Phytotaxa 205 (3): 205–210
www.mapress.com/phytotaxa/

Article

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

http://dx.doi.org/10.11646/phytotaxa.205.3.8

A new species in the lichen genus *Caloplaca* from the Canary Islands, including a key to all brown-black *Caloplaca sensu lato* species in Macaronesia

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Abstract:

Caloplaca nigrocarpa sp. nov. found on bark of canary willow from the Canary Islands is described as new to science. A description of the species is given together with notes on its chemistry, distribution, ecology and taxonomy. Related lichen taxa are discussed briefly and a key to the Macaronesian species of the genus *Caloplaca s.l.* with brown-black apothecia is also provided.

Key words: Biodiversity, Macaronesia, taxonomy, Teloschistaceae

Introduction

Teloschistaceae is a widespread and well delimited family of lichenized fungi, with considerable morphological and ecological heterogeneity across genera and species groups, and one of the largest families of lichens (Søchting & Lutzoni 2003, Gaya *et al*. 2008, Arup *et al*. 2013). The cosmopolitan *Caloplaca* Th. Fr. is the largest genus within Teloschistaceae and may comprise as many as 1000 or more species (Kärnefelt 1989; Arup 2006, Arup *et al*. 2013). It is a rather complex genus due to not only the great number of existing species, but also to the many characters used to distinguish them and our poor understanding of their variability. Several, more or less distinctive groups of species can be recognized within the genus, although intermediate forms can occur (Clauzade & Roux 1985; Kärnefelt 1989; Kärnefelt *et al*. 2002). The subgenus *Pyrenodesmia* (A. Massal.) Boist. comprises species with brown or black apothecia, a thallus that is not orange unlike most other *Caloplaca* spp., and the abscence of anthraquinones in all parts of the thallus (Clauzade & Roux 1985, Wetmore 1994). This group is artificial and not phylogenetically justified (Kärnefelt 1989, Wetmore 1994, Gaya *et al*. 2008, Muggia *et al*. 2008, Vondrák *et al*. 2012). These species, which are generally collected less frequently and more difficult to recognize in the field, nevertheless seem to be widespread and occur mainly on acidic and calcareous rocks in many regions (Khodosovtsev *et al*. 2002); some species in this group have endolithic thallus (Tetriach & Muggia 2006, Muggia *et al.* 2008) and a few species are also corticolous (Wetmore 1994).

In the Canary Islands, we discovered a black-fruited *Caloplaca* restricted to a small willow forest in La Caldera de Taburiente National Park. It could not be assigned to any known taxon, and is therefore formally described here as a new species. Recently, Arup *et al*. (2013) published a new taxonomy of the family Teloschistaceae with 31 newly described or resurrected genera; *Pyrenodesmia* A. Massal. does not seem to be monophyletic. The authors maintain that the phylogeny around the core group of species in this group must be further studied. Also, there are still many groups and species related to the new circumscribed genus *Pyrenodesmia* to evaluate. Pending further information on molecular phylogenetic relationships around this group and the inclusion of more species, we prefer to keep its classical name and to describe this new species in the genus *Caloplaca*.

The Canaries form part of Macaronesia, one of the 25 World Biodiversity Hotspots (Myers *et al*. 2000), a phytogeographical region that includes five Atlantic volcanic archipelagoes (the Azores, the Madeiras, the Savages, the Canary Islands and the Cape Verde Islands), as well as the Macaronesian enclave on the African mainland (Báez & Sánchez-Pinto 1983; Jaén-Molina *et al.* 2009). The lichen and lichenicolous biota of the Canary Islands is very rich with more than 1600 species listed for an area of just 7447 km^2 (Hernández Padrón & Pérez-Vargas 2010). Neverthe-

Accepted by Thorsten Lumbsch: 16 Jan. 2015; published: 21 Apr. 2015

6. Thallus immersed or almost absent ..... *Pyrenodesmia alociza* (=*C. alociza*)
Thallus on surface, obvious 7

7. Apothecia immersed in thallus at maturity, epihymenium K+ violet, isthmus 3–7 µm ... *Pyrenodesmia chalybaea* (=*C. chalybaea*)
Apothecia sessile at maturity, epihymenium weakly K+ violet, isthmus 3–4 µm 8

