Phytotaxa 189 (1): 255–267
www.mapress.com/phytotaxa/

Article

ISSN 1179-3155 (print edition)
PHYTOTAXA
ISSN 1179-3163 (online edition)

http://dx.doi.org/10.11646/phytotaxa.189.1.18

New species of Graphidaceae from Loei Province, Thailand

VASUN POENGSUNGNOEN[1,3], LEKA MANOCH[2], PACHARA MONGKOLSUK[3] & KLAUS KALB[4,5]

[1]*Tropical Agriculture, Faculty of Agriculture, Kasetsart University, Bangkhen, Bangkok, 10900 Thailand; email: vasun_poeng@hotmail.com*

[2]*Department of Plant Pathology, Faculty of Agriculture, Kasetsart University, Bangkhen, Bangkok, 10900 Thailand*

[3]*Lichen Research Unit, Department of Biology, Faculty of Science, Ramkhamhaeng University, Ramkhamhaeng 24 Road, Bangkok, 10240 Thailand; email: pm-tamrapap@ru.ac.th*

[4]*Lichenologisches Institut Neumarkt, Im Tal 12, D-92318 Neumarkt, Germany; email: klaus.kalb@arcor.de*

[5]*University of Regensburg, Institute of Botany, Universitätsstraße 31, D-93040 Regensburg, Germany.*

Abstract

Twelve new species of the lichen family Graphidaceae are described from NE Thailand, namely *Fissurina niveoalba*, with warty paraphyses tips, muriform ascospores and the lack of secondary lichen substances; *F. phuluangii*, with 2–8 muriform ascopores and the production of stictic and hypostictic acids; *Graphis subdussii*, distinguished by unbranched, straight ascomata with entire labia, a completely carbonized exciple and transversely septate, up to 170 µm long ascospores; *G. subinsulana*, with conspicuous, prominent ascomata, a laterally carbonized exciple, single, muriform ascospores and norstictic acid; *Leiorreuma hypomelaenoides*, which differs from *L. hypomelaenum* by the absence of hypostictic acid; *Phaeographis caesiodiscoides*, distinguished by radiately branched immersed to erumpent ascomata with uncarbonized exciple and muriform, brown ascospores; *P. loeiensis* with numerous irregularly branched, clustered ascomata, with an uncarbonized exciple and 8–11-septate brown, transversely septate ascospores; *P. neotricosoides* which differs from *P. neotricosa* by the lack of neotricone, instead producing stictic acid; *P. phurueaensis*, distinguished by a clear hymenium, 5–7-septate, dark-brown ascospores and especially by producing stictic and norstictic acids, both as major metabolites; *P. schizolomoides*, distinguished by conspicuous prominent ascomata with a white-pruinose disc surrounded by a whitish thalline margin, and brown, submuriform ascospores; *P. siamensis*, which is separated from *P. brasiliensis* by the production of stictic acid and small, 3-septate ascospores; and *Platygramme subarechavaletae*, which is distinguished by inconspicuous ascomata with a concealed disc, an apically to laterally carbonized exciple and submuriform ascospores.

Keywords: Loei, Phu Luang Wildlife Sanctuary

Introduction

Although there is only a limited number of regional monographs dealing with Graphidaceae in Thailand, most of them unpublished (Homchantara 2002; Homchantara & Coppins 2002; Sutjaritturakan 2002; Mongkolsuk & Poengsungnoen 2010; Papong *et al.* 2010; Rivas Plata *et al.* 2012a, 2012b), up till now, ca. 310 species from this family are known to occur in this country (Aptroot & Sparrius 2013). Although this number seems high, many more species are to be expected, either new additions to the lichen biota of Thailand or even new for science, considering the great diversity of the country. The North-South-extension is almost 1800 km and the altitude reaches from 2565 m (Doi Inthanon) with tropical montane rainforests, rainforests, deciduous forests, mixed forests with evergreen and deciduous trees, coniferous forests, down to mangrove forests along the coastlines (Pfeffer 2013). From Thailand, 264 mammals are reported (Ivanovic 2011). The richness and diversity of Thailand's flora is demonstrated by the presence of about 10,000 vascular plant species, belonging to 275 families of spermatophytes and 36 families of pteridophytes (Anonymous 2013). Lepage (2013) published a checklist of birds from Thailand. No less than 1013 species are mentioned, almost twice the number known from Europe (Peterson *et al.* 2002).

