

# New data on nomenclature, taxonomy and distribution of some species of the lichen genus *Cladonia*

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**Abstract:** Ahti, T. & Stenroos, S. 2012. New data on nomenclature, taxonomy and distribution of some species of the lichen genus *Cladonia*. *Bot. Complut.* 36: 31-34.

The name *Cladonia diversa* Asperges ex S. Stenroos is validated, and the species is reported as new to Japan. *Cladonia angustiloba*, earlier known from Macaronesia, is reported to extend to Faeroe Is., Denmark. *Cladonia aspera* Ahti & Kashiw. is an illegitimate later homonym of *C. aspera* (Flörke) Doign. The former name is still regarded as a synonym of *C. sarmentosa*, while the latter name is a synonym of *C. gracilis* subsp. *gracilis*. The type of *C. dilleniana* is stated to be from Bahama Islands rather than Turks and Caicos Islands. The volcano lichen *C. vulcani* is recorded from Iceland as new to Europe. The author citation of *C. bacilliformis* (Nyl.) Sarnth. and type location citation of *C. glauca* Flörke are corrected.

**Key words:** *Cladonia*, lichens, Bahamas, Faeroe Is., Iceland, Japan,

**Resumen:** Ahti, T. & Stenroos, S. 2012. Nuevos datos sobre nomenclatura, taxonomía y distribución de algunas especies del género *Cladonia*. *Bot. Complut.* 36: 31-34.

Se valida el nombre *Cladonia diversa* Asperges ex S. Stenroos y se reporta nueva para Japón. *Cladonia angustiloba*, anteriormente conocida de la Macaronesia extiende su área de distribución hasta las islas Feroe, Dinamarca. *Cladonia aspera* Ahti & Kashiw. es el último homónimo ilegítimo de *C. aspera* (Flörke) Doign. El primer nombre válido es considerado un sinónimo de *C. sarmentosa*, mientras que este último es un sinónimo de *C. gracilis* subsp. *gracilis*. El tipo de *C. dilleniana* procede de las islas Bahamas en lugar de las islas Turcos y Caicos. El líquen de los volcanes *C. vulcani* se cita de Islandia y constituye nueva cita para Europa. Se corrige la autoría de *C. bacilliformis* (Nyl.) Sarnth. y la indicación locotípica de *C. glauca* Flörke.

**Palabras clave:** *Cladonia*, líquenes, Bahamas, Islas Feroe, Islandia, Japón.

## INTRODUCTION

The lichen genus *Cladonia* P. Browne is notorious for its numerous species which can be difficult to identify. Therefore there are still many unsolved and controversial taxonomic problems, even in Spanish species, which were recently monographed by Burgaz & Ahti (2009). However, all the time many new projects to study various groups of the genus with modern phylogenetic methods are ongoing, producing new data for our current taxonomic concepts.

On the other hand, *Cladonia* is also known for intricate specific and especially infraspecific nomenclature. There are thousands of published epithets and their nomenclatural combinations. Although most of the names are in-

fraspecific, there are also many problematic and overlooked specific epithets and combinations. All of these are not covered as completely as in most other genera in electronic sources, such as the *Index fungorum*. Indeed, the world monograph by Vainio (1887, 1894, 1897) is still an excellent, though not fully complete source to names published before 1894. Nevertheless, we can still find overlooked names or publications which can upset the existing nomenclature, author citations or typifications. In addition, many names have not been typified at all.

Below we present some corrections to recent taxonomic treatments, some of them being only very minor emendations, as well as a few major range extensions of some species in Europe.

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The senior author dedicates this article to Profesora Esther Fuertes Lasala, who accompanied him on a journey to collect bryophytes and lichens in the Pyrenees in 1992 and on later excursions in Finland.

Recibido: 1 febrero 2012. Aceptado: 30 marzo 2012.

***Cladonia angustiloba*** Ahti & Aptroot  
Biblioth. Lichenol. 99: 11, 2009

This lichen was reported by Ahti & Aptroot (2009) from the Azores and Madeira and was believed to be a typical Macaronesian endemic. However, it has also been collected further north, on the Faeroe Islands (Denmark), which make it a more widespread, oceanic species. It was earlier (Alstrup et al. 1994) reported as *Cladonia foliacea* (Huds.) Willd. from the Faeroes. Specimens of the records are cited below:

Denmark. Faeroe Islands: a few specimens from the islands Sandoy, Skuvóy and Suduroy (C).

