

SP11_006_PF: THE PYRENOLICHENS AROUND RAMKHAMHAENG UNIVERSITY REGIONAL CAMPUS IN HONOUR OF HIS MAJESTY THE KING, NAKHON PHANOM PROVINCE

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Abstract:

Survey and collection of pyrenolichens from a dry dipterocarp forest during November 2014 to April 2015 revealed a total of 97 specimens around Ramkhamhaeng University Regional Campus in Honour of His Majesty the King at Nakhon Phanom Province. They were classified based on morphological and anatomical characteristics of thalli, ascomata, and colorless to grey brown or brown color, ellipsoidal to fusiform shapes, muriform or trans-septate types of ascospores. In addition, chemical characteristics of KOH+ red purple on thalli or around ascomata were also observed. Sixteen species, belonged to 3 families and 8 genera including *Anisomeridium*, *Bathelium*, *Campylothelium*, *Laurera*, *Marcelaria*, *Nigrovothelium*, *Pyrenula* and *Trypethelium*. The highest diversity of pyrenolichens included 8 species which were found on *Gluta usitata* (Wall.) Ding Hou., whereas the common lichens were *Marcelaria benguelensis*, *Pyrenula anomala* and *Trypethelium eluteriae*.

Introduction:

Pyrenolichens has a great variety of species. It comprises 2,125 named taxa worldwide ^{8,10}. In Thailand 157 species have been reported ⁶, and crustose lichens typically grow on smooth, shaded bark². Lichens grow in well ventilated areas with high light intensity and distributed in all inland forests ⁹. Pyrenolichens produce a reproductive structure called perithecium, a fruiting body which is rounded or flask-shaped, and which opens by a narrow pore at the apex, and exposed as a pigmented ascospores and hyaline ascospores in the hymenium. Such characteristics can be used to identify the genus and species of lichens, which are essential for conservation, and sustainability, as well as to enhance the researchers' experience and expertise. The aim of this study was to investigate the biodiversity and distribution of pyrenolichens from Ramkhamhaeng University Regional Campus in Honour of His Majesty the King, Nakhon Phanom Province (in a radius of 50 km) which is a part of Plant Genetic Conservation Project Office under the Royal Initiative of Her Royal Highness Princess Maha Chakri Sirindhorn.

Methodology:

In this study, lichen specimens were collected from 19 host plants in 11 study sites of a dry dipterocarp forest around Ramkhamhaeng University Regional Campus in Honour of His Majesty the King at Nakhon Phanom Province during November 2014 to April 2015 (Figure 1). They were classified based on morphological and anatomical characteristics of thalli, ascomata and ascospores, as well as chemicals characteristics of KOH tests ^{1,2,3,4,5,7,11,12}.

Results and Discussion:

Ninety-seven pyrenolichens specimens were collected on 19 host plants from 11 study sites of a dry dipterocarp forest around Ramkhamhaeng University Regional Campus in Honour of His Majesty the King at Nakhon Phanom Province (Figure 1) . They were classified into 3 families including Monoblastiaceae, Pyrenulaceae and Trypetheliaceae. Sixteen species belonging to 8 genera, namely *Anisomeridium*, *Bathelium*, *Campylothelium*, *Laurera*, *Marcelaria*, *Nigrovothelium*, *Pyrenula* and *Trypethelium* were classified primarily based on the characteristics of the sexual reproductive structures (Figure 2).

The highest biodiversity of pyrenolichens belonged to the family Trypetheliaceae which comprised 6 genera and 9 species. The second most diverse group was the family Pyrenulaceae which contained 1 genus and 6 species. The family Monoblastiaceae on the other hand, possessed the lowest biodiversity of 1 genus and 1 species (Table 1).

The highest diversity of pyrenolichens included 8 species which were found on *Gluta usitata* (Wall.) Ding Hou (Table 2). The bark was cracked into longitudinal grooves, thus, thick gum resin could support the lichen growth. The common lichens were *Marcelaria benguelensis*, *Pyrenula anomala* and *Trypethelium eluteriae*.