Accepted by Mohammad Sohrabi: 20 Jun. 2014; published: 19 Dec. 2014

Platygramme subarechavaletae* Poengs. & Kalb, *sp. nov. (Fig. 3F)
Mycobank #807277

Similar to *Platygramme arechavaletae*, but differs by slightly longer ascospores with more transverse septa.

Type:—THAILAND. Loei: Phu Luang Wildlife Sanctuary, Khok Nok Kraba Ranger Station, in a lower montane scrub, on a unidentified tree; 1468 m, 17º 16' 49.0" N, 101º 31' 06.1" E; 27 June 2008, *V. Poengsungnoen VP00324* (holotype RAMK 011376!).

Thallus corticolous, grey, yellowish green; surface smooth or sometimes subtuberculate and dull; cortex densely organized, 15–30 µm thick; algal layer continuous with a few crystals, 25–35 µm thick; medulla penetrating into the periderm. Ascomata lirelliform, sparse, inconspicuous, dispersed, irregularly branched, straight or curved, prominent to sessile, 2.0–5.0 mm long and 0.2–0.3 mm wide; lips black; disc concealed. Exciple apically to laterally carbonized and sometimes also with a thin carbonization at the base, with a few crystals; labia entire, convergent. Hymenium inspersed, 120–160 µm high, I–; hypothecium hyaline, 10–15 µm high; epihymenium indistict; paraphyses simple. Asci clavate, 85–135 × 15–30 µm with 4–8 ascospores. Ascospores pale brown, submuriform, with 5–7 transverse septa and 2–3 longitudinal septa, 25–45 × 10–15 µm, I+ reddish violet.

Secondary chemistry:—No lichen compounds detected by TLC.

Etymology:—The specific epithet refers to the similarity with *Platygramme arechavaletae*.

Distribution and ecology:—Rare on bark in lower montane scrub.

Remarks:—The species is similar to *Platygramme arechavaletae* (Müll. Arg.) A. W. Archer (2005: 76), but differs by slightly longer ascospores (24–31(–39) µm long in *P. arechavaletae*) with more transverse septa (3–5 in *P. arechavaletae*) and a sometimes completely carbonized exciple.

Acknowledgements

K. K. is most thankful to all the members of the Lichen Research Unit at Ramkhamhaeng University for all their help in the field as well as in the laboratory. Special thanks go to its leader, Assoc. Prof. Dr. Kansri Boonpragob, for her kind hospitality and most skilful organisation. Assoc. Prof. Pachara Mongkolsuk has organized and funded a four weeks stay at RAMK where much of the work on lichens from Phu Luang Wildlife Sanctuary was performed. Without the unselfish logistic help of Mr. W. Polyiam, many things would have been much more difficult for me. Mrs. K. Buaruang is thanked for arranging the very fast loan of critical specimens from RAMK as well as the keepers of all the herbaria mentioned for partly very long lasting loans. The senior author (V. P.) would like to express his gratitude to the Royal Thai Government for the financial support. Furthermore, he would like to give his special thanks to Dr. Thorsten Lumbsch who invited him to stay and to do some research at the Field Museum, Chicago. He also wants to thank Dr. Robert Lücking and Dr. Sittiporn Parnmen for all their assistance.

References

Amataviwat, F. (1994) *Chemotaxonomy and chemistry of lichens in Southern Thailand.* Final report of Faculty of Science. Songkhla: Prince of Songkhla University, 54 pp.

