F. Schumm (2026):

Images of Lichens
Vezda Lichenes Selecti Exsiccati part 14

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With this volume, I continue the documentation of Vezda's works on exiccata, now with Lichenes Selecti as part 14. I have chosen the genus names that Vezda used, even though others are now more common. However, I also include the currently used names in the synonym list and the index. In addition, I have again made every effort to add species descriptions to the detailed information on the labels from the literature.

For the descriptions of europaean species I used mainly the excellent descriptions that are provided in Prof. Nimis ITALIC 8 under the URL:
https://italic.units.it/

and the Australian Lichenslist under the Url:
https://www.anbg.gov.au/abrs/lichenlist/lichenchecklist_e_o.html

F. Schumm, 2026

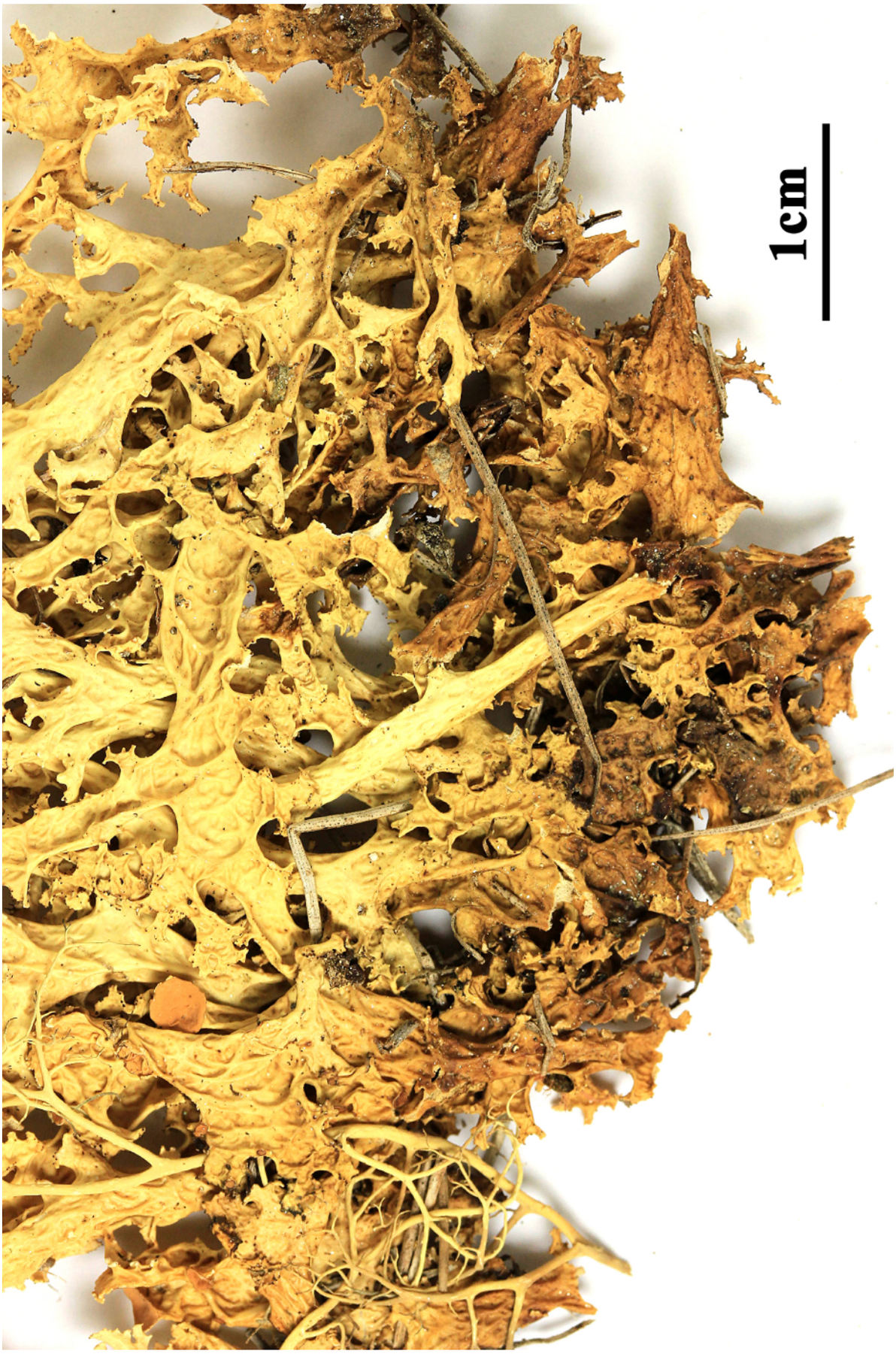
Cetraria nivalis (L.) Ach., Methodus, Sectio post. (Stockholmiæ): 294 (1803)
= *Foveolaria nivalis* (L.) Chesnokov, Prokopiev, Konoreva & Davydov , in Chesnokov, Davydov, Konoreva, Prokopiev, Poryadina, Zheludeva & Shavarda, Pl. Syst. Evol. 309(no. 24): 15 (2023)
= *Allocetraria nivalis* (L.) Randlane & Saag, Mycotaxon 44(2): 492 (1992)
= *Cetraria nivalis* (L.) Ach., Methodus, Sectio post. (Stockholmiæ): 294 (1803) f. nivalis
= *Cetraria nivalis* (L.) Ach., Methodus, Sectio post. (Stockholmiæ): 294 (1803) var. nivalis
= *Flavocetraria nivalis* (L.) Kärnefelt & A. Thell, in Kärnefelt, Thell, Randlane & Saag, Acta bot. fenn. 150: 84 (1994)
= *Flavocetraria nivalis* (L.) Kärnefelt & A. Thell, in Kärnefelt, Thell, Randlane & Saag, Acta bot. fenn. 150: 84 (1994) subsp. nivalis
= *Lichen nivalis* L., Sp. pl. 2: 1145 (1753)
= *Lobaria nivalis* (L.) Hoffm., Deutschl. Fl., Zweiter Theil (Erlangen): 143 (1796) [1795]
= *Nephromopsis nivalis* (L.) Divakar, A. Crespo & Lumbsch, in Divakar, Crespo, Kraichak, Leavitt, Singh, Schmitt & Lumbsch, Fungal Diversity 84: 113 (2017)
= *Parmelia nivalis* (L.) Spreng., Syst. veg., Edn 16 4(1): 281 (1827)
= *Platisma nivale* (L.) Frege, Deutsch. Botan. Taschenb. 2: 161 (1812)
= *Platysma nivale* (L.) Frege, Deutsch. Botan. Taschenb. 2: 161 (1812)

[VZ1213], Suecia. Sör-Tröndelag. Röros, Olavsgruva, 800 m. Ad terram in saxosis prope metalla cupri vetusta. Leg. R. Santesson (no. 24533), 3.8.1973. EX A. VĚZDA LICHENES SELECTI EXSICCATI NR. 1213.

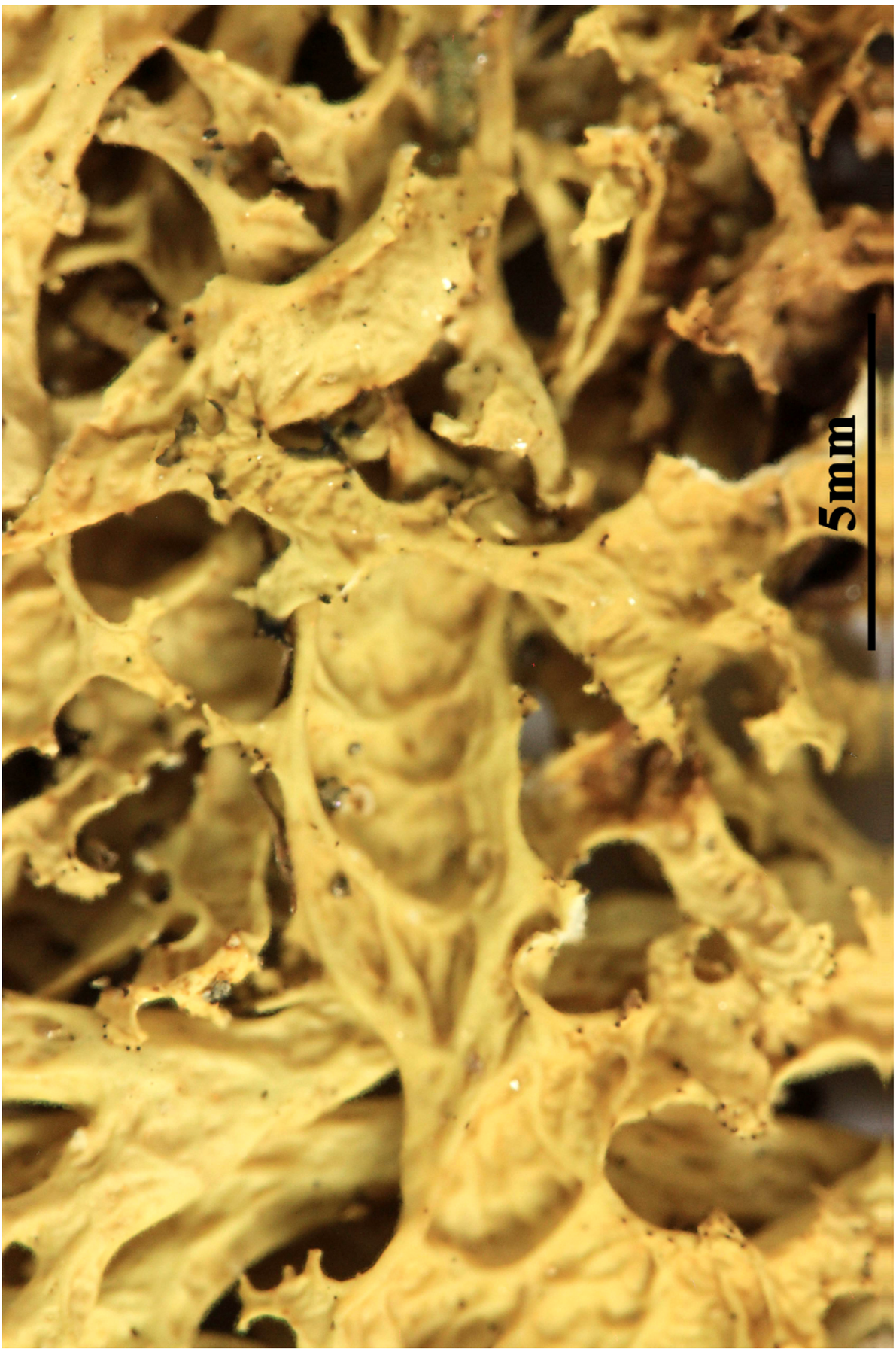
Thallus fruticose, once or twice dichotomously branched, cream-coloured, yellowish brown at the necrotic base, loosely attached, sometimes forming compact mats. Lobes 6-10 mm wide and 2-4(-8) cm tall (usually smaller in Italian material), foveolate and reticulately ridged, erect to ascending; underside corticate, with narrow, mostly marginal, whitish pseudocyphellae. Cortex thin, paraplectenchymatous in upper part; medulla white, rather lax. Apothecia extremely rare, zeorine, submarginal at lobe-ends, up to 8 mm across, with a brown disc. Epithecium brownish; hymenium and hypothecium colourless. Asci 8-spored, narrowly clavate, with a small axial body and a distinct, K/I+ blue ring-structure in the rather large tholus, approaching the Lecanora-type. Ascospores 1-celled, hyaline, subglobose to broadly ellipsoid, 5-10 x 3-6 µm. Pycnidia black, marginal, slightly projecting. Conidia dumbbell-shaped (thickened at both ends), c. 6 x 1 µm. Photobiont

chlorococcoid. Spot tests: cortex K-, C-, KC+ yellowish, P-; medulla K-, C-, KC-, P-. Chemistry: cortex with usnic acid; brownish parts at the base with anthraquinones. - Note: a circumpolar, arctic-alpine lichen, a typical element of tundra-like vegetation in open, dry habitats above treeline; common throughout the Alps.

Cetraria nivalis



Cetraria nivalis



Cetraria nivalis

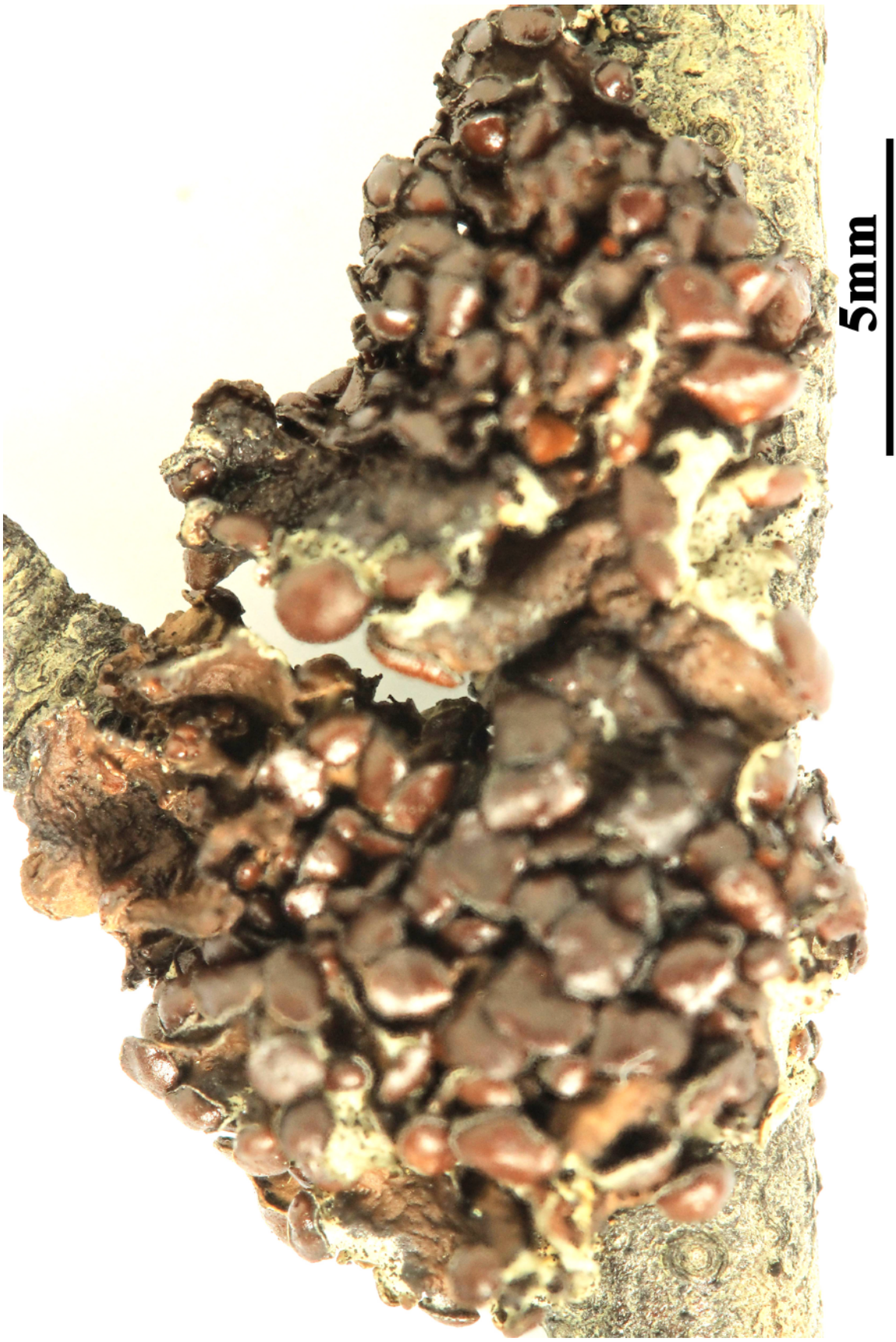
Cetraria sepincola (Ehrh.) Ach. [as 'saepincola'], Methodus, Sectio post. (Stockholmiæ): 297 (1803)
= *Cetraria chlorophylla var. ulophylla* (Ach.) Maas Geest., Blumea 6: 180 (1948)
= *Cetraria sepincola var. ulophylla* Ach., Methodus, Sectio post. (Stockholmiæ): 297 (1803)
= *Cetraria ulophylla* (Ach.) Rebent., Prodr. fl. neomarch. (Berolini): 313 (1804)
= *Lichen sepincola* Ehrh. [as 'saepincola'], Hannov. Magazin: 205 (1783)
= *Lichen sepincola * ulophylla* (Ach.) Lam., Encycl. Méth., Bot. Suppl. (Paris) 3(2): 418 (1813)
= *Lichen sepincola var. ulophyllum* (Ach.) Wahlenb., Fl. lapp.: 433 (1812)
= *Lichen sepincola var. ulophyllus* (Ach.) Wahlenb., Fl. lapp.: 433 (1812)
= *Lobaria sepincola* (Ehrh.) Hoffm. [as 'saepincola'], Deutschl. Fl., Zweiter Theil (Erlangen): 145 (1796) [1795]
= *Parmelia olivacea f. polycarpa* Flot., Flora, Regensburg 11(40): 630 (1828)
= *Parmelia sepincola* (Ehrh.) Sommerf., Suppl. Fl. lapp. (Oslo): 114 (1826)
= *Parmelia sepincola var. ulophylla* (Ach.) Sommerf., Suppl. Fl. lapp. (Oslo): 114 (1826)
= *Physcia sepincola* (Ehrh.) DC., in Lamarck & de Candolle, Fl. franç., Edn 3 (Paris) 2: 401 (1805)
= *Physcia sepincola var. ulophylla* (Ach.) Duby, Bot. Gall., Edn 2 (Paris) 2: 613 (1830)
= *Platisma sepincola* (Ehrh.) Hoffm., Descr. pl. cl. crypt. 1.2(fasc. 3, 4): 71 (1790)
= *Platysma sepincola* (Ehrh.) Hoffm. [as 'saepincolum'], Descr. Adumb. Plant. Lich. 1(3): 71 (1790)
= *Platysma sepincola var. ulophyllum* (Ach.) Nyl., Act. Soc. linn. Bordeaux 21(4): 296 (1857) [1856]
= *Platysma ulophyllum* (Ach.) Nyl., Lich. Scand. (Helsinki): 82 (1861)
= *Tuckermannopsis sepincola* (Ehrh.) Hale, in Egan, Bryologist 90(2): 164 (1987)

[VZ1214], Suecia. Härjedalen. Storsjö Paroecia, Ruändan prope lacum Messlingen, 850 m. In ramulis *Betulae pubescentis*. Leg. R. Santesson (no. 24492a), 26.7.1073. Ex A. VěZDA Lichenes Selecti Exsiccati Nr. 1214.

Thallus foliose to subfruticose, almost monophyllous, often more thalli appearing together in colonies of small lobes radiating from the substrate, forming 1-2 cm wide, cushion-like tufts. Lobes olivaceous to dark

brown, rather glossy, flattened, rounded at apex, up to 10 mm long (usually less), 2-3 mm broad, smooth to wrinkled; lower surface whitish or pale brown, with scattered, simple or sparingly branched rhizines. Upper and lower cortex prosoplectenchymatous, with a non-pored epicortex, the cell walls containing Cetraria-type lichenan; medulla white, rather loose. Apothecia very numerous and often obscuring the lobes, lecanorine, submarginal to terminal, up to 3.5(-4) mm across, with a reddish brown, glossy disc and a thin, smooth to crenulate margin often bearing scattered pseudocyphellae. Epithecium brown; hymenium and hypothecium colourless; paraphyses coherent. Asci 8-spored, narrowly clavate, with a small axial body and a distinct, K/I+ blue ring-structure in the rather large tholus, approaching the Lecanora-type. Ascospores 1-celled, hyaline, ellipsoid, 6-10 x (3.5-)5-7(-10) µm. Pycnidia black, mostly marginal, slightly projecting. Conidia dumb-bell-shaped (enlarged at both ends), 5-7 x c. 1 µm. Photobiont chlorococcoid. Spot tests: cortex and medulla K-, C-, KC-, P-, UV-. Chemistry: medulla with lichesterinic and protolichesterinic acid. - Note: a subarctic-subalpine, circumpolar species found near treeline on small twigs of shrubs and trees, especially *Betula*, *Alnus alnobetula*, *Rhododendron ferrugineum*, mostly near the ground and in areas with siliceous substrata; confined to the Alps in Italy and very rare in dry areas.

Cetraria sepincola



Cetraria sepincola



Cetraria sepincola

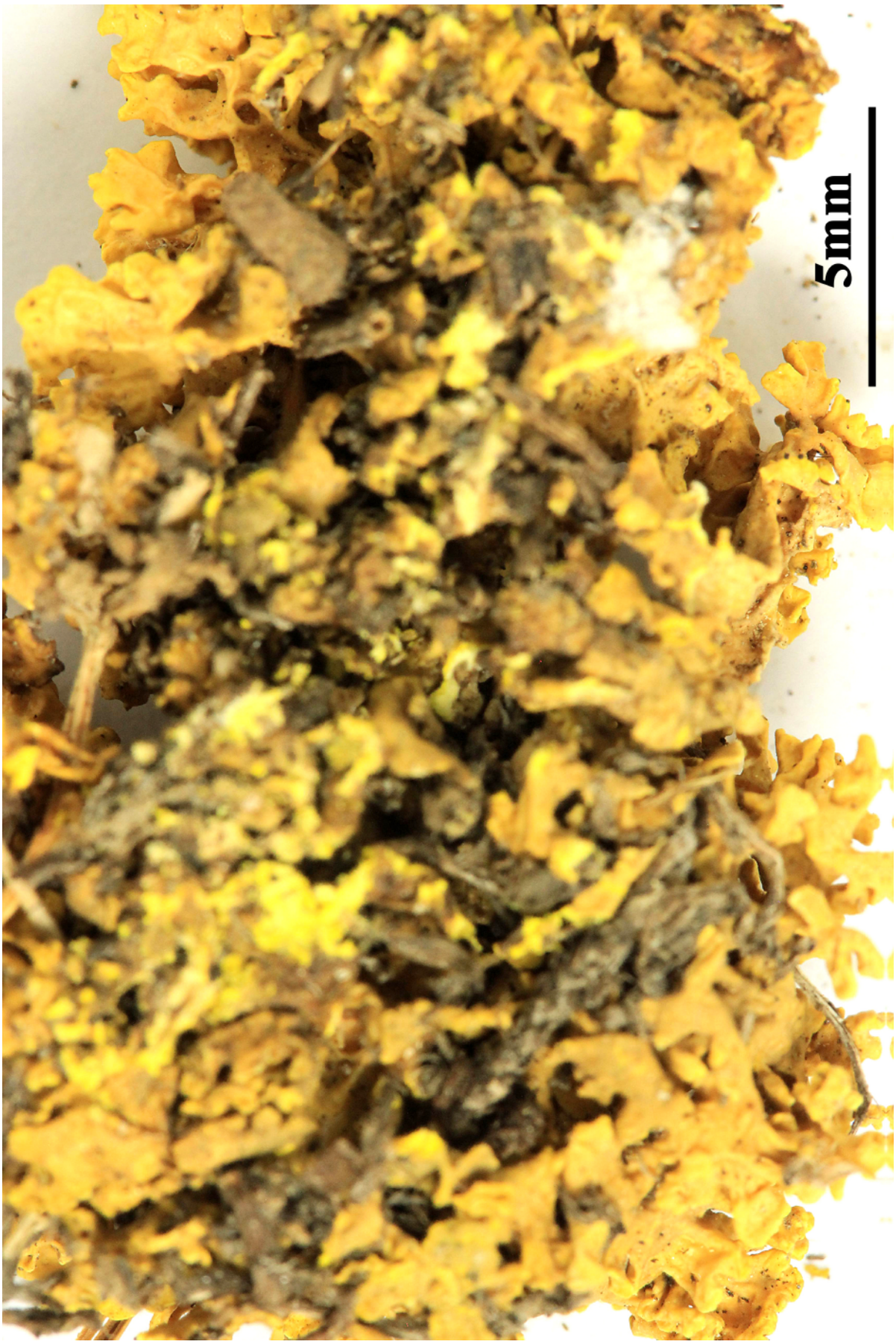
Cetraria tilesii Ach., Syn. meth. lich. (Lund): 228 (1814)
= *Vulpicida tilesii* (Ach.) J.-E. Mattsson & M.J. Lai, Mycotaxon 46: 428 (1993)
= *Cetraria juniperina var. tilesii* (Ach.) Th. Fr., Nova Acta R. Soc. Scient. upsal., Ser. 3 3: 138 (1861) [1860]
= *Cetraria nivalis var. tilesii* (Ach.) Boistel, Nouv. Fl. Lich. (Paris) 2: 48 (1903)
= *Platysma juniperinum var. tilesii* (Ach.) H. Olivier, Mém. Soc. natn. Sci. nat. Cherbourg 36: 172 (1907)
= *Platysma tilesii* (Ach.) Nyl., Bull. Soc. linn. Normandie, sér. 4 1: 257 (1887)

[VZ1808}, Hispania. Pyrenaei montes, prov. Girona: Nuria, Bosque de la Verge, 2100 m. Ad terram in saxis schistosis pro parte calcareis. Leg. X. Llimona et A. Vězda, 27.5.1983. Ex A. Vězda Lichenes Selecti Exsiccati Nr. 1908.

Thallus erect, foliose, brittle, golden yellow, on calcareous soils; branching irregular with narrow lobes to 3-4 mm broad, tips somewhat dentate; upper side smooth to slightly sul-cate; underside smooth, of same color as above; medulla yellow, lacking rhizinae. Cortex very irregular in thickness, varying from 8-37 µ in section even in same thallus, prosoplectenchymatous but with a few paraplectenchymatous groups of cells here and there; medulla yellow, very loose, of irregular shaped hyphae with much pigmentary material over them and with much crystaline mineral inclusions between, about 75 µ thick, the hyphae to about 7 µ. Apothecia not seen. Growing on calcareous soils and between calcareous gravels, this is a circumpolar arctic-alpine species originally described from Kamtchatka. In North America it has been collected south to the Gaspe Peninsula in the east and to New Mexico in the west (Egan 1971). It has apparently not yet been collected in Greenland. The exceedingly loose medulla and the thinness of the cortex in spots probably contribute to the brittleness of this species, a characteristic quite unlike the toughness of *C. juniperina* with which it has often been associated. Arctic reports of *C. juniperina* usually refer to this species.



Cetraria tilesii



Cetraria tilesii

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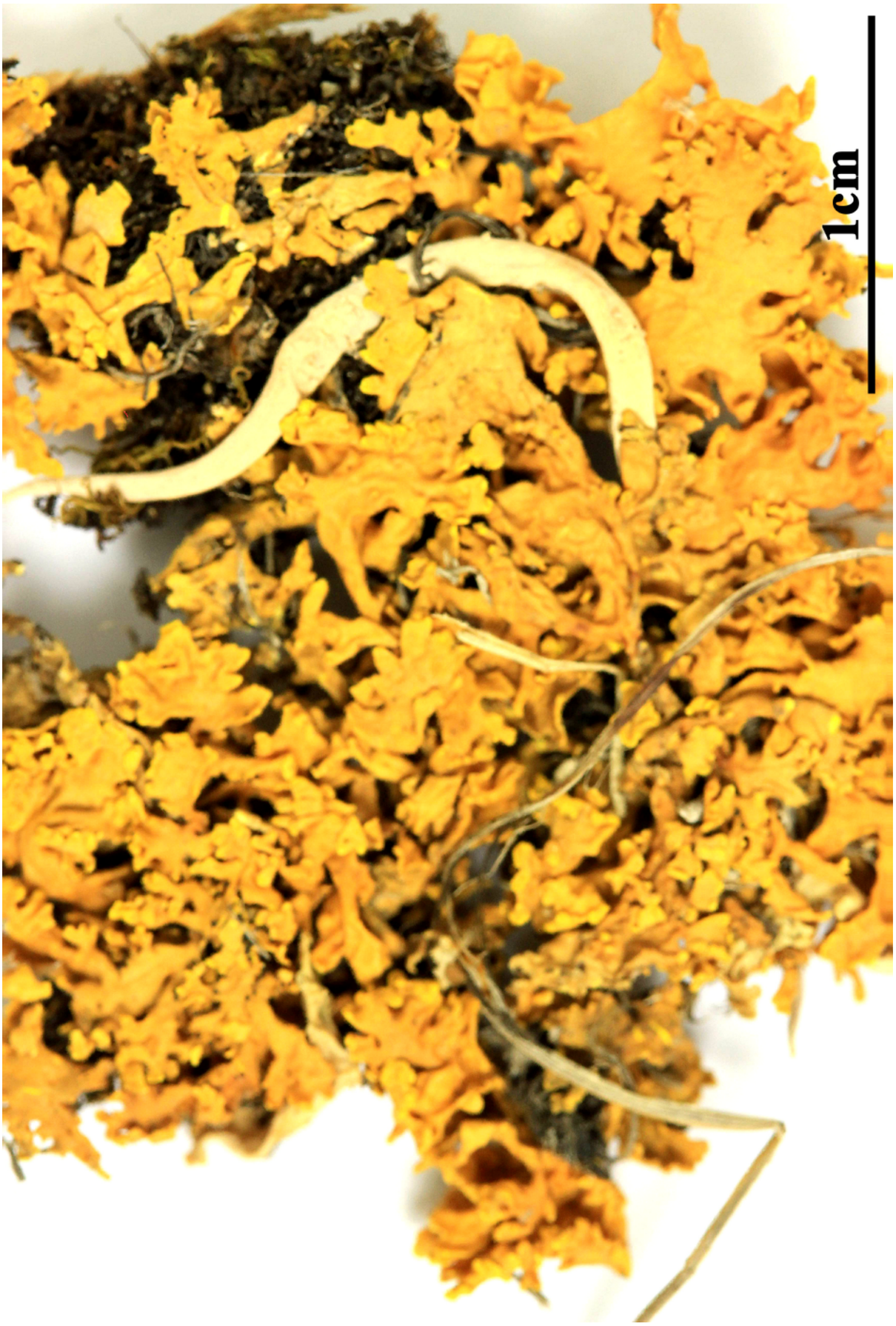
= *Vulpicida tilesii* (Ach.) J.-E. Mattsson & M.J. Lai, Mycotaxon 46: 428 (1993)
= *Cetraria juniperina var. tilesii* (Ach.) Th. Fr., Nova Acta R. Soc. Scient. upsal., Ser. 3 3: 138 (1861) [1860]
= *Cetraria nivalis var. tilesii* (Ach.) Boistel, Nouv. Fl. Lich. (Paris) 2: 48 (1903)
= *Platysma juniperinum var. tilesii* (Ach.) H. Olivier, Mém. Soc. natn. Sci. nat. Cherbourg 36: 172 (1907)
= *Platysma tilesii* (Ach.) Nyl., Bull. Soc. linn. Normandie, sér. 4 1: 257 (1887)

[VZ1947], Gallia. Hautes Alpes, in valle "La Romanche", La Grave, loco dicto "Plan de Paris", 2450 m. Ad terram in regione alpina. Leg E. Sérusiaux (no. 4129), 8.1982. EX A. VěZDA LICHENES SELECTI EXSICCATI NR. 1947.

Thallus erect, foliose, brittle, golden yellow, on calcareous soils; branching irregular with narrow lobes to 3-4 mm broad, tips somewhat dentate; upper side smooth to slightly sul-cate; underside smooth, of same color as above; medulla yellow, lacking rhizinae. Cortex very irregular in thickness, varying from 8-37 µ in section even in same thallus, prosoplectenchymatous but with a few paraplectenchymatous groups of cells here and there; medulla yellow, very loose, of irregular shaped hyphae with much pigmentary material over them and with much crystaline mineral inclusions between, about 75 µ thick, the hyphae to about 7 µ. Apothecia not seen. Growing on calcareous soils and between calcareous gravels, this is a circumpolar arctic-alpine species originally described from Kamtchatka. In North America it has been collected south to the Gaspe Peninsula in the east and to New Mexico in the west (Egan 1971). It has apparently not yet been collected in Greenland. The exceedingly loose medulla and the thinness of the cortex in spots probably contribute to the brittleness of this species, a characteristic quite unlike the toughness of *C. juniperina* with which it has often been associated. Arctic reports of *C. juniperina* usually refer to this species.



Cetraria tilesii



Cetraria tilesii

Cetrariastrum cirrhatum (Fr.) W.L. Culb. & C.F. Culb., Bryologist 84(3): 283 (1981)
= *Hypotrachyna cirrhata* (Fr.) Divakar, A. Crespo, Sipman, Elix & Lumbsch, in Divakar, Crespo, Núñez-Zapata, Flakus, Sipman, Elix & Lumbsch, Phytotaxa 132(1): 31 (2013)
= *Evernia cirrhata* (Fr.) M. Choisy, Bull. Soc. bot. Fr. 104: 334 (1957)
= *Parmelia camtschadalis* var. *cirrhata* (Fr.) Zahlbr. [as 'kamtschadalis'], Annln K. K. naturh. Hofmus. Wien 19: 43 (1904)
= *Parmelia cirrhata* Fr., Syst. orb. veg. (Lundae): 283 (1825)
= *Parmelia cirrhata* f. *gracilis* Zahlbr., Cat. Lich. Univers. 6: 60 (1929)
= *Pseudevernia cirrhata* (Fr.) R. Schub. & Klem., Nova Hedwigia 11: 59 (1966)

[VZ2246], Aequatoria. Carchi: in vegetatione montana dicta páramo ad septentriones versus a La Libertad, 4000 m. Ad terram secus viam. Leg. W. L. Culberson (no. 20198(et C. F. Culberson, 19.8.1987.- Annot: Atranorin, salazinic acid, galbinic acid (trace), consalazinic acid and protolichesterinic acid by TLC - A. Johnson et F. C. Culberson. Ex A. VěZDA Lichenes Selecti Exsiccati Nr. 2246.

