

ความหลากหลายทางชีวภาพของไลเคนวงศ์คลาโดเนียซิติ ณ อุทยานแห่งชาติภูหินร่องกล้า

ประเทศไทย

BIODIVERSITY OF THE LICHEN FAMILY CLADONIACEAE AT PHU HIN RONG KLA NATIONAL PARK, THAILAND.

สิทธิพร ปานเม่น, ณัฐสุรางค์ หอมจันทร์ และ พิบูลย์ มงคลสุข

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บทคัดย่อ: การศึกษาความหลากหลายของไลเคนวงศ์คลาโดเนียซิติที่สำรวจ และเก็บรวบรวม ณ อุทยานภูหินร่องกล้าระหว่างปี พ.ศ. 2546 ถึง 2548 จำนวน 326 ตัวอย่าง พบ 2 สกุล 14 ชนิด 3 หมู่ (section) โดยไลเคนสกุลคลาเดียพบ 1 ชนิด ได้แก่ *Cladia aggregata* (Swartz) Nyl. และ สกุลคลาโดเนียพบ 3 หมู่ 13 ชนิด ได้แก่ หมู่ *Cladonia* พบ 10 ชนิด ประกอบด้วย *Cladonia borbonica* Nyl., *C. rappii* A.Evans, *C. ramulosa* (With.)Laun., *C. singhii* Ahti & Dixit, *C. submultiformis* Asah., *C. fruticulosa* Kremp., *Cladonia* cf. *awasthiana* Ahti & Upreti, *C. ochrochlora* Flörke, *C. mauritiana* Ahti & J.C.David และ *Cladonia* ph.1 หมู่ *Cocciferae* พบ 2 ชนิด ประกอบด้วย *Cladonia macilenta* Hoffm. และ *C. rubricapitata* Ahti, ined. และ หมู่ *Perviae* พบ 1 ชนิด ประกอบด้วย *Cladonia* aff. *crispatula* (Nyl.)Ahti. ผลการศึกษาครั้งนี้พบไลเคนที่ไม่เคยมีรายงานการพบในประเทศไทยมาก่อน 1 ชนิด ได้แก่ *Cladonia rubricapitata* Ahti, ined. นอกจากนี้พบไลเคนที่คาดว่าเป็นชนิดใหม่จำนวน 3 ชนิด ได้แก่ *Cladonia* cf. *awasthiana* Ahti & Upreti., *Cladonia* aff. *crispatula* (Nyl.)Ahti. และ *Cladonia* ph.1 แหล่งอาศัยที่พบย่อย ได้แก่ ป่าละเมาะเขาต่ำ ป่าดิบเขาต่ำ ป่าไม้ก่อ และป่าไม้ก่อ-สนเขา คิดเป็นเปอร์เซ็นต์การแพร่กระจายเท่ากับ 28, 28, 25 และ 19 เปอร์เซ็นต์ตามลำดับ โดยไลเคนวงศ์คลาโดเนียซิติทั้ง 3 หมู่ ไม่พบการแพร่กระจายในป่าเบญจพรรณ และป่าดิบชื้น ไลเคนวงศ์นี้ส่วนใหญ่เจริญบนหิน และดิน บางชนิดพบบนเปลือกไม้ สารทุติยภูมิที่พบส่วนใหญ่อยู่ในกลุ่ม depsides, depsidones, anthraquinones, dibenzofurans และ dibenzofuranoid

Abstract: Study on biodiversity of lichens in the family Cladoniaceae was explored at Phu Hin Rong Kla National Park during 2003 – 2005. Collected 326 samples were identified into 2 genera, 13 species and 3 sections. They comprised of *Cladia aggregata* (Swartz) Nyl. and 3 sections of genus *Cladonia*. The section *Cladonia* had 10 species, namely *Cladonia borbonica* Nyl., *C. rappii* A.Evans, *C. ramulosa* (With.)Laun., *C. singhii* Ahti & Dixit, *C. submultiformis* Asah., *C. fruticulosa* Kremp., *Cladonia* cf. *awasthiana* Ahti & Upreti, *C. ochrochlora* Flörke, *C. mauritiana* Ahti & J.C.David and *Cladonia* ph.1. The section *Cocciferae* had 2 species, including *Cladonia macilenta* Hoffm. and *C. rubricapitata* Ahti, ined. And the section *Perviae* had one species which was *Cladonia* aff. *crispatula* (Nyl.)Ahti. The *Cladonia rubricapitata* was described as a new record in Thailand. Three species were expected to be new species consisted of

Cladonia cf. *awasthiana*, *Cladonia* aff. *crispatula* and *Cladonia* ph.1. Species composition varies among different forest types. The highest diversity was found in lower montane shrub forest (28%), lower montane rain forest (28%) and lesser in lower montane oak forest (25%), the lowest diversity was found in the lower montane oak-pine forest (19%). There has been no report on the finding of 3 *Cladonia* sections in mixed deciduous forest and tropical rain forest. Most of specimens were found on rock and soil, rarely on bark. Most secondary metabolites found were depsides, depsidones, anthraquinones, dibenzofurans and dibenzofuranoid derivatives.

