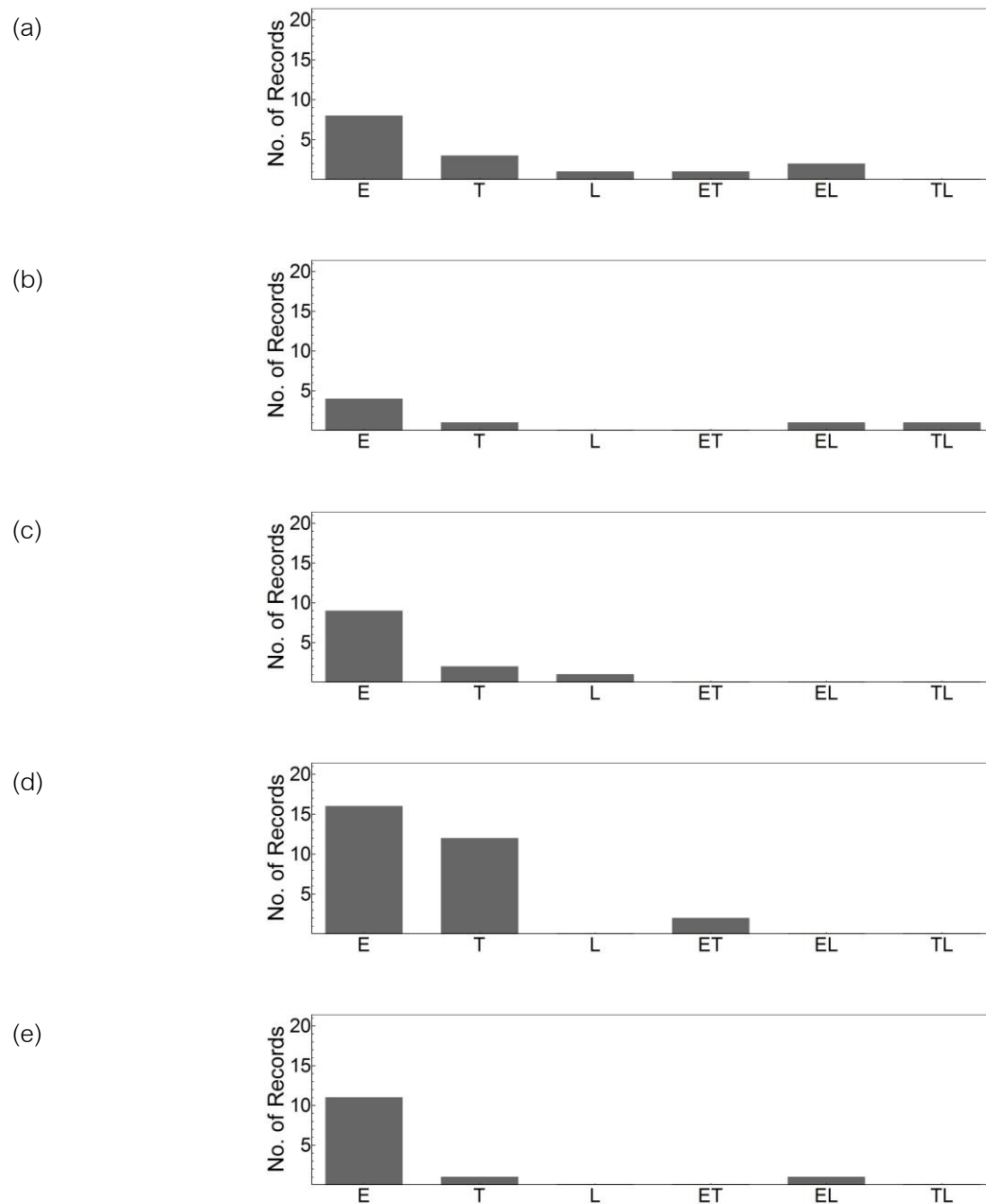


Figure 2. The number of records in each wild orchids habitat in (a) Bua Chak Yai, (b) Thaton-Yodnum, (c) Huai Lek, (d) Sanyen and (e) Thaton-1400 m Peak trail. E, T, L, ET, EL and TL represent epiphyte, terrestrial, lithophyte, epiphyte & terrestrial, epiphyte & lithophyte and terrestrial & lithophytes, respectively.