8. Apothecia with pruinose thalloid margin; disc usually partly pruinose ..... *Pyrenodesmia variabilis* (=*C. variabilis*)
Apothecia with proper margin thin, epruinose, same color as disk, no thalloid margin; disc no pruinose ..... *Caloplaca conversa*

Acknowledgements

The authors are deeply grateful to Dr C. Wetmore for checking this species and for his many and helpful suggestions. Kate Dziubinska is gratefully acknowledged for linguistic corrections; Luis Quijada-Fumero is thanked for his help with the photographs. Partial funding for this research was provided by "Asociación de Antiguos Alumnos y Amigos de la Universidad de La Laguna".

References

Arup, U. (2006) *Caloplaca sorediella* Arup, a new sorediate species from western Britain. *Lichenologist* 38: 499–502. http://dx.doi.org/10.1017/S0024282906006165

Arup, U. & van den Boom, P.P.G. (2011) Three new dark-fruited *Caloplaca* species from Cape Verde. *Bibliotheca Lichenologica* 106: 1–6.

Arup, U., Søchting, U. & Frödén, P. (2013) A new taxonomy of the family Teloschistaceae. *Nordic Journal of Botany* 31: 16–83. http://dx.doi.org/10.1111/j.1756-1051.2013.00062.x

Báez, M. & Sánchez-Pinto, L. (1983) *Islas de Fuego y Agua*. *Canarias, Azores, Madeira, Salvajes, Cabo Verde. Macaronesia*. Edirca Press, Las Palmas de Gran Canaria, 200 pp.

Clauzade, G. & Roux, C. (1985) Likenoj de Okcidenta Eũropo. Ilustrita determinlibro. *Bulletin de la Société Botanique du Centre – Ouest*, *Nouvelle Série, Numéro Spécial* 71: 1–893. [Royan]

Crespo, A., Argüelo, A. & Lumbsch, H.T. (2006) A new species of *Lepraria* (*Lecanorales*: *Stereocaulaceae*) from the Canary Islans and the typification of *Lepraria isidiata*. *Lichenologist* 38: 213–221. http://dx.doi.org/10.1017/S0024282906005846

Del Arco Aguilar, M.J., González-González, R., Garzón-Machado, V. & Pizarro-Hernández, B. (2010) Actual and potential natural vegetation on the Canary Islands and its conservation status. *Biodiversity and Conservation* 19: 3089–3140. http://dx.doi.org/10.1007/s10531-010-9881-2

Gaya, E., Navarro-Rosinés, E., Llimona, X., Hladún, N. & Lutzoni, F. (2008) Phylogenetic reassessment of the Teloschistaceae (Lichen forming Ascomycota, *Lecanoromycetes*). *Mycological Research* 112: 528–546. http://dx.doi.org/10.1016/j.mycres.2007.11.005

Giralt, M. & van den Boom, P.P.G. (2009) *Rinodina etayoi*, a new saxicolous lichen species from the Canary Islands. *Lichenologist* 41: 141–145. http://dx.doi.org/10.1017/S0024282909007956

Hernández Padrón, C.E. & Pérez-Vargas, I. (2010) *Lichenes*, *Lichenicolous Fungi*. *In*: Arechavaleta, M., Rodríguez, S., Zurita, N. & García, A. (Coord.) *Lista de especies silvestres de Canarias. Hongos, plantas y animales terrestres. 2009*. Consejería de Medio Ambiente y Ordenación Territorial. Gobierno de Canarias, La Laguna, pp. 58–84.

Jaén-Molina, R., Caujapé-Castell, J., Reyes-Betancort, J.A., Hakhani, H., Fernández-Palacios, O., Pérez de Paz, J., Febles-Hernández, R. & Marrero-Rodríguez, A. (2009) The molecular phylogeny of *Matthiola* R. Br. (Brassicaceae) inferred from ITS sequences, with special emphasis on the Macaronesian endemics. *Molecular Phylogenetics and Evolution* 53: 972–981. http://dx.doi.org/10.1016/j.ympev.2009.08.031

Kärnefelt, I. (1989) Morphology and phylogeny in the *Teloschistales*. *Cryptogamic Botany* 1: 147–203.