Thalli to 12 (exceptionally to 25) cm long, the lobes 0.5-2(-4) mm broad, dichotomously or subdichotomously divided, strongly to moderately involute or flat or nearly so; upper surface pale, the marginal rhizines abundant, to 3-4 mm long, simple or (more commonly) branched; lower surface black or brown or pale-colored at the tips of the lobes, but with a few short, usually simple, black rhizines in some. Apothecia relatively uncommon, 4-6 mm in diameter; spores 8-10 x 16-21 µm, ellipsoid or slightly reniform. Pycnidia common, 0.1-0.2 mm in diameter; conidia 1 x 5-7(-8) µm, straight rods. Cortex K+ yellow; medulla K+ yellow turning red, C-, P+ yellow turning orange. Mountains (900-3600 m) of Mexico, Central and South America; Japan, Taiwan, southern China, Nepal, India, Sri Lanka, Thailand and Reunion. On trees and shrubs, rarely on rock or soil. *Cetrariastrum cirrhatum* is one of the most widely distributed and locally often the most abundant species of the genus. Some very sparsely isidiate specimens of a corre- sponding secondary species, *C. vexans*, may be mistaken for *C. cirrhatum* in the extensive regions of their sympatry. The lower surface of *C. cirrhatum* is typically naked in contrast to the rhizinate ones of *C. nepalense* and *C. pseudonepalense*, but occasional specimens of *C. cirrhatum* have a few short, usually simple, black

rhizines on the lower surface, especially near the tips of the lobes. The existence of such slightly rhizinate specimens of *C. cirrhatum* might be thought to blur the distinction between the Cirrhatum and Nepalense Groups, but if a large series of specimens of species of both assemblages is examined, it will be seen that it does not. Atypical, sparsely rhizinate thalli of *C. nepalense* and of *C. pseudonepalense* are only the ends of continua of morphs of which the other ends are the densely rhizinate morphs typical of both species. On the other hand, morphs of C. cirrhatum with rhizines on the lower surface never have more than a very few such rhizines. In the Old World there are no unequivocal chemical markers to assist in troublesome identifications, but after careful examination all but the most fragmentary material can be assigned to species by morphology: the lobes of *C. cirrhatum* are usually strongly involute and brown or pale below at the tips whereas those of *C. nepalense* are usually subinvolute to flat and black or dark-colored to the tips below. In the New World, where *C. nepalense* does not occur, *C. cirrhatum* can be invariably distinguished from sparsely rhizinate specimens of *C. pseudonepalense* by the production in the latter of at least a trace of norstictic acid in addition to the constituents shared by both species. In Mexico *C. cirrhatum* is essentially replaced by the common sibling species *C. neocirrhatum* that differs primarily by the production of norstictic acid. Although large numbers of specimens of both species were tested by TLC, galbinic acid (trace amounts of which are common in *C. cirrhatum*) and norstictic acid (always produced in large amounts in *C. neocirrhatum*) were found together in only one collection (Culberson 17816) from the state of Durango. This material, containing trace amounts of both substances and being somewhat morphologically atypical, is tentatively referred to *C. cirrhatum*. As such, it would represent the northernmost known limit of that species in the New World. The northern limit based upon an unequivocal identification is in Chiapas, 1500 km to the southeast.

Cetrariastrum cirrhatum



Cetrariastrum cirrhatum



Cetrariastrum cirrhatum

Cetrariastrum andense Kärnefelt ex Sipman, Proc. K. Ned. Akad. Wet., Ser. C, Biol. Med. Sci. 83(4): 338 (1980)

= *Hypotrachyna kaernefeltii* Divakar, A. Crespo, Sipman, Elix & Lumbsch, in Divakar, Crespo, Núñez-Zapata, Flakus, Sipman, Elix & Lumbsch, Phytotaxa 132(1): 2013.

[VZ2078], Venezuela. Estado Merida, Páramo de Los Granates, regio montes ignivomi Chimborazo, 3450 m. in ramulis *Hyperici laricifolii*. Leg. M. López-Figueiras (no. 31880) et D. Griffio III, 21.11.1985. Ex A. Vězda Lichenes Selecti Exsiccati Nr. 2078.

Ex: Bryologist Vol 84: 297 (1981): - Thallus orbicular, to 3 cm in diam., the lobes to 2 mm broad, short, undivided or subdichotomously branched, flat; upper surface pale, the marginal rhizines abundant, to 7 mm long. simply or more commonly dichotomously divided once at the middle, occasionally with slight additional dichotomous branching near the tips; lower surface black to brown, strongly ridged, with scattered rhizines. Apothecia numerous, to 3 mm in diam., spores 4-5 x 4-6 µm and spherical to subglobose or 5-6 x 8-12(-13) µm and ellipsoid. Conida 0.5 x 5 µm. Cortex K+ yellow; medulla K-, C-, KC-, P-.



Cetrariastrum andense



Cetrariastrum andense

Cetrariastrum sorocheilum (Vain.) W.L. Culb. & C.F. Culb., Bryologist 84(3): 292 (1981)

= *Hypotrachyna sorocheila* (Vain.) Divakar, A. Crespo, Sipman, Elix & Lumbsch, in Divakar, Crespo, Núñez-Zapata, Flakus, Sipman, Elix & Lumbsch, Phytotaxa 132(1): 32 (2013)

= *Everniastrum sorocheilum* (Vain.) Hale ex Sipman, Mycotaxon 26: 242 (1986)

= *Parmelia kamerunensis* J. Steiner, Verh. Kaiserl.-Königl. zool.-bot. Ges. Wien 53: 232 (1903)

= *Parmelia sorocheila* Vain., Hedwigia 38(Beibl.): (123) (1899)

= *Pseudevernia kamerunensis* (J. Steiner) C.W. Dodge, Ann. Mo. bot. Gdn 46: 182 (1959)

[VZ2247], Aequatoria. Cotopaxi: In reservato Parque National de Cotomi, in latero septentrionali et occidentali montis ignivomi Cotopaxi, 4035 m. Ad ramulos *Pini radiatae* in aprico. Leg- W. L. Culberson (nr. 20342) et C. F. Culberson, 22.8.1987. - Annot: Atranorin, salazinic acid, consalazinic acid (trace), protolichesterinic acid by TLC.- A. Johnson et F. C. Culberson. Ex A. VěZDA Lichenes Selecti Exsiccati Nr. 2247.

Thalli to 7 (exceptionally to 9) cm long, the lobes 0.5-2.5(-4) mm broad, subdichotomously divided, flat to involute; upper surface pale, sometimes inconspicuously white stippled, sometimes blackened in part, sorediate at the tips or along the subterminal edges of the lobes or (in specimens from southeastern Asia) over the surface of the distal 1 cm of the lobes, the marginal rhizines few, 0.5-1(-2) mm long, simple or sparingly branched; lower surface black or pale- or brown-colored at the tips of the lobes, smooth or obscurely wrinkled transversely, particularly on the older lobes. Apothecia very rare, to 1 mm in diameter (in the single specimen with immature apothecia seen); spores not seen. Pycnidia infrequent, to 0.15 mm in diameter; conidia 1 x 4-6 µm, straight rods. Cortex K+ yellow; medulla K+ yellow turning red, C-, P+ orange. Mountains (1350-4300 m) of Mexico, Guatemala, northern South America and Chile, New Zealand, Philippines, Java, Madagascar, Kenya and Tanzania. On trees and shrubs; primarily angiosperms, secondarily gymnosperms. *Cetrariastrum sorocheilum* is the most variable species in the genus. Although it is normally sorediate only at the tips or along the subterminal margins of the lobes, enough narrow- and elongate-lobed specimens with abundant erumpent laminal soredia

over the distal centimeter of the lobe-tips were seen from Java and the Philippines to attest to the presence there of morphologically (but not chemically) distinct populations. A few somewhat similar specimens from South America were also seen. Some specimens from the high mountains of Kenya and Tanzania may have few soredia and closely resemble *C. cirrhatum*, but an excellent series of well-developed African collections (ups) shows that all these materials doubtless belong to *C. sorocheilum*. *Cetrariastrum sorocheilum* could be mistaken for *C. catawbiense*, which is different chemically in lacking f,-orcinol depsidones and geographically in having its main range in the Southern Appalachian Mountains where *C. sorocheilum* is unknown. The relatively rare South American *C. columbiense* has very different, diffuse soredia scattered all over the upper surface of the thallus. A few sorediose forms, particularly from Venezuela, of the normally isidiate *C. vexans* might also be mistaken for *C. sorocheilum*, but such individuals invariably have at least some normal isidia in addition to the sorediose ones and these asexual structures are broadly scattered over the thallus, not confined to apical or marginal soralia as in typical New World specimens of *C. sorocheilum*. Although the Cirrhatum Group is in part characterized by its general lack of rhizines on the lower surface, several species of the complex occasionally produce a few of these. *Cetrariastrum sorocheilum* shows the greatest tendency in this regard. The fact that some superficially similar-looking, poorly-known, salazinic acid-producing species of Parmelia sens. str. also may produce few rhizines has led to misidentifications. Some specimens that appear to be P. brevirhiza Kurok., for example, have been mistaken for C. sorocheilum. Most of the species of Parmelia that could be confused with *C. sorocheilum* are from the southern hemisphere-for example, a morphologically somewhat anomalous specimen from South Island, New Zealand (Du Rietz 1821b-us), that also lacked protolichesterinic acid, a constant constituent of *C. sorocheilum*. Such materials are rare in herbaria, and their eventual study should include careful comparisons, including examinations of the epicortices, with C. sorocheilum. The major element of taxonomic confusion in C. sorocheilum in Middle America came from the presence of the common, relatively narrow-lobed, salazinic acid-producing Parmotrema paramoreliense described in the Appendix. It might be thought that C. sorocheilum is a simple secondary species derived from C. cirrhatum, but the more variable

Cetrariastrum sorocheilum

vegetative morphology and the occasional proclivity to form some rhizines on the lower surface make us think that the origin of this species must have been elsewhere in spite of the chemical similarities of this species to C. cirrhatum. The specimens referred here to *C. sorocheilum* are variable enough and the members of the convergent *Parmelia brevirhiza* complex are poorly known.

Cetrariastrum sorocheilum



Cetrariastrum sorocheilum



Cetrariastrum sorocheilum

Cetrelia olivetorum (Nyl.) W.L. Culb. & C.F. Culb., Contr. U.S. natnl. Herb. 34(7): 515 (1968)
= *Imbricaria olivetorum* (Nyl.) Arnold, Flora, Regensburg 53: 211 (1870)
= *Imbricaria perforata* var. *olivetorum* Hepp, Flecht. Europ.: no. 580 (1860)
= *Imbricaria perlata* var. *olivetorum* (Bausch) Jatta, Acta Horti Petropolit. 16: 530 (1900)
= *Imbricaria perlata* var. *olivetorum* Bausch, Verh. naturw. Verein. Karlsruhe 4: 31 (1869)
= *Parmelia cetrarioides var. rubescens* (Th. Fr.) Du Rietz, Nytt Mag. Natur. 62: 73 (1924)
= *Parmelia olivaria* (Ach.) Th. Fr., Lich. Scand. (Upsaliae)(1): 112 (1871)
= *Parmelia olivaria* var. *olivetorum* (Ach.) Gyeln., Feddes Repert. Spec. Nov. Regni veg. 36: 302 (1934)
= *Parmelia olivetorum* Nyl., Not. Sällsk. Fauna et Fl. Fenn. Förh., Ny Ser. 8: 180 (1866)
= *Parmelia perlata* var. *olivaria* Ach., Methodus, Sectio post. (Stockholmiæ): 217 (1803)
= *Parmelia perlata* var. *olivetorum* Ach., Lich. Univ.: 458 (1810)
= *Parmelia perlata* ß *rubescens* Th. Fr., Lich. Scand. (Upsaliae)(1): 112 (1871)
= *Parmotrema cetrarioides* subsp. *rubescens* (Th. Fr.) M. Choisy, Bull. mens. Soc. linn. Soc. Bot. Lyon 21: 175 (1952)
= *Rimelia olivaria* (Ach.) Hale & A. Fletcher, Bryologist 93(1): 28 (1990)

[VZ1411], URSS. Caucasus Magnus. Osetija Sept.. distr. Ordžonikidze: in valle rivi Fiagdon, supra vicum Zivgis, 1700 m. Ad corticem *Juniperi* sp.. Leg. E. Jelínková et A. Vězda, 31.5.1976. EX A. VĚZDA LICHENES SELECTI EXSICCATI NR. 1411.

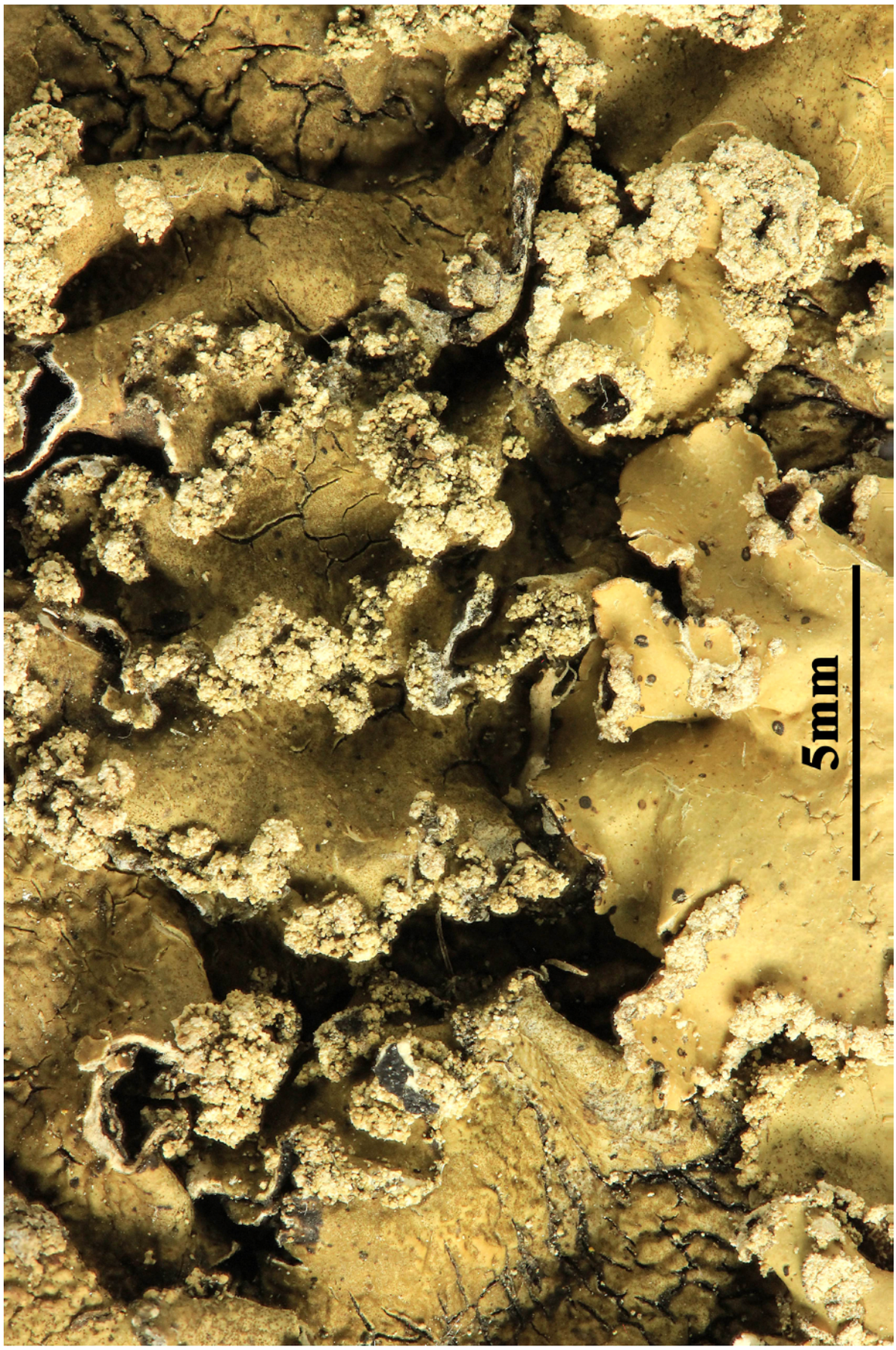
Thallus foliose, heteromerous, dorsiventral, broad-lobed, loosely attached, forming wide-spreading, usually orbicular 6-20(-40) cm wide rosettes. Lobes broad and rotund, (0.5-)1-1.5(-2) cm wide, with raised, wavy margins, greenish grey (sometimes tinged brown), with punctiform pseudocyphellae on upper surface, which are rather small and usually not raised, often concentrated in the submarginal parts of lobes; pseudocyphellae on the lower surface not developed, or appearing as very small white dots. Soralia primarily marginal, elongated, usually smooth, with fine to rather coarse soredia. Lower surface black, rather regularly ridged, with scattered, simple, black rhizines and a brown, rhizine-free zone along the margin. Upper and lower cortices prosoplectenchymatous, the upper one with a non-pored epicortex, of densely

agglutinated hyphae with tiny lumina; medulla white, with isolichenan, I-. Apothecia very rare, lecanorine. Asci 8-spored, Lecanora-type. Ascospores 1-celled, hyaline, ellipsoid, 12-15 x 7-10 µm. Pycnidia unknown. Photobiont chlorococcoid. Spot tests: cortex K+ (weakly) yellow, C-, KC-, P-; medulla and soralia K+ yellow, C+ strongly blood-red, KC+ reddish, P-, UV-. Chemistry: cortex with atranorin and chloroatranorin (in lower amounts than in soralia); soralia (and medulla) with atranorin, olivetoric acid, anziaic acid, and 4-O-demethylmicrophyllinic acid, sometimes with a fatty acid. - Note: a species with the olivetoric acid syndrome, found on bark of broad-leaved trees and on epiphytic, more rarely silicicolous mosses in humid, old forests, locally still locally abundant in montane *Abies*-*Fagus* forests, especially in the Eastern Alps.

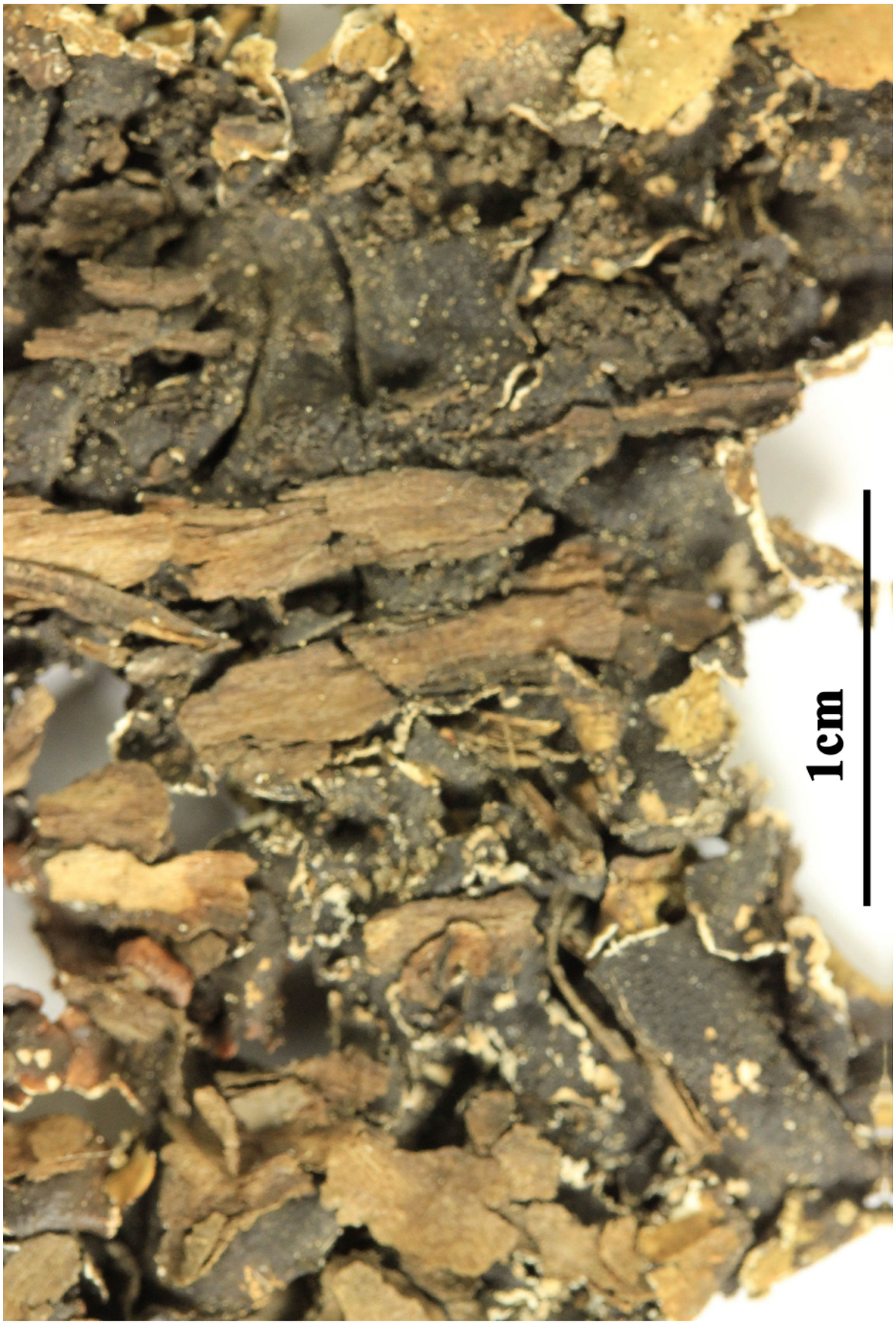
Cetrelia olivetorum



Cetrelia olivetorum



Cetrelia olivetorum

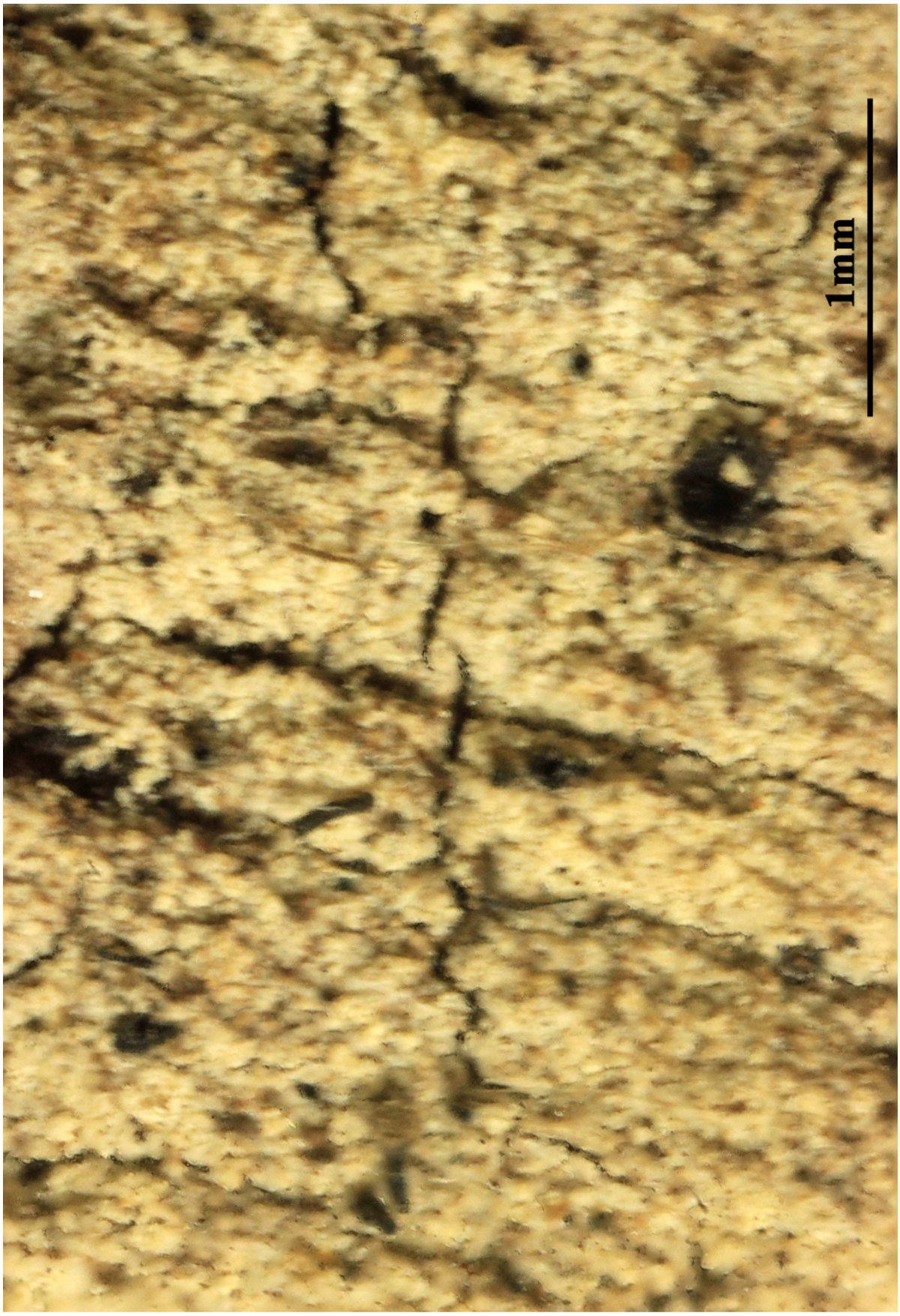


Cetrelia olivetorum

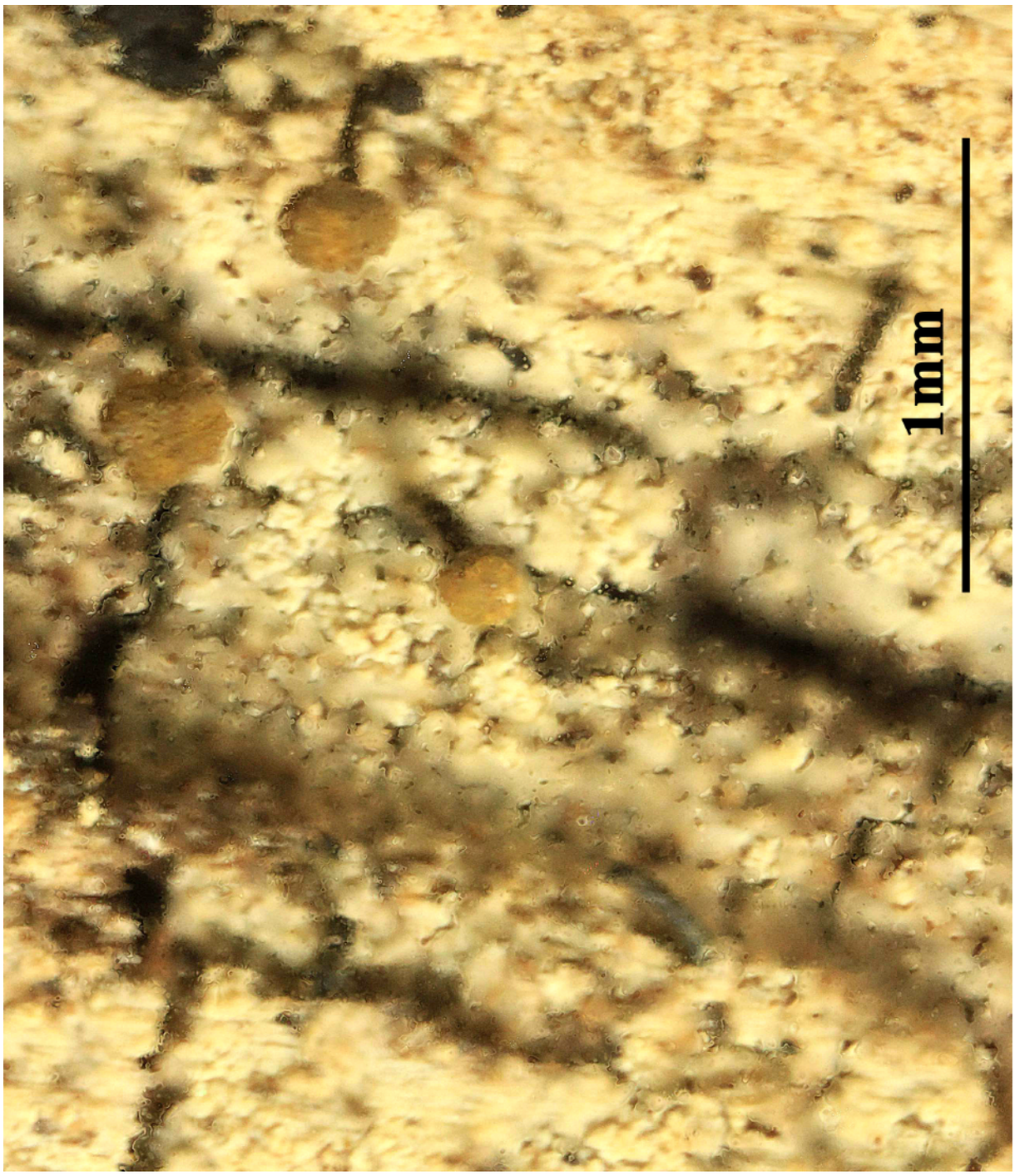
Chaenotheca benearnensis Vězda & Vivant, in Vězda, Lichenes Selecti Exsiccati, Fasc. (Průhonice) 45: no. 1104 (1972)

[VZ1104], Gallia. Montes Pyrenaei occidentales. Béarn, Orthez: Saint-Boës, 100 m. Lignicola ad truncum vetustum in Querceto pedunculatae. Leg. J. Vivant, 28.3.1972. Ex A. Vězda Lichenes Selecti Exsiccati Nr. 1104. - det from L. Tibell 1975 as: *Chaenotheca brunneola* (Ach,) Müll, Arg.

Description from Vězda: Lich. Sel. Exsicc. NR, 1104. Thallus granuloso-leprosus, cinereo-virescens, K+ fulvus, P- aurantiacus. Algae pleurococcacea, cellulis 14-25 µm crassis. Apothecia capitulis globosis subtus fusco-pruinosis stipitibusque nigris nudis circiter 0.8 mm altis. Mazaedium flavescenti-fuscum. Sporae globosae. diam. 3-4.5 µm, pallide fuscae. Species raesertim thallo granuloso-leproso, P+ aurantiaco, capitulis subtus fusco-pruinosis sporisque pallide fuscis praeditis.



Chaenotheca benearnensis

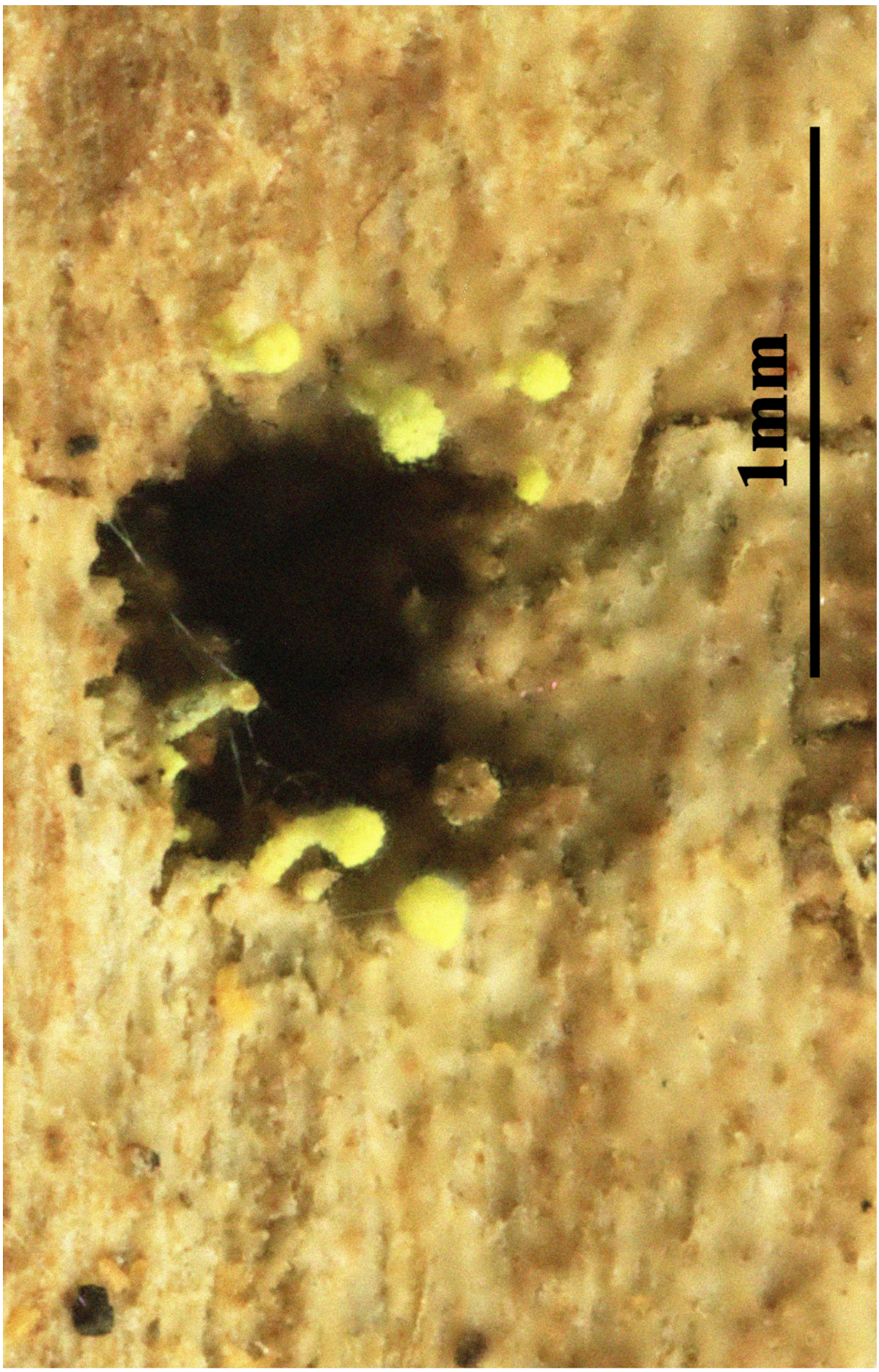


Chaenotheca benearnensis

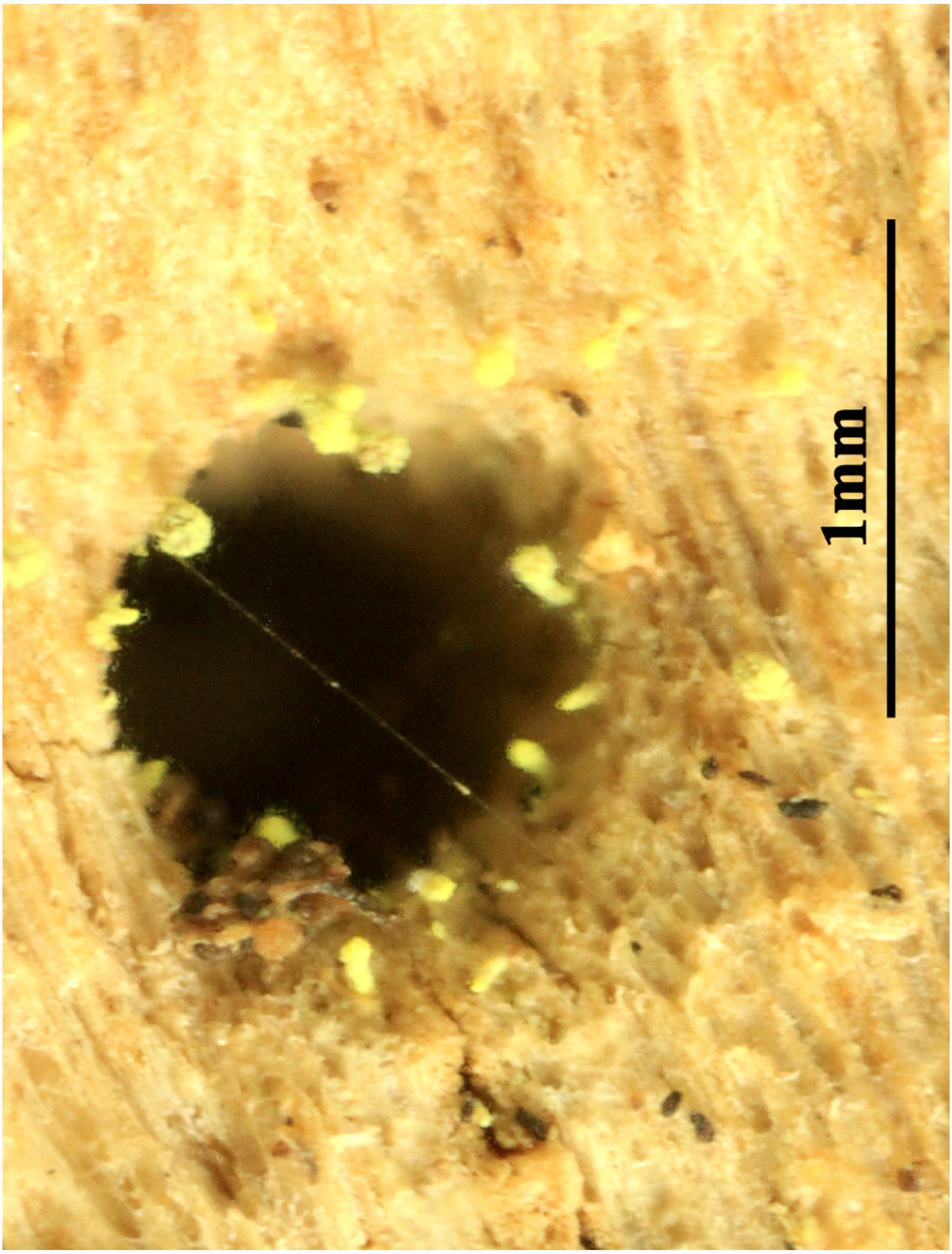
Chaenotheca brachypoda (Ach.) Tibell, Symb. bot. upsal. 27(no. 1): 71 (1987)
= *Calicium furfuraceum* var. *sulphurellum* Link [as 'sulphurella'], Grundr. Krauterk. 3: 223 (1833)
= *Coniocybe brachypoda* Ach., K. Vetensk-Acad. Nya Handl. 4: 287 (1816)
= *Coniocybe furfuracea* subsp. *brachypoda* (Ach.) Arnold, Flora, Regensburg 68(4): 59 (1885)
= *Coniocybe sulphurea* (Retz.) Nyl. ex Cromb., Grevillea 15(no. 73): 14 (1886)
= *Lichen sulphureus* Retz., K. svenska Vetensk-Akad. Handl., ser. 1 30: 249 (1769)

[VZ2472], Italia. Calabria. Cosenza: Fiumarella di Rossale, 1250 m. Ad lignum *Fagi sylvaticae*. Leg. D. Puntillo, 6.5.1990. Ex A. VěZDA LICHENES SELECTI EXSICCATI NR. 2472.