***Cladonia aspera*** (Flörke) Doign.  
La Feuille des Naturalistes, n.s., 2: 102, 1947

*Capitularia gracilis* var. *aspera* Flörke, Beitr. Naturk. 2: 233, 259, 260, 333. 1810. - *Cladonia gracilis* var. *aspera* (Flörke) Flörke, De Cladon.: 40. 1828. - Type: Germany, near Berlin and Jena, H. G. Flörke (UPS, possible syntype).

The epithet *aspera* has been used by many authors to squamulose morphs of *Cladonia gracilis* subsp. *gracilis*. Such morphs have probably no taxonomic importance. The overlooked species name *Cladonia aspera* (Flörke) Doign. published in Doignon (1947) is thus a synonym of ***Cladonia gracilis*** subsp. ***gracilis***.

However, it unfortunately makes a later *C. aspera* described from Chile illegitimate: *Cladonia aspera* Ahti & Kashiw. in Inoue, Stud. Cryptog. S. Chile: 132. 1984, nom. illeg. (later homonym).

Indeed, Stenroos & Ahti (1991: 322) synonymized the latter *C. aspera* with *C. sarmentosa* (Hook. f. & Taylor) C. W. Dodge, described from Auckland Islands. Hammer (2003), however, accepted *C. aspera* Ahti & Kashiw., and applied it to Australasian material; it is also accepted in Galloway (2007). We would still like to keep it as a synonym of *C. sarmentosa*, but if Hammer's treatment is followed the taxon needs a new name.

***Cladonia bacilliformis*** (Nyl.) Sarnth.  
Oesterr. Bot. Z. 46: 264. 1896

It has been uncertain who first made this combination. Ahti (1993) suggested that it was Glück (1899), but we have now found that it has been published earlier at least Sarnthein (1896). This correction was first published by Osyczka (2011) at our suggestion.

***Cladonia dilleniana*** Flörke  
De Cladon.: 138, 1828

Type: Bahama Islands, drawing in Dillenius, Hist. Musc.: t. 16, f. 23. 1742 ('1741'), holotype (see Ahti 2000: 324); Bahama Islands, New Providence ('Providencia'), 1726 M. Catesby (OXF-Dillenius no. 100.23, epitype, here designated; BM, OXF-Sherard, isoeotypes).

In Ahti (2000: 324-326) the type was erroneously indicated to derive from the island Providenciales of Turks and Caicos Islands. In fact, Mark Catesby collected the lichen on the island New Providence, which belongs to the Bahamas, where the species has also been collected later. The species is here epitypified with specimens.

***Cladonia diversa*** Asperges ex S. Stenroos, *sp. nova*

Type: Belgium, Kempisch district, Kalmthout, Van Ganzenvan, 1974 M. Asperges 2498 (BR, holotype; BM, H, U, isotypes). MycoBank No.: MB564334.

Description: Similar to *Cladonia coccifera* (L.) Willd. but differs by producing densely microsquamulose and granulose, esorediate podetia, with narrow scyphi. Hymenial discs and jelly in conidiomata red. Contains usnic acid, porphyritic acid (inconstant), rhodocladonic acid (in hymenia and conidiomata) and zeorin (forming needle crystals on thallus surface after prolonged preservation in herbarium).

*Cladonia diversa* Asperges, De Cladonia's uit de sectie Cocciferae in België 2: 358, 1983, not effectively published (International Code of Botanical Nomenclature 2006, Art. 30.5); Dumortiera 32: 24, 1985, nom. inval. (descr. only in French).

*Cladonia pleurota* f. *tubulosa* Asahina, Lich. Japan 1: 202, 1950.

Type: Japan, Honshu, Prov. Izu (Pref. Shizuoka), Shimoda Harbour, 1933 Y. Asahina 13188 (TNS, lectotype here designated by T. Ahti).

For earlier descriptions in English, see Stenroos (1989), Burgaz & Ahti (1994), James (2009) and Osyczka (2009, 2011); in French, see Asperges (1983, 1985); in Spanish, see Burgaz & Ahti (2009); in Finnish, see Stenroos et al. (2011).

Illustrations: Stenroos 1989: figs. I-J; Wirth 1995: 323, in colour, sub *C. coccifera*, Barreno & Pérez-Ortega 2003: lám. 35, in colour; Burgaz & Ahti 2009: lám. 2J-M; Stenroos et al. 2011: 134 (colour).