The forest behind Ramkhamhaeng University Regional Campus in Honour of His Majesty the King, Nakhon Phanom Province had the highest species diversity of pyrenolichens (Table 3). Lichens usually grow in well ventilated areas with high light intensity and can tolerate extreme climatic conditions.

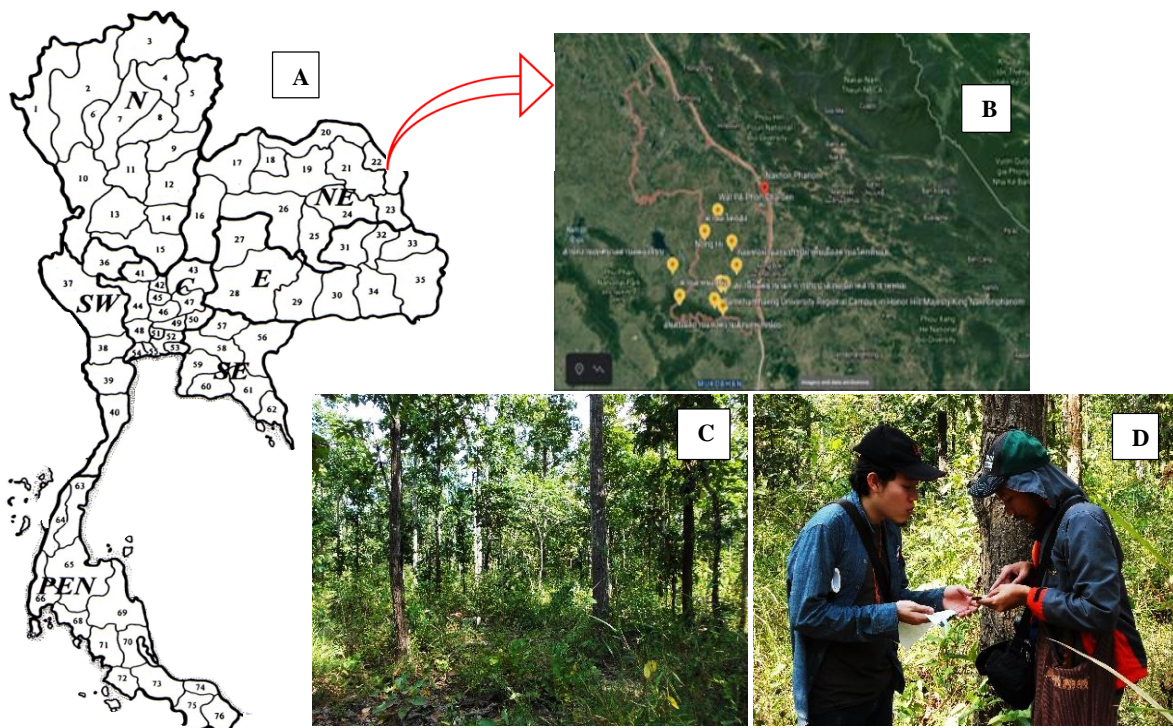


Figure 1. A = Map of Thailand (from “Thai Plants names” by Tem Smitinand, 2001, Bangkok: Royal Forest Department). B = 11 study sites from Ramkhamhaeng University Regional Campus in Honour of His Majesty the King, Nakhon Phanom Province. C = Dry dipterocarp forest (DDF). D = Collected pyrenolichens.



Table 1. The pyrenolichens around Ramkhamhaeng University Regional Campus in Honour of His Majesty the King, Nakhon Phanom Province.