Thallus crustose, endosubstratic and poorly visible. Apothecia stalked, pin-like, the stalk slender, 0.4-1.4 mm high, 0.04-0.08 mm thick, densely yellowish green-pruinose except sometimes in the black lowermost part, the inner part of periclinally arranged, medium brown hyphae, the outer part of dark brown, sclerotized hyphae. Capitulum spherical, 0.1-0.2 mm across, yellowish-green-pruinose, with a poorly developed excipulum of periclinally arranged hyphae, continuous with the stalk tissue and often reduced to a small basal collar. Mazaedium well-developed, dark to medium brown, but usually greenish-pruinose at least in young stages; hypothecium dark brown, with a convex upper surface. Asci cylindrical or irregular, formed in chains, dissolving early. Ascospores 1-celled, medium brown, globose to cuboid, 3-4.5 µm wide, the wall with a very minute ornamentation of tiny ridges and conspicuous, larger irregular cracks. Photobiont chlorococcoid, with rectangular cells (Stichococcus). Spot tests: thallus K-, C-, KC-, P-. Chemistry: thallus and pruina of the apothecia with pulvinic and vulpinic acids. - Note: on decorticated stumps of deciduous and coniferous trees, more rarely on bark and siliceous rocks in old humid forests, on faces slightly protected from rain. Reported from both the Alps and the Apennines, but rare.



Chaenotheca brachypoda

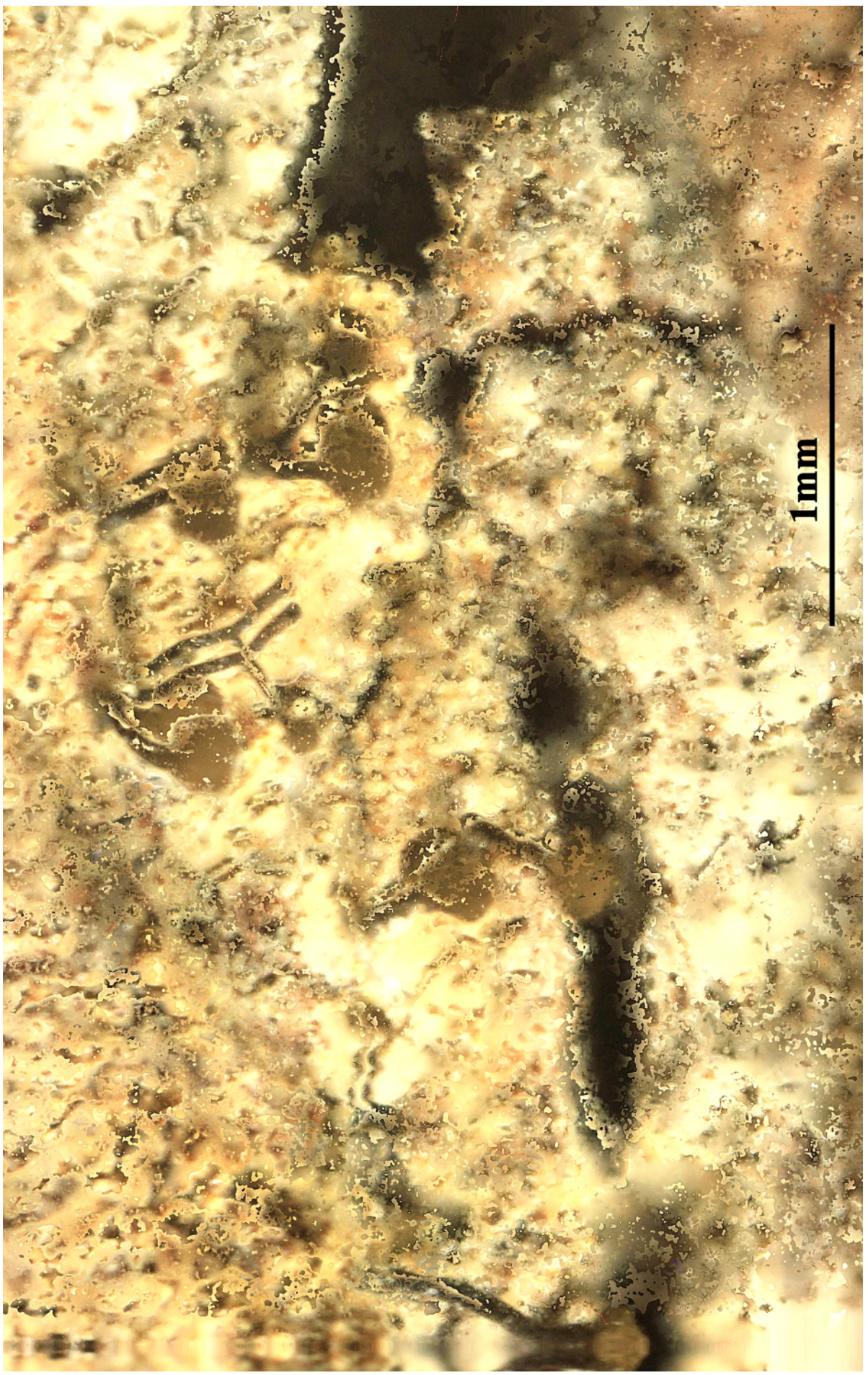


Chaenotheca brachypoda

Chaenotheca brunneola (Ach.) Müll. Arg., Mém. Soc. Phys. Hist. nat. Genève 16(2): 360 (1862)
= *Allodium brunneolum* (Ach.) Kieff., Lich. Envir. Paris 19: 10 (1895)
= *Calicium brunneolum* Ach., K. Vetensk-Acad. Nya Handl. 4: 279 (1816)
= *Calicium melanophaeum* var. *brunneolum* (Ach.) Schaer., Lich. helv. spicil. 4-5: 236 (1833)
= *Calicium trichiale* var. *brunneolum* (Ach.) Nyl., Act. Soc. linn. Bordeaux 21(4): 276 (1857) [1856]
= *Coniocybe brunneola* (Ach.) Samp., Brotéria, sér. bot. 20(3): 153 (1922)
= *Cyphelium brunneolum* (Ach.) De Not., G. bot. ital. 2(1.1): 318 (1846)
= *Cyphelium trichiale* var. *brunneolum* (Ach.) Mudd, Man. Brit. Lich.: 260 (1861)
= *Embolus brunneolus* (Ach.) Wallr., Fl. crypt. Germ. (Norimbergae) 1: 565 (1831)
= *Phacotium brunneolum* (Ach.) Trevis., Flora, Regensburg 45(1): 6 (1862)

[VZ2153], Tansania. Regio Tanga. Usambara Occidentalis, reservatum Marvera Forest dictum, 6 km ad septentriones et orientem ab Amani, 1100-1180. Ad truncum putridum arboris. Leg. E. Farkas st T. Pócs, 12.12.1985, det. L. Tibell. Ex A. Vězda Lichenes Selecti Exsiccati Nr. 2153.

Thallus crustose, endosubstratic or rarely thinly episubstratic and then finely granular, ecorticate. Apothecia stalked, pin-like, epruinose, shining black. Stalk slender, 0.5-1.5 mm high, 0.05-0.1 mm thick, sometimes branched and bearing 2-5 capitula, of periclinally arranged, medium brown hyphae. Capitulum globose, with a poorly developed excipulum continuous with the stalk tissue, epruinose but lower side sometimes appearing pruinose from short projecting hyphae. Mazaedium well-developed, brown; hypothecium medium brown, broadly obconical, with a strongly convex upper surface. Asci cylindrical, ellipsoid or irregular, formed in chains, dissolving early, with 1- or 2-seriately arranged ascospores. Ascospores 1-celled, brown to pale brown, globose, 3.5-4.5 µm wide, the wall smooth or with irregular fissures. Photobiont chlorococcoid (Dictyochloropsis, the cells > 10 µm diam). Spot tests: thallus K-, C-, KC-, P- or P+ yellowish red, UV+ white. Chemistry: thallus with baeomycesic and squamatic acids. - Note: on relatively soft-decomposed lignum of old coniferous stumps in humid woodlands, more rarely on wood of deciduous trees or even of *Quercus ilex*, very rarely corticolous.

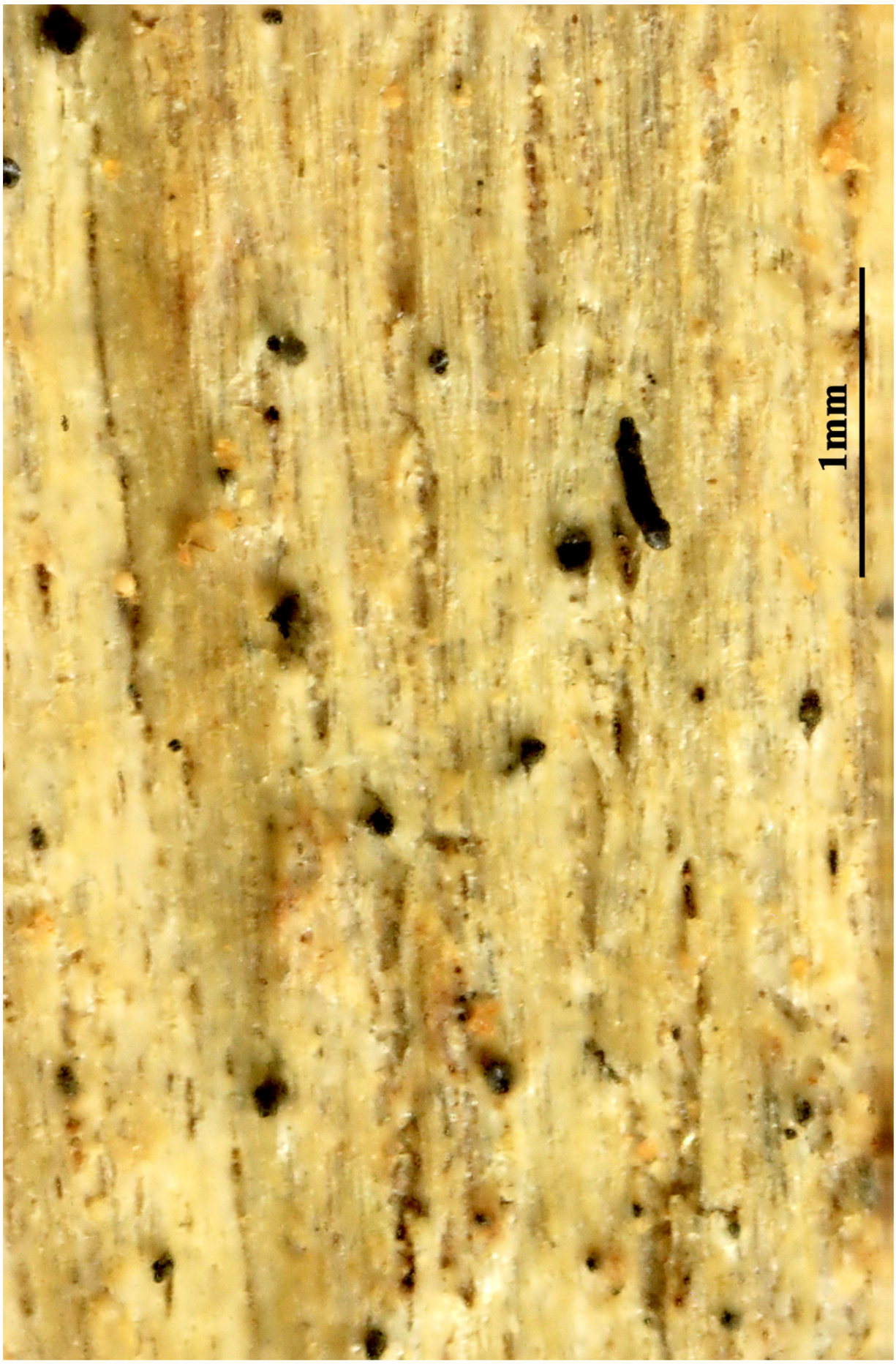


Chaenotheca brunneola

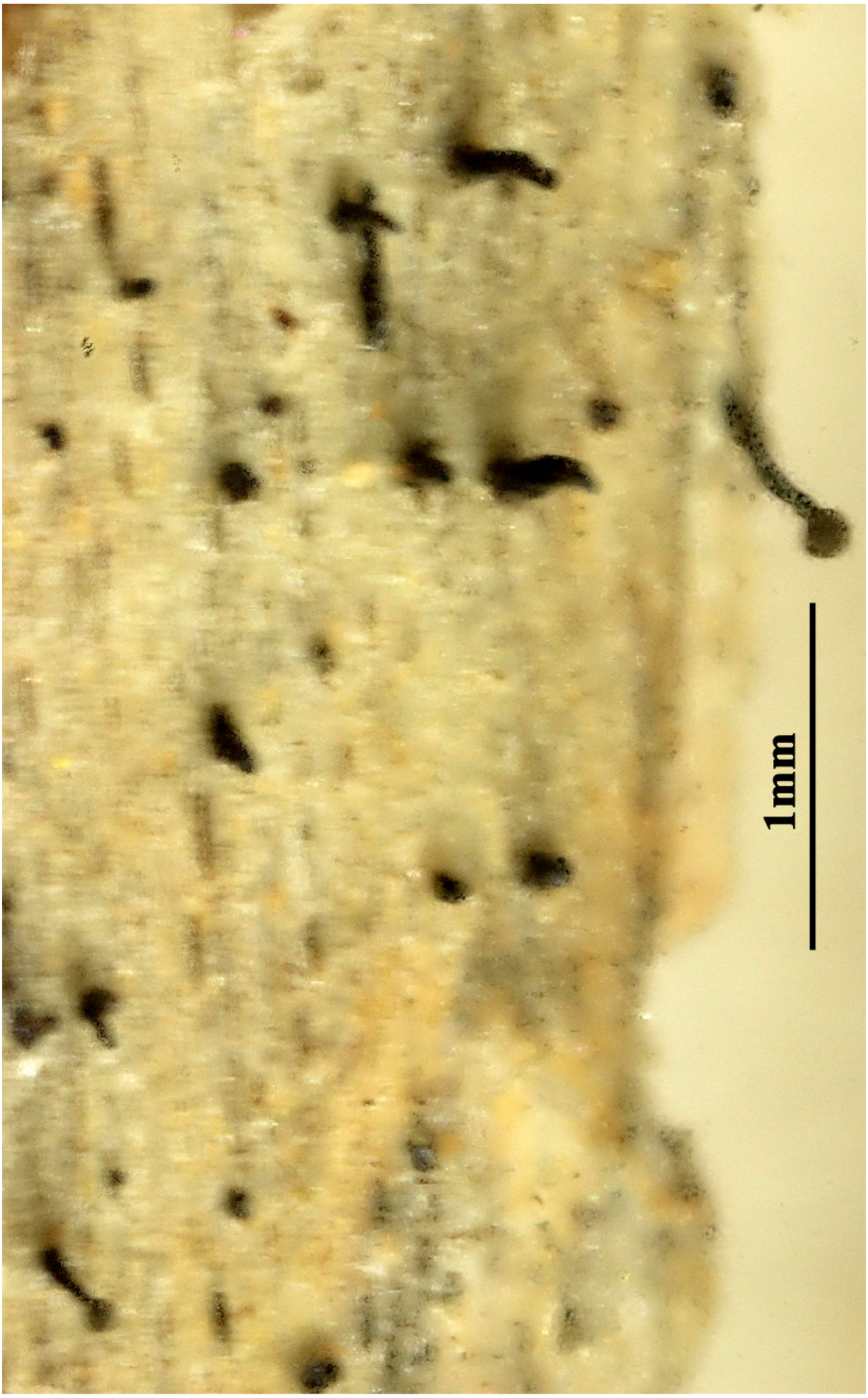
Chaenotheca brunneola (Ach.) Müll. Arg., Mém. Soc. Phys. Hist. nat. Genève 16(2): 360 (1862)
= *Allodium brunneolum* (Ach.) Kieff., Lich. Envir. Paris 19: 10 (1895)
= *Calicium brunneolum* Ach., K. Vetensk-Acad. Nya Handl. 4: 279 (1816)
= *Calicium melanophaeum* var. *brunneolum* (Ach.) Schaer., Lich. helv. spicil. 4-5: 236 (1833)
= *Calicium trichiale* var. *brunneolum* (Ach.) Nyl., Act. Soc. linn. Bordeaux 21(4): 276 (1857) [1856]
= *Coniocybe brunneola* (Ach.) Samp., Brotéria, sér. bot. 20(3): 153 (1922)
= *Cyphelium brunneolum* (Ach.) De Not., G. bot. ital. 2(1.1): 318 (1846)
= *Cyphelium trichiale* var. *brunneolum* (Ach.) Mudd, Man. Brit. Lich.: 260 (1861)
= *Embolus brunneolus* (Ach.) Wallr., Fl. crypt. Germ. (Norimbergae) 1: 565 (1831)
= *Phacotium brunneolum* (Ach.) Trevis., Flora, Regensburg 45(1): 6 (1862)

[VZ2308], Germania. Bavaria, Berchtesgadener Land, Jettenberg, Aschauer Klamm, 610 m. Ad lignum *Piceae excelsae*. Leg- R. Türk et H. Wunder, 17.5.1988. Ex A. Vězda Lichenes Selecti Exsiccati Nr. 2308.

Thallus crustose, endosubstratic or rarely thinly episubstratic and then finely granular, ecorticate. Apothecia stalked, pin-like, epruinose, shining black. Stalk slender, 0.5-1.5 mm high, 0.05-0.1 mm thick, sometimes branched and bearing 2-5 capitula, of periclinally arranged, medium brown hyphae. Capitulum globose, with a poorly developed excipulum continuous with the stalk tissue, epruinose but lower side sometimes appearing pruinose from short projecting hyphae. Mazaedium well-developed, brown; hypothecium medium brown, broadly obconical, with a strongly convex upper surface. Asci cylindrical, ellipsoid or irregular, formed in chains, dissolving early, with 1- or 2-seriately arranged ascospores. Ascospores 1-celled, brown to pale brown, globose, 3.5-4.5 µm wide, the wall smooth or with irregular fissures. Photobiont chlorococcoid (Dictyochloropsis, the cells > 10 µm diam). Spot tests: thallus K-, C-, KC-, P- or P+ yellowish red, UV+ white. Chemistry: thallus with baeomycesic and squamatic acids. - Note: on relatively soft-decomposed lignum of old coniferous stumps in humid woodlands, more rarely on wood of deciduous trees or even of *Quercus ilex*, very rarely corticolous.



Chaenotheca brunneola



Chaenotheca brunneola

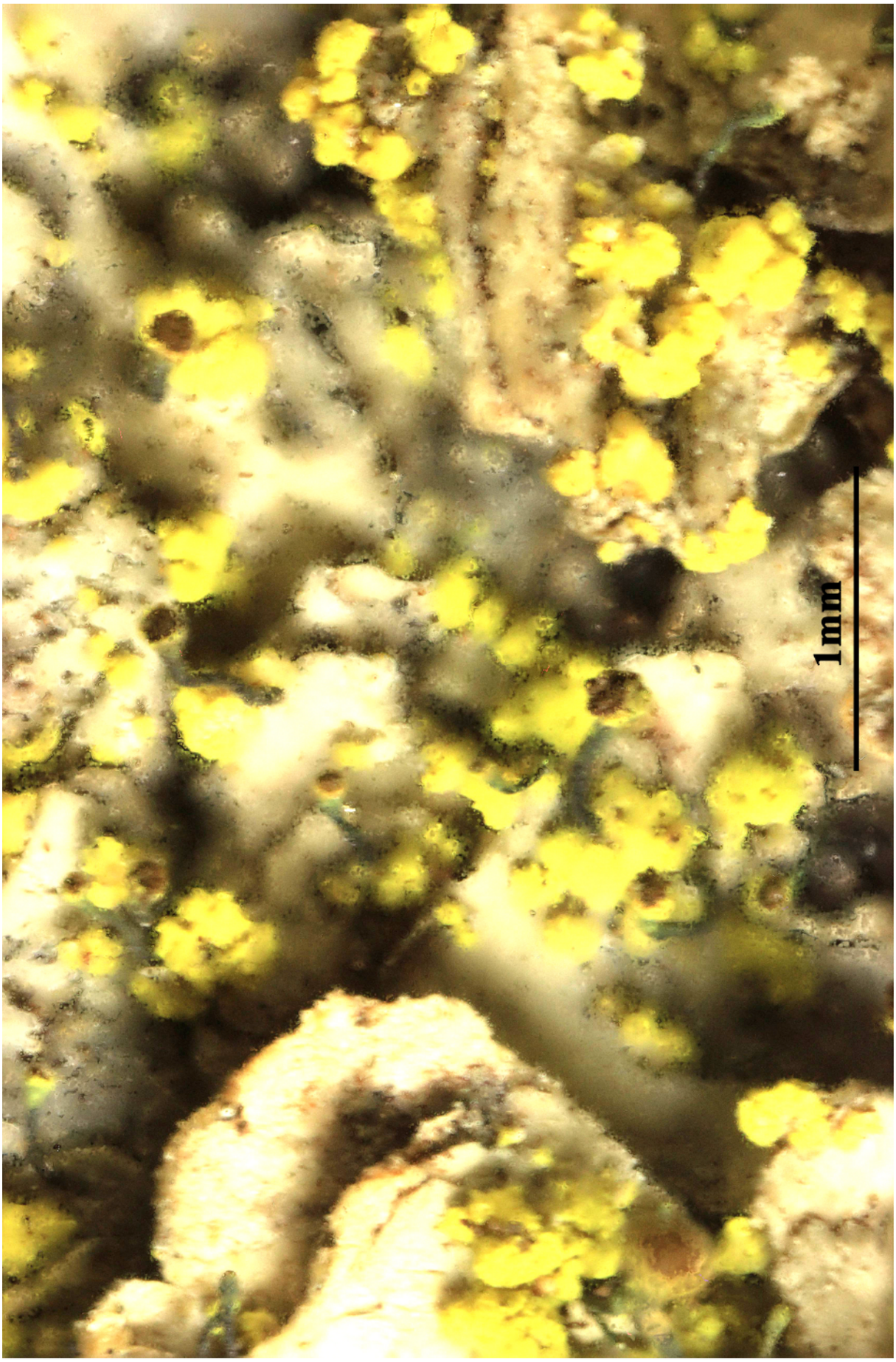
Chaenotheca chrysocephala (Ach.) Th. Fr., Lich. arct. (Uppsala): 250 (1860)
= *Calicium chrysocephalum* Ach., Methodus, Suppl. (Stockholmiæ): 15 (1803)
= *Calicium chrysocephalum* f. *filare* (Ach.) Cromb., Monogr. Lich. Brit.(1): 88 (1894)
= *Calicium chrysocephalum* f. *holochryseum* Nyl., Syn. meth. lich. (Parisiis) 1(2): 147 (1860)
= *Calicium chrysocephalum* f. *melanocephalum* Nyl., Syn. meth. lich. (Parisiis) 1(2): 147 (1860)
= *Calicium chrysocephalum* var. *filare* Ach., K. Vetensk-Acad. Nya Handl. 29: 281 (1808)
= *Calicium chrysocephalum* var. *melanocephalum* Nyl., Syn. meth. lich. (Parisiis) 1(2): 147 (1860)
= *Chaenotheca chrysocephala* f. *filaris* (Ach.) Blomb. & Forssell, Enum. Pl. Scand.: 96 (1880)
= *Chaenotheca chrysocephala* f. *melanocephala* (Nyl.) Zahlbr., Cat. Lich. Univers. 1: 564 (1922)
= *Chaenotheca chrysocephala* subsp. *filaris* (Ach.) Fink, Contr. U.S. natnl. Herb. 14(1): 49 (1910)
= *Chaenotheca chrysocephala* var. *filaris* (Ach.) A.L. Sm., Monogr. Brit. Lich., Edn 2 1: 5 (1918)
= *Chaenotheca chrysocephala* var. *melanocephala* (Nyl.) A.L. Sm., Monogr. Brit. Lich., Edn 2 1: 6 (1918)
= *Coniocybe chrysocephala* (Ach.) Rabenh., Krypt.-Fl. Sachsen, Abth. 2 (Breslau): 16 (1870)
= *Cyphelium chrysocephalum* (Ach.) De Not., G. bot. ital. 2(1.1): 318 (1846)
= *Cyphelium chrysocephalum* f. *filare* (Ach.) Arnold, Verh. Kaiserl.-Königl. zool.-bot. Ges. Wien 30: 144 (1881) [1880]
= *Cyphelium chrysocephalum* f. *melanocephalum* (Nyl.) Stein, in Cohn, Krypt.-Fl. Schlesien (Breslau) 2(2): 306 (1879)
= *Cyphelium chrysocephalum* var. *filare* (Ach.) Hepp, Flecht. Europ.: no. 761 (1860)
= *Lichen chrysocephalus* Turner, Trans. Linn. Soc. London 7: 88 (1804)
= *Phacotium chrysocephalum* (Ach.) Trevis., Flora, Regensburg 45(1): 5 (1862)
= *Phacotium chrysocephalum* var. *filare* (Ach.) Trevis., Flora, Regensburg 45(1): 5 (1862)
= *Phacotium chrysocephalum* var. *holochryseum* (Nyl.) Trevis., Flora, Regensburg 45(1): 5 (1862)
= *Phacotium chrysocephalum* var. *melanocephalum* (Nyl.) Trevis., Flora, Regensburg 45(1): 5 (1862)

= *Phacotrum chrysocephalum* (Ach.) Gray, Nat. Arr. Brit. Pl. (London) 1: 484 (1821)

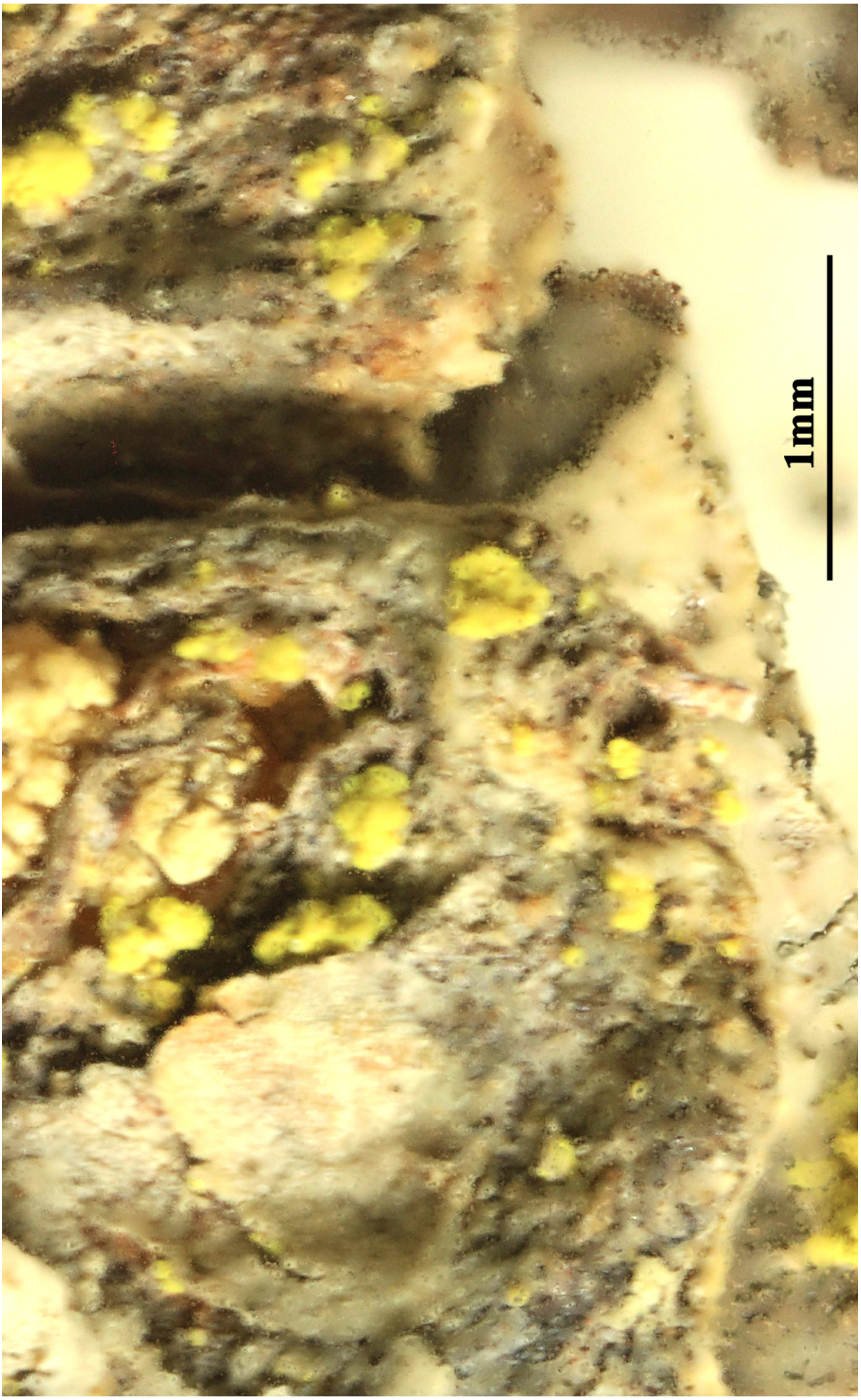
[VZ2254], Bohemoslovacia. Slovacia, Tatra Magna, in valle Bielovodská dolina prope casam forestalam dictam Pod Vysokou, 1100 m. Ad corticem *piceae excelsae* in ripa torrentis. Leg. J. Horáková, Z. Kyselová et A. Vězda, 9.6.1988. Ex A. Vězda Lichenes Selecti Exsiccati Nr. 2254.

Thallus crustose, episubstratic, bright yellow, of rounded, coarse, ecorticate granules or warts forming a more or less continuous crust, very rarely endosubstratic and poorly evident. Outermost part of granules densely inspersed with minute, yellow crystals. Apothecia frequent, developing from the lower side of granules, stalked and pin-like, 0.6-1.4 mm tall. Stalk 0.04-0.09 mm thick, black to pale brown, with a bright yellow pruina at least in the upper part. Capitulum obovoid to obconical, 0.15-0.3 mm wide; exciple well developed, with a dense yellowish green pruina on the lower side, the inner hyphae periclinally arranged, the outer ones turned outwards and almost anticlinally arranged; hypothecium broadly obconical, with a flat to slightly concave upper surface. Asci cylindrical, with a 5-9 µm long, narrow stalk, arising singly from ascogenous hyphae with hooks, degenerating early, 14-19 x 2-3.5 µm, with uniseriately arranged spores. Ascospores 1-celled, brown, short-ellipsoid to globose, (6-)7-9 x 4-5 µm, with a coarse ornamentation of irregular cracks. Conidiomata hyphomycetous. Conidia 1-celled, 2-3 x c. 1 µm. Photobiont trebouxioid, with isodiametrical cells. Spot tests: thallus K-, C-, KC-, P-. Chemistry: apothecial pruina and thallus with vulpinic acid. - Note: a boreal-montane, circumpolar species found on the acid bark of both broad-leaved trees and conifers, more rarely on hard lignum, with optimum on conifers near treeline. Widespread and locally not rare throughout Italy.