Anonymous (2013) The Flora of Thailand. Available from: http://web3.dnp.go.th/botany/Botany_Eng/FloraofThailand/flora_Eng_publication.html

Aptroot, A. & Sparrius, L.B. (2013) Checklist of lichens of Thailand. http://www.tropicallichens.net/ checklists/?country=Thailand

Archer, A.W. (2001a) The lichen genera *Phaeographis* and *Phaeographina* (Graphidaceae) in Australia 3. *Phaeographis* - new reports and new species. *Telopea* 9: 663–667.

Archer, A.W. (2001b) The lichen genus *Graphina* (Graphidaceae) in Australia: new reports and new species. *Mycotaxon* 77: 153–180.

Archer, A.W. (2005) New combinations and synonymies in the Australian Graphidaceae. *Telopea* 11: 59–78.

Archer, A.W. (2006) The lichen family Graphidaceae in Australia. *Bibliotheca Lichenologica* 94: 1–191.

Archer, A.W. & Elix, J.A. (2008) Three new species in the Australian Graphidaceae (lichenized Ascomycota). *Australasian Lichenology* 65: 24–29.

Archer, A.W. & Elix, J.A. (2009) A new species, new combination, and new report in the Australian Graphidaceae. *Australasian Lichenology* 65: 24–29.

