

BIODIVERSITY OF DISCOLICHENS AT PHU LUANG WILDLIFE SANCTUARY, LOEI PROVINCE

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Abstract: Seven hundred specimens of discolichen samples were collected from barks and rocks at Phu Luang Wildlife Sanctuary in Loei province between August 2005 and June 2010 at an elevation of 700 to 1,555 meters above sea level from seven forest types. These seven forest types were coniferous forest, dry dipterocarp forest, dry evergreen forest, lower montane rainforest, lower montane scrub, mixed deciduous forest, and tropical rainforest. Taxonomic investigation involving systematic identification showed that there are eleven families, fifteen genera, and fifty species, of which eight taxa as follows: *Catillochroma melanotropia*, *Caloplaca* aff. *ferruginea*, *C. bassiae*, *Haematomma* cf. *africanum*, *Lecidella carpathica*, *L. elaeochroma*, *Malmidea microspora*, and *Micarea melaena*, has never been previously reported in the Kingdom of Thailand. An additional five species found—*Bellemerea* PL.1, *Caloplaca* PL.1, *Haematomma* PL.1, *Malmidea* PL.1, and *Ramboldia* PL.1—are expected to be lichen species new to science. The greatest lichen species diversity was found in lower montane scrub (45 percent). The least lichen species diversity was found in coniferous forest and dry evergreen forest. The greatest diversity of genera and species was found to be in the Lecanoraceae family. The least genera and species diversity was found to be in the Brigantiaeaceae family, Lecideaceae family, Megalosporaceae family, and Pilocarpaceae family. However, three species of lichens—*Lecanora austrotropica*, *L. tropica*, and *Letrouitia transgressa*—were generally found in almost all forest types.

Introduction: Discolichens are a group of lichen-forming fungi (Ascomycota) containing 7 orders and 30 families which distributed throughout the world.¹ Previous studies reported twenty-three families of discolichens from Thailand.²⁻¹⁴ This group is characterized by disc shaped, that usually colored apothecia, with a margin containing algal cells call and then called a “lecanorine apothecium”. In this case, the margin is usually of the same color as the thallus. When apothecia are lacking a thalline margin, they are called a “lecideine or biatorine apothecium”. Furthermore, discolichens often have colorless, simple or transeptate to muriform ascospores. The aims of this study were to assess taxonomy, diversity and distribution of discolichens at Phu Luang Wildlife Sanctuary. All data provides the information for conservation and sustainable utilization of biodiversity resources in Thailand.

Methodology: Discolichens growing on barks and rocks were collected from various forest types were taxonomically identified according to Awasthi in 1991.¹⁵⁻¹⁹ The lichen substances were identified by thin layer chromatography (TLC). Three standard solvent systems, A, B', and C were used for routine examinations. The basic solvent systems were prepared according to Kalb as follows.

- A = Toluene (180 ml): 1,4-Dioxan (45 ml): Acetic acid (5 ml) (T.D.A.)
 B' = n-Hexane (140 ml): tert-Butyl-Methylether (72 ml): Formic acid (18ml) (T.D.B'.)
 C = Toluene (195 ml): Acetic acid (35 ml) (T.D.C.)

Results, Discussion and Conclusion: Seven hundred specimens of discolichens were collected at Phu Luang Wildlife Sanctuary from seven forest types; coniferous forest (CF), dry dipterocarp forest (DDF), dry evergreen forest (DEF), lower montane rainforest (LMRF), lower montane scrub (LMS), mixed deciduous forest (MDF), and tropical rainforest (TRF). This study is able to identify 41 species in 12 genera and 8 families pertaining to the order Lecanorales and 9 species in 3 genera and 3 families of the order Teloschistales (Table1). Species composition varies among different forest types. The highest diversity was found in lower montane scrub (45%), lower montane rainforest (25%), dry dipterocarp forest (11%), the mixed deciduous forest (10%), the lower in tropical rainforest (5%), and the lowest diversity was found in dry evergreen forest (3%) and coniferous forest (1%) (Figure 1). The family Lecanoraceae revealed the highest number of genera and species composition (42%). The lowest number of genera and species composition were found in Brigantiaeaceae (2%), Lecideaceae (2%), Megalariaceae, Megalosporaceae, Pilocarpaceae respectively (Figure 2).