Kärnefelt, I., Kondratyuk, S., Søchting, U., Frödén, P. & Arup, U. (2002) Two new species of *Caloplaca* (Teloschistaceae) from the Southern Hemisphere. *Bryologist* 105: 301–309. http://dx.doi.org/10.1639/0007-2745(2002)105[0301:TNSOCT]2.0.CO;2

Khodosovstev, A., Kondratyuk, S. & Kärnefelt, I. (2002) *Caloplaca albopustulata*, a new saxicolous lichen from Crimea Peninsula,

Ukraine. *Graphis Scripta* 13: 5–8.

Meyer, B. & Printzen C. (2000) Proposal for a standardized nomenclature and characterization of insoluble lichen pigments. *Lichenologist* 32: 571–583.
http://dx.doi.org/10.1006/lich.2000.0294

Muggia, L., Grube, M. & Tretiach, M. (2008) A combined molecular and morphological approach to species delimitation in black-fruited, endolithic *Caloplaca*: high genetic and low morphological diversity. *Mycological Research* 112: 36–49.
http://dx.doi.org/10.1016/j.mycres.2007.02.001

Myers, N., Mittermeier, R.A., Mittermeier, C.G., da Fonseca, G.A.B. & Kent, J. (2000) Biodiversity hotspots for conservation priorities. *Nature* 403: 853–858.
http://dx.doi.org/10.1038/35002501

Orange, A., James, P.W. & White, F.J. (2001) *Microchemical methods for the identification of lichens*. British Lichen Society, London, 101 pp.

Pérez-Vargas, I., Hernández Padrón, C. & Pérez de Paz, P.L. (2012) *Pertusaria etayoi* (lichenized Ascomycota: *Pertusariaceae*) a new lichen species from the Canary Islands. *Lichenologist* 44: 333–337.
http://dx.doi.org/10.1017/S0024282911000934

Pérez-Vargas, I., Etayo, J. & Hernández Padrón, C. (2013) New species of lichenicolous fungi f rom the Canary Islands. *Phytotaxa* 99 (2): 58–64.
http://dx.doi.org/10.11646/phytotaxa.99.2.2

Pérez-Vargas, I. & Pérez-Ortega, S. (2014) A new endemic *Ramalina* species from the Canary Islands (Ascomycota, Lecanorales). *Phytotaxa* 159 (4): 269–278.
http://dx.doi.org/10.11646/phytotaxa.159.4.3

Sérusiaux, E., Berger, F., Brand, M. & van den Boom, P.P.G. (2007) The lichen genus *Porina* in Macaronesia, with descriptions of two new species. *Lichenologist* 39: 15–33.
http://dx.doi.org/10.1017/S0024282907005993

Søchting, U. & Lutzoni, F. (2003) Molecular phylogenetic study at the generic boundary between the lichen-forming fungi *Caloplaca* and *Xanthoria* (*Ascomycota*, Teloschistaceae). *Mycological Research* 107: 1266–1276.
http://dx.doi.org/10.1017/S0953756203008529

Tretiach, M. & Muggia, L. (2006) *Caloplaca badioreagens*, a new calcicolous, endolithic lichen from Italy. *Lichenologist* 38: 223–229.
http://dx.doi.org/10.1017/S0024282906005305

Van den Boom, P.P.G. & Etayo, J. (1995) A new epiphytic species of the lichen genus *Caloplaca* from southwestern Europe. *Mycotaxon* 56: 125–132.

Vondrák, J., Soun, J., Vondrákova, O., Fryday, A.M., Khodosovtsev, A. & Davydov, E.A. (2012) Absence of anthraquinone pigments is paraphyletic and a phylogenetically unreliable character in the Teloschistaceae. *Lichenologist* 44: 401–418.
http://dx.doi.org/10.1017/S0024282911000843

Wetmore, C.M. (1994) The lichen genus *Caloplaca* in North and Central America with brown or black apothecia. *Mycologia* 86: 813–838.
http://dx.doi.org/10.2307/3760596

Wetmore, C.M. (2007) *Caloplaca*. *In*: Nash III, T.H., Gries, C. & Bungartz, F. (Eds.) *Lichen Flora of the Great Sonoran Desert*. *Vol 2*. Lichens Unlimited ASU, Tempe, pp. 179–220.