Chaenotheca chrysocephala



Chaenotheca chrysocephala



Chaenotheca chrysocephala

Chaenotheca ferruginea (Turner ex Sm.)Mig., in Kryptogamenfl. Deutschl., Deutsch-Österr., Schweiz, 4, Flechten, 2: 479, 1931.
= *Calicium ferrugineum* Turner ex Sm., in Smith & Sowerby, Engl. Bot. 35: [2473] (1813)
= *Calicium melanophaeum* Ach., K. Vetensk-Acad. Nya Handl. 4: 276 (1816)
= *Calicium melanophaeum* var. *ferrugineum* (Turner ex Sm.) Schaer., Lich. helv. spicil. 4-5: 236 (1833)
= *Calicium stemoneum* var. *ferrugineum* (Turner ex Sm.) H. Olivier, Expos. Lich. Ouest France, Suppl. 2: 305 (1903)
= *Calicium trichiale* var. *ferrugineum* (Turner ex Sm.) Nyl., Monogr. Calic.: 13 (1857)
= *Calicium trichiale* var. *melanophaeum* (Ach.) Nyl., Lich. Lapp. Orient.: 106 (1866)
= *Chaenotheca melanophaea* (Ach.) Zwackh, Flora, Regensburg 45(34): 535 (1862)
= *Chaenotheca melanophaea* f. *flavocitrina* (Paulson) Keissl., Rabenh. Krypt.-Fl., Edn 2 (Leipzig) 9(1.2): 550 (1937)
= *Chaenotheca melanophaea* var. *ferruginea* (Turner ex Sm.) Lettau, Festschr. Preuss. Bot. Ver.: 27 (1912)
= *Chaenotheca melanophaea* var. *flavocitrina* Paulson, J. Bot., Lond. 55: 195 (1917)
= *Chaetocypha ferruginea* (Turner ex Sm.) Kuntze, Revis. gen. pl. (Leipzig) 2: 847 (1891)
= *Cyphelium ferrugineum* (Turner ex Sm.) Ach., K. Vetensk-Acad. Nya Handl. 5: 225 (1817)
= *Cyphelium melanophaeum* (Ach.) A. Massal., Nuovi Ann. Sci. nat. Bologna, Ser. 3 7: 217 (1853)
= *Cyphelium melanophaeum* f. *ferrugineum* (Turner ex Sm.) Anzi, Cat. Lich. Sondr.: 99 (1860)
= *Cyphelium melanophaeum* var. *ferrugineum* (Turner ex Sm.) A. Massal., Nuovi Ann. Sci. nat. Bologna, Ser. 3 7: 217 (1853)
= *Cyphelium trichiale var. ferrugineum* (Turner ex Sm.) Mudd, Man. Brit. Lich.: 261 (1861)
= *Phacotium ferrugineum* (Turner ex Sm.) Trevis., Nuovi Ann. Sci. nat. Bologna, Ser. 3 7: 217 (1853)
= *Phacotium melanophaeum* (Ach.) Trevis., Flora, Regensburg 45(1): 6 (1862)
= *Phacotrum ferrugineum* (Turner ex Sm.) Gray, Nat. Arr. Brit. Pl. (London) 1: 484 (1821)

[VZ2255], Bohemoslovacia. Slovacia. Carpates, Tatra Magna: supra balneas Tatranská Lomnica secus viam ad Velká Studená dolina duc-

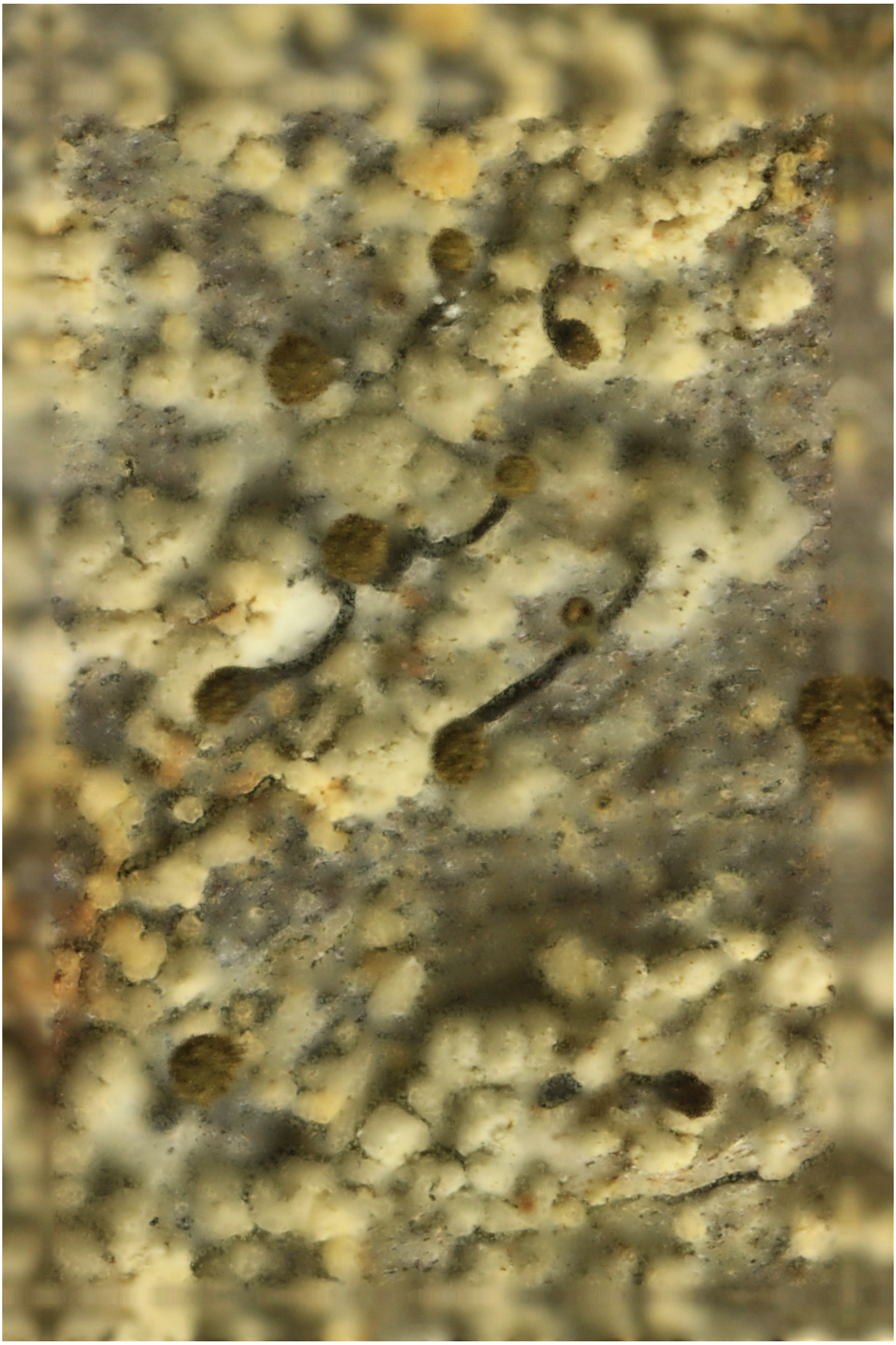
tam, 1000 m. Ad corticem *Piceae excelsae*. Leg. J. Horáková et. A. Vězda. Ex A. VěZDA Lichenes Selecti Exsiccati Nr. 2255.

Thallus crustose, usually episubstratic, ecorticate, granular-verrucose, sometimes patchily sorediate, pale whitish grey to pale green, often with yellow-orange to rusty red patches which may extend over most of the thallus, rarely immersed and inconspicuous. Apothecia rather frequent, on long stalks, pin-like, (0.4-)1-2 mm tall, 5-15 times as long as width of stalk; stalk 70-150 µm thick, shiny black, epruinose; capitulum broadly to narrowly obconical, 0.2-0.5 mm across, the mazaedium pale to dark brown, often with a yellow tinge. Exciple well-developed, epruinose consisting of numerous layers of interwoven but largely periclinally arranged hyphae; hypothecium obconical, medium brown, with a convex upper surface. Asci cylindrical to narrowly clavate, distinctly stalked, formed singly or in short chains, disintegrating early, with uni- to biseriately arranged spores. Ascospores 1-celled, dark brown, globose, 5.5-8 µm wide, thick-walled, coarsely and irregularly fissured at maturity. Photobiont chlorococcoid (Trebouxia). Spot tests: thallus K-, C-, KC, P-, except the pigmented parts, which react K+ deep red; ascospore mass with a yellowish, K+ red pigment. Chemistry: a quinoid pigment. - Note: a cool-temperate to boreal-montane, circumboreal species found on acid bark, especially of very old oaks, Castanea and conifers, on faces protected from rain, sometimes on decorticated stumps and even charred wood, reported as tolerant of air pollution and expanding in northern Europe, but rare and bound to natural habitats throughout Italy.

Chaenotheca ferruginea



Chaenotheca ferruginea



Chaenotheca ferruginea

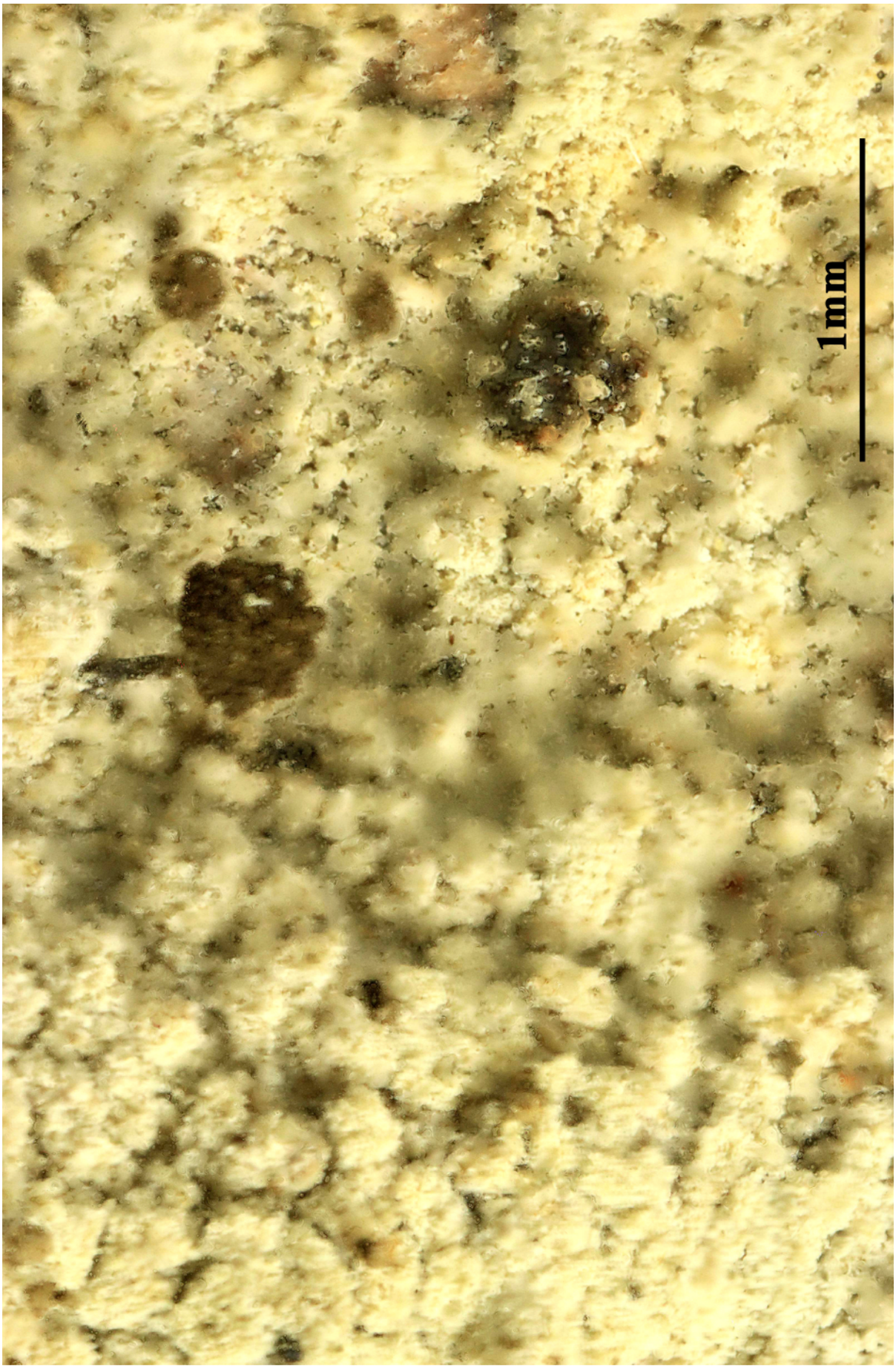
Chaenotheca stemonea (Ach.) Müll. Arg., Mém. Soc. Phys. Hist. nat. Genève 16(2): 360 (1862)
= *Allodium stemoneum* (Ach.) Nyl. ex Kieff., Flora, Regensburg 19: 10 (1895)
= *Allodium trichiale* subsp. *stemoneum* (Ach.) Nyl., Lich. Envir. Paris: 24 (1896)
= *Calicium stemoneum* (Ach.) Ach., K. Vetensk-Acad. Nya Handl. 4: 278 (1816)
= *Calicium stemoneum* var. *aeruginosum* Turner ex Schaer., Lich. helv. spicil. 4-5: 239 (1833)
= *Calicium trichiale* subsp. *stemoneum* (Ach.) Lamy, Bull. Soc. bot. Fr. 25(5): 345 (1880) [1878]
= *Calicium trichiale* var. *stemoneum* Ach., K. Vetensk-Acad. Nya Handl. 29: 283 (1808)
= *Chaenotheca aeruginosa* f. *viridis* (Stein) Grummann ex Tobol., Pr. Kom. biol. Poznań 24(5): 48 (1966)
= *Chaenotheca trichialis* subsp. *stemonea* (Ach.) Fink, Contr. U.S. natnl. Herb. 14(1): 50 (1910)
= *Chaenotheca trichialis* var. *stemonea* (Ach.) Blomb. & Forssell, Enum. Pl. Scand.: 96 (1880)
= *Coniocybe stemonea* (Ach.) Rabenh., Krypt.-Fl. Sachsen, Abth. 2 (Breslau): 15 (1870)
= *Cyphelium stemoneum* (Ach.) De Not., G. bot. ital. 2(1.1): 316 (1846)
= *Cyphelium stemoneum* f. *aeruginosum* (Turner ex Schaer.) Kremp., Denkschr. Kgl. Bayer. Bot. Ges., Abt. 2 4: 270 (1861)
= *Cyphelium stemoneum* f. *viride* Stein, in Cohn, Krypt.-Fl. Schlesien (Breslau) 2(2): 305 (1879)
= *Cyphelium stemoneum var. aeruginosum* (Turner ex Schaer.) Saut., Mitteil. Gesellschaft für Salzburger Landeskunde 12: 124 (1872)
= *Cyphelium trichiale* var. *stemoneum* (Ach.) Mudd, Man. Brit. Lich.: 259 (1861)
= *Embolus trichoides* var. *mesogonimicus* Wallr., Fl. crypt. Germ. (Norimbergae) 1: 569 (1831)
= *Phacotium stemoneum* (Ach.) Trevis., Flora, Regensburg 45(1): 6 (1862)

[VZ2378], Austria. Styria, regio Oststeirisches Hügelland, secus viam inter Weiz et Anger, 1 km septentriones ab Oberfeistritz, 400 m. Ad corticem *Abies albae*. Leg. J. & A. Hafellner, 22.10.1989. Ex A. Vězda Lichenes Selecti Exsiccati Nr. 2378.

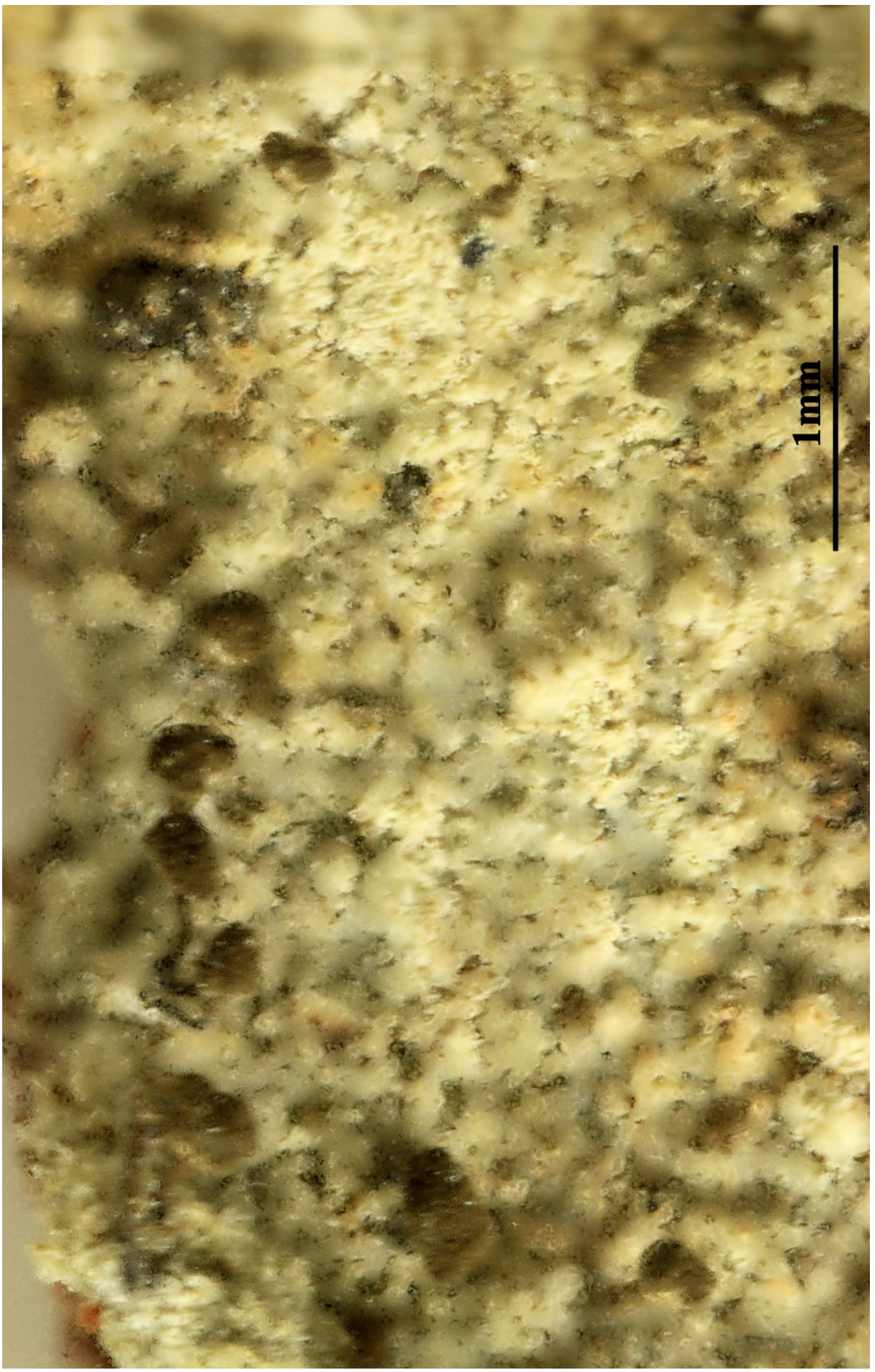
Thallus crustose thinly episubstratic, farinose, glaucous green. Apothecia stalked, pin-like, 0.7-1.6 mm high. Stalk 0.05-0.09 mm thick, brown

to black in lower part, whitish to dull brownish in upper part, of periclinally arranged, medium brown hyphae. Capitulum globose, 0.2-0.3 mm across, with a well-developed, brown mazaedium, the exciple poorly developed, forming a basal collar not visible from above; lower side of exciple paler and apparently brown-pruinose around the mazaedium, due to a hyphal web which tends to trap the brown ascospores; hypothecium brown, with a strongly convex upper surface. Asci short-cylindrical or irregular, formed in chains, dissolving early, with 1-seriately to irregularly arranged spores. Ascospores 1-celled, brown, globose, 3.5-4 µm wide, with a smooth to irregularly and thinly cracked wall. Photobiont chlorococcoid, with rectangular cells (Stichococcus). Spot tests: thallus K-, C-, KC-, P+ yellow to reddish. Chemistry: thallus with barbatic and obtusatic acids. - Note: a cool-temperate to boreal-montane, circumpolar lichen found in rain-protected hollows of conifer trunks inside forests, especially near the ground, both on bark and lignum, sometimes on acid-barked deciduous trees, e.g. *Betula* and *Quercus*. Widespread, but not common.

Chaenotheca stemonea



Chaenotheca stemonea



Chaenotheca stemonea

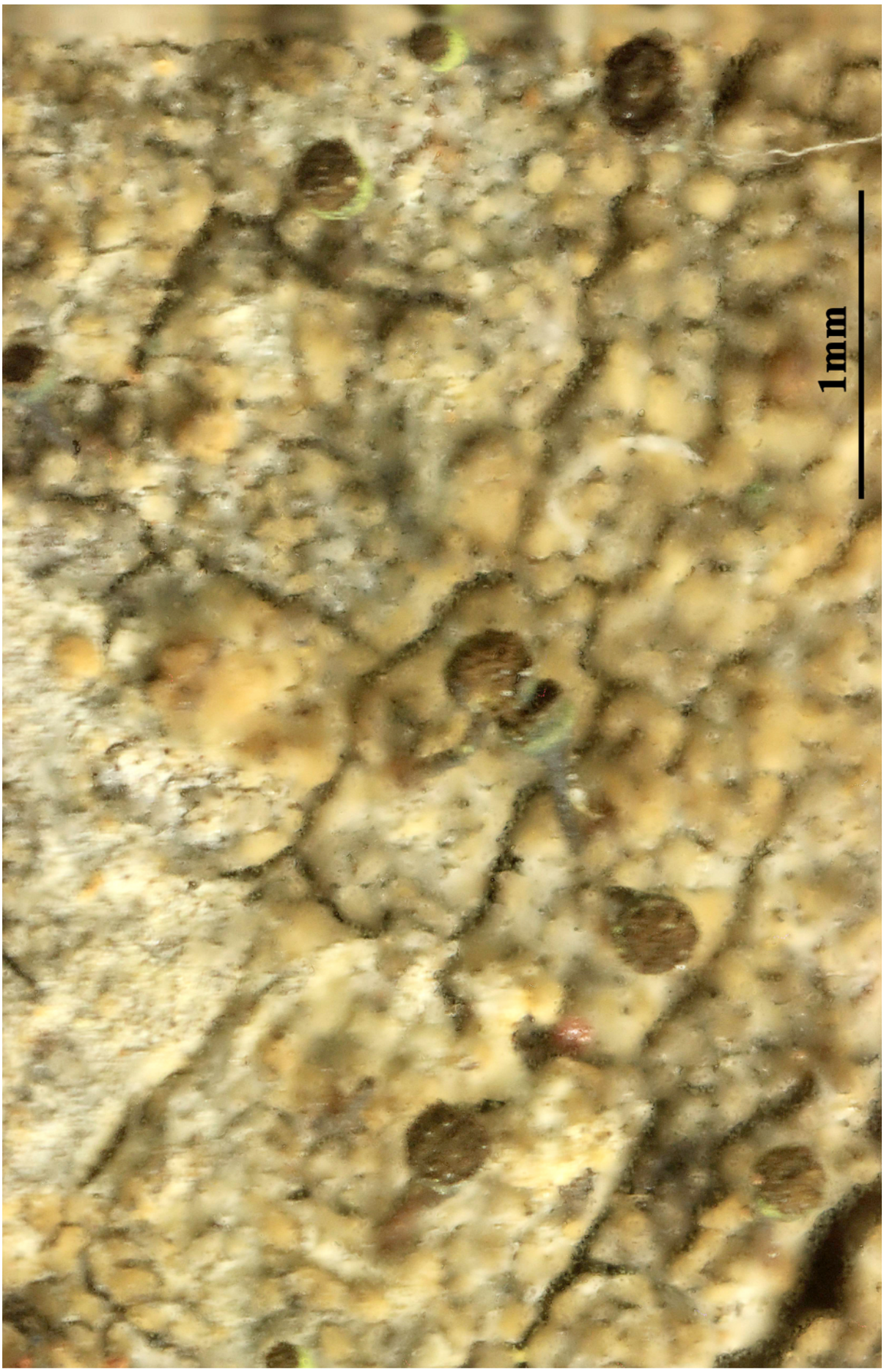
Chaenotheca trichialis (Ach.) Th. Fr., Lich. arct. (Uppsala): 251 (1860)
= *Allodium trichiale* (Ach.) Nyl. ex Kieff., Flora, Regensburg 19: 9 (1895)
= *Calicium aeruginosum* Turner, in Smith & Sowerby, Engl. Bot. 35: [2502] (1813)
= *Calicium aeruginosum* var. *caerulescens* Turner, Spec. lichonogr. brit. (Yarmouth): 156 (1839)
= *Calicium elassosporum* Nyl., Flora, Regensburg 58: 441 (1875)
= *Calicium trichiale* Ach., K. Vetensk-Acad. Nya Handl. 29: 283 (1808)
= *Chaenotheca aeruginosa* (Turner) A.L. Sm., Monogr. Brit. Lich., Edn 2 1: 8 (1918)
= *Chaenotheca brunneola* var. *elassospora* (Nyl.) A.L. Sm., Monogr. Brit. Lich., Edn 2 1: 9 (1918)
= *Chaenotheca elassospora* (Nyl.) Zahlbr., Cat. Lich. Univers. 1: 567 (1922)
= *Chaenotheca stemonea* var. *aeruginosa* (Turner) Müll. Arg., Mém. Soc. Phys. Hist. nat. Genève 16(2): 360 (1862)
= *Chaenotheca trichialis* f. *caerulescens* (Turner) Nádv., Stud. Bot. Čechoslov. 5: 22 (1942)
= *Chaenotheca trichialis* var. *caerulescens* (Turner) Vain., Acta Soc. Fauna Flora fenn. 57(no. 1): 105 (1927)
= *Coniocybe elassospora* (Nyl.) Vain., Acta Soc. Fauna Flora fenn. 57(no. 1): 128 (1927)
= *Coniocybe trichialis* (Ach.) Rabenh., Krypt.-Fl. Sachsen, Abth. 2 (Breslau): 15 (1870)
= *Cyphelium elassosporum* (Nyl.) Sacc., Syll. Fung. (Abellini) 8: 831 (1889)
= *Cyphelium trichiale* (Ach.) De Not., G. bot. ital. 2(1.1): 316 (1846)
= *Phacotium trichiale* (Ach.) Trevis., Flora, Regensburg 45(1): 6 (1862)
= *Phacotrum aeruginosum* (Turner) Gray, Nat. Arr. Brit. Pl. (London) 1: 484 (1821)

[VZ2009], Jugoslavia. Crna Gora (Montenegro): Montes Durmitor, loco Surdup dicto supra lacum Zminje jezero, 1500-1600 m. Ad corticem arborum (*Abies*) in silva virginea. Leg. A. Vězda, 20.8.1984. Ex A. Vězda Lichenes Selecti Exsiccati Nr. 2009.

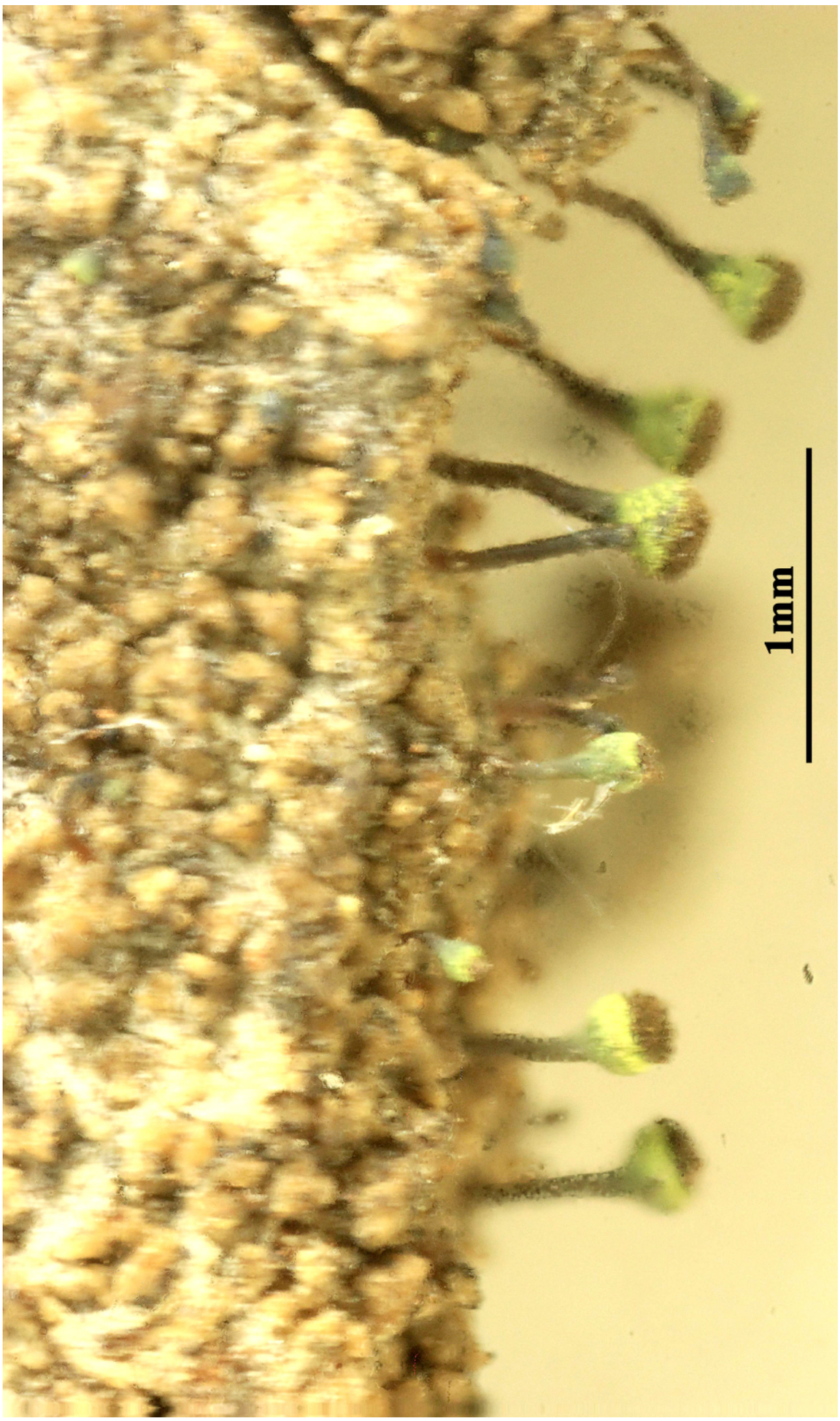
hallus crustose, episubstratic, granular to minutely squamulose, greenish grey to brownish green, very rarely completely endosubstratic. Apothecia long-stalked, pin-like, 1-2 mm high, the stalk slender, 0.05-0.1 mm thick, shining black, epruinose or with a faint white pruina in upper part, consisting of periclinally arranged, brown hyphae. Capitulum obconical to lenticular, 0.2-0.3 mm across, usually faintly white-pruinose on the lower side, with a well-developed, brown mazaedium.

Exciple well-developed, of periclinally arranged hyphae, continuous with the stalk tissue; hypothecium pale brown, obconical, with a convex upper surface. Asci short-cylindrical or irregular, formed in chains, dissolving early, with 1-seriate to irregularly arranged ascospores. Ascospores 1-celled, brown, globose, 3-4 µm wide, with a smooth to irregularly cracked wall. Photobiont chlorococcoid, with rectangular cells (Stichococcus). Spot tests: thallus K-, C-, KC-, P-. Chemistry: thallus with two unidentified substances. - Note: a widespread holarctic species found on acid-barked deciduous trees, conifers and lignum, sometimes even on Quercus ilex, in forests and woodlands; widespread in upland areas, but most common in the Alps.