Introduction: The lichens family Cladoniaceae are lichen-forming fungi (Ascomycotina: Lecanorales, suborder Cladoniinae) that includes 13 genera 435 species which are distributed throughout the world (Hawksworth et al., 2000). Cladoniaceae species are found on all continents. This family is characterized by thallus like those of crustose or foliose and capitates bodies borne on simple or branched podetia. The lichens in this family are complicated in morphology and chemistry. Thus, they are divided some genera of cladoniaceae into infrageneric entities including sections, subsections, groups or subgroups. The aims of this studied are primarily to classify and construct key characteristics and later to conserve the diversity and bring about sustainable uses.

Methodology: The lichen specimens collected from various forest types were determined according to Ahti (2000), Awasthi (1983) and others. The lichen substances were identified by thin layer chromatography. Two standard solvent systems, A and G were used, for routine examinations. The basic solvent systems were prepared according to White and James (1985) as follows.

A = Toluene (180 ml): dioxin (60 ml): acetic acid (8 ml) (T.D.A.)

G = Toluene (139 ml): ethylacetate (83 ml): formic acid (8 ml)

Results, Discussion, and Conclusion: The biodiversity and distribution of lichens from the family Cladoniaceae were explored at Phu Hin Rong Kla National Park during 2003 – 2005. They consisted of 2 genera, 13 species and 3 sections from 326 specimens. The genus *Cladia* had one species which was *Cladia aggregate* (Swartz) Nyl. Ten species of this genus are distributed throughout the world. The genus *Cladonia*, classified into infrageneric levels, had 3 sections: *Cladonia*, *Cocciferae* and *Perviae* (**Figure 1**). The section *Cladonia* consisted of 10 species, namely *Cladonia borbonica* Nyl., *C. rappii* A.Evans, *C. ramulosa* (With.)Laun., *C. singhii* Ahti & Dixit, *C. submultiformis* Asah., *C. fruticulosa* Kremp., *Cladonia* cf. *awasthiana* Ahti & Upreti, *C. ochrochlora* Flörke, *C. mauritiana* Ahti & J.C.David and *Cladonia* ph.1. The section *Cocciferae* had 2 species, *Cladonia macilenta* Hoffm. and *C. rubricapitata* Ahti, ined. And the section *Perviae* had one *Cladonia* species which was *Cladonia* aff. *crispatula* (Nyl.)Ahti.

Two hundred, 60 and 60 species from each section are distributed throughout the world (Ahti 2000). *Cladonia rubricapitata* was described as a new record in Thailand. Three species, *Cladonia* cf. *awasthiana*, *Cladonia* aff. *crispatula* and *Cladonia* ph.1 were expected to be new species. Species composition varies among different forest types. The highest diversity was found in lower montane shrub forest (28%), lower montane rain forest (28%) and lesser in lower montane oak forest (25%), the lowest diversity was found in the lower montane oak-pine forest (19%). There has been no report of finding of the 3 *Cladonia* sections in mixed deciduous forest and tropical rain forest. The distribution of the cladoniaceae was affected by specific microhabitats. Most

of specimens were found on rock and soil, rarely on bark. Habitats were exposed to direct sun light.

Figure 1. The characteristics of the section *Cladonia*, *Cocciferae* and *Perviae* in natural habitat at Phu Hin Rong Kla National Park, Thailand.



Twelve lichen substances, 8 depsides, 2 depsidones, 1 anthraquinones and 1 dibenzofurans and dibenzofuranoid derivatives were detected by thin layer chromatography. Depsides, depsidones, anthraquinones, dibenzofurans and dibenzofuranoid derivatives were the major categories. Common chemical substances were fumarprotocetraric, thamnolic, didymic, barbatic and homosekikaic acids. These substances mostly occurred in the medulla and rarely on apothecium. Some compound of anthraquinones such as rhodocladonic acid was usually found on apothecia of the lichens section *Cocciferae*.

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