Family	Genus	Species
1. MONOBLASTIACEAE	<i>Anisomeridium</i>	<i>Anisomeridium tamarindi</i>
2. PYRENULACEAE	<i>Pyrenula</i>	<i>Pyrenula anomala</i>
		<i>Pyrenula aspistea</i>
		<i>Pyrenula atropurpurea</i>
		<i>Pyrenula immissa</i>
		<i>Pyrenula laetior</i>
		<i>Pyrenula thailandica</i>
3. TRYPETHELIACEAE	<i>Bathelium</i>	<i>Bathelium madreporiformis</i>
		<i>Bathelium phaeomelodes</i>
	<i>Campylothelium</i>	<i>Campylothelium nitidum</i>
	<i>Laurera</i>	<i>Laurera subdiscreta</i>
	<i>Marcelaria</i>	<i>Marcelaria benguelensis</i>
	<i>Nigrovothelium</i>	<i>Nigrovothelium tropicum</i>
	<i>Trypethelium</i>	<i>Trypethelium eluteriae</i>
		<i>Trypethelium nigroporum</i>
<i>Trypethelium ochroleucum</i>		

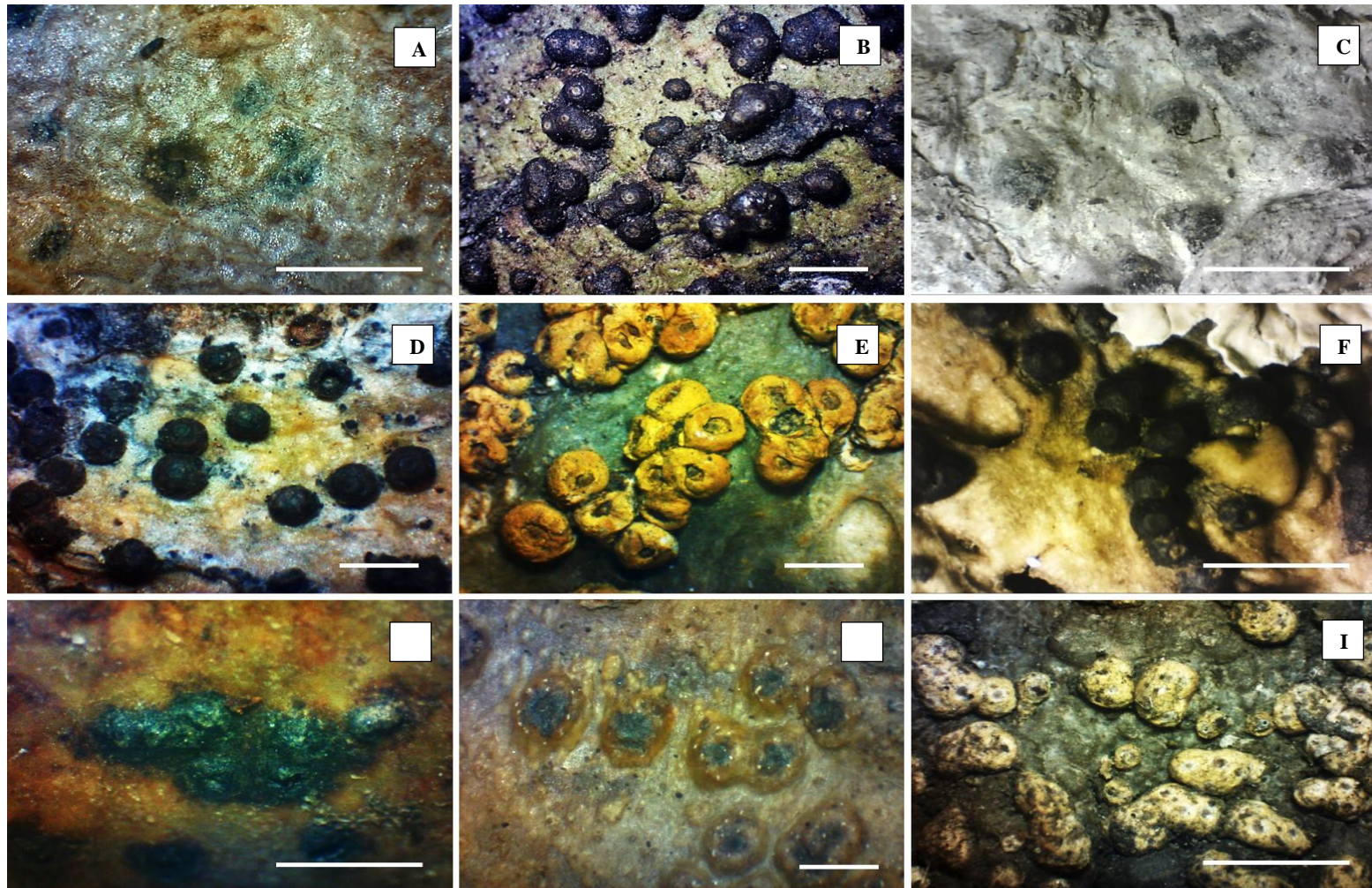


Figure 2. The pyrenolichens around Ramkhamhaeng University Regional Campus in Honour of His Majesty the King, Nakhon Phanom Province. A. *Anisomeridium tamarindii*, B. *Bathelium madreporiformis*, C. *Campylothelium nitidum*, D. *Laurera subdiscreta*, E. *Marcelaria benguelensis*, F. *Nigrovothelium tropicum*, G. *Pyrenula anomala*, H. *Pyrenula immissa*, I. *Trypethelium eluteriae*; scale = 1 mm



Table 2. Host plants of Pyrenolichens around Ramkhamhaeng University Regional Campus in Honour of His Majesty the King, Nakhon Phanom Province.

Host plant	Species
1. <i>Acacia auriculiformis</i> Cunn.	<i>Pyrenula thailandica</i> , <i>Trypethelium eluteriae</i>
2. <i>Canarium subulatum</i> Guill.	<i>Marcelaria benguelensis</i> , <i>Nigrovothelium tropicum</i> , <i>Trypethelium eluteriae</i> , <i>Trypethelium nigroporum</i>
3. <i>Careya sphaerica</i> Roxb	<i>Pyrenula anomala</i> , <i>Pyrenula thailandica</i> , <i>Marcelaria benguelensis</i>