Chaenotheca trichialis



Chaenotheca trichialis

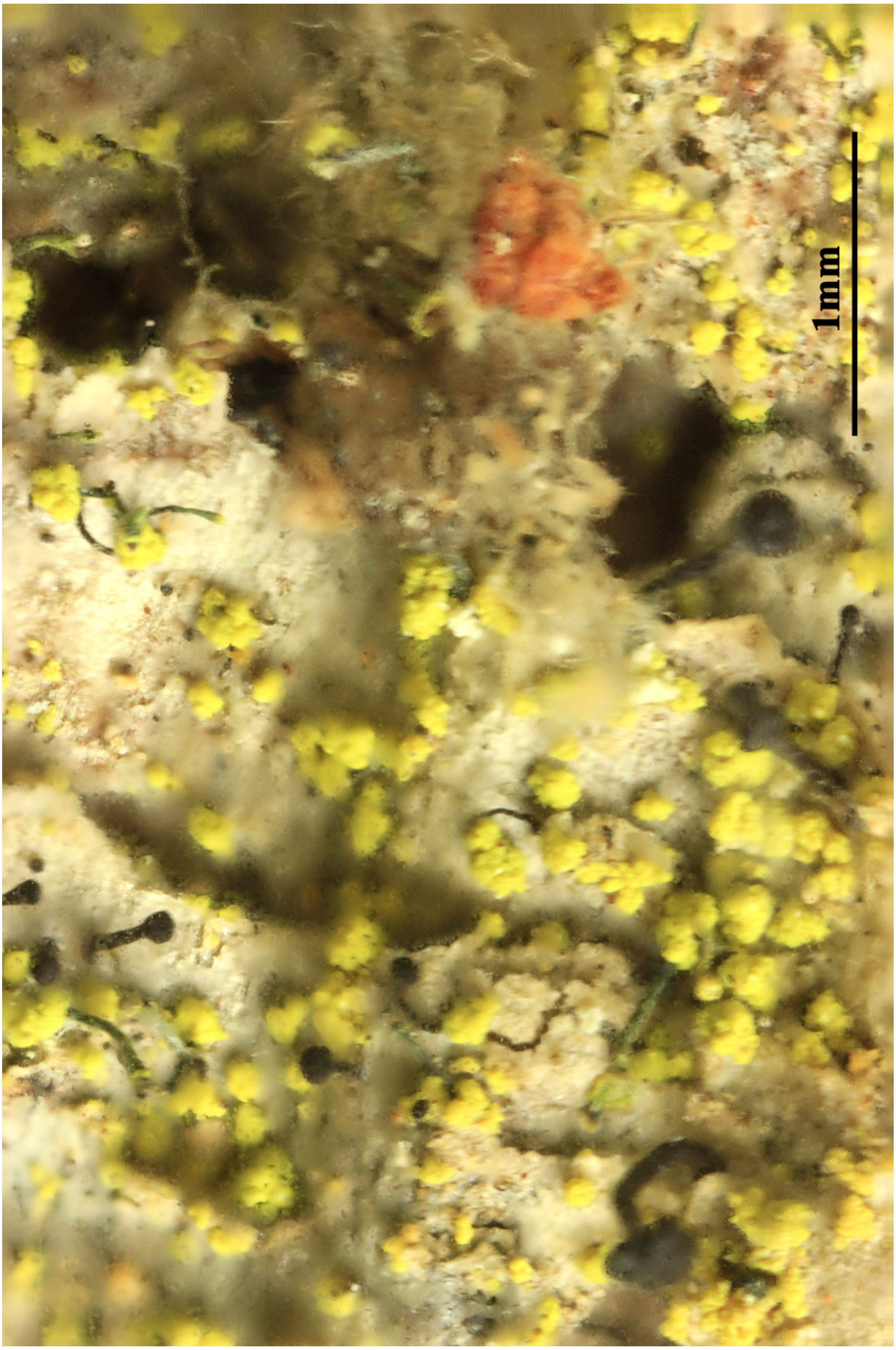


Chaenotheca trichialis

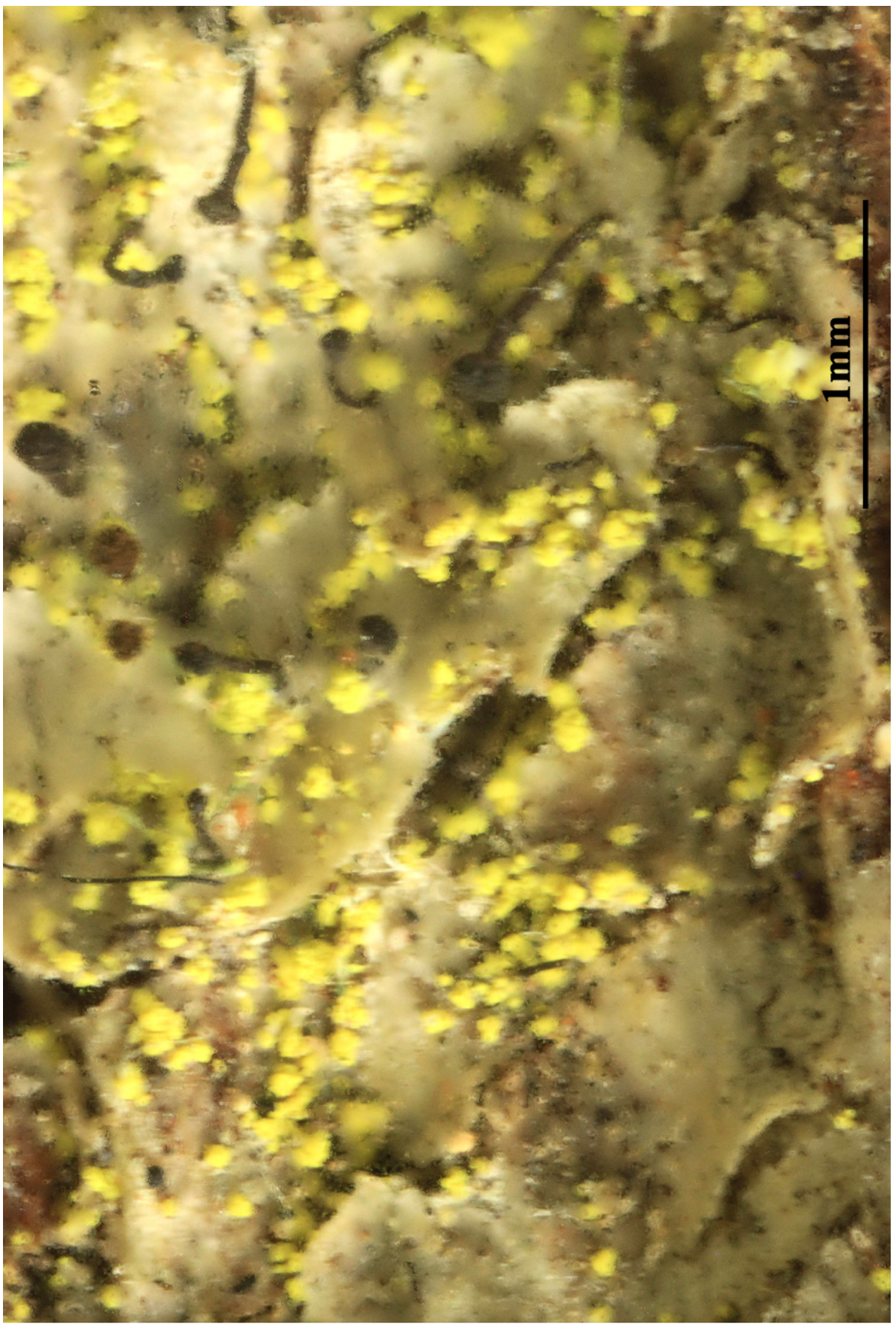
Chaenothecopsis consociata (Nádv.) A.F.W. Schmidt, Mitt. Staatsinst. Allg. Bot. Hamburg 13: 148 (1970)
= *Calicium consociatum* Nádv. 1942

[VZ1301], Suecia. Värmland: Frykerud, austro-orientem versus a Getmossen, 180 m. Ad corticem *Piceae abietis*. Leg. S. W. Sundell, 13.10.1974. Ex A. Vězda Lichenes Selecti Exsiccati Nr. 1301.

Thallus not evident, not lichenized. Apothecia long-stalked, pin-like 0.7-1.3 mm high. Stalk slender, 0.05-0.1 mm thick, black, the central part formed by colourless, intricately interwoven or partly periclinally arranged hyphae, the outer part formed by periclinally arranged, dark reddish brown hyphae. Capitulum obconical or subdivided into smaller capitula, 0.2-0.3(-0.4) mm across, often faintly white pruinose on upper surface, with an exciple of intertwined and sclerotized, reddish brown to dark brown, intertwined hyphae; mazaedium not present. Epithecium thin, reddish brown; hypothecium reddish brown. Asci 8-spored, cylindrical, with a thickened apex penetrated by a narrow canal, formed singly, persisting until the spores are mature, with 1-seriately arranged ascospores. Ascospores 1-septate, dark brown with a paler septum, ellipsoid, 6-8 x 2-2.5 µm, with a smooth wall. Photobiont absent. Spot tests: epithecium, exciple and hypothecium K+ persisting green. Chemistry: an unidentified, reddish, K+ green pigment. - Note: parasitic or parasymbiontic on *Chaenotheca chrysocephala* on trunks of old trees in ancient and humid, montane to subalpine coniferous forests; certainly more widespread in the Alps, but not common.



Chaenothecopsis consociata



Chaenothecopsis consociata

Chaenothecopsis parasitaster (Bagl. & Carestia) D. Hawksw., Notes R. bot. Gdn Edinb. 36(1): 184 (1978)

= *Calicium floerkei* var. *parasitaster* (Bagl. & Carestia) Zahlbr., Cat. Lich. Univers. 1: 601 (1922)

= *Calicium parasitaster* (Bagl. & Carestia) Zopf, Hedwigia 35(6): 320 (1896)

= *Calicium pusillum* var. *parasitaster* Bagl. & Carestia, Atti Soc. Crittogam. Ital. 2: 246 (1880) [1879]

[VZ1824], Austria. Salisburgia, Lungau,in alpibus "Schladminger Tauern" dictis, in valle dicta Weissprichachtal, inter Kühbarnalm et Kühbarnhütte, 1450 m. In thallo *Cladoniae digitatae* vigens. Leg. J. Hafellner, K. Kalb et A. Vězda, 8.9.1981. EX A. VěZDA LICHENES SELECTI EXSICCATI NR. 1824.

Thallus not evident, not lichenized, parasitic on squamules of *Cladonia*. Apothecia stalked, pin-like, (0.35-)0.5-0.7(-0.9) mm high, the stalk 0.04-0.075 mm thick, black or rarely pale greenish, brownish or grey in lower part, always darker in upper part, the central part formed by pale, in lower part intricately interwoven, in upper part periclinally arranged hyphae, the outer part green-brown to greenish, formed by periclinally arranged, sclerotized hyphae. Capitulum lenticular, (0.12-)0.2-0.3 mm across, black or sometimes faintly white pruinose in upper part; mazaedium absent. Exciple of greenish to brown, periclinally arranged hyphae. Epithecium thin, reddish brown; hypothecium pale or greenish brown. Asci 8-spored, cylindrical, with a thickened apex penetrated by a narrow canal, formed singly, persisting until the spores are mature. Ascospores 1-septate, medium brown, ellipsoid, (5-)6-10(-14) x 2-3(-3.5) µm, with a minutely warted wall. Photobiont absent. Spot tests: all parts of ascocarps K-, C-, KC-, P-, N-. Chemistry: no lichen substances, except unidentified greenish or brownish pigments.- Note: this taxon, frequently synonymised with *Ch. pusilla*, seems to be a distinct species (see Groner 2010), which is strictly parasitic on species of *Cladonia*. Rare in the Alps.

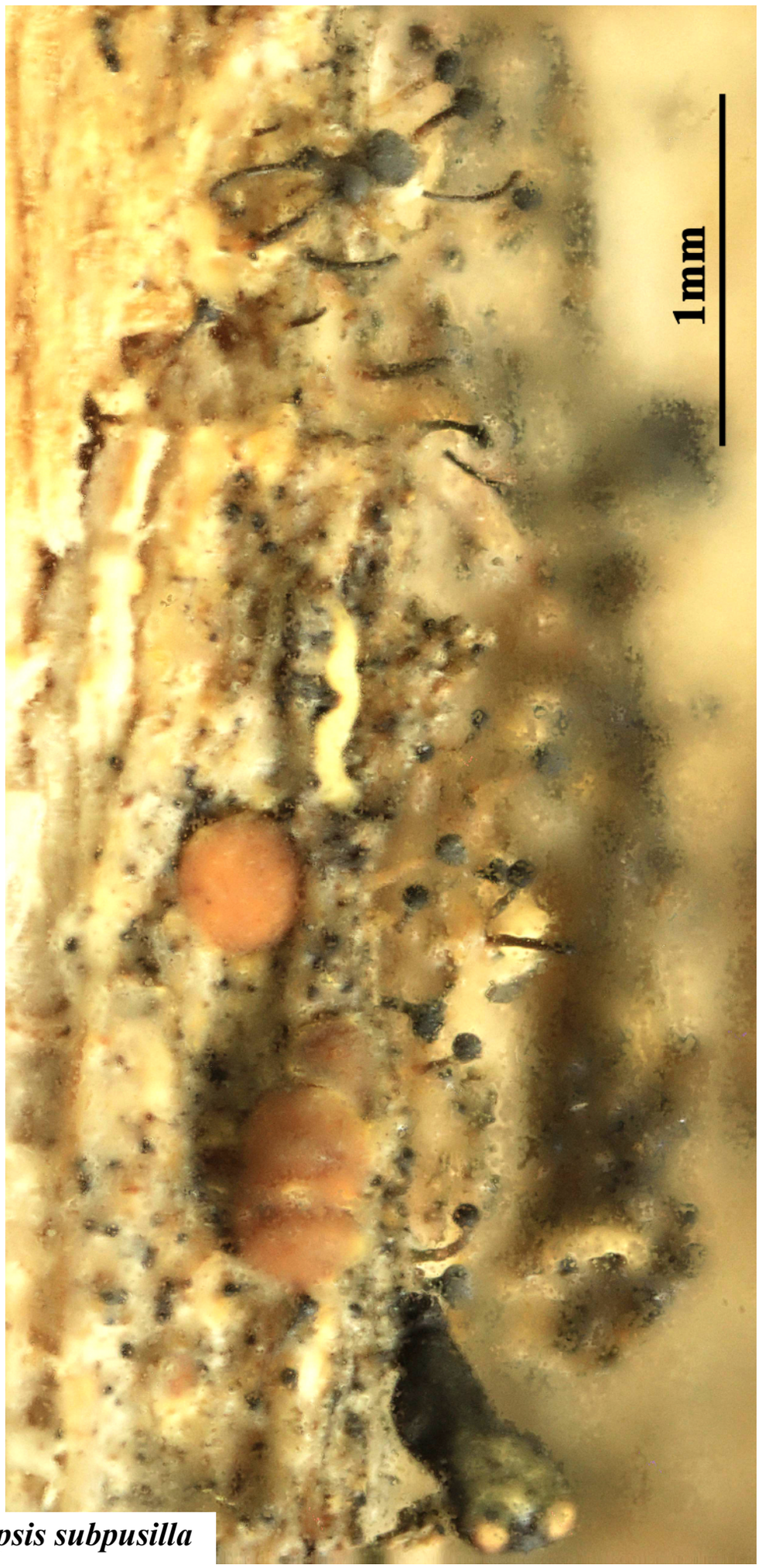


Chaenothecopsis parasitaster

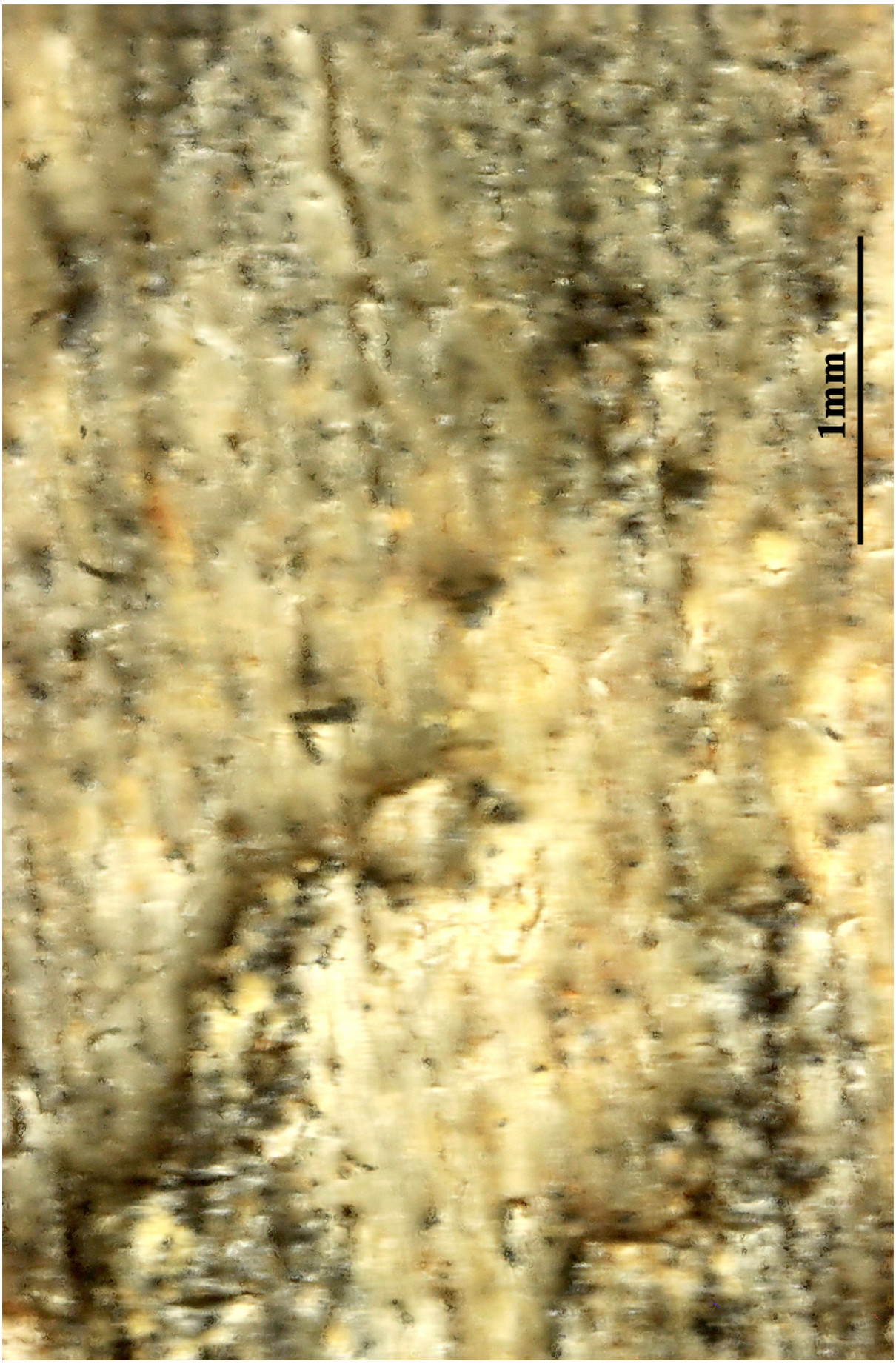
Chaenothecopsis subpusilla (Vain.) Tibell, Symb. bot. upsal. 21(no. 2): 47 (1975)
= *Chaenothecopsis pusilla* (Ach.) A.F.W. Schmidt, Mitt. Staatsinst. Allg. Bot. Hamburg 13: 148 (1970)
= *Calicium claviculare var. pusillum* Ach., K. Vetensk-Acad. Nya Handl. 29: 279 (1808)
= *Calicium floerkei* Zahlbr., Cat. Lich. Univers. 1: 598 (1922)
= *Calicium pusillum* (Ach.) Flörke, Deutsche Lich. 7: 6 (no. 188) (1821)
= Calicium subpusillum Vain., Acta Soc. Fauna Flora fenn. 57(no. 1): 50 (1927)
= *Cyphelium pusillum* (Ach.) A. Massal., Memor. Lich.: 158 (1853)
= *Mycocalicium pusillum* (Ach.) Räsänen, Ann. bot. Soc. Zool.-Bot. fenn. Vanamo 3(no. 8): 348 (1926)

[VZ2076], Bohemoslovacia. Slovacia. Carpates Centrales (Tatra Magna), iugum Belanské Tatry dictum: Javorina, in valle Zadné Medodoly, 1300-1400 m. Ad lignum putridum trunci *Piceae excelsae*, thallo lichenis (*Chaenotheca brunneola*) vigens. Leg. E. Farkas, Z. Kyselov´s et. A. Vězda, 22.6.1985. Ex A. Vězda Lichenes Selecti Exsiccati Nr. 2076.

Thallus not evident, not lichenized, saprobic on lignum. Apothecia stalked, pin-like, 0.5-0.9 mm high, the stalk 0.04-0.08 mm thick, black or rarely pale greenish, brownish or grey in lower part, always darker in upper part, the central part formed by pale, in lower part intricately interwoven, in upper part periclinally arranged hyphae, the outer part brown to greenish, formed by periclinally arranged, sclerotized hyphae. Capitulum lenticular, 0.2-0.3 mm across, black or sometimes faintly white-pruinose in upper part; mazaedium absent. Exciple of greenish to brown, periclinally arranged hyphae; epithecium thin, greenish or brown; hypothecium 85-110 µm high, pale or greenish brown. Asci 8-spored, cylindrical, with a thickened apex penetrated by a narrow canal, formed singly, persisting until the spores are mature. Ascospores 1-septate, medium brown, ellipsoid, 6-7 x 2-2.5 µm, with a smooth wall, the septum much paler than the wall. Photobiont absent. Spot tests: all parts of ascocarps K-, C-, KC-, P-, N-. Chemistry: without lichen substances, except unidentified greenish or brownish pigments. - Note: on trunks of old conifers in ancient forests, and on lignum, sometimes on old oaks, perhaps a parasite of free-living algal colonies, or possibly a saprophyte. Widespread throughout Italy, but not common.



Chaenothecopsis subpusilla

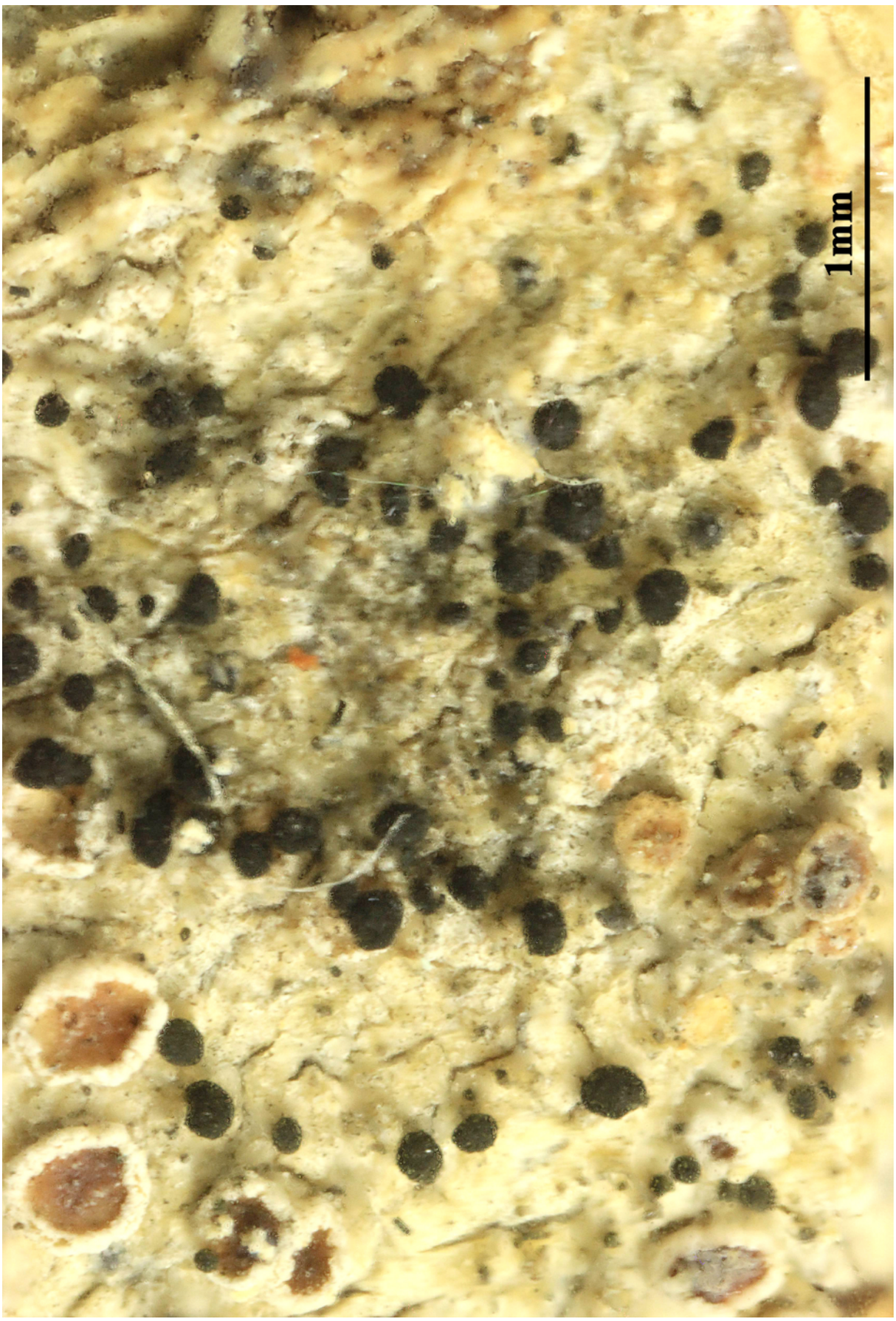


Chaenothecopsis subpusilla

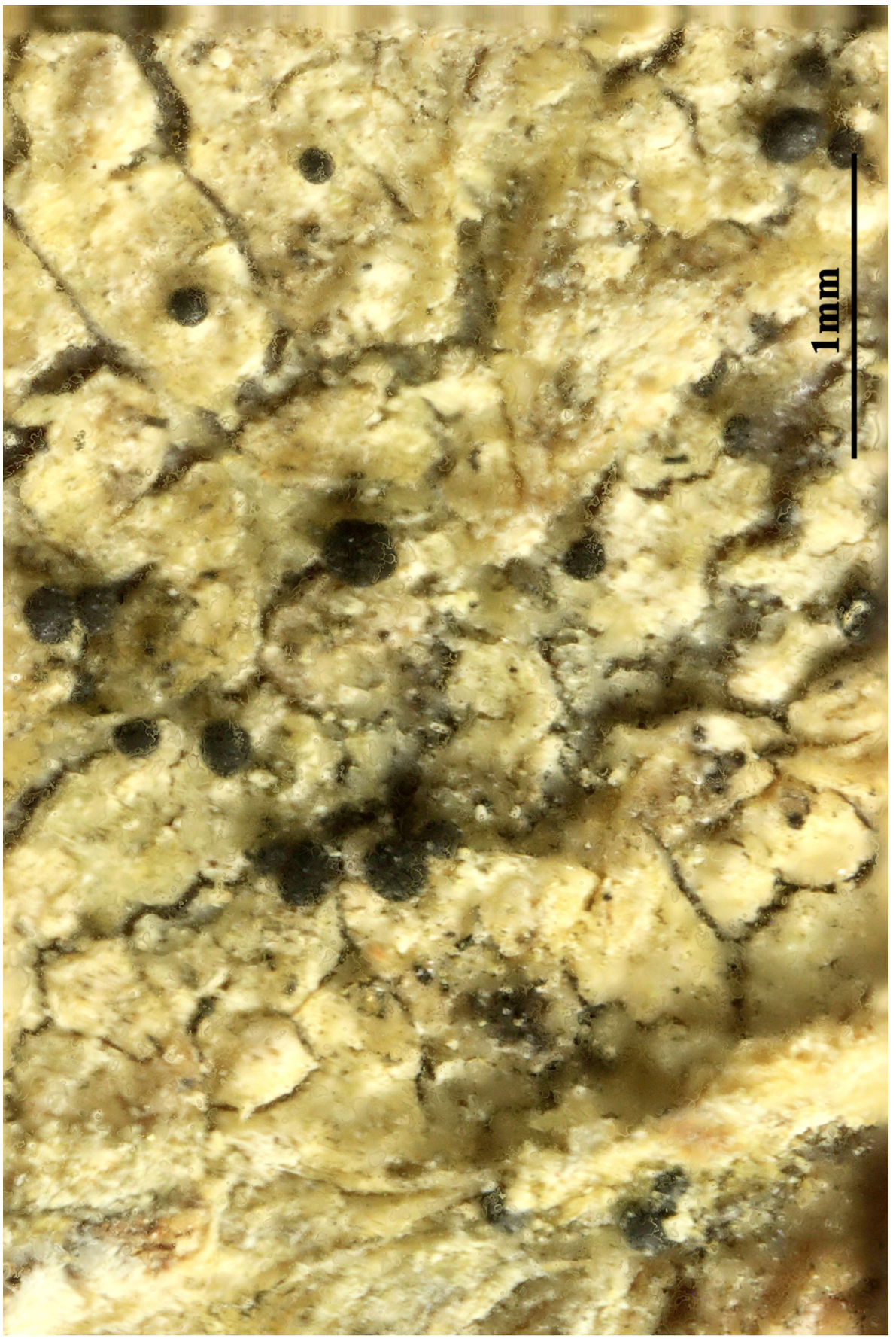
Chaenothecopsis treicheliana (Stein) Kalb, Herzogia 6(1-2): 77 (1983)
= *Calicium treichelianum* Stein 1885

[VZ2335], Austria. Tirolia, alpes "Hohe Tauern" dicti Virgen, in faucibus fluminis Isel, 1150 m. Supra thallum *Lecanorae pallidae*, ad corticem *Alni incanae*. Leg. O. Breuss et A. Vězda, 27.8.1988 - it is according L Tibell 1992 *Chaenothecopsis hosptans* (Th. FR.) -. Ex A. Vězda Lichenes Selecti Exsiccati Nr. 2335

Thallus not evident, not lichenized. Apothecia short-stalked, 0.12-0.2 mm high, pin-like, developing on the thalli of epiphytic *Lecanora*-species. Stalk black in upper part, pale brown to whitish in lower part, epruinose, 50-60 µm thick, formed by intertwined, brownish hyphae. Capitulum lenticular, black, epruinose, 0.1-0.2 mm across. Excipulum brown, of intertwined hyphae; epithecium poorly evident; mazaedium not present; hypothecium brown. Asci 8-spored, cylindrical to subclavate, with a thickened apex penetrated by a narrow canal, formed singly, persisting until the uniseriately arranged spores are mature. Ascospores 1-celled, greyish brown to dark brown at maturity, narrowly ellipsoid, (4.5-)5.3-7(-7.5) x 2.5-3(-3.5) µm, with a minutely verrucose surface. Photobiont absent. Spot tests: ascocarps K-, C-, KC-, P-. Chemistry: without lichen substances. - Note: Tibell & Ryman (1995) did not recognize *Ch. treicheliana* as a distinct species and presumed it might be a synonym of *Ch. hospitans*. However, according to Gasparyan & al. (2014), *Ch. hospitans* shows a faint K+ reaction of the ascomata, and its stalk and the ascospores are distinctly larger (7.8-9.6 × 3.9-5 µm). The species, which is also known from Austria, Poland and Armenia, occurs as a parasite on the thalli of epiphytic *Lecanora*-species.



Chaenothecopsis treicheliana

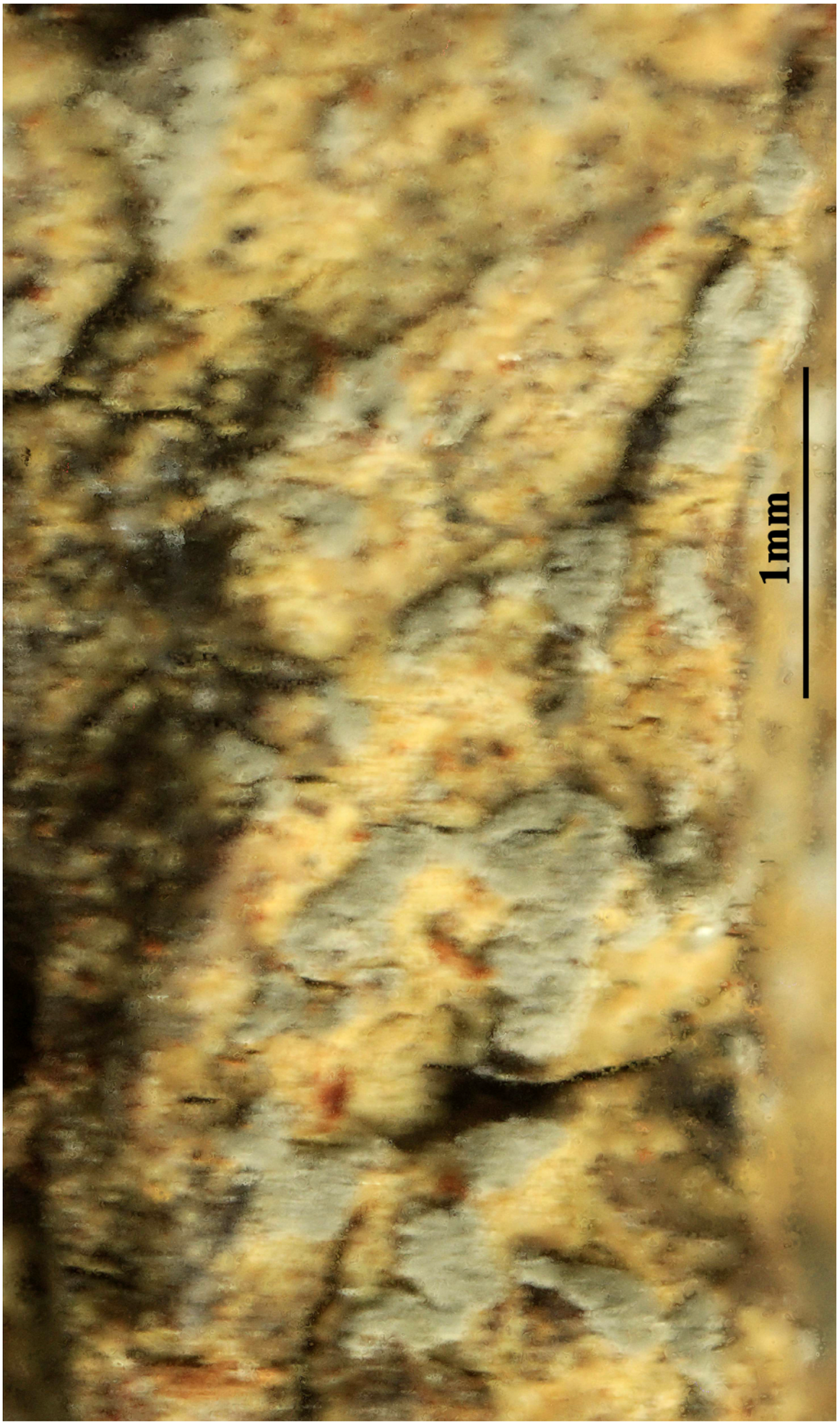


Chaenothecopsis treicheliana

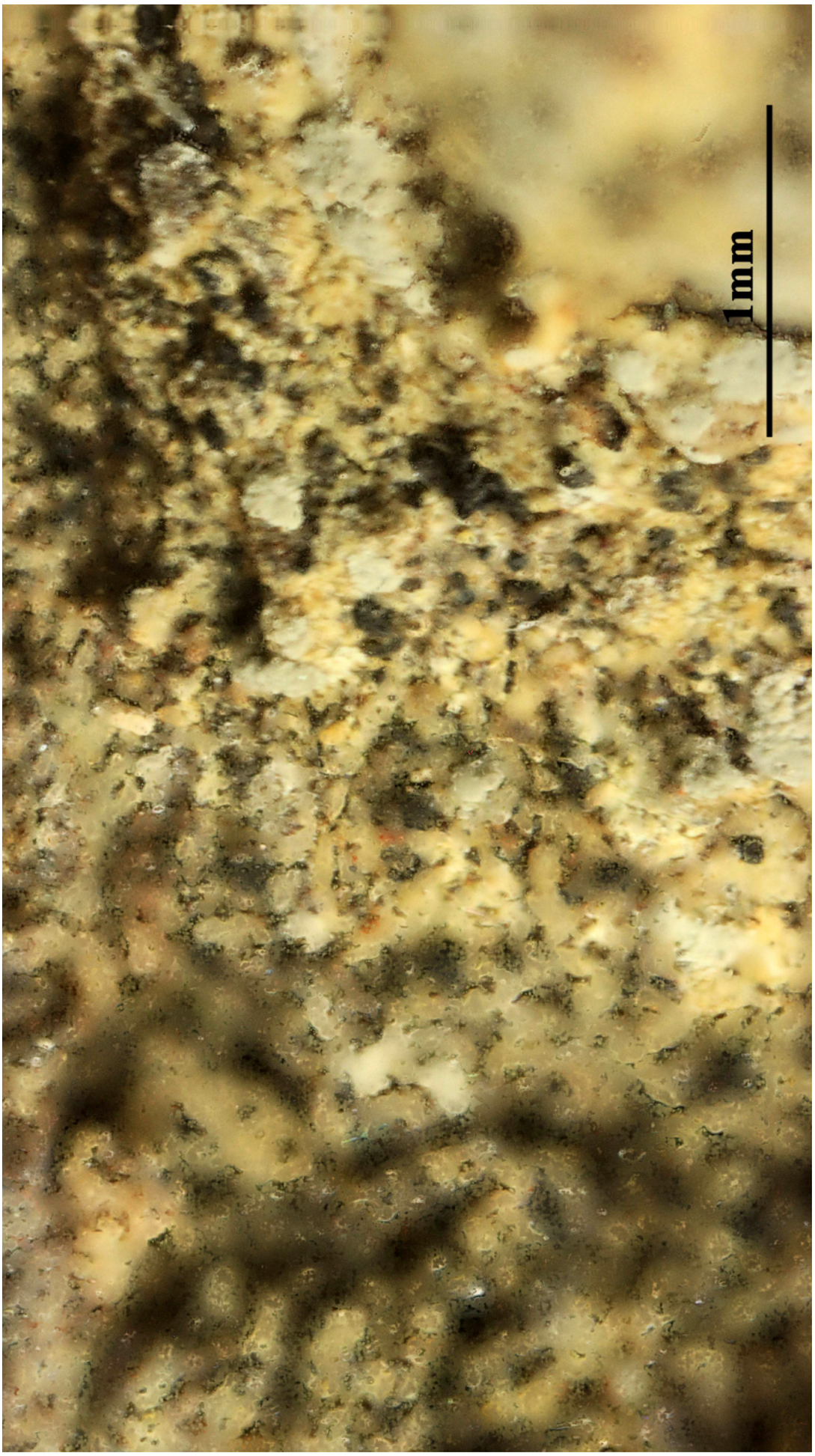
Cheiromycina petri D. Hawksw. & Poelt, Lichenologist 22(3): 219 (1990)

[VZ2428], Austria. Styria: in collibus "Oststeirisches Hügelland", distr. Feldbach, Lamberg, in pago Petersdorf II, 420 m. Ad corticem trunci *Betulae*. Leg. J. Poelt et G. Pittoni, 27.11.1987. - ISOTYPUS- EX A. VěZDA LICHENES SELECTI EXSICCATI NR. 2428.

