

"DENDRISCOCAULON"

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"*Dendriscoaulon*" Nyl., *Flora* 68: 299 (1885); from the Greek *dendrisco* (tree-like) and the Latin *caulis* (a stem), referring to the branching tree-like thallus.

Type: *D. unhausense* (Auersw.) Degel.

Thallus fruticose, dendroid, sometimes \pm dorsiventral with rudimentary cyphellae on lower surface, rather delicate to robust, arising from a \pm terete rooted holdfast 1–5 (–10) cm tall. Branches terete to flattened, complex-entangled, \pm coralloid at apices, subdichotomously branching below from 1–4 prominent primary stems. Surface glabrous to \pm uniformly pubescent or tomentose; pubescence slight, short to thick and woolly, pale buff or yellow-brown; coralloid branchlets at apices grey, grey-brown or brown-black often suffused reddish, sometimes prominently maculate ($\times 10$ lens). Medulla white, K–. Photobiont *Nostoc* or *Scytonema*, radially arranged below upper cortex in primary branches, \pm homoiomerous towards apices of secondary coralloid branchlets. Apothecia unknown.

A widespread genus of humid, deeply shaded habitats in temperate regions. It often occurs among mosses, and is easily overlooked. Species are corticolous, often among mats of bryophytes and other lichens, and also occur on spray-drenched rocks near waterfalls. One free-living species is known from Australia, although other species probably occur, especially in northern rainforests.

The type of "*Dendriscoaulon*" is now widely accepted as being the cyanobacterial state of the lichen *Lobaria amplissima*. This has given rise to taxonomic difficulties in the treatment of Southern Hemisphere free-living cyanobacterial states of lichen-forming fungi in the Lobariaceae currently assigned to "*Dendriscoaulon*" (see Armaleo & Clerc, 1991; Jørgensen, 1991, 1996, 1997, 1998; Laundon, 1995; Heidmarsson *et al.*, 1997) where green algal and cyanobacterial associations of the same fungus may show dramatically different morphologies, the green algal state being a species of *Sticta*. Since the free-living cyanobacterial states appear to be physiological adaptations of certain lichen-forming fungi (*Lobaria*, *Nephroma*, *Peltigera*, *Pseudocyphellaria* or *Sticta*) to low light and high humidity, it is not possible (under the rules of the ICBN) to give separate names to the cyanobacterial states when they are known to form photosymbiodemes with a named green-algal lichen. Laundon (1995) proposed that cyanobacterial states be treated as forma of the green species, a position opposed by Jørgensen (1997, 1998) and Heidmarsson *et al.* (1997). Although it is assumed that free-living cyanobacterial states (currently referred to "*Dendriscoaulon*") are facultatively associated with a green-algal species, this is commonly not the case in the field. Until molecular studies, currently in progress, on generic relationships in the Lobariaceae are further advanced, the view of Jørgensen (1998: 355) is followed here, i.e. informal names are given to the cyanobacterial states, but confer no nomenclatural status, the informal names being cited within quotation marks, e.g. "*Dendriscoaulon dendriothamnodes*". This seems a reasonable interim solution to this problem of "*Dendriscoaulon*" states.

Caulescent, green-algal species of *Sticta* often produce "*Dendriscoaulon*"-like outgrowths from both upper and lower surfaces; these are regarded as external cephalodia. Species of *Sticta* having such cephalodia include *S. pedunculata*, *S. sayeri* and *S. stipitata* in Australia, *S. caperata* in the Palaeotropics, and *S. filix* and *S. latifrons* in New Zealand.

F.R.M. Wilson, Notes on a remarkable lichen growth in connection with a new species of *Sticta*: with descriptions of both, *Proc. Roy. Soc. Queensland* 7: 8–11 (1891); R. Dughi, Sur les relations, la position systématique et l'extension du genre *Dendriscoaulon*, *Annl. Fac. Sci. Marseille* 16: 147–157 (1944); P.W. James & A. Henssen, The morphological and taxonomic significance of cephalodia, in D.H. Brown, D.L. Hawksworth & R.H. Bailey (eds) *Lichenology: Progress and Problems* 27–77 (1976); D.J. Galloway, *Fl. New Zealand Lichens* 152–154 (1985); D. Armaleo & P. Clerc, Lichen chimeras: DNA analysis suggests that one fungus forms two morphotypes, *Experimental Mycol.* 15: 1–10 (1991); P.M. Jørgensen, Difficulties in lichen nomenclature, *Mycotaxon* 40: 497–501 (1991); J.R. Laundon, On the classification of lichen photomorphs, *Taxon* 44: 387–389 (1995); P.M. Jørgensen, On the nomenclature of lichen phototypes, *Taxon* 45: 663–664 (1996); S. Heidmarsson, J.-E. Mattsson, R. Moberg, A. Nordin, R. Santesson & L. Tibell, Classification of lichen photomorphs, *Taxon* 46: 519–520 (1997); P.M. Jørgensen, Lichen phototypes, nature's unmanageable misprints? *Taxon* 46: 721–722 (1997); P.M. Jørgensen, What shall we do with the blue-green counterparts? *Lichenologist* 30: 351–356 (1998); G. Kantvilas & S.J. Jarman, *Lichens of Rainforest in Tasmania & SE Australia* 64–65 (1999).

"***Dendriscoaulon dendriothamnodes***" Dughi ex D.J. Galloway, *New Zealand J. Bot.* 21: 192 (1983)

T: Belmore Falls, N.S.W., 1 Sept. 1907, *E. Cheel*; lecto: BM, *vide* D.J. Galloway, *loc. cit.*

Illustration: G. Kantvilas & S.J. Jarman, *Lichens of Rainforest in Tasmania & SE Australia* 65 (1999).

Thallus erect or spreading or pendulous-decumbent, tangled, 1–3 cm tall. Branches terete to \pm flattened, sometimes with weakly developed cyphella-like structures below, thick at base, finer and \pm coralloid to phyllidiate at apices. Surface pale buff-greyish below, leaden grey to livid brownish or red-brown or

blackened above, smooth, matt or glossy or pubescent, ±woolly-buff-tomentose at base and on thicker primary stems.

Chemistry: No substances detected.

Occurs in Qld, N.S.W., Vic. and Tas.; grows in humid rainforest habitats, among bryophytes on tree trunks and on boulders. Also in New Zealand. Map 40.

Qld: *s. loc.*, *J.Shirley* (G 002063) [with type of *Sticta shirleyana* (*q.v.*)]. Vic.: Mt Macedon, *F.R.M.Wilson* (BM, G002326) [with lectotype of *Sticta stipitata* (*q.v.*)]; Fern Tree Gully, *E.Cheel* (MEL). Tas.: c. 2 km SW of Stormont, *G.Kantvilas* 300/99 (HO); track to Wylds Craig, *G.Kantvilas* 291/98 (HO).

In Tasmania, "*D. dendriothamnodes*" occurs both free-living and in association with *Sticta stipitata*. A morphologically similar state is known in New Zealand, associated with *S. latifrons*, as well as being widespread as a free-living entity apparently not associating with a green-algal species.