Clements, F. (1909) *The genera of Fungi*. M.W. Wilson, New York. 227 pp.
Elix, J.A. & Ernst-Russell, K.D. (1993) *A catalogue of standardized thin layer chromatographic data and biosynthetic relationships for lichen substances (2nd ed.)*. Australian National University, Canberra, 163 pp.
Homchantara, N. (2002) *The taxonomy and ecological aspects of the Thelotremataceae in Southeast Asia.* A thesis presented to Liverpool John Moores University in partial fulfillment of the requirements for the degree of Doctor of Philosophy. Edinburgh. United Kingdom, 384 pp. (unpubl.).
Homchantara, N. & Coppins, B.J. (2002) New species of the lichen family Thelotremataceae in SE Asia. *Lichenologist* 34: 113-140. http://dx.doi.org/10.1006/lich.2002.0382
Ivanovic, J. (2011) Mammals of Thailand. http://www.australianscience.com.au/biology/mammals-of-thailand/
Kalb, K. (2001) New or otherwise interesting lichens. I. *Bibliotheca Lichenologica* 78: 141–167.
Krempelhuber, A. (1876) Lichenes Brasilienses, collecti a D.A. Glaziou in provincia brasiliensi Rio Janeiro. *Flora* 59: 33–38, 56–63, 70–77, 140–144, 172–176, 217–224, 248–251, 265–271, 316–320, 378–384, 412–416, 417–423, 445–448, 475–482, 511–514, 522–529.
Leighton, W.A. (1866) Lichenes Amazonici et Andini lecti a Domino Spruce. *Transactions of the Linnean Society of London* 25: 433–460. http://dx.doi.org/10.1111/j.1096-3642.1865.tb00194.x
Leighton, W.A. (1869) The lichens of Ceylon collected by G.H.K. Thwaites. *Transactions of the Linnean Society of London* 27: 161–186.
Lepage, D. (2013) Avibase—Vogel-Kontrolllisten der Welt: Thailand. http://avibase.bsc-eoc.org/checklist.jsp?lang=DE&region=th&list=clements
Lücking, R., Chaves, J.L., Sipman, H.J.M., Umaña, L. & Aptroot, A. (2008) A first assessment of the Ticolichen Biodiversity Inventory in Costa Rica: The genus *Graphis*, with notes on the genus *Hemithecium* (Ascomycota: Ostropales: Graphidaceae). *Fieldiana (Botany), New Series* 46(1): 1–126. http://dx.doi.org/10.3158/0015-0746(2008)46[1:afaott]2.0.co;2
Lücking, R., Archer, A.W. & Aptroot, A. (2009) A world-wide key to the genus *Graphis* (Ostropales: Graphidaceae). *Lichenologist* 41: 363–452. http://dx.doi.org/10.1017/s0024282909008305
Lücking, R., Sutjaritturakan, J. & Kalb, K. (2012) Validation of three species names and description of a new species in the genus *Graphis* (Ascomycota: Ostropales: Graphidaceae). *Lichenologist* 44: 391–394. http://dx.doi.org/10.1017/s0024282911000855
Lumbsch, H.T., Ahti, T., Altermann, S., Amo De Paz, G., Aptroot, A,. Arup, U., Bárcenas Peña, A., Bawingan, P.A., Benatti, M.N., Betancourt, L., Björk, C.R., Boonpragob, K., Brand, M., Bungartz, F., Cáceres, M.E.S., Candan, M., Chaves, J.L., Clerc, P., Common, R., Coppins, B.J., Crespo, A., Dal-Forno, M., Divakar, P.K., Duya, M.V., Elix, J. A., Elvebakk, A., Fankhauser, J.D., Farkas, E., Itatí Ferraro L., Fischer, E., Galloway, D.J., Gaya, E., Giralt, M., Goward, T., Grube, M,. Hafellner, J., Hernández, J.E., Herrera Campos, M.A., Kalb, K., Kärnefelt, I., Kantvilas, G., Killmann, D., Kirika, P., Knudsen, K., Komposch, H., Kondratyuk, S., Lawrey J.D., Mangold, A., Marcelli, M.P., Mccune, B., Messuti, M.I., Michlig, A., Miranda González, R., Moncada, B., Naikatini, A., Nelsen, M.P., Øvstedal, D.O., Palice, Z., Papong, K., Parnmen, S., Pérez-Ortega, S., Printzen, C., Rico, V.J., Rivas Plata, E., Robayo, J., Rosabal, D., Ruprecht, U., Salazar Allen, N., Sancho, L., Santos De Jesus, L., Santos Vieira, T., Schultz, M., Seaward, M.R.D., Sérusiaux, E., Schmitt I., Sipman, H.J.M., Sohrabi, M., Søchting, U., Søgaard, M.Z., Sparrius, L.B., Spielmann, A., Spribille, T., Sutjaritturakan, J., Thammathaworn, A., Thell, A., Thor, G., Thüs, H., Timdal, E., Truong, C., Türk, R., Umaña Tenorio, L., Upreti, D.K., Van Den Boom, P., Vivas Rebuelta, M., Wedin, M., Will-Wolf, S., Wirth, V., Wirtz, N., Yahr, R., Yeshitela, K., Ziemmeck, F., Wheeler, T. & Lücking, R. (2011) One hundred new species of lichenized fungi: a signature of undiscovered global diversity. *Phytotaxa* 18: 1–127.
Lumbsch, H.T., Kraichak, E., Parnmen, S., Aptroot, A., Cáceres, M.E.S., Feuerstein, S.C., Mercado-Díaz, J.A., Staiger, B. & Lücking, R. (2014) New higher taxa in the lichen family Graphidaceae (lichenized Ascomycota: Ostropales) based on a three-gene skeleton phylogeny. *Phytotaxa* http://dx.doi.org/10.11646/phytotaxa.189.1.5.
Massalongo, A.B. (1860) Esame comparativo di alcuni generi di licheni. *Atti del Reale Istituto Veneto di Scienze, Lettere ed Arti* ser. 3 (5): 247–276, 313–337.
Mongkolsuk, P. & Poengsungnoen, V. (2012) *The lichen family Graphidaceae, Natural Art.* Nobel print, Phayathy, Bangkok, 195 pp.
Müller, J. (1880) Lichenologische Beiträge 10. *Flora* 63: 17–24, 40–45.
Müller, J. (1882a) Lichenologische Beiträge 15. *Flora* 65: 291–306, 316–322, 326–337, 381–386, 397–402.
Müller, J. (1882b) Lichenologische Beiträge 16. *Flora* 65: 483–490, 499–505, 515–519.
Müller, J. (1883) Die auf der Expedition der Gazelle von Dr. Naumann gesammelten Flechten. *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 4: 53–58.
Müller, J. (1886) Lichenologische Beiträge 24. *Flora* 69: 252–258, 286–290, 307–318.
Müller, J. (1888) Lichenes montevidenses. *Revue Mycologique* 10: 1–6.
Nakanishi, M., Kashiwadani, H. & Moon, K.H. (2003) Taxonomical notes on Japanese Graphidaceae (Ascomycotina), including some new combinations. *Bulletin of the National Science Museum Tokyo ser. B*, 29: 83–90.
Nylander, W. (1859) Lichenes in regionibus exoticis quibusdam vigentes. A*nnales des Sciences Naturelles, Botanique,* série 4(11): 203–264.
Nylander, W. (1863) Lichenographiae Novo-Granatensis Prodromus. *Acta Societatis pro Fauna et Flora Fennica* 7: 415–504.
Nylander, W. (1891) *Sertum Lichenaeae tropicae e Labuan et Singapore*. Paris, 48 pp.
Nylander, W. (1900) Lichenes Ceylonenses et Additamentum ad Lichenes Japoniae. Opus posthumum. *Acta Societatis pro Fauna et*