Thallus crustose, thinly episubstratic, pale yellowish green to yellow-grey, the surface somewhat waxy, effuse, of dispersed to aggregated warts or more or less continuous to irregularly rimose, (25-)30-50(-60) um thick. Cortex composed of plectenchymatous to almost pseudo-parenchymatous, hyaline, subglobose, 3-4 µm wide cells; hyphae developed below the photobiont layer and the sporodochia penetrating between the outer bark cells, flexuose to torulose, septate, hyaline, (l-5-)2-2-5(-3) µm thick. Conidiomata sporodochial, superficial, persistently pale bluish grey to grey, flattened to slightly convex, discrete to confluent, orbicular to elongate-ellipsoid, sometimes cerebriform, mainly 0.2-0.5(-0.7) x 0.l-0.3(-0.4) mm. Conidiophores hyaline to pale brown, septate, dichotomously branched, slightly swollen between septa, 8-15(-20) x 2-3-5 µm wide, smooth-walled. Basal conidiogenous cell terminal or lateral, colourless, elongate-ellipsoid to subglobose, (3-)4-6(-9) x 2-5-5(-6) µm. Conidia very variable in size, broadly fan-shaped, (12-)20-50(-65) x 18-25 µm, 3-6 times dichotomously branched, multi-septate (euseptate in lower part, distoseptate in upper part), the branches convergent, compacted, 2-5-3-5 µm thick, the apical cells palmate to finger-like, the final branches 3-8 µm long, remaining colourless in upper part, turning pale to fuscous brown in lower part, smooth-walled. Photobiont chlorococcoid, the cells 7-10 µm wide. Spot tests: thallus K-, C-, KC-, P-, UV-. Chemistry: without lichen substances. - Note: a widespread holarctic species growing on the bark of different broad-leaved trees (e.g. *Betula*, *Acer*), mostly in natural situations, which, however, was poorly collected being always sterile, with a few records from the Eastern Alps (Austria).



Cheiromycina petri



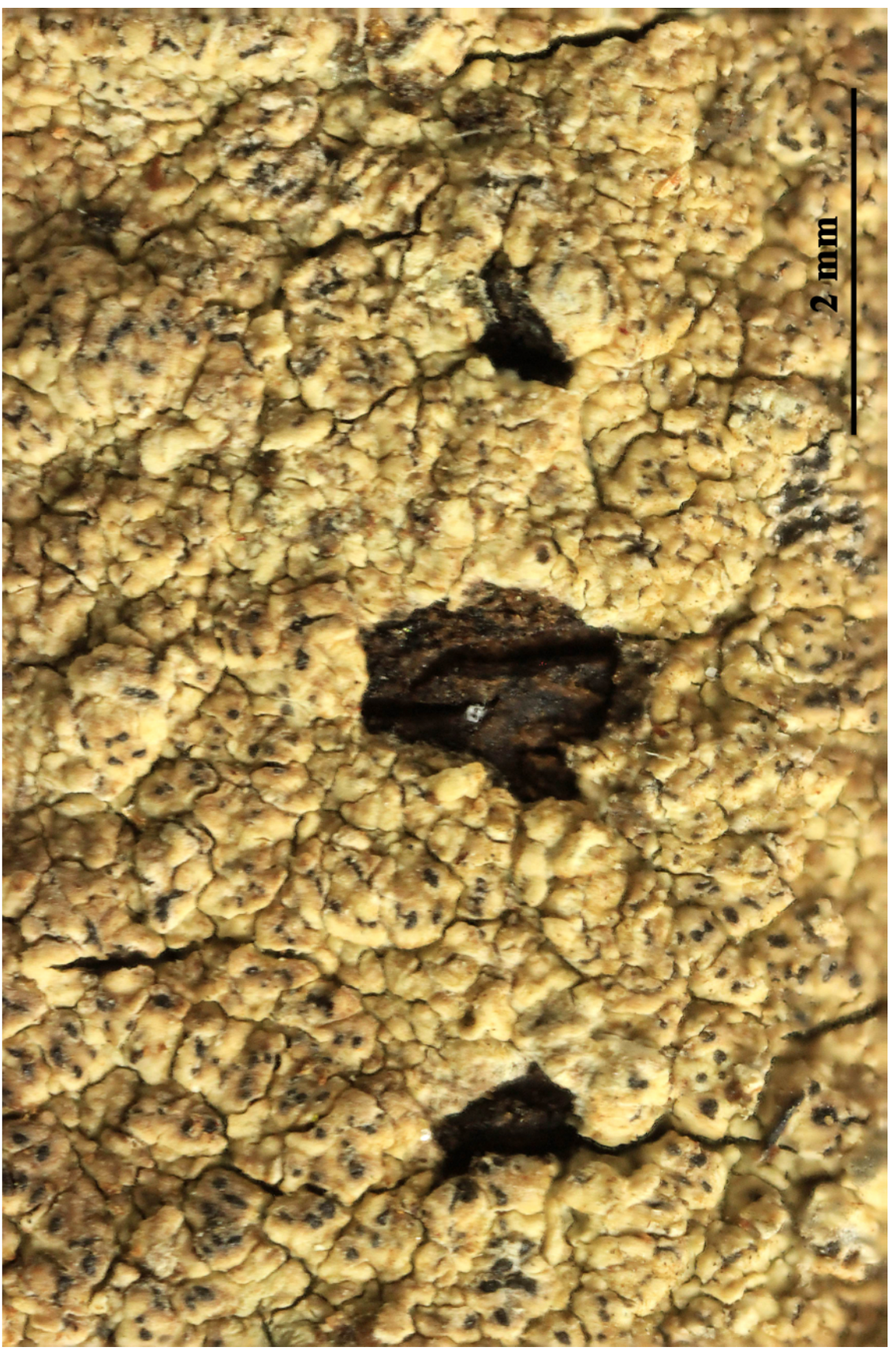
Cheiromycina petri

Chiodecton colensoi (A. Massal.) Müll. Arg., Bull. Herb. Boissier 2(app. 1): 86 (1894)
= *Chiodecton capense* (A. Massal.) Zahlbr., Cat. Lich. Univers. 2: 474 (1923) [1924]
= *Chiodecton grossum* Müll. Arg., Bull. Herb. Boissier 1(2): 61 (1893)
= *Chiodecton hypoleucum* C. Knight, in Bailey, Syn. Queensl. Fl. 1(Suppl.): 76 (1886)
= *Chiodecton neohollandicum* Nyl., Bull. Soc. linn. Normandie, sér. 2 2: 98 (1868)
= *Chiodecton ochraceofuscescens* C. Knight [as 'ochraceo-fuscescens'], in Bailey, Syn. Queensl. Fl. 1(Suppl.): 75 (1886)
= *Chiodecton perplexum* Nyl., Acta Soc. Sci. fenn. 7(2): 485 (1863)
= *Chiodecton subdepressum* Müll. Arg., Bull. Herb. Boissier 1(2): 62 (1893)
= *Chiodecton trypethelioides* (Müll. Arg.) Zahlbr., Cat. Lich. Univers. 2: 482 (1923) [1924]
= *Chiodecton velatum* Müll. Arg., Bull. Herb. Boissier 1(2): 61 (1893)
= *Chiodecton virens* Müll. Arg., Bull. Herb. Boissier 3: 324 (1895)
= *Enterographa capensis* A. Massal., Mem. Imp. Reale Ist. Veneto 10: 81 (1861)
= *Enterographa trypethelioides* Müll. Arg., Flora, Regensburg 70: 424 (1887)
= *Leucodecton colensoi* A. Massal., Atti Inst. Veneto Sci. lett., ed Arti, Sér. 3 5: 326 (1860) [1859-1860]
= *Stigmatidium capense* (A. Massal.) Zahlbr., Cat. Lich. Univers. 2: 474 (1923) [1924]
= *Stigmatidium colensoi* (A. Massal.) A. Massal., Bull. Soc. Imp. nat. Moscou 36(1-2): 266 (1863)

[VZ2478], Australia. Queensland, Blackall Range, 10 km ad occidentem a Nambour, Mapleton, ad cataracta Mapleton, 400 m, 26°37' austr., 152°51' orient. Ad corticam arborum. Leg. G. Thor (4865), 7.11.1985. Ex A. Vězda Lichenes Selecti Exsiccati Nr. 2478.

Thallus in irregular patches 0.5-1-(-4) cm diam., pale brownish-white, grey-green or fawnish, minutely wrinkled-uneven, scabrid-granular, matt, continuous or minutely areolate-cracked, sometimes ± effuse or in parts lacking, delimited at margins by an irregular black prothallus. Apothecia in thalline verrucae, verrucae whitish or distinctly paler than thallus, raised, rounded to flexuose-elongate sigmoid, or ± confluent, 0.3-1.5 mm long and 0.1-0.4 mm wide, polycarpic, 1-6(-20) discs per verruca, disc minute, 0.05-0.15 mm diam., convex, plane or concave,

black, carbonaceous or red-brown, rarely pale brown, shining or matt, aggregated or arranged in a row following shape of verruca. Ascospores 3-septate, acicular, flexuose, 46-56 × 3 µm. Hypothecium brown-black. Chemistry: TLC negative.



Chiodecton colensoi



Chiodecton colensoi

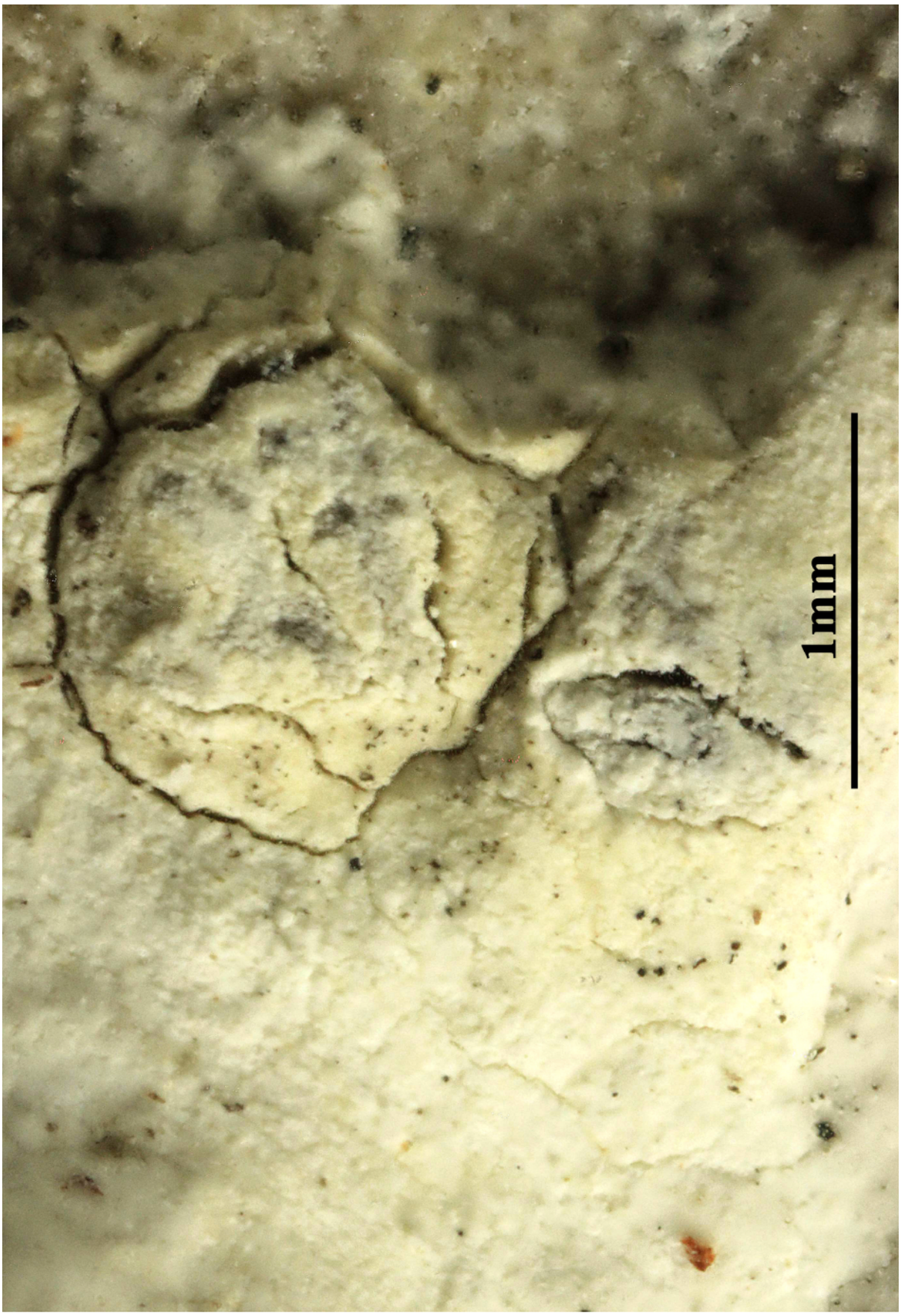
Chiodecton cretaceum Zahlbr., Öst. bot. Z. 49: 245 (1899)
Dirina cretacea (Zahlbr.) Tehler Opera Bot., 69: 44

[VZ1673], Jugoslavia. Dalmatia, peninšula Peljesac, inlitore prope vicum Zuljana, 2-5 m. Ad scopulos calcareos. Leg. A. Vězda, 15.7.1979. Ex A. Vězda Lichenes Selecti Exsiccati Nr. 1673.

Thallus crustose, episubstratic, 0.3-1 mm thick, smooth to slightly rugose-verruculose, white-grey, pruinose. Cortex 40-60 µm thick, of anticlinally arranged, colourless hyphae immersed in a pale yellow-brown gelatinous matrix; medulla chalk-like throughout. Apothecia lecanorine, stromatoid-pluricarpocentral, numerous, sessile, circular in outline, not constricted at base, 3-8 mm across, with a black but usually white-grey-pruinose disc and an entire thalline margin. Proper exciple inconspicuous; epithecium brownish; hymenium colourless; paraphysoids unbranched or sparsely branched, 1-2 µm thick, the apices 1-3 µm wide; hypothecium black. Asci 8-spored, clavate, bitunicate, the apex thickened with a small internal K/I+ blue ring. Ascospores 3-septate, hyaline, fusiform, 19-23 x 5-6 µm. Pycnidia black, immersed or slightly projecting. Conidia thread-like, sickle-shaped. Photobiont trentepohlioid. Spot tests: thallus surface K-, C+ red, KC+ red, P-; medulla and apothecial disc C-. Chemistry: erythrin, lecanoric acid (the latter sometimes absent). - Note: most common along the coasts of Dalmatia and the eastern Mediterranean region, locally abundant along the coast of Puglia.



Chiodecton cretaceum



Chiodecton cretaceum

Chiodecton myrticola Fée, Essai Crypt. Exot. (Paris): 63 (1825) [1824]
= *Syncesia myrticola* (Fée) Tehler, Fl. Neotrop., Monogr. 74: 18 (1997)
= *Chiodecton albidum* (Taylor) Leight., Brit. Sp. Ang. Lich.: 25 (1851)
= *Chiodecton myrticola* var. *albidum* (Taylor) Nyl., Mém. Soc. Imp. Sci. Nat. Cherbourg 3: 190 (1855)
= *Chiodecton myrticola* var. *petraeum* (Delise ex Nyl.) Boistel, Nouv. Fl. Lich. (Paris) 2: 257 (1903)
= *Chiodecton myrticola var. sarniense* Salwey ex Mudd [as 'sarniensis'], Man. Brit. Lich.: 245 (1861)
= *Chiodecton myrticola* var. *syncesia* Schaer., Enum. critic. lich. europ. (Bern): 226 (1850)
= *Chiodecton petraeum* Delise ex Nyl., Mém. Soc. Imp. Sci. Nat. Cherbourg 4: 104 (1856)
= *Syncesia albida* Taylor, in Mackay, Fl. Hibern. (Dublin) 2: 103 (1836)

[VZ2202], Italia.Sardinia. Prov. Sassari: Nurra, scopulum Punta (Capo) Falcone dictum, 150 m. In ramulis emortuis *Juniperi*. Leg. A. Vězda, 19.7.1987. Ex A. Vězda Lichenes Selecti Exsiccati Nr. 2202.

Thallus crustose, episubstratic, continuous and smooth to folded-nodulose, chalky white to pale grey, water-repellent, esorediate, sometimes delimited by a dark prothallus. Apothecia brown to black, but often white-pruinose, punctiform, circular, lirelliform or star-shaped, 0.1-0.2 mm across, often confluent, immersed in raised, basally constricted, rounded to oval, 1-4 mm wide stromata with 5-15 apothecia. Exciple level with disc, of richly branched, interwoven, hyaline hyphae encrusted with crystals dissolving in K; epithecium dark brown; hymenium colourless, 70-90 µm high, I+ blue; pseudoparaphyses sparingly branched, coherent in water but easily separable in K; hypothecium carbonaceous, K+ olive-black. Asci 8-spored, clavate, fissitunicate, thickened at apex, with an internal K/I+ blue ring. Ascospores 3-septate, hyaline, narrowly fusiform, straight or curved, 35-44 x 4-5 µm. Pycnidia brown to black. Conidia thread-like, straight to curved. Photobiont trentepohlioid. Spot tests: thallus K-, C-, KC-, P+ rust-red, UV+ cream-coloured, K/UV+ bright blue. Chemistry: protocetraric and roccellic acids. - Note: a humid subtropical to Mediterranean-Atlantic lichen found on bark and base-rich siliceous rocks in the most humid parts of Tyrrhenian Italy, usually in the Mediterranean belt and not far from the sea, sometimes lichenicolous on *Dirina*-species. Sterile, sorediate, often epiphytic forms corresponding with .



Chiodecton myrticola



Chiodecton myrticola

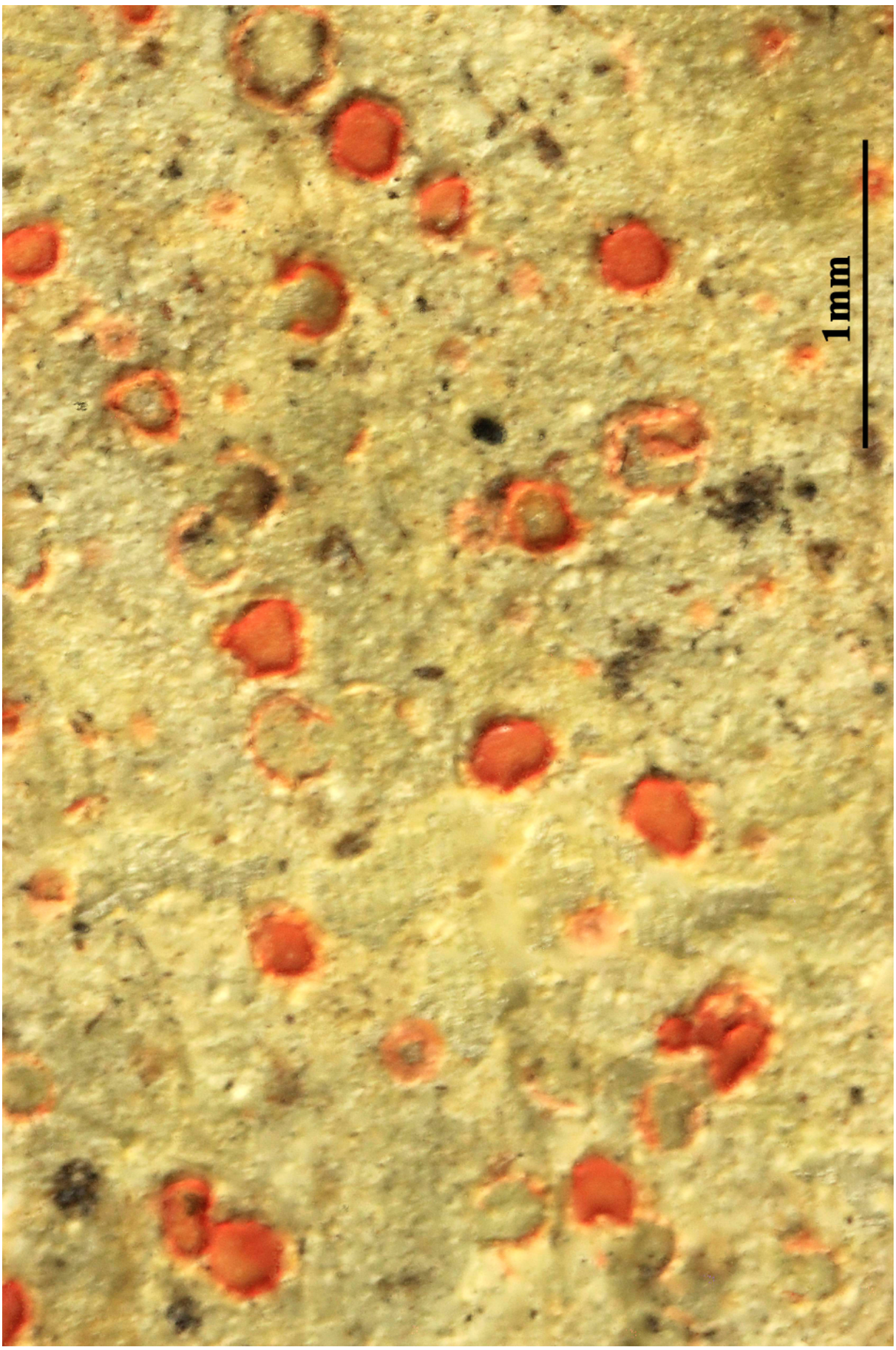
Chroodiscus coccineus (Leight.) Müll. Arg., Lich. Epiph. Novi: 18 (1890)
= *Ocellularia coccinea* (Leight.) Müll. Arg., Flora, Regensburg 66(22): 353 (1883)
= *Phyllophthalmaria coccinea* (Leight.) Zahlbr., in Engler & Prantl, Nat. Pflanzenfam., Edn 2 (Leipzig) 8: 139 (1926)
= *Platygrapha coccinea* Leight., Trans. Linn. Soc. London 25: 456 (1866)
= *Thelotrema coccineum* (Leight.) Hale, Mycotaxon 11(1): 131 (1980)

[VZ1891], Brasilia. Amazonas. Manaus, 100-200 km ad septentriones et occidentem versus a Manaus, In ripa fluminis Negro, 40 m. Foliicola, in pluviisilva. Leg. K. Kalb (nr. 310), 14.18.10.1980. EX A. VěZDA LICHENES SELECTI EXSICCATI NR. 1891.

Thallus continuous, coarsely verrucose, pale greenish grey to greenish white. Photobiont cells rectangular, 12–20 x 4–5 µm, in radiate rows. Apothecia immersed-erumpent, more or less regularly rounded, 0.2–0.4 mm diam. and 60–80 µm high; disc plane, orange-red, K+ dark purple; margin orange-red, K+ purple. Excipulum 5–8 µm broad, colorless. Hypothecium 5–15 µm high, pale yellow. Epithecium 3–8 µm high, yellow to orange-red, K+ purple. Hymenium 40–55 µm high, colorless. Ascospores fusiformellipsoid, 3-septate, without constrictions at septa, 8–12 x 2.5–4 ´µm, colorless. Pycnidia not observed. Chemistry: unidentified anthraquinones in apothecial disc. Distribution and Ecology. Neotropics. The most abundant member of the genus, typically found in the
rain forest understory and small light gaps and particularly common on palm leaves. This species has been reported from the Paleotropics (Santesson, 1952; Awasthi, 1965; Sethy & Patwardhan, 1987; Vézda et al., 1997).



Chroodiscus coccineus



Chroodiscus coccineus

Cladia aggregata (Sw.) Nyl., Bull. Soc. linn. Normandie, sér. 2 4(2): 167 (1870)
= *Baeomyces aggregatus* (Sw.) Ach., Methodus, Sectio post. (Stockholmiæ): 355 (1803)
= *Cenomyce aggregata* (Sw.) Ach., Lich. Univ.: 563 (1810)
= *Cenomyce diatrypa* Taylor, London J. Bot. 6: 186 (1847)
= *Cladia collodes* (Hook. f. & Taylor) C.W. Dodge, Nova Hedwigia 19(3-4): 490 (1971) [1970]
= *Cladina aggregata* (Sw.) Nyl., Flora, Regensburg 49(12): 179 (1866)
= *Cladina gorgonea var. subrangiferina* (Nyl.) Stizenb., Ber. Tät. St Gall. naturw. Ges.: 134 (1890) [1888-89]
= *Cladonia aggregata* (Sw.) Spreng., Syst. veg., Edn 16 4(1): 270 (1827)
= *Cladonia aggregata f. subdivergens* Hellb., Bih. K. svenska VetenskA-kad. Handl., Afd. 3 21(no. 13): 89 (1896)
= *Cladonia aggregata var. straminea* Müll. Arg., in Vainio, Revue mycol., Toulouse 1(4): 162 (1879)
= *Cladonia aggregata var. subdivergens* (Hellb.) Räsänen, Ann. bot. Soc. Zool.-Bot. fenn. Vanamo 2(no. 1): 51 (1932)
= *Cladonia aggregata var. tenera* F. Wilson, Pap. Proc. R. Soc. Tasm.: 153 (1893) [1892]
= *Cladonia cornicularia* Flörke, De Cladoniis, Commentatio secunda: 180 (1828)
= *Cladonia gorgonea var. subrangiferina* Nyl., Syn. meth. lich. (Parisiis) 1(2): 214 (1860)
= *Cladonia gorgonina* (Bory) Vain., Acta Soc. Fauna Flora fenn. 4(no. 1): 306 (1887)
= *Cladonia gorgonina var. subrangiferina* (Nyl.) Vain., Acta Soc. Fauna Flora fenn. 4(no. 1): 309 (1887)
= *Clathrina aggregata* (Sw.) Müll. Arg., Flora, Regensburg 66(6): 80 (1883)
= *Coralloides gorgonina* Bory, in Flörke, Mag. Gesell. naturf. Freunde, Berlin 3(1-2): 125 (1809)
= *Dufourea collodes* Hook. f. & Taylor, London J. Bot. 3: 650 (1844)
= *Lichen aggregatus* Sw., Prodr.: 147 (1788)
= *Stereocaulon aggregatum* (Sw.) Raeusch., Nomencl. bot., Edn 3: 328 (1797)

[VZ1911], Republica Dominicana. La Vega: 17 km ad meridiem et orientem versus a Constanza, 1650 m. In rupibus secus viam. Leg. W. L. Culberson & C. F. Cilberson, 17.6.1982. Ex A. VěZDA: Lichenes Selecti Exsiccati Nr. 1911.

Pseudopodetia 1–8 cm tall, hollow, fragile when dry, green through shades of cream, straw, brown to almost black. Sterile pseudopodetia horny, rigid when dry, extremely variable in size, from 0.5–8 mm wide, dichotomously or irregularly branched, flexuose, prostrate or ascending, sometimes smaller branches terminating in cilia-like spines. Fertile pseudopodetia much thicker and taller than sterile pseudopodetia, usually more perforate and more branched towards apex. Apothecia solitary or tiered, to 0.3 mm wide; disc slightly concave to flat, matt, brownish black to black. Ascospores 12–15 × 4–5 µm. Pycnidia ellipsoidal, 320 × 120 µm. Conidia 5 × 1 µm. CHEMISTRY: thallus K-, C-, KC-, P-. Barbatic, 4-O-demethylbarbatic, fumarprotocetraric, ursolic acids, unknown triterpenes and 13 unidentified products. Occurs in Hawaii, Asia, South America and South Africa. Tolerant of a wide range of habitats; often growing on rotten wood, and also often epiphytic.

Cladia aggregata



Cladia aggregata

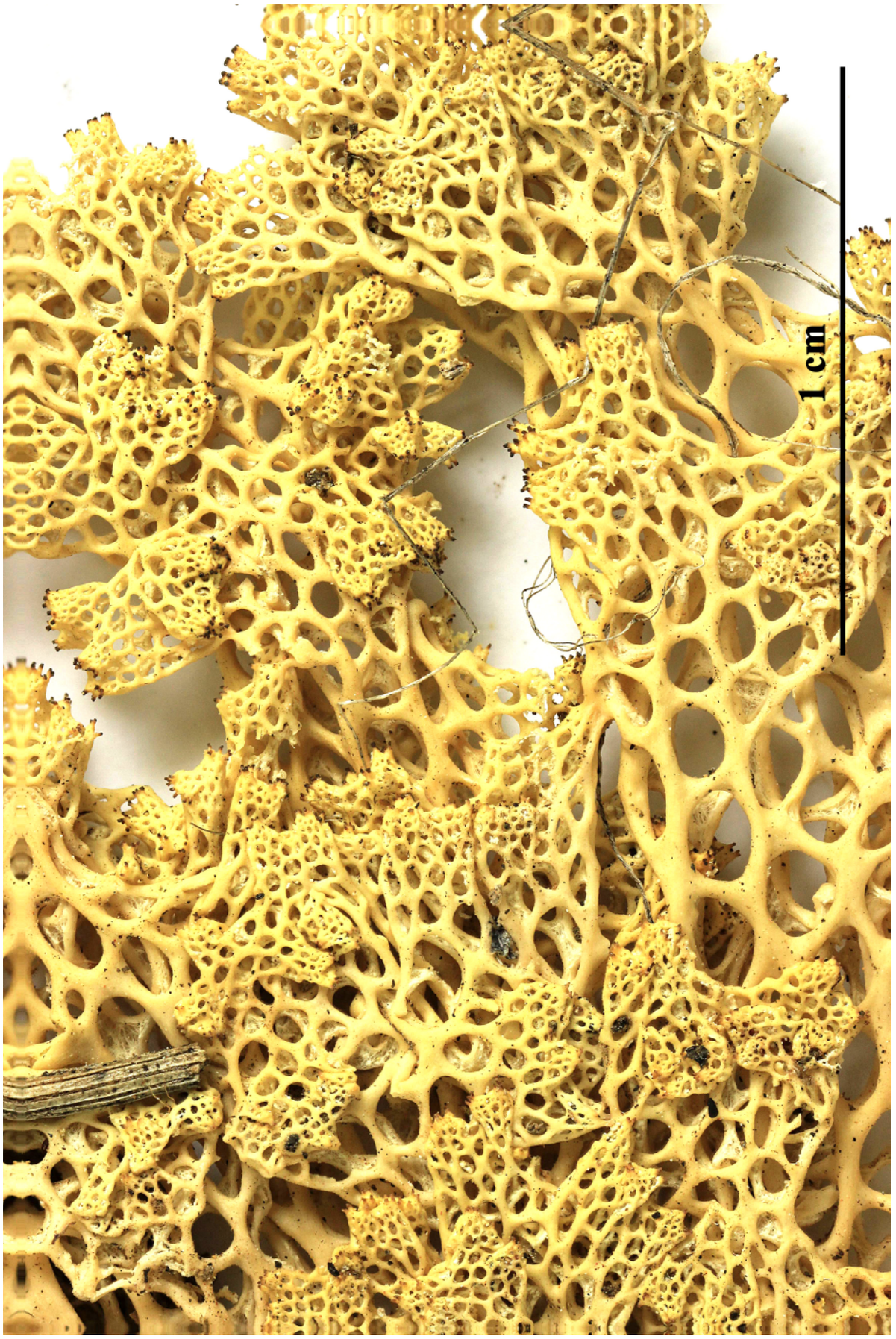


Cladia aggregata

Cladia ferdinandii (Müll. Arg.) Filson, Victorian Nat. 87: 325 (1970)
= *Pulchrocladia ferdinandii* (Müll. Arg.) S. Stenroos, Pino-Bodas & Ahti, in Stenroos, Pino-Bodas, Hyvönen, Lumbsch & Ahti, Cladistics 35: 379 (2018)
= *Cladonia ferdinandii* Müll. Arg. [as 'ferdinandi'], Flora, Regensburg 65(19): 293 (1882)
= *Cladonia retipora* var. *ferdinandii* (Müll. Arg.) Vain. [as 'ferdinandi'], Acta Soc. Fauna Flora fenn. 4(no. 1): 234 (1887)
= *Clathrina ferdinandii* (Müll. Arg.) Müll. Arg. [as 'ferdinandi'], Flora, Regensburg 66(6): 80 (1883)

[VZ2495], Australia occidentalis: Ad meridiem et occidentem versus a Brookton, loco Boyagin Rock (32°28' S, 116°54' E); in margine sylvae. Ad terram. Leg L. Culberson (no. 21285) et C. F. Cilberson, 12.11.1990.- Annot; Atranorin, usnic acid, rangiformic acid, and two unidentifoed compounds by TLC; A. Johnson and F. Culberson. Ex A. VěZDA Lichenes Selecti Exsiccati Nr. 2495.