4. <i>Cratoxylum formosum</i> (Jack) Dyer.	<i>Pyrenula anomala</i>
5. <i>Croton oblongifolius</i> Roxb	<i>Pyrenula anomala</i> , <i>Pyrenula thailandica</i>
6. <i>Erythrophloeum succirubrum</i> Gagnep.	<i>Pyrenula thailandica</i>
7. <i>Gluta usitata</i> (Wall.) Ding Hou	<i>Bathelium madreporiformis</i> , <i>Bathelium phaeomelodes</i> , <i>Marcelaria benguelensis</i> , <i>Pyrenula anomala</i> , <i>Pyrenula laetior</i> , <i>Trypethelium eluteriae</i> , <i>Laurera subdiscreta</i> , <i>Marcelaria benguelensis</i>
8. <i>Heteropanax fragrans</i> (Roxb. ex DC.) Seem.	<i>Anisomeridium tamarindi</i> , <i>Laurera subdiscreta</i> , <i>Nigrovothelium tropicum</i> , <i>Trypethelium nigroporum</i>
9. <i>Irvingia malayana</i> Oliv. ex A.W. Benn.	<i>Nigrovothelium tropicum</i>
10. <i>Lithocarpus polystachyus</i> (Wall.) Rehd. Share.	<i>Nigrovothelium tropicum</i>
11. <i>Lophopetalum wallichii</i> Kurz.	<i>Anisomeridium tamarindi</i> , <i>Marcelaria benguelensis</i>
12. <i>Peltophorum dasyrachis</i> (Miq.) Kurz	<i>Pyrenula anomala</i> , <i>Pyrenula aspistea</i>
13. <i>Peltophorum dasyrrhachis</i> (Miq.) Kurz	<i>Laurera subdiscreta</i>
14. <i>Senna siamea</i> Lam.	<i>Marcelaria benguelensis</i> , <i>Trypethelium eluteriae</i>
15. <i>Shorea roxburghii</i> G. Don.	<i>Trypethelium eluteriae</i> , <i>Trypethelium ochroleucum</i>
16. <i>Sindora siamensis</i> Teijsm. & Miq.	<i>Laurera subdiscreta</i> , <i>Marcelaria benguelensis</i> , <i>Trypethelium nigroporum</i>
17. <i>Strychnos nux-vomica</i> L.	<i>Anisomeridium tamarindi</i> , <i>Pyrenula anomala</i> , <i>Pyrenula immissa</i> , <i>Pyrenula thailandica</i>
18. <i>Wrightia religiosa</i> Benth.	<i>Trypethelium eluteriae</i>
19. <i>Ziziphus oenoplia</i> (L.) Mill.	<i>Trypethelium eluteriae</i>