Three species, namely *Lecanora austrotropica* and *Lecanora tropica*, which are common species most occurred in each forest type except CF and TRF, while *Letrouitita transgressa* was found in nearly all forest types except CF and DDF (Figure 3). Eight species consists of *Catillochroma melanotropa*, *Caloplaca* aff. *ferruginea*, *C. bassiae*, *Haematomma* cf. *africanum*, *Lecidella carpathica*, *L. elaeochroma*, *Malmidea microspora*, and *Micarea melaena*, were new records of Thailand.^{3,4,14} Five species, namely *Bellemerea* PL. 1, *Caloplaca* PL.1, *Haematomma* PL.1, *Malmidea* PL.1, and *Ramboldia* PL.1, were expected to be new species of science.¹⁵⁻¹⁹ The distribution of the discolichens were affected by specific microhabitats especially light intensity, temperature, humidity, forest types and altitude of explorer site.

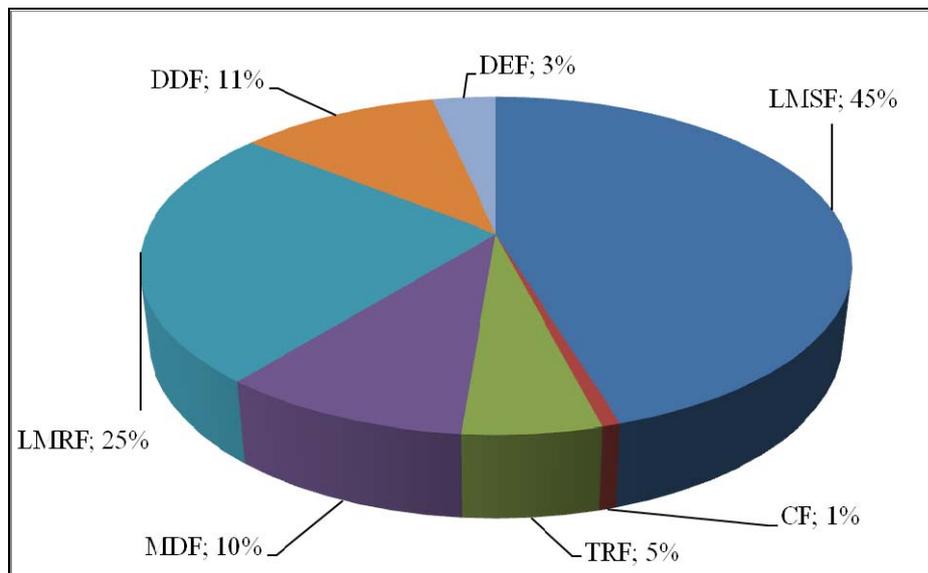


Figure 1. The Percentage of lichen taxa that belong to 15 genera were found in coniferous forest (CF), dry dipterocarp forest (DDF), dry evergreen forest (DEF), lower montane rainforest (LMRF), lower montane scrub (LMS), mixed deciduous forest (MDF), and tropical rainforest (TRF) at Phu Luang Wildlife Sanctuary