Cladia ferdinandii looks similar to sister-species *Cladia retipora*, but is overall larger, and prefers dryer habitats than the latter. Thallus fruticose, in pulvinate clumps up to 75 cm diam., or in scattered clusters; composed of pseudopodetia, up to 15 cm tall; creamy white, yellowing at the tips. Sterile pseudopodetia rigid when dry, horny, up to 12 mm diam., irregularly branched; walls regularly perforate; perforations large, up to 4 mm diam., irregularly rounded. Cortex up to 40 µm thick; algal layer in scattered colonies throughout the medulla, c lls up to 10 µm diam.; medulla loosely woven, hyphae hyaline, up to 12 µm diam. inner-medulla lacking. Fertile pseudopodetia and apothecia not known. Pycnidia globose, terminal or laminal, partly immersed or sessile on the upper branches, 50 µm diam. and up to 60 µm long; conidia 5 x 1 µm, hyaline, curved. Chemistry. Thallus K+ yellow, C-, KC-, P-. Contains usnic, ursolic acids and atranorin. Chemical variation in this species is confined to the presence or absence of ursolic acid. Ecology and distribution. This species shows very little morphological variation; some specimens vary a little in colour depending on the amount of Usnic acid they contain but, on the whole, populations are fairly uniform. Cladia ferdinandii is the largest and most spectacular species in the genus. It was first described by Prof. Jean Miiller (Miill. Arg., 1882) from material collected by Andrew Dempster near Esperance Bay in Western Australia.



Cladia ferdinandii

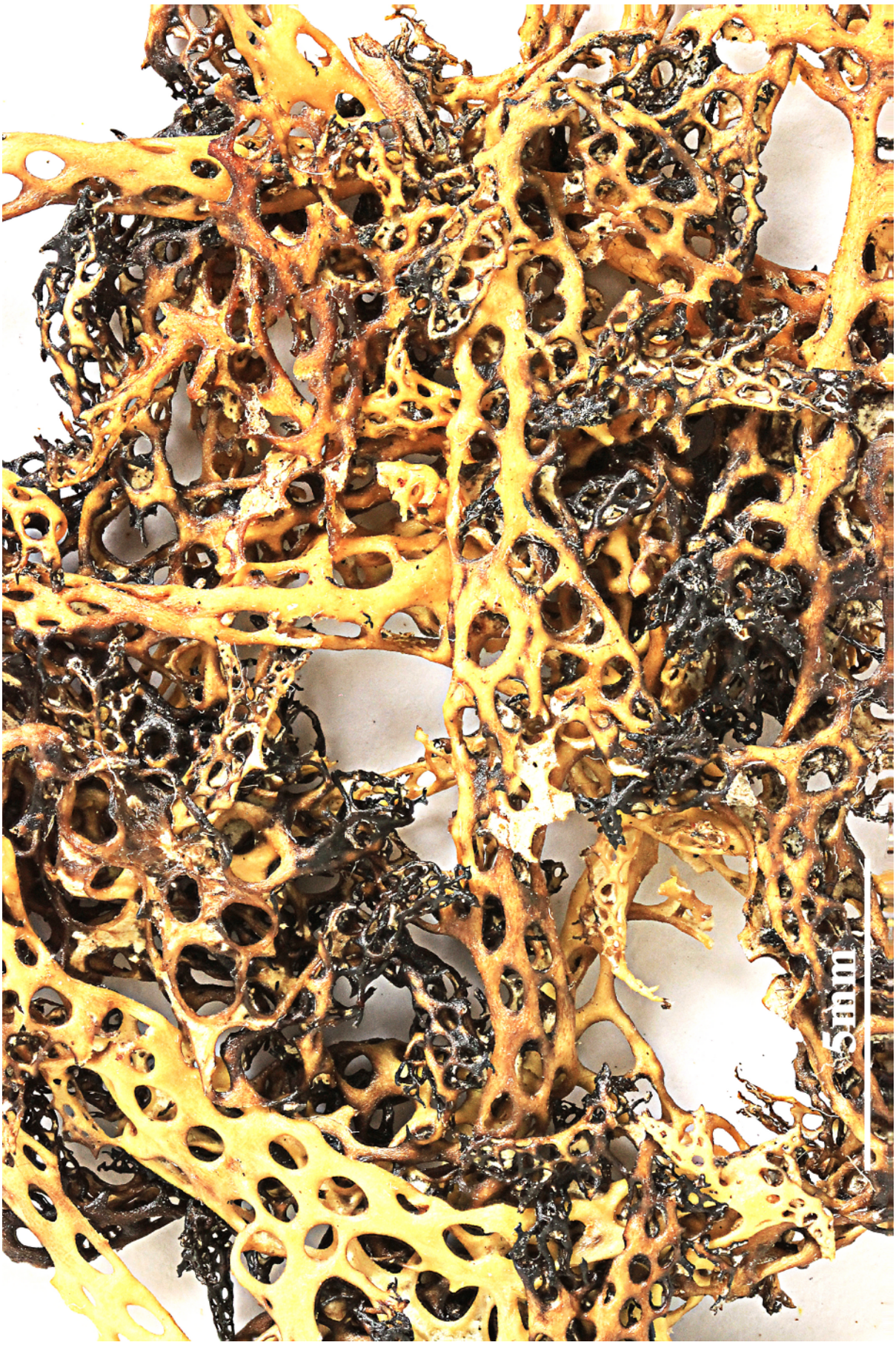


Cladia ferdinandii

Cladia fuliginosa Filson, Victorian Nat. 87: 325 (1970)
= *Rexiella fuliginosa* (Filson) S. Stenroos, Pino-Bodas & Ahti, in Stenroos, Pino-Bodas & Ahti, Cladistics 35: [603] (2019)
= *Rexia fuliginosa* (Filson) S. Stenroos, Pino-Bodas & Ahti, in Stenroos, Pino-Bodas, Hyvönen, Lumbsch & Ahti, Cladistics 35: 379 (2018) [2019]

[VZ2064], Australia, Tasmania. Perambulator Ridge, ad septentriones a Lake Curly, 920 m. Ad furfam in regione alpina. Leg. G. Kantvilas (no. 80/85) et. J. Jarman, 6.II.1985. Ex A. Vězda: Lichenes Selecti Exsiccati Nr. 2064.

Pseudopodetia in scattered clumps or carpeting small areas, to 7 cm high, green when immature, becoming brown to black; smaller pseudopodetia within clump, green with orange-brown tips. Sterile pseudopodetia rigid, horny, to 2 mm wide, irregularly branched; perforations broadly elliptic to round, irregularly spaced. Fertile pseudopodetia similar. Inner-medulla filling most of pseudopodetium; hyphae 8–10 µm wide, pale brown to black, Apothecia to 0.5 mm wide; disc slightly concave to flat, reddish brown to dark brown; exciple slightly raised, persistent; lower cortex concolorous with pseudopodetia. Asci and ascospores not seen. Pycnidia c. 170 × 120 µm. Conidia not seen. CHEMISTRY: thallus K-, C-, KC-, P-. Divaricatic and ursolic acids, unknown triterpenes and one unidentified product. - Occurs Australia, New Zealand, and South America.



Cladia fuliginosa



Cladia fuliginosa

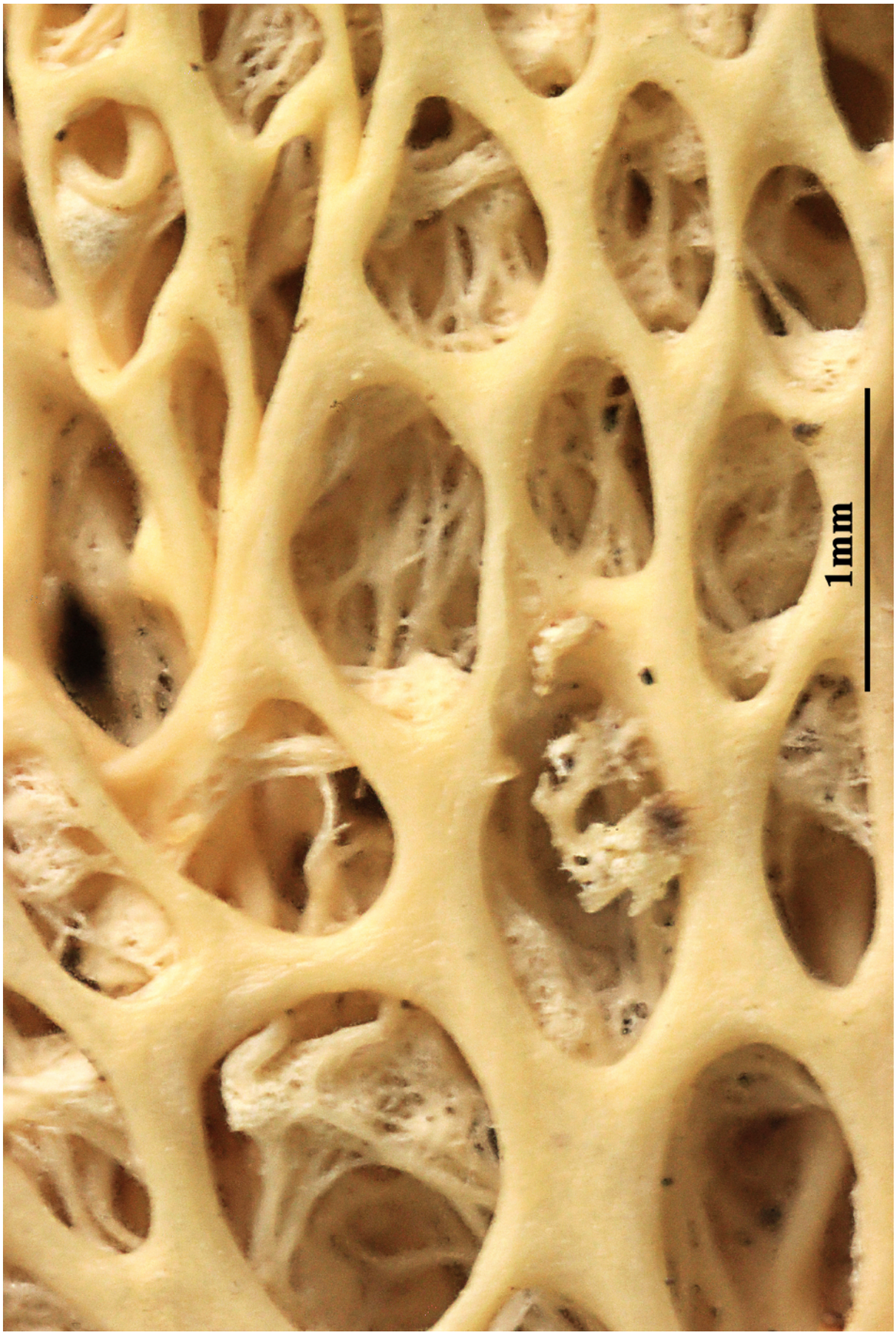
Cladia retipora (Labill.) Nyl., Bull. Soc. linn. Normandie, sér. 2 4(2): 167 (1870)
= *Pulchrocladia retipora* (Labill.) S. Stenroos, Pino-Bodas & Ahti, in Stenroos, Pino-Bodas, Hyvönen, Lumbsch & Ahti, Cladistics 35: 379 (2018)
= *Baeomyces retiporus* Labill. [as 'reteporus'], Nov. holland. pl. spec. 2: 110 (1806)
= *Cenomyce retipora* (Labill.) Ach., Syn. meth. lich. (Lund): 248 (1814)
= *Cladina retipora* (Labill.) Nyl., Bull. Soc. linn. Normandie, sér. 2 2: 50 (1868)
= *Cladonia retipora* (Labill.) Fr., Nov. Sched. Critic. Lich. (Lundae): 21 (1826)
= *Clathrina retipora* (Labill.) Müll. Arg., Flora, Regensburg 66(6): 80 (1883)
= *Lichen retiporus* (Labill.) DC., in Lamarck, Encycl. Méth. Bot., Suppl. (Paris) 3(1): 368 (1813)
= *Pycnothelia retipora* (Labill.) Fée, Essai Crypt. Exot. (Paris): xcviii (1825) [1824]

[VZ2065], Nova Zelandia. Southerb Lakes: Secus viam 9 km ad australem versus ad Te Anau, 210 m. Ad terram. Leg. M. E. Hale, 27.o1.1984. Ex A. VěZDA: Lichenes Selecti Exsiccati Nr. 2065.

Thallus fruticose, in pulvinate clumps up to 0.5 m diam., or in occasional scattered clusters 3-4 cm diam. ; composed of pseudopodetia up to 5 cm high, white to pale grey, sometimes yellowing at the tips of the branches, sometimes upper portions or just the tips blackening. Sterile pseudopodetia robust, up to 8 mm diam., dichotomous to irregularly branched, fenestrations variable in shape, round to ellipsoidal. Cortex 30-40 µm thick, pale brown; algal cells 6-12 µm diam., in scattered colonies up to 150 µm diam; medulla loosely woven of anastomosing hyphae 6-9 µm diam.; inner-medulla stranded throughout the central portion of the pseudopodetium, sometimes becoming corticate, sometimes containing scattered algal colonies. Fertile pseudopodetia similar. Apothecia terminal on the upper branches of the fertile pseudopodetia, up to 0.14 mm diam.; disk convex, dark reddish-brown to black; margin thin disappearing at maturity; hymenium 35-40 µm high, reddish-brown; paraphyses tightly set in mucilage; asci 8-spored, 27-30 x 11-16 µm; ascospores 11-14 x 3-4.5 µm, hyaline, unicellular, tapering towards each end, sometimes slightly curved. Pycnidia brownishblack to black, terminal on the apical and auxillary branchlets, sessile, ellipsoidal, 180 x 150 µm; conidia baccilliform, hyaline, 6 <1 µm, curved. Chemistry: Thallus K- or K+ yellow, C-, KC- or KC+ orange, P-. Contains usnic, protolichesterinic, ursolic acids, atranorin, unknown triterpenes and four unidentified substances.



Cladia retipora



Cladia retipora

Cladia schizopora (Nyl.) Nyl., Bull. Soc. linn. Normandie, sér. 2 4(2): 167 (1870)
= *Cladina schizopora* (Nyl.) Nyl., Flora, Regensburg 49(12): 179 (1866)
= *Cladonia schizopora* Nyl., Syn. meth. lich. (Parisiis) 1(2): 217 (1860)
= *Clathrina aggregata var. pygmaea* Müll. Arg., Flora, Regensburg 66(6): 80 (1883)
= *Clathrina schizopora* (Nyl.) Müll. Arg., Flora, Regensburg 66(6): 80 (1883)

[VZR1835], Tasmania. Huonville, in monte Snug, ad cataracta Snug Falls dicta, 43°05' austr., 147°12' orient., 180 m. Ad truncum decorticatum *Eucalypti* sp.. in silva *Eucalyptus obliqua*. Leg. et det. L. Tibell (no. 11270), 8.03. 1981. Ex A. Vezda: Lichenes Selecti Exsiccati Nr. 1835.

Thallus fruticose, corticolous, composed of pseudopodetia up to 1.5 cm tall, green to yellow-green to brown. Sterile pseudopodetia up to 2 mm tall, sorediose on the tips or completely reduced to soredia. Fertile pseudopodetia horny when dry, up to 15 mm tall, perforated, branched towards the apex, sorediose on the inside. Cortex 50-80 µm thick; algal layer discontinuous, becoming disjointed as the soredia forms, cells up to 8 µm diam.; medulla compactly woven; inner-medulla lacking. Apothecia terminal on the branches of the fertile pseudopodetia, 0.3-0.5 mm diam.; disk slightly concave to flat, dull, brownish-black to black; margin slightly raised at first, disappearing at maturity; lower cortex black; hypothecium pale brown; Hymenium up to 40 µm tall, pale brown; paraphyses simple, 1.5 µm diam., apical cell expanded to 4 µm; asci 30-40 < 8-11 µm; ascospores 8-10 x 3 µm, simple, hyaline. Pycnidia terminal on the lobes of the sterile pseudopodetia, ellipsoidal, 120 um long and 60 ym diam.; conidia 5 x1 µm baccilliform, curved. Chemistry: Thallus K-, C-, KC-, CK- or CK+ yellow, P-. Contains gyrophoric, fumarprotocetraric, protolichesterinic, ursolic acids and unknown triterpenes.



Cladia schizopora



Cladia schizopora

Cladia sullivanii (Müll. Arg.) W. Martin, Trans. Roy. Soc. N.Z., Bot. 2: 44 (1962)

= *Rexiella sullivanii* (Müll. Arg.) S. Stenroos, Pino-Bodas & Ahti, in Stenroos, Pino-Bodas & Ahti, Cladistics 35: [603] (2019)

= *Cladonia sullivanii* Müll. Arg. [as 'sullivani'], Flora, Regensburg 65(19): 294 (1882)

= *Clathrina sullivanii* (Müll. Arg.) Müll. Arg. [as 'sullivani'], Flora, Regensburg 66(6): 80 (1883)

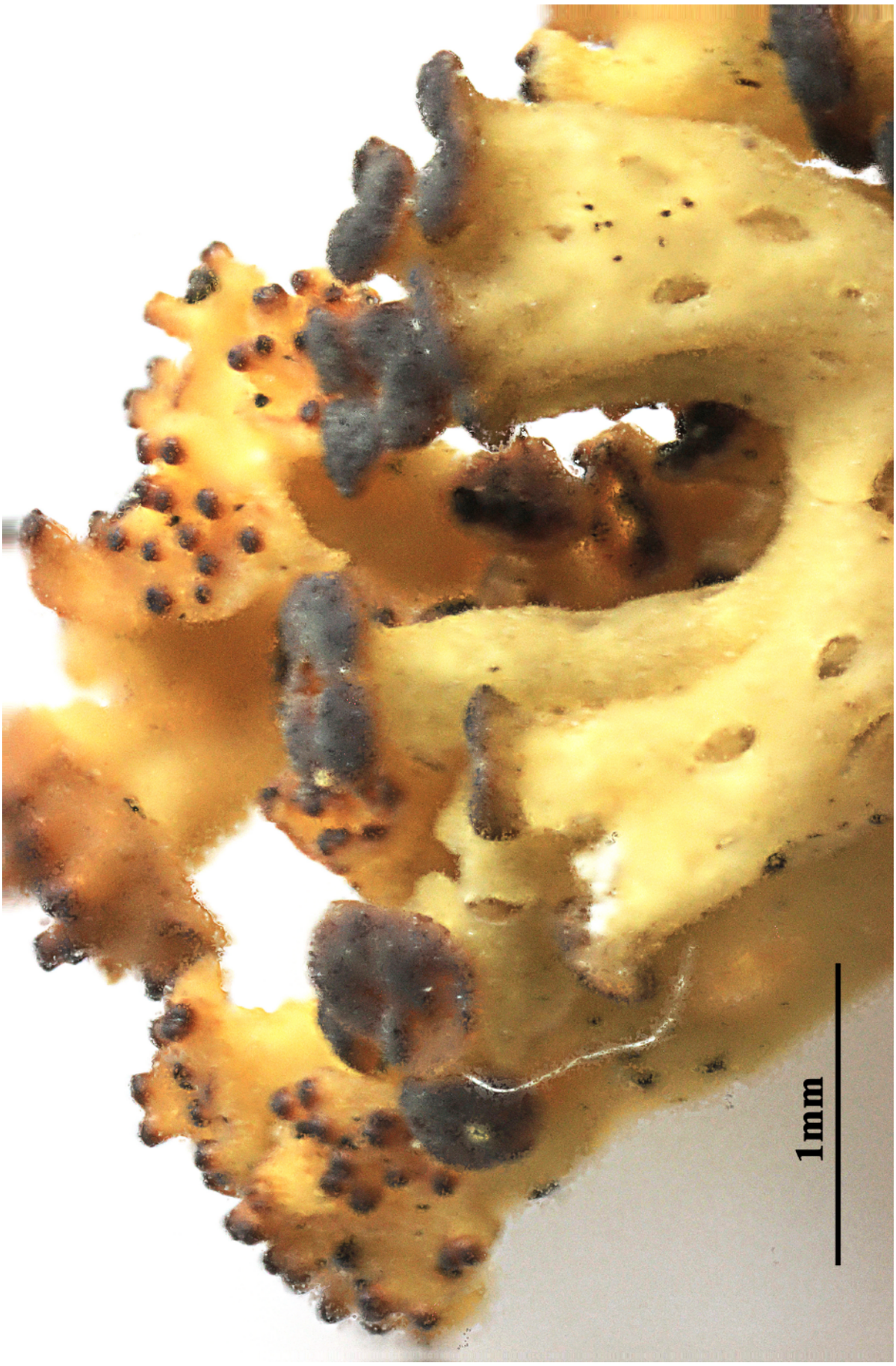
= *Rexia sullivanii* (Müll. Arg.) S. Stenroos, Pino-Bodas & Ahti, in Stenroos, Pino-Bodas, Hyvönen, Lumbsch & Ahti, Cladistics 35: 378 (2018) [2019]

[VZ3036], Australia, Tasmania. Ramonea Plains, 80 m. Supra turfam. Leg. G. Kantvilas (586/84), 30.III.1084. EX A VěZDA: LICHENES SELECTI EXSICCATI NR. 2036.

Thallus fruticose, usually in clumps; composed of pseudopodetia up to 14 cm tall in wet habitats and as low as 1cm in dry; colour varies from greenish-yellow, straw-coloured, cinnamon-brown to black. Sterile pseudopodetia tigid when dry, coarsely farinose, up to 5 mm diam. in expanded specimens, unevenly branched, walls perforate; perforations irregularly rotund to elliptic. Cortex up to 40 µm thick, with a very thick, discontinuous outer amorphous layer, in places up to 60 µm thick, algal layer discontinuous 30-40 µm thick, cells up to 12 µm diam. ; medulla compactly woven below the algal layer; inner-medulla compact, filling the whole of the interior of the pseudopodetium, hyphae hyaline at the tips of the branches, becoming brown to black towards the base, 10 µm diam. Fertile pseudopodetia much taller than the sterile pseudopodetia, in other ways the same. Apothecia terminal on the upper branches of the fertile pseudopodetia, lecideine, 0.2-0.7 mm diam.; disk flat, becoming strongly convex at maturity, dull, reddish-brown to brownish-black; margin just discernible when young, disappearing; lower cortex reddish-black; hypothecium pale brown; hymenium 60-70 µm tall, pale brown; paraphyses 1.0-1.5 µm diam., apical cell expanded to 4 µm; asci 45 x 8 µm; ascospores 25-27 x 5 µm, simple, hyaline, slightly pointed at one end. Pycnidia terminal on the smaller branches of the sterile pseudopodetia, c. 320 µm long and 120 µm diam.; conidia 6 x 1 µm, hyaline, straight or curved. Chemistry: Thallus K-, C-, KC-, P-. Contains usnic, ursolic, protolichesterinic and divaricatic acids, unknown triterpenes and one unidentified substance.



Cladia sullivanii



Cladia sullivanii

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= *Patellaria coccinea* var. *squarrosa* Wallr., Naturg. Saulchen.-Fl.: 191 (1829)
= *Patellaria foliacea* var. *arbuscula* Wallr., Naturg. Saulchen.-Fl.: 169 (1829)

[VZ2092], Venezuela. Estado Tachira, Páramo El Zumbator (Páramo do los Colorados), 3600 m. Ad terram. Leg. M. López-Figueiras (no. 9460) et M. Keogh, 4.7.1975, det. T. Ahiti. - Annot: Acidos usnico y fumarprotocetrarico - M. López-Figueiras. EX A. VěZDA LICHENES SELECTI EXSICCATI NR. 2092.

Podetia yellowish to whitish gray, slightly browned at tips, 7-13(-17) cm tall, 1-1.5(-2) mm thick, slender (occasionally forming robust morphs with 3-5 mm thick axes; loosely branched; branching type anisotomic dichotomy (86-92%), rarely trichotomy (8-14%); ultimate branchlets erect to divaricate, rather dense at apex but rarely strongly unilaterally "combed." Surface longitudinally rather loosely fibrose but smooth to very little verruculose because algal glomerules do not form verruculae, not corticoid. Podetial wall 120-320 µm; arachnoid ectal layer 25-30 µm; medulla 40-90 µm; stereome 80-240 µm; central canal minutely papillate. Conidiomata frequent, 160 x 100-120 µm, cylindrical; conidia 5-7 x 1 µm, slightly curved. Hymenial disks to 0.4 mm in diam., pale brown, often pruinose; spores not observed. Chemistry. Four major chemotypes: (I) P+ orange red, K-, usnic and fumarprotocetraric acids as major compounds, with traces of protocetraric acid and confumarprotocetraric acids, rarely additionally convirensic acid (identification uncertain); (II) P-, K- , usnic acid alone; (III) P+ yellow orange (reaction weak) or P-, K+ yellow-orange or K-, usnic and stictic acids as major compounds, with constictic and cryptostictic acids as minor ones; (IV) P+ orange red, K+ yellow orange, usnic acid, fumarprotocetraric-acid complex, and stictic-acid complex all combined in the same thalli. Ursolic acid and two to four fatty acids (but not rangiformic or norrangiformic acids, and pseudonorrangiformic acid very rare) as well as some other unknown substances, rarely also isousnic acid. The usnic-acid contents are low but higher
than those of fumarprotocetraric acid (0.5%) and stictic acid (0.3%) (Huovinen & Ahti, 1986a). Chemotype I is by far the most frequent, but in certain regions chemotypes II and III are also common, locally perhaps the only ones, while chemotype IV is very rare. Distribution: Northern Andes, from Colombia and Venezuela south to Bolivia, rarely in Central America (Costa Rica, Guatemala), at 1500- 4000 m; small outlier in the Brazilian Highland, south- east Brazil. Very common in paramos, descending to upper Andean forests. In Colombia (Sipman &

Cladina boliviana

Cleef 1979) it is reported to occur particularly in subparamo Sphagnum bogs; in humid Swallenochloa communi- ties, open dwarf-shrub communities in zonal paramos; and in lower grass paramos (especially chemotypes II and III) and on rock outcrops. Similar ecology was noted in the Venezuelan paramos, where the species is common, even dominant, in *Hypericum* dwarf-shrub communities and in bogs. In Brazil above 2000 m on moist, open rock outcrops and road banks in cloud forests, relatively scarce.

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[VZ2108], Venezuela. Estado Merida: Páramo de los Granates, regio montisChimborazo, 2800 m. Ad terram. Leg. M. López-Figueiras (15069).30.12.1977, det T. Ahiti. - acido usnico y acido fumarprotocetrarico; anal. M. López-Figueiras. EX A. VEZDA LICHENES SELECTI EXSICCATI NR. 2108.

Podetia yellowish to whitish gray, slightly browned at tips, 7-13(-17) cm tall, 1-1.5(-2) mm thick, slender (occasionally forming robust morphs with 3-5 mm thick axes; loosely branched; branching type anisotomic dichotomy (86-92%), rarely trichotomy (8-14%); ultimate branchlets erect to divaricate, rather dense at apex but rarely strongly unilaterally "combed." Surface longitudinally rather loosely fibrose but smooth to very little verruculose because algal glomerules do not form verruculae, not corticoid. Podetial wall 120-320 µm; arachnoid ectal layer 25-30 µm; medulla 40-90 µm; stereome 80-240 µm; central canal minutely papillate. Conidiomata frequent, 160 x 100-120 µm, cylindrical; conidia 5-7 x 1 µm, slightly curved. Hymenial disks to 0.4 mm in diam., pale brown, often pruinose; spores not observed. Chemistry. Four major chemotypes: (I) P+ orange red, K-, usnic and fumarprotocetraric acids as major compounds, with traces of protocetraric acid and confumarprotocetraric acids, rarely additionally convirensic acid (identification uncertain); (II) P-, K- , usnic acid alone; (III) P+ yellow orange (reaction weak) or P-, K+ yellow-orange or K-, usnic and stictic acids as major compounds, with constictic and cryptostictic acids as minor ones; (IV) P+ orange red, K+ yellow orange, usnic acid, fumarprotocetraric-acid complex, and stictic-acid complex all combined in the same thalli. Ursolic acid and two to four fatty acids (but not rangiformic or norrangiformic acids, and pseudonorrangiformic acid very rare) as well as some other unknown substances, rarely also isousnic acid. The usnic-acid contents are low but higher
than those of fumarprotocetraric acid (0.5%) and stictic acid (0.3%) (Huovinen & Ahti, 1986a). Chemotype I is by far the most frequent, but in certain regions chemotypes II and III are also common, locally perhaps the only ones, while chemotype IV is very rare. Distribution: Northern Andes, from Colombia and Venezuela south to Bolivia, rarely in Central America (Costa Rica, Guatemala), at 1500- 4000 m; small outlier in the Brazilian Highland, south- east Brazil. Very common in paramos, descending to upper Andean forests. In Colombia (Sipman & Cleef 1979) it is reported to occur particularly in subparamo Sphagnum

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[VZ2109], Venezuela. Estado Tachira: Páramo El Zumbador (Páramo de los Colorados), 600 m. Ad terram. Leg. López-Figueiras, 4.6.1975, det. T. Ahti. - annot: acido usnico y acido protocetrarico, anal. López-Figueiras. EX A.VěZDA LICHENES SELECTI EXSICCATI NR. 2109.

Podetia yellowish to whitish gray, slightly browned at tips, 7-13(-17) cm tall, 1-1.5(-2) mm thick, slender (occasionally forming robust morphs with 3-5 mm thick axes; loosely branched; branching type anisotomic dichotomy (86-92%), rarely trichotomy (8-14%); ultimate branchlets erect to divaricate, rather dense at apex but rarely strongly unilaterally "combed." Surface longitudinally rather loosely fibrose but smooth to very little verruculose because algal glomerules do not form verruculae, not corticoid. Podetial wall 120-320 µm; arachnoid ectal layer 25-30 µm; medulla 40-90 µm; stereome 80-240 µm; central canal minutely papillate. Conidiomata frequent, 160 x 100-120 µm, cylindrical; conidia 5-7 x 1 µm, slightly curved. Hymenial disks to 0.4 mm in diam., pale brown, often pruinose; spores not observed. Chemistry. Four major chemotypes: (I) P+ orange red, K-, usnic and fumarprotocetraric acids as major compounds, with traces of protocetraric acid and confumarprotocetraric acids, rarely additionally convirensic acid (identification uncertain); (II) P-, K- , usnic acid alone; (III) P+ yellow orange (reaction weak) or P-, K+ yellow-orange or K-, usnic and stictic acids as major compounds, with constictic and cryptostictic acids as minor ones; (IV) P+ orange red, K+ yellow orange, usnic acid, fumarprotocetraric-acid complex, and stictic-acid complex all combined in the same thalli. Ursolic acid and two to four fatty acids (but not rangiformic or norrangiformic acids, and pseudonorrangiformic acid very rare) as well as some other unknown substances, rarely also isousnic acid. The usnic-acid contents are low but higher
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= *Cladina alpestroides* Abbayes, Rev. Bryol. Lichénol. 16: 79 (1947)
= *Cladina confusa f. bicolor* (Müll. Arg.) Ahti, Beih. Nova Hedwigia 79: 34 (1984)
= *Cladina galapagosensis* (Ahti) W.A. Weber, Mycotaxon 13(1): 101 (1981)
= *Cladina leptoclada* (Abbayes) D.J. Galloway, New Zealand J. Bot. 21(2): 192 (1983)
= *Cladina pohlia* (R. Sant.) W.A. Weber [as 'polia'], Mycotaxon 13(1): 101 (1981)
= *Cladina pycnoclada subsp. thyrsifera* Nyl., Lich. Nov. Zeland. (Paris): 20 (1888)
= *Cladina sylvatica f. sylvestris* (Oeder) Navás, Brotéria, sér. bot. 11: 24, tab. VI, fig. 1 (1913)
= *Cladonia confusa* R. Sant., Ark. Bot. 30A(no. 10): 13 (1942)

[VZ2066], Nova Zeelandia. Southern Lakes: Secus viam 9 km ad australem versus ad Te Anau, 210 m. Ad terram. Leg. M. E. Hale, 25.1.1984. EX A. VěZDA LICHENES SELECTI EXSICCATI NR. 2066.

Primary thallus evanescent. Podetia in mats or tufts often spreading in dense swards, 2-15 cm tall, branching loose to dense, isotomic, mainly trichotomous, irregular or forming compact rounded heads, branches slender 0.3-0.4 mm diam., internodes 5 mm long, axils distinctly open with star-like diverging branchlets. Cortex cottony with minute algal glomerules, greenish-yellow to pale yellow, sometimes bright yellow, never brownish at apices. Chemistry: Cortex K-, KC+ yellow, P-. Perlatolic, anziaic and usnic acids.