Flora Fennica 26(10): 1–33.
Papong, K., Boonpragob, K., Mangold, A., Divakar, P.K. & Lumbsch, H.T. (2010) Thelotremoid lichen species recently described from Thailand: a re-evaluation. *Lichenologist* 42: 131-137. http://dx.doi.org/10.1017/s0024282909990405
Peterson, R.T., Mountfort, G. & Hollom, P.A.D. (2002) Die Vögel Europas, Blackwell Wissenschafts-Verlag; 15th edition, Berlin, 530 pp.
Poengsungnoen, V. (2010) *Systematic taxonomy and biodiversity of the lichen family Graphidaceae at Phu Luang Wildlife Sanctuary, Loei province.* A thesis presented to Ramkhamhaeng University in partial fulfillment of the requirements for the degree of Master of Science. Bangkok, Thailand, 400 pp. (unpubl.).
Raddi, G. (1820) Di alcune specie nuove di rettili, e piante brasiliane. *Memorie di Matematica e di Fisica della Società Italiana delle Scienze* 18: 313–345.
Redinger, K. (1935) Die Graphidineen der ersten Regnellschen Expedition nach Brasilien 1892-1894. III. *Graphis*, *Phaeographis*, nebst einem Nachtrage zu *Graphina*. *Arkiv för Botanik* 27A (3): 1–103.
Rivas Plata, E., Lücking, R. & Lumbsch, H.T. (2012a) A new classification for the family Graphidaceae (Ascomycota: Lecanoromycetes: Ostropales). *Fungal Diversity* 52: 107-121. http://dx.doi.org/10.1007/s13225-011-0135-8
Rivas Plata, E., Lücking, R. & Lumbsch, H.T. (2012b) Molecular phylogeny and systematics of the *Ocellularia* clade (Ascomycota: Ostropales: Graphidaceae). *Taxon* 61: 1161–1179.
Staiger, B. (2002) Die Flechtenfamilie Graphidaceae. Studien in Richtung einer natürlicheren Gliederung. *Bibliotheca Lichenologica* 85: 1–526.
Sipman, H.J.M. (1994) New Graphidales (lichenized Ascomycotina) from the Guianas and nearby areas. *Acta Botanica Fennica* 150:165–172.
Sutjaritturakan, J. (2002) *The taxonomy and ecology of the lichens Graphidaceae at Khao Yai National Park.* A thesis presented to Ramkhamhaeng University in partial fulfillment of the requirements for the degree of Master of Science. Bangkok, Thailand, 558 pp. (unpubl.).
Tuckerman, E. (1888) *Synopsis of the North American lichens: Part II, comprising the Lecideacei, and (in part) the Graphidacei.* New Bedford. 176 pp. http://dx.doi.org/10.5962/bhl.title.46052
Vainio, E.A. (1899) Lichenes novi rarioresque. III. *Hedwigia* 38: 253–259.
Zahlbruckner, A. (1923). *Catalogus Lichenum Universalis*. 2: Leipzig, 815 pp.