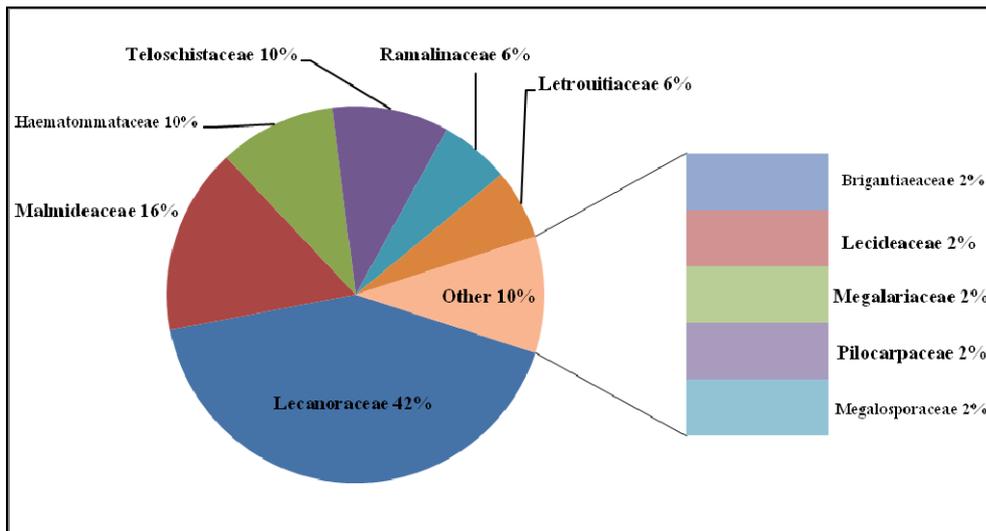


Figure 2. Proportion of number of species among eleven families of Discolichens.

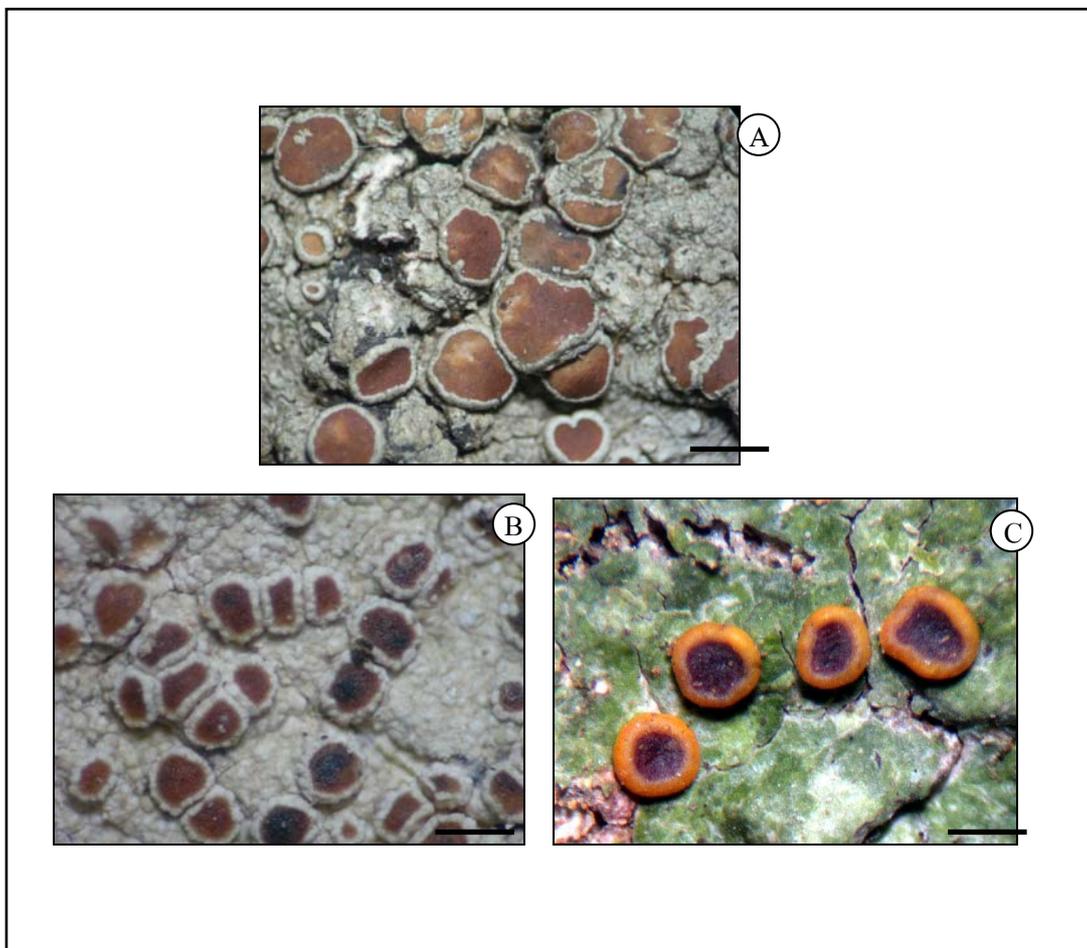


Figure 3. Three common species of a) *Lecanora austrotropica* b) *Lecanora tropica* c) *Letrovitia transgressa* (scale = 1 mm)

Table 1. Families, genera and species of discolichens in seven forest types at Phu Luang Wildlife Sanctuary.