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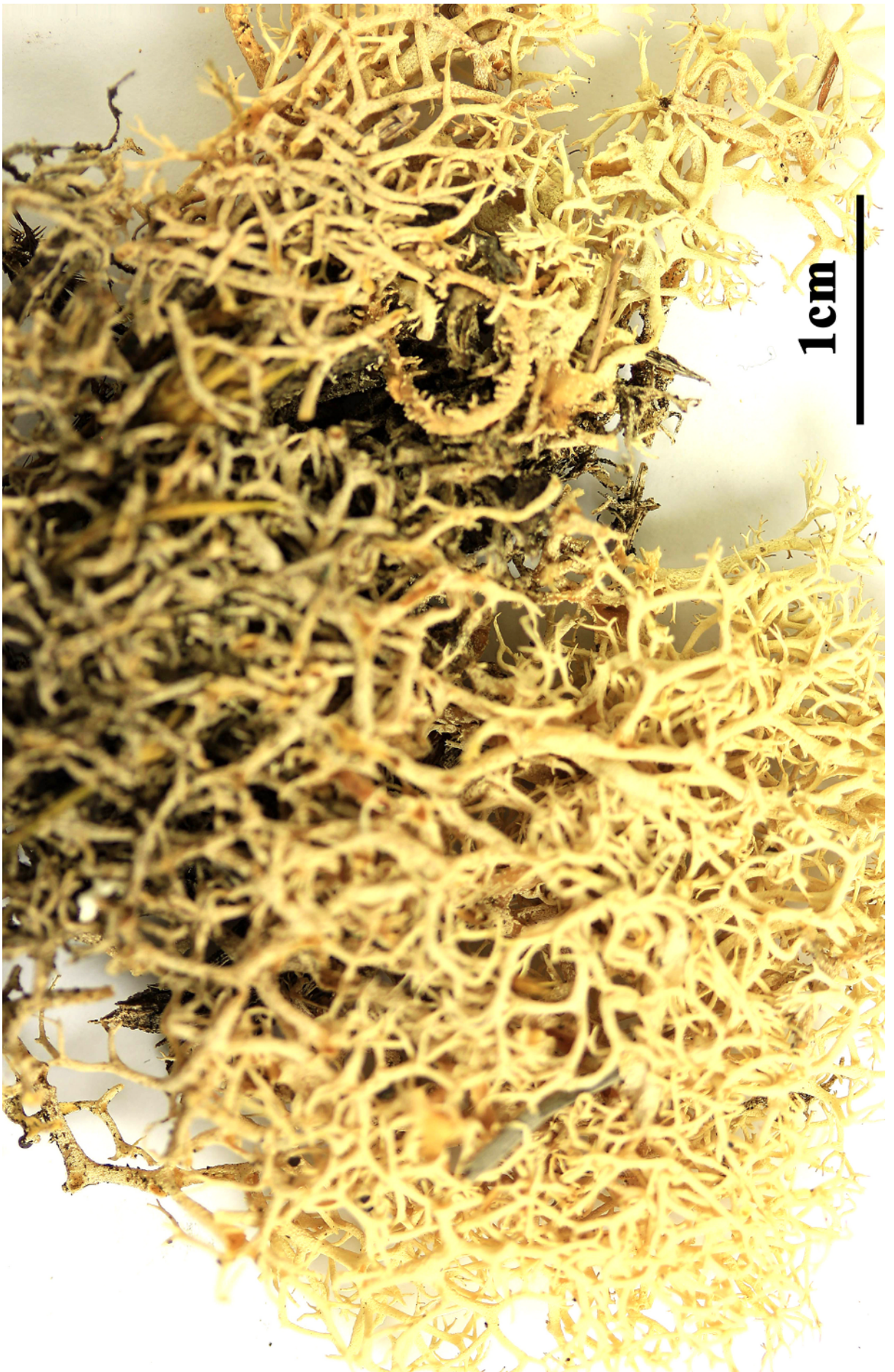
[VZ1912], Respublica Dominica. La Vega: 22 km ad merifiem et orientem versus Constanza, 2160 m. Ad terram secus viam, cum muscis. Leg. W. L. Culberson (no. 18998) et C. F. Culberson, 15.5.1982. - Annot.: Usnic acid, perlatolic acid and probable fain traces of anziaic acid by TLC; A. Johnson and C.F. Culberson. Ex A. VěZDA Lichenes Selecti Exsiccati Nr. 1912.

Primary thallus evanescent. Podetia in mats or tufts often spreading in dense swards, 2-15 cm tall, branching loose to dense, isotomic, mainly trichotomous, irregular or forming compact rounded heads, branches slender 0.3-0.4 mm diam., internodes 5 mm long, axils distinctly open with star-like diverging branchlets. Cortex cottony with minute algal glomerules, greenish-yellow to pale yellow, sometimes bright yellow, never brownish at apices. Chemistry: Cortex K-, KC+ yellow, P-. Perlatolic, anziaic and usnic acids.



Cladina confusa



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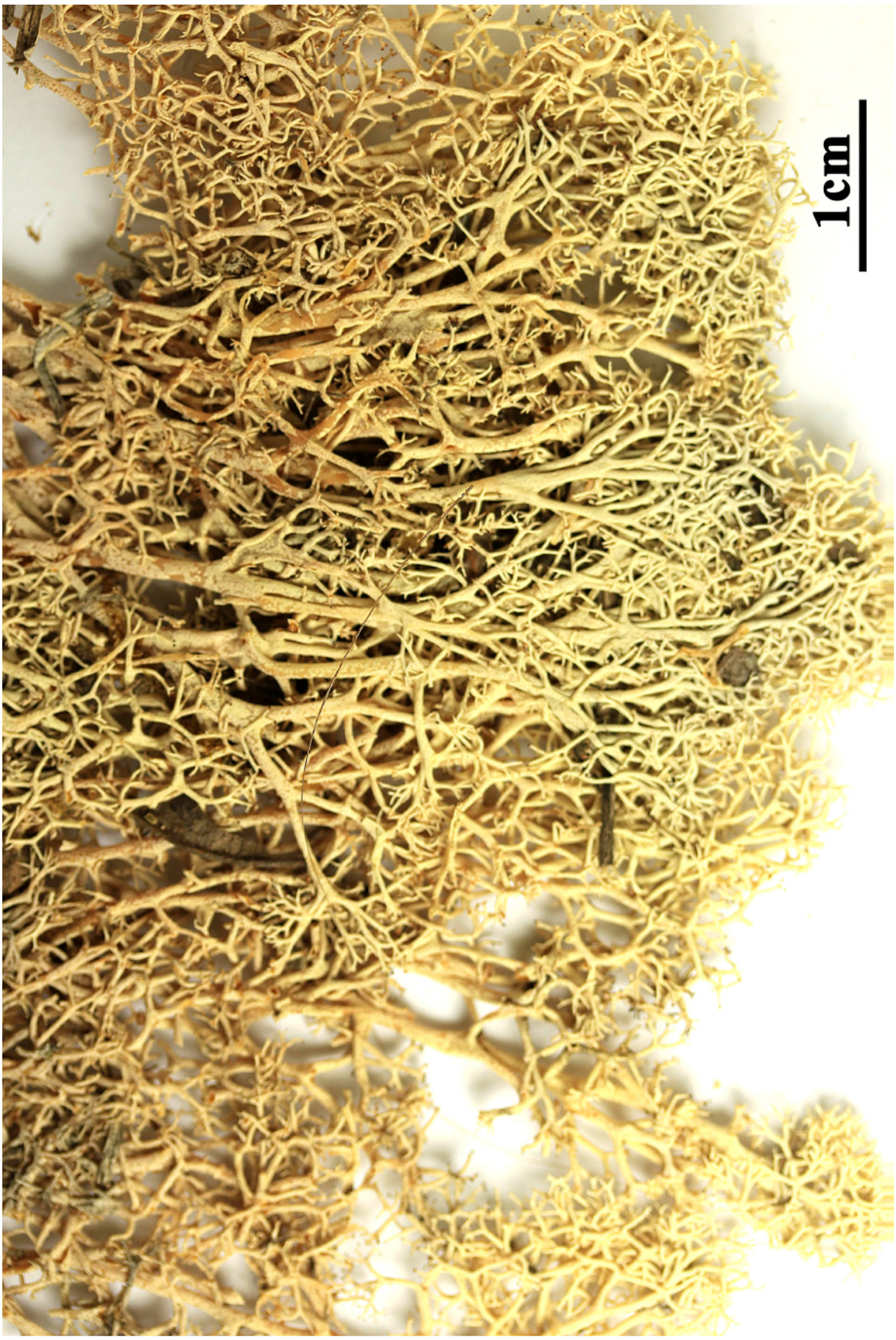
VZ1807], Jamaica Insula. St. Andrew: In montibus dictis Blue Mountains, prope hortum botaniscum dictum Cinchona. Ad terram cum *C. subtenuis* (Abb,) Hale et A. Culb. Leg. W. L. Culberson (no. 18587) et C. F. Culberson, 12.1978. - Annot.: Usnic acid and probably trace of anziaic acid by TLC; A. Johnson and C. F. Culberson. - EX A. VěZDA LICHENES SELECTI EXSICCATI NR. 1807.

Primary thallus evanescent. Podetia in mats or tufts often spreading in dense swards, 2-15 cm tall, branching loose to dense, isotomic, mainly trichotomous, irregular or forming compact rounded heads, branches slender 0.3-0.4 mm diam., internodes 5 mm long, axils distinctly open with star-like diverging branchlets. Cortex cottony with minute algal glomerules, greenish-yellow to pale yellow, sometimes bright yellow, never brownish at apices. Chemistry: Cortex K-, KC+ yellow, P-. Perlatolic, anziaic and usnic acids.



Cladina confusa



Cladina confusa

Cladonia amaurocraea (Flörke) Schaer., Enum. critic. lich. europ. (Bern): 197 (1850)
= *Baeomyces amaurocraeus* (Flörke) Wahlenb., Fl. lapp.: 455 (1812)
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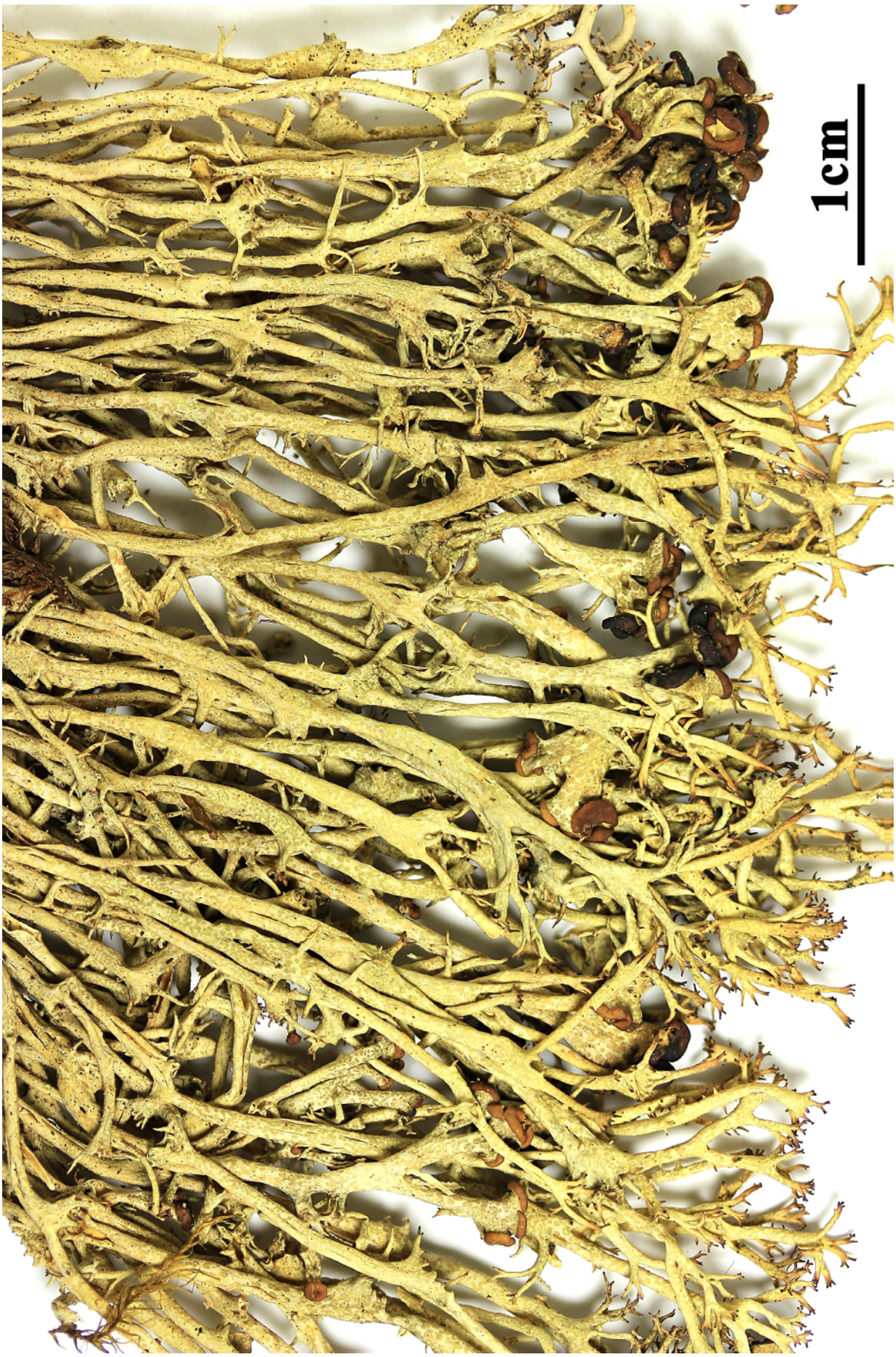
= Cenomyce amaurocraea (Flörke) Flot., Flora, Regensburg 11(40): 629 (1828)
= *Cladina amaurocraea* (Flörke) Nyl., Lich. Lapp. Orient.: 111 (1866)
= *Cladonia gracilis* f. *amaurocraea* (Flörke) Fr., Fl. crypt. Germ. (Norimbergae) 1: 423 (1831)
= *Cladonia gracilis* subvar. *amaurocraea* (Flörke) Mont., in Gay, Hist. fis. y polit. Chile, Bot. 8: 159 (1852)
= *Cladonia uncialis* subsp. *amaurocraea* (Flörke) Th. Fr., Lich. Scand. (Upsaliae)(1): 63 (1871)
= *Patellaria amaurocraea* (Flörke) Wallr., in Fries, Lich. eur. reform. (Lund): 219 (1831)

[VZ1461], Suecia. Värmland, Bogen, in occidente lacus Lomsen, 275 m. Ad terram in saxis.Leg. S. W. Sundell (9817), 30.7.1974. Ex A. VěZDA Lichenes Selecti Exsiccati Nr. 1461.

Primary thallus ephemeral and rarely seen, of small, crenate to incised, up to 1.5 mm broad and long squamules. Podetia hollow inside, yellowish green to yellowish grey, non-squamulose, to 12(-15) cm tall and up to 1.5(-3) mm thick, not melanotic at base, more or less anisotomic dichotomously branched, often forming large tufts, the tips of branchlets often brownish, pointed or terminating in narrow cups which flare rapidly, the cups perforate or closed, often with thorn-like brownish lateral projections. Axils mostly closed, more rarely slightly perforated; internal surface of podetia striated. Apothecia rare, brown to yellowish brown, convex. Asci 8-spored, clavate, thickened at apex, with a K/I+ blue tholus and a K/I+ strongly blue outer gelatinous sheath, Cladonia-type. Ascospores 1-celled, hyaline, ellipsoid. Pycnidia dark, semi-immersed in the tips of podetia or along the margins of cups; pycnidial jelly colourless. Conidia hyaline, curved, rarely cylindrical. Photobiont chlorococcoid. Spot tests: K-, C-, KC+ yellowish, P-, UV-. Chemistry: usnic, barbatic and 4-0-demethylbarbatic acids. - Note: a circumpolar, boreal-subarctic-subalpine lichen found on acid soil and bryophytes in open habitats, mostly in sites with a long snow lie near and above treeline.



Cladonia amaurocraea



Cladonia amaurocraea

Cladonia anitae W.L. Culb. & C.F. Culb., in Culberson, Culberson & Johnson, Mycologia 74(4): 663 (1982)

[VZ1854], USA. North Carolina. Onslw County: inter Folkstone et Holly Ridge, in silva sparsa (*Pinus palustris*). Ad terram arenariam. Leg. W. L. Culberson (no. 18539) etr C. F. Culberson, 1.4.1981 - ISOTYPE - Annot.: Usnic, grayanic, 4-O-demethylgrayanic (trace), congrayanic (trace), squamatic, and rhodocladonic acids by TLC and HPLC. - A. Johnson and C. F. Culberson. EX A. VěZDA LICHENES SELECTI EXAICCATI NR.1854.

A *C. cristatella* squamis primariis parce vel modice sorediatis, podetiis brevioribus, vulgo simplicibus, non squamulosis, praesentia acidorum grayanici et squamatici et absentia acidi didymici differt; a *C. incrassata* sorediis minoribus et praesentia acidi grayanici differt.Primary squamules 0.5-1 mm broad at maturity, esorediate or with few to relatively many granular soredia on the edges and lower surfaces; bearing erect, sessile or slightly stalked pycnidia, 0.3-0.5 mm tall with conidia <1 x (5-)8-10 (-13) µm, as straight, slightly bent or curved rods. Podetia pale yellowish, slender, to I mm thick, erect, to 10(-14) mm tall, usually simple, occasionally branched once or rarely twice, corticate, smooth or areolate, esorediate, not squamulose or only slightly so, flaring at the summit to 3 mm broad, the tops sometimes torn; apothecia one to several, terminal, scarlet, the spores 3-4 x (5-) 8-10(-13) µm, ellipsoid, ovoid or fusiform. Medulla: K-, C-, KC-, P-. Secondary natural products: Usnic, grayanic, 4-O-demethylgrayanic (trace), congrayanic (+; faint trace), squamatic and rhodocladonic acids. Southeastern North Carolina near the Atlantic Coast; on sandy soil in savannahs.



Cladonia anitae



Cladonia anitae

Cladonia apodocarpa Robbins, Rhodora 27: 211 (1926)

[VZ1611], USA. Carolina Borealis. Orange County: Inter oppidos Hillsborough et Chapel Hill, in silva dicta Duke Forest, 165 m. Ad terram secus viam. Leg. W. L. Culberson (no. 17402) et C. F. Culberson, 10.9.1978. - Annot: Atranorin, Fumarprotocetraric cid and probably a trace protocetraric acid by TLC - C. F. Culberson et A. Johnson. Ex A. Vězda Lichenes Selecti Exsiccati Nr. 1611.

EX: Lendemer, J.C. and B.P. Hodkinson. 2009. The wisdom of fools: new molecular and morphological insights into the North American apodetiate species of Cladonia. Opuscula Philolichenum 7: 79-100.

CHEMISTRY. – Atranorin (major), fumarprotocetraric acid (major). Spot tests: K+ yellow, C-, KC-, P+ red, UV-. Medulla UV- (sphaerophorin absent), P+ red (fumarprotocetraric acid always present).Squamules K+ yellow (atranorin present).
Squamules long and erect, upper portions convex-reflexed to show the white underside, without a blackened narrow stipe; thallus not forming distinct cushions; typical of roadside banks and disturbed areas; widespread - ECOLOGY: This species typically occurs on soil and humus in recently disturbed habitats or other areas such as forest openings where succession is arrested because of natural factors such as periodic fire. It typically occurs in edge habitats where it is not fully exposed to the sun but rather protected by shade, at least periodically. Although we have not observed saxicolous populations of *Cladonia apodocarpa*, several specimens we examined listed the ecology as “vertical rock faces” or “boulders in light shade”. Thalli in these specimens appeared to represent typical *C. apodocarpa* and almost certainly occurred on a layer of soil or humus rather than directly on rock. - DISTRIBUTION: *Cladonia apodocarpa* is known primarily from eastern North America, where it is common and widespread at low to middle elevations. Although the species is most common south of the boreal region, records from as far north as Quebec have been reported (Thomson 1967). Ahti (2000) also reported the species from a single locality in Uruguay and noted a questionable literature report by Thomson (1967) from Haiti. - DISCUSSION:. – Due to the large size of its squamules, *Cladonia apodocarpa* is not easily confused with any of its close relatives, namely *C. petrophila* and *C. stipitata*. Rather, it is likely to be confused with sterile thalli of members of the *C. subcariosa* group, with which it frequently

occurs. Members of the *C. subcariosa* group that occur in eastern North America differ chemically from *C. apodocarpa* in lacking the combination of atranorin and fumarprotocetraric acid. The primary squamules of taxa in the *C. subcariosa* group also tend to be coarser, less fragile, and shorter than those of *C. apodocarpa* although these characters are variable and distinguishing among species in the field (i.e., without access to chemical data) can be difficult. In most cases, however, careful examination of a given, apparently sterile population will reveal the presence of some podetia. Several species of *Cladonia* with cushion-forming primary squamules that could be confused with *C. apodocarpa*, particularly *C. robbinsii* and *C. strepsilis*, are distinguished in the above key. Although the apothecia of *Cladonia apodocarpa* have generally been described as being sessile on the primary squamules of the thallus (Brodo et al. 2001, Evans 1930, Hinds & Hinds 2007, Robbins 1925, Thomson 1967), they were recently noted to be borne on short podetia by Ahti (2000).

DESCRIPTIONS. – Ahti (2000: 237), Thomson (1967: 87).
PUBLISHED COLOR ILLUSTRATION. – Brodo et al. (2001: 238 [fig. 210]).

Cladonia apodocarpa



Cladonia apodocarpa



Cladonia apodocarpa

Cladonia balfourii Cromb., J. Linn. Soc., Bot. 15: 433 (1876) [1877]
= *Cladonia subradiata* (Vain.) Sandst., Abh. naturw. Ver. Bremen 25: 230 (1922)
= *Cladonia balfourii* f. *subradiata* (Vain.) Robbins, Rhodora 33: 138 (1931)
= *Cladonia fimbriata* f. *balfourii* (Cromb.) L. Scriba, Hedwigia 53: 174 (1913)
= *Cladonia fimbriata* var. *balfourii* (Cromb.) Vain., Acta Soc. Fauna Flora fenn. 10: 239 (1894)
= *Cladonia fimbriata* var. *subradiata* Vain., Acta Soc. Fauna Flora fenn. 10: 338 (1894)

[VZ1612], USA. Florida, Lake County: In silva dicta Ocala National Forest, prope viam dictam Florida Route 545. Ad terram et lignum putrefactum, Leg. B. J. Moore (no. 2891), 6.7.1965.- Annot: Fumarprotocetraric, protoetraric and ursolic acids and unidentified substances by TLC - C. F. Culberson and A. Johnson. EX A. VěZDA LICHENES SELECTI EXSICCATI NR. 1612.

Primary thallus squamulose, persistent; squamules 1-6 mm long, 2-5 mm wide, sometimes with granular soredia; podetia 2-30 mm tall, 1-4 mm wide, grayish to whitish green, unbranched to sparingly branched, subulate or blunt, not cup-forming; surface sorediate, with disappearing cortex on upper portions, but basally thickly corticate (also below apothecia); soredia coarse at base, sometimes intergrading with isidioid structures Apothecia scarce, 0.5-3 mm wide, red; ascospores oblong, 8-13 x 3-4 µm; Pycnidia common, on primary squamules or tips of podetia, ovoid to cylindrical, with red gelatin; conidia 3-8 x 0.5-1 µm; Spot tests: K+ bright yellow, persistent, or K-, C+ & KC+ canary yellow, or C- & KC-, P+ orange, or P-, UV-;Secondary metabolites: thallus with two major chemotypes: (1) thamnolic, barbatic (inconstant), and didymic (accessory) acids; (2) barbatic acid, didymic acid (accessory); many minor accessory metabolites also present (Ahti 2000); apothecial discs with rhodocladonic acid as a red pigment. Habitat and ecology: on dead wood, tree bases, or sometimes over soil or rocks World distribution: all continents (Antarctica uncertain), Arizona, southern California, Baja CalIfornia, and Sinaloa.



Cladonia balfourii



Cladonia balfourii

Cladonia beaumontii (Tuck.) Vain., Acta Soc. Fauna Flora fenn. 10: 455 (1894)
= *Cladonia santensis var. beaumontii* Tuck. 1882

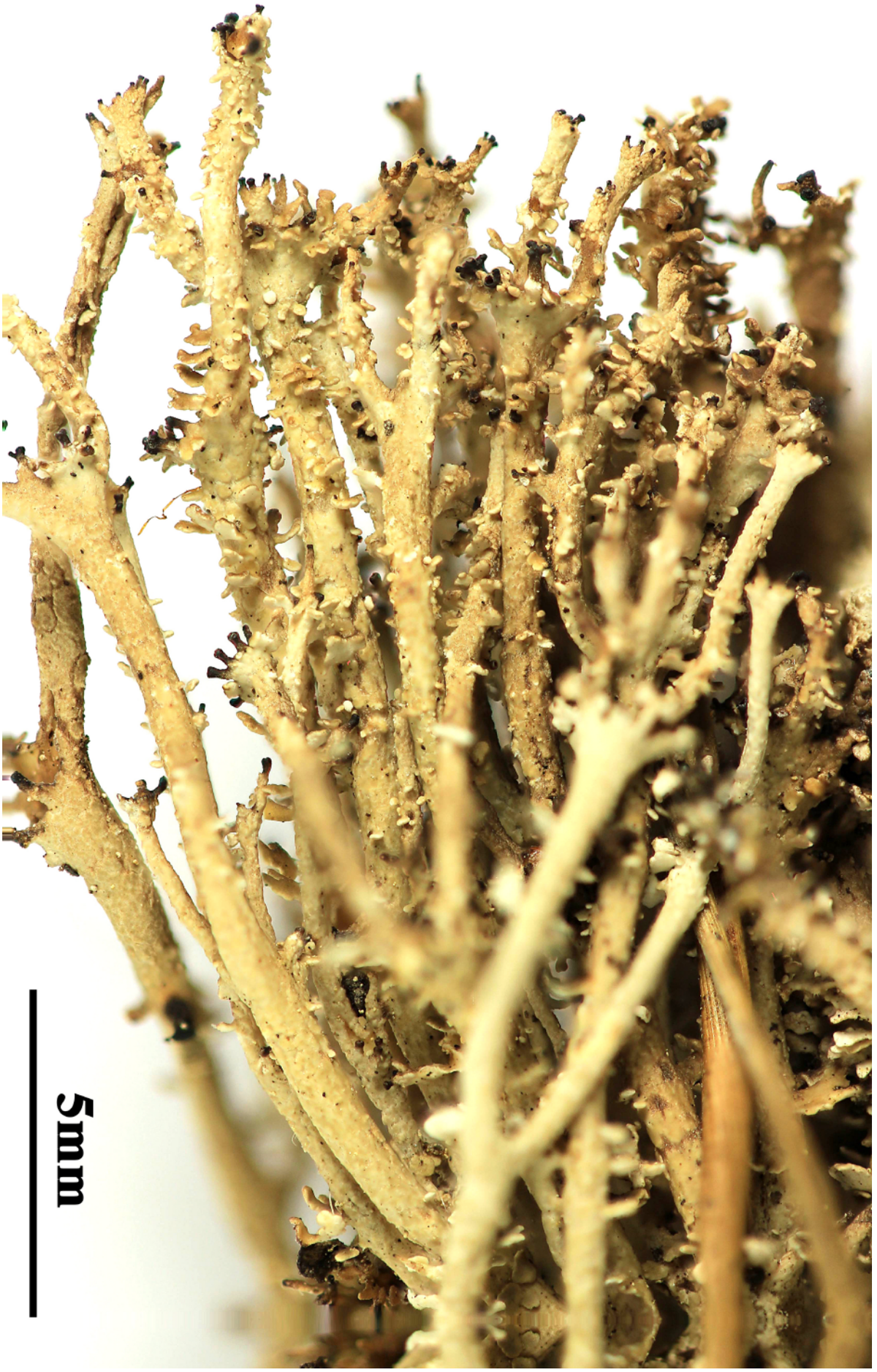
[VZ2289], USA. Carolina Borealis. Wake County: Ad occidentem versus a Zebulon, loco Hominy Greek Granite outcrop dicto,125 m. Ad terram supra saxum horizontalem. Leg. W. L. Culberson (no. 20708) et C. F. Culberson, 1.7.1988.- Annot.: Baeomycesic acid and squamatic acid by TLC - A. Johnson et C. F. Culberso. Ex A. VěZDA Lichenes Selecti Exsiccati Nr. 2289.

Thallus dimorphic. Primary thallus squamulose; squamules gray-green, small to medium (1.5-2 mm wide), irregular, clustered, crenate to digitately incised, erect to ascending, white beneath. Photobiont trebouxioid alga. Podetia short to elongate 10-18 x 1-1.8 mm, slender, cylindrical becoming slender, cupless, dichotomously branched, the branches sometimes much entangled, +/- squamulose; cortex minutely areolate, scattered, concolorous with squamules. Ascomata biatorine apothecia, 0.1-0.3 mm. diam., solitary or clustered on the apices of the branches; disk convex, brownish to brown. Chemistry. K-, P+ yellow; squamatic and baeomycesic acids. Substrate and Habitat. On soil or humus in mixed forests and woodlands. Distribution. Eastern North America; in North Carolina records from Coastal Plain and Piedmont ecoregions.

Literature:
Ahti, T., R. Pino-Bodas, A. Flakus & S. Stenroos. (2016) Additions to the global diversity of Cladonia. The Lichenologist 48(5): 517-526.
Fink, B. (1935) The Lichen Flora of the United States. University of Michigan Press, Ann Arbor. 426 pp.
Hammer, S. (1996) Meristem initials: distinguishing characters in two Cladonia species. The Bryologist 99(4): 397-400.
Robbins, C.A. (1927). The Identity of *Cladonia beaumontii*. Rhodora 29(343): 133-138.
Tuckerman, E. (1882) A synopsis of the North American lichens. Part. I, comprising the Parmeliacei, *Cladoniei* and *Coenogoniei*. S.F. Cassino, Boston. 262 pp. (original description as *Cladonia santensis* var. *beaumontii*).
Wainio, E. (1894) Monographia Cladoniarum Universalis II. Acta Societatis pro Fauna et Flora Fennica 10: 1-499.



Cladonia beaumontii



Cladonia beaumontii

Cladonia bellidiflora (Ach.) Schaer., Lich. helv. spicil. 1: 35 (1823)
= *Baeomyces bellidiflorus* (Ach.) Ach., Methodus, Sectio post. (Stockholmiæ): 335 (1803)
= *Capitularia bellidiflora* (Ach.) Flörke, Mag. Gesell. naturf. Freunde, Berlin 2(3): 224 (1808)
= *Cenomyce bellidiflora* (Ach.) Ach., Syn. meth. lich. (Lund): 270 (1814)
= *Cenomyce coccocephala* Ach., Lich. Univ.: 540 (1810)
= *Cenomyce coccocephala* var. *bellidiflora* (Ach.) Ach., Lich. Univ.: 540 (1810)
= *Cladonia bellidiflora* var. *coccocephala* (Ach.) Vain., Acta Soc. Fauna Flora fenn. 4(no. 1): 204 (1887)
= *Cladonia coccifera* var. *bellidiflora* (Ach.) Linds., J. Linn. Soc., Bot. 9: 421 (1867)
= *Cladonia coccifera* ß *bellidiflora* (Ach.) Mudd, Man. Brit. Lich.: 60 (1861)
= *Lichen bellidiflorus* Ach., Lich. suec. prodr. (Linköping): 194 (1799) [1798]
= *Lichen coccocephala* (Ach.) DC., in Lamarck, Encycl. Méth., Bot. Suppl. (Paris) 3(1): 362 (1813)
= *Scyphophorus bellidiflorus* (Ach.) Gray [as 'Scyphophora'], Nat. Arr. Brit. Pl. (London) 1: 424 (1821)

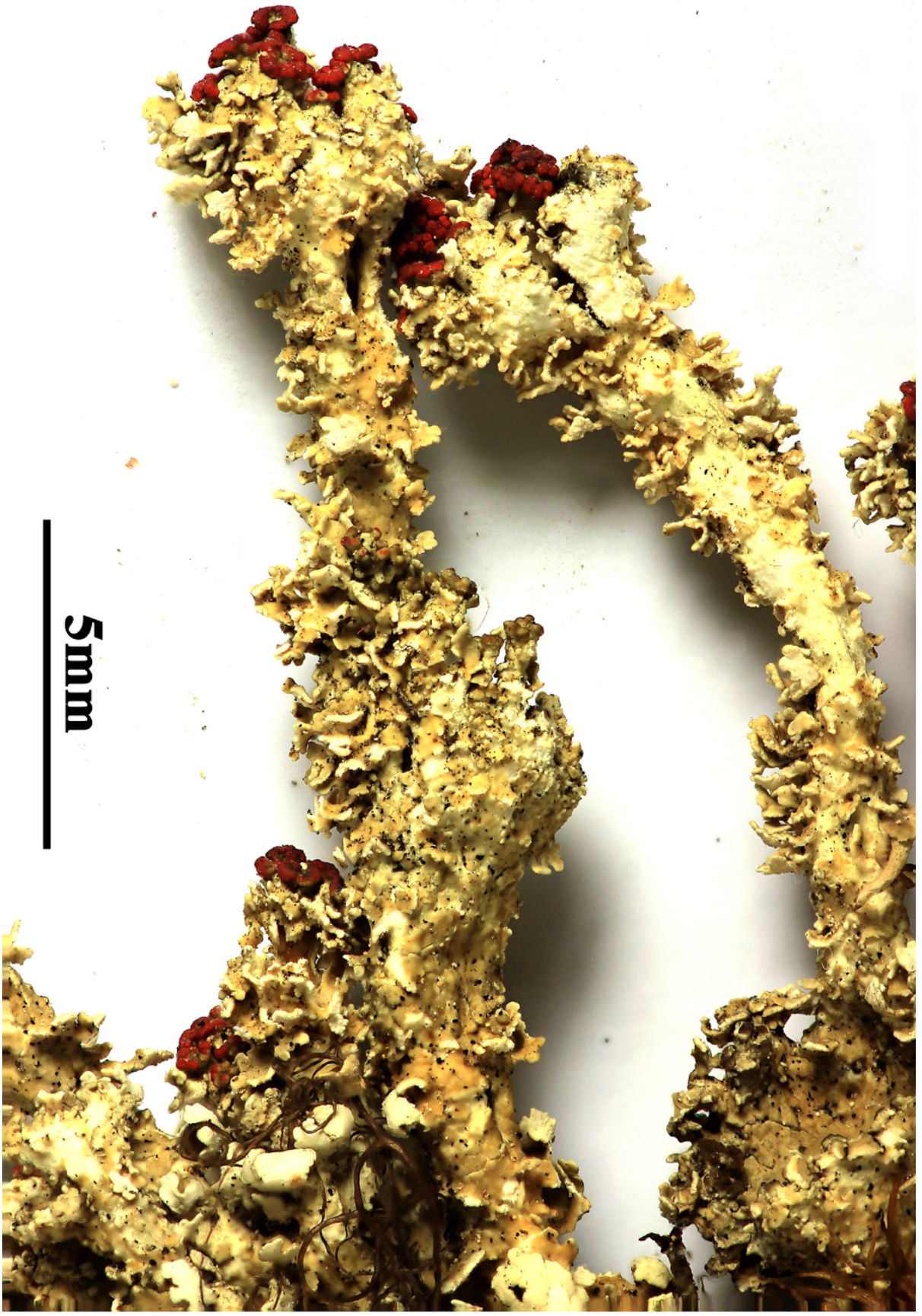
[VZ1462], Suecia. Värmland. Nyskoga, prope Tapptjärn. Ad terram in saxis. Leg. A. W. Sundell (9817), 9.7.1974. Ex A. VěZDA Lichenes Selecti Exsiccati Nr. 1462.

Primary thallus squamulose, the squamules persistent, 9-22 mm long, 2-4 mm wide, deeply indented, esorediate, white beneath, sometimes yellowish brown towards the base. Podetia elongate, hollow inside, grey-green to yellowish green, 2-3(-5) cm tall, up to 3 mm thick, corticate but cortex often disrupted, densely macrosquamulose also in upper parts, becoming granular or decorticate in upper parts, but never sorediate, pointed at apices or rarely with small, regular to