Table 3. Distribution of pyrenolichens in 11 study sites from Ramkhamhaeng University Regional Campus in Honour of His Majesty the King, Nakhon Phanom Province.

Species	NP1	NP2	NP3	NP4	NP5	NP6	NP7	NP8	NP9	NP10	NP11	Total sites
1. <i>Anisomeridium tamarindi</i>							4	1				2
2. <i>Bathelium madreporiformis</i>	1			1								2
3. <i>Laurera phaeomelodes</i>	1											1
4. <i>Campylothelium nitidum</i>					1							1
5. <i>Laurera subdiscreta</i>							2		1		5	3
6. <i>Marcelaria benguelensis</i>	2	1					2	1		1	1	6
7. <i>Nigrovothelium tropicum</i>	1				1		1	2				4
8. <i>Pyrenula anomala</i>	5	3	1		3		1			4		6
9. <i>Pyrenula aspistea</i>	1											1
10. <i>Pyrenula atropurpurea</i>			3									1
11. <i>Pyrenula immissa</i>								2		4		2
12. <i>Pyrenula laetior</i>	1											1
13. <i>Pyrenula thailandica</i>	4	3	7	3								4
14. <i>Trypethelium eluteriae</i>	6	1	2		3	1				1		6
15. <i>Trypethelium nigroporum</i>	1						1			3	1	4
16. <i>Trypethelium ochroleucum</i>					2							1
Total species	10	4	4	2	5	1	6	4	1	5	3	-

**1 nakae subdistrict, ² nakoo subdistrict, ³ khok hin hae subdistrict, ⁴ nong hee subdistrict, ⁵ kuruku subdistrict, ⁶ khok sung subdistrict, ⁷ phiman subdistrict, ⁸ tongkop subdistrict, ⁹ nongbo subdistrict. NP1¹=forest behide Ramkhamhaeng, NP2²= the forest on the right-hand side of the Ban Na Khu floodgate sign, NP3²=behind the naka vocational college, NP4²=forest opposite the water pump, NP5³=ban khok hin hae, NP6⁴= ban nong hee, NP7⁵= roadside forest no.22, NP8⁶= roadside forest no. 2009, NP9⁷= forest around the monument of peace phu phan noi, NP10⁸= roadside forest, tongkop subdistrict, NP11⁹= wat pa muang wang thong (pha daeng).

Conclusion:

The diversity of pyrenolichens was studied on 19 host plants from 11 study sites in a dry dipterocarp forest of Ramkhamhaeng University Regional Campus in Honour of His Majesty the King, Nakhon Phanom Province. A total of 97 lichen specimens were classified into 3 families, 8 genera and 16 species. *Marcelaria benguelensis* (Müll.Arg.) Aptroot, Nelsen & Parmen, *Pyrenula anomala* (Ach.) Vain., and *Trypethelium eluteriae* Spreng. were common species (Table 3). The highest diversity of pyrenolichens included 8 species which were found on *Gluta usitata* (Wall.) Ding Hou. The forest behind this campus of Ramkhamhaeng University had the highest species diversity of pyrenolichens. If the forest is disturbed either by nature or human activities, the diversity of these lichens will be affected which may result in extinction in the future.

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