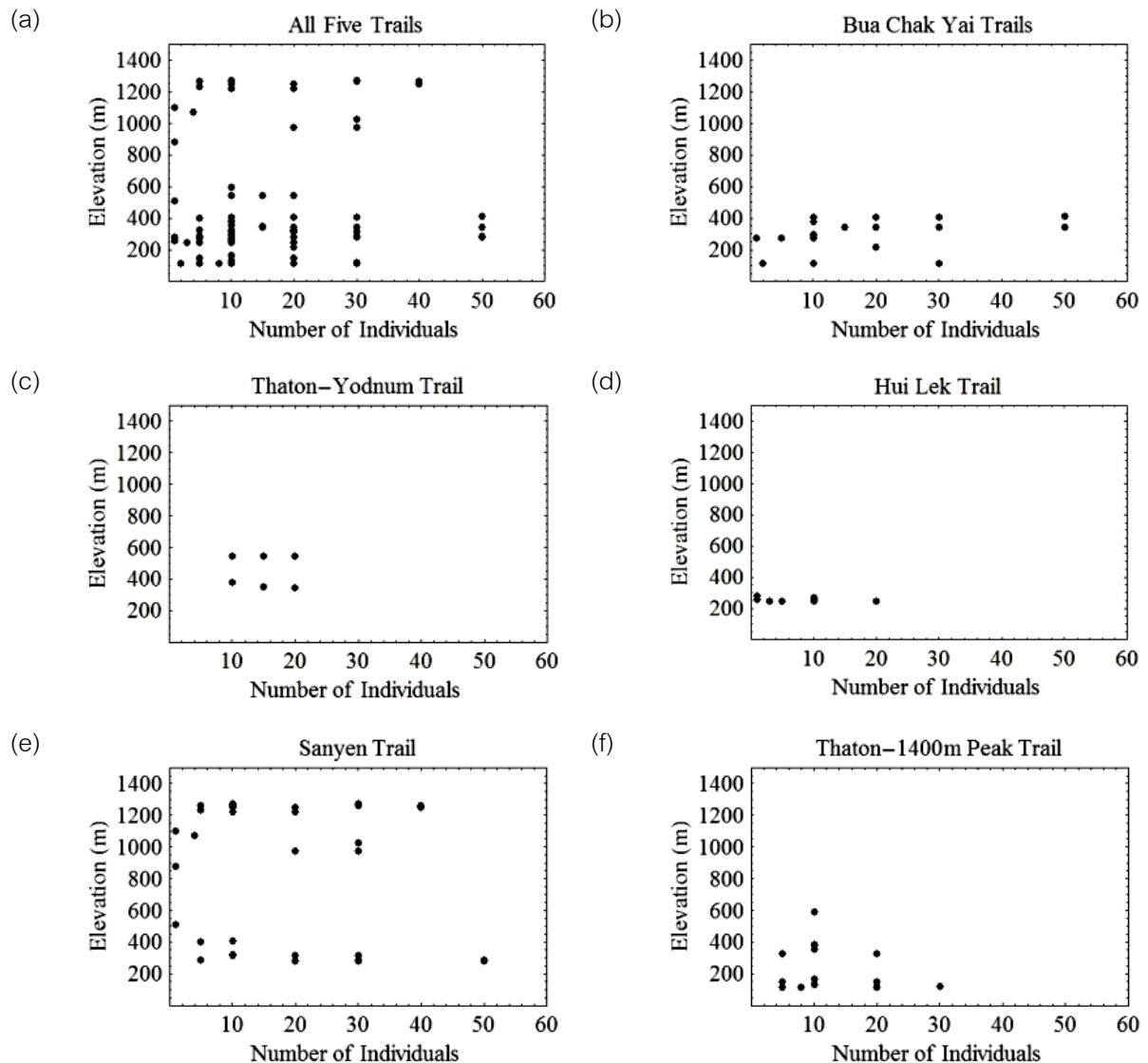


Figure 3. Number of orchid individuals and elevations at (a) all nature trails, (b) Bua Chak Yai, (c) Thaton-Yodnam, (d) Huai Lek, (e) Sanyen and (f) Thaton-1400 m Peak nature trail.

Lithophytic orchids occur on moist or muddy rocks where sunlight penetrated to the forest floor. In this study, *Coelogyne cumingii* Lindl. and *Flickingeria* sp. were found, which usually grew only on wet rocks in streamlets or nearby waterfalls. *Paphiopedilum callosum* (Rchb.f.) Stein var. *sublaeve* (Rchb.f.) Cribb., was also found, usually restricted to limestone rocks. Limestone hills could be found throughout Khao Nan National Park.

Some orchids were found in more than one habit type such as *Eria discolor* Lindl. found as epiphytic orchid and lithophytic orchid, *Sunipia viridis* (Seidenf.) Hunt. found as epiphytic orchid and terrestrial orchid and *Habenaria rhodocheila* Hance. found as terrestrial orchid and lithophytic orchid.

There were a high number of orchid individuals (~50 individuals) at Bua Chak Yai and Sanyen Nature trails but a lower number of orchid individuals at Huai Lek and Thaton-Yodnum nature trails.

with less than 20 individuals. Orchid abundance was not correlated with elevation in all trails (Figure 3a-3f).

The results show that there was the highest number of wild orchid species, abundance and biodiversity index at Sanyen nature trail. This might be due to two possible reasons. First, Sanyen nature trail has the highest elevation composing of a highly diverse habitat types ranging from lower montane forest to cloud forest. Second, Sanyen nature trail has a long mountain ridge. It is commonly known that, there will be more available sunlight at the mountain ridge than in the valley. Therefore, wild orchids will have a better chance at exposing to more sunlight.

CONCLUSION

From this surveyed, 58 species (41 genera) of wild orchids were found along five nature trails. Sanyen nature trail had the highest number of wild orchid species, abundance and biodiversity index among five nature trails.

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