The name *Cladonia diversa* Asperges has been in use for this species since 1983. Its publication in a Belgian Ph.D. Thesis (with 12 copies) was fully validly published

at that time. However, in 2005 the International Code of Botanical Nomenclature was retroactively changed so that the thesis was no more considered to have been effectively published. Although we were aware of the situation, which was also noted at least by James (2009) and Osyczka (2011), we have refrained from validating *C. diversa* until we have rechecked that it is distinguishable. Now we have become more convinced that it is an acceptable taxon, and are validating the name here. The validating description is in English, because from the beginning of 2012 no Latin description is required for new taxa according to the new International Code of Nomenclature for algae, fungi and plants (Smith *et al.* 2011).

Stenroos (1989) reported *C. diversa* in only a few countries in Europe. The senior author has collected data from numerous herbaria and publications and has by now recorded it from 21 countries in Europe and also from the Azores and Canary Islands. In addition, he has accepted a few specimens from Japan, including the type of *C. coccifera* f. *tubulosa*, cited above. This species has been recorded from China by Guo (1999), but his records need confirmation, especially because there is another, very similar, sorediate, species *C. sinensis* S. Stenroos & J.B. Chen. Recently Lendemer (2007) distributed in his exsiccata (n<sup>o</sup>. 230) under the name *C. diversa*, as new to North America, but it probably represents squamulose *C. pleurota*. However, T. Ahti has recently collected some (poorish) specimens from eastern North America, which might belong to *C. diversa*, but they also need confirmation.

### *Cladonia glauca* Flörke

De Cladon.: 140, 1828

Type: Germany, Mecklenburg-Vorpommern, Waren ('Wahren'), 1826 *H. G. Flörke 47* (H, lectotype, Ahti 1993).

The type locality Waren is located in Mecklenburg-Vorpommern, rather than Brandenburg, which has been incorrectly cited by Ahti (1993) and other authors. The error was kindly pointed out by Dr. Birgit Litterski, Greifswald.

### *Cladonia vulcani* Savicz

Izv. Imp. Bot. Sada Petra Velikago 14: 124, 1914

Type: Russia, Kamchatka Region, [Kronotskiy Park], crater of volcano Uzon (Uson), 1909 *V.P. Savicz 6413* (LE, holotype; BP(2), FH, H, UPS, US, US-Evans (+ photo), W(2), isotypes, mostly as *Lichenotheca Rossica* No. 38). - Note that Ahti (1974: 223) designated a lectotype (Savicz 6420) for *C. vulcani*, but thereafter he found that there is a definite holotype in LE, as cited in Ahti (1993).

*Cladonia theiophila* Asahina 1939, *C. pseudomacilenta* Asahina 1943, *C. polydactyla* var. *theiophila* (Asahina) Asahina 1953, *C. hitatiensis* Asahina 1953, *C. macilenta* var. *corticata* Asahina 1953 (see Stenroos & Ahti 1994).

Here reported as new to Europe: Iceland, Central Iceland (IMi), Gullbringusýsla, lava field W of Köldunámur, 200 m, on lava peaks around steam holes, 1980 *H. Kristinsson LA-02252* (AMNH); contains usnic and squamatic acids (TLC by H. Kristinsson in 1980).

This is a widespread, coastal species in East Asia, extending from Kamchatka and Kuril Is. through Korea and Japan to Taiwan and also to Papua New Guinea. It is particularly common on volcanic soil, just like in Iceland.

#### ACKNOWLEDGEMENTS

We are grateful to the curators of the herbaria AMNH (Akureyri), BM (London), C (Copenhagen), OXF (Oxford), TNS (Tokyo), and UPS (Uppsala) for making material available for study. The stay of T. Ahti in Copenhagen was supported by the exchange program SYNTHESYS (Denmark).