Order	Family	Species	Number of specimens of each forest type							Total	
			LMS	CF	TRF	MDF	LMRF	DDF	DEF		
Lecanorales	Ramalinaceae	<i>Bacidia convexula</i>	7							7	
		<i>Bacidia incongruens</i>	5							5	
		<i>Bacidia subannexa</i>	6							6	
	Brigantiaeaceae	<i>Brigantiaea leucoxantha</i>			15		10			25	
	Haematommataceae	<i>Haematomma</i> cf. <i>africanum</i>							1		1
		<i>Haematomma collatum</i>			5		15				22
		<i>Haematomma flexuosum</i>	2				15				20
		<i>Haematomma</i> PL.1	5				5				10
	Lecanoraceae	<i>Haematomma wattii</i>	32				7				39
		<i>Lecanora achroa</i>	5						12		17
		<i>Lecanora argentata</i>	1				7				8
		<i>Lecanora austrotropica</i>	1			1	4		2	1	9
		<i>Lecanora flavoviridis</i>	1								1
		<i>Lecanora helva</i>	1						9		10
		<i>Lecanora leprosa</i>							1		1
		<i>Lecanora phaeocardia</i>	36				5		2		43
		<i>Lecanora subimmersa</i>					12		7		19
		<i>Lecanora toroyensis</i>			2						2
		<i>Lecanora tropica</i>	6			3	6	11	11		37
		<i>Lecanora vainioi</i>	23						1		24
		<i>Lecidella carpathica</i>	1								1
		<i>Lecidella elaeochroma</i>	1								1
		<i>Maronina orientalis</i>	5		1		5				11
		<i>Ramboldia deficiens</i>					6		2		8
		<i>Ramboldia heterocarpa</i>	6			1			3		10
		<i>Ramboldia russula</i>	1	1			16		13		31
		<i>Ramboldia</i> cf. <i>siamensis</i>	1								1
		<i>Ramboldia siamensis</i>	37	4			10		7		58
	<i>Ramboldia</i> PL.1	1								1	
	<i>Vainionora flavidorufa</i>	58			3	2				63	
	Lecideaceae	<i>Bellemerea</i> PL.1	1								1
	Megalariaceae	<i>Catillochroma melanotropa</i>	5				18				23
	Malmideaceae	<i>Malmidea bakeri</i>				10	10				20
		<i>Malmidea coralliformis</i>	10			2	11				23
		<i>Malmidea duplomarginata</i>				1					1
		<i>Malmidea eeuuae</i>	1		1	26					28
		<i>Malmidea microspora</i>	1								1
		<i>Malmidea perplexa</i>	6								6
		<i>Malmidea piaie</i>								5	5
		<i>Malmidea</i> PL.1			1						1
		Pilocarpaceae	<i>Micarea melaena</i>	1							
	Teloshistales	Letrouitiaceae	<i>Letrouitia domingensis</i>	4				2			6
			<i>Letrouitia transgressa</i>	3		12	8	12		7	42
			<i>Letrouitia vulpina</i>	4				3		1	8
	Megalosporaceae	<i>Megalospora tuberculosa</i>	19								19
	Teloschistaceae	<i>Caloplaca testaceorufa</i>	5						4		9
		<i>Caloplaca</i> aff. <i>ferruginea</i>	1								1
<i>Caloplaca flavorubescens</i>		7								7	
<i>Caloplaca</i> PL.1		1				5				6	
<i>Caloplaca bassiae</i>		1						1		1	
			317	5	37	67	174	76	24	700	

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Keywords: lichens, discolichens, biodiversity, new record, Lecanorales