#### BIBLIOGRAPHY

- AHTI, T. 1974. The identity of *Cladonia theiophila* and *C. vulcani*. *Ann. Bot. Fenn.* 11: 223-224.
- AHTI, T. 1993. Names in current use in the Cladoniaceae (lichen-forming ascomycetes) in the ranks of genus to variety. *Regnum Veg.* 128: 58-106.
- AHTI, T. 2000. Cladoniaceae. *Flora Neotropica Monographs* 78: 1-363. The New York Botanical Garden, Bronx, NY.
- AHTI, T. & APTROOT, A. 2009. Two new lichen species of *Cladonia* from the Azores. *Biblioth. Lichenol.* 99: 11-17.
- ALSTRUP, V.; CHRISTENSEN, S. N.; HANSEN, E. S. & SVANE, S. 1994. The lichens of the Faeroes. *Frødskaparrit* 40: 61-121.
- ASPERGES, M. 1983. *De Cladonia's uit de sectie Cocciferae in België*. Unpubl. Ph.D. Thesis, Univ. Antwerpen, Wilrijk.
- ASPERGES, M. 1985. *Cladonia diversa* Asperges en Europe occidentale. *Dumortiera* 32: 24-31.
- BARRENO, E. & PÉREZ-ORTEGA, S. 2003. *Líquenes de la Reserva Natural Integral de Muniellos, Asturias*. KRK Ediciones, Oviedo.
- BURGAZ, A. R. & AHTI, T. 1994. Contribution to the study of the genera *Cladina* and *Cladonia* in Spain. II. *Nova Hedwigia* 59: 399-440.

- BURGAZ, A. R. & AHTI, T. 2009. Cladoniaceae. *Flora Lichenológica Ibérica* 4. Sociedad Española de Lichenología, Madrid.
- DOIGNON, P. 1947. Lichens hétérogènes inédits du Massif de Fontainebleau. *Feuille des Naturalistes* 2: 102-103.
- GALLOWAY, D. J. 2007. *Flora of New Zealand. Lichens*. Revised ed. 1, 2. Manaaki Whenua Press, Lincoln.
- GLÜCK, H. 1899. Entwurf zu einer vergleichenden Morphologie der Flechtenspermogonien. *Verhandl. Naturhist.-Medizin. Vereins Heidelbergs*, N. F. 6: 81-216.
- GUO, S. Y. 1999. Fungal flora of tropical Guanxi: the lichen family Cladoniaceae. *Mycotaxon* 72: 339-347.
- HAMMER, S. 2003. Notes on *Cladonia* in New Zealand. *Bryologist* 106: 410-430.
- JAMES, P. W. 2009. *Cladonia* P. Browne (1756). In C. W. Smith et al. (eds), *The lichens of Great Britain and Ireland*: 309-338. British Lichen Society, London.
- LENDEMER, J. 2007. Lichens of Eastern North America Exsiccati. Fasc. V, nos. 201-250. *Opusc. Philolich.* 4: 69-80.
- OSY CZKA, P. 2009. *Cladonia diversa* – overlooked lichen in Poland. *Acta Soc. Bot. Polon.* 78: 215-219.
- OSY CZKA, P. 2011. The genus *Cladonia*, group *Cocciferae*, in Poland. *Herzogia* 24: 231-249.
- SARNTHEIN, L. G. 1896. Flora von Oesterreich-Ungarn. Tirol und Vorarlberg (Schluss). *Oesterr. Bot. Z.* 46: 259-265.
- SMITH, G. F., FIGUEIREDO, E. & MOORE, G. 2011. English and latin as alternative languages for validating the names of organisms covered by the International Code of Nomenclature for algae, fungi, and plants: The final chapter? *Taxon* 60: 1502-1503.
- STENROOS, S. 1989. Taxonomy of the *Cladonia coccifera* group. 1. *Ann. Bot. Fenn.* 26: 157-168.
- STENROOS, S. & AHTI, T. 1991 ('1990'). The lichen family Cladoniaceae in Tierra del Fuego: problematic or otherwise noteworthy taxa. *Ann. Bot. Fenn.* 27: 317-327.
- STENROOS, S. & AHTI, T. 1994. A synopsis of the Japanese taxa of *Cladonia* section *Cocciferae*. *J. Hattori Bot. Lab.* 75: 305-318.
- STENROOS, S., AHTI, T., LOHTANDER, K. & MYLLYS, L. (eds) 2011. Suomen jäkäläopas. *Norrinia* 21: 1-534.
- VAINIO, E. A. 1887. Monographia Cladoniarum universalis. 1. *Acta Soc. Fauna Fl. Fenn.* 4: 1-509.
- VAINIO, E. A. 1894. Monographia Cladoniarum universalis. II. *Acta Soc. Fauna Fl. Fenn.* 10: 1-498.
- VAINIO, E. A. 1897. Monographia Cladoniarum universalis. III. *Acta Soc. Fauna Fl. Fenn.* 14(1): 1-268.
- WIRTH, V. 1995. *Die Flechten Baden-Württembergs*. 1. Ed. 2. Ulmer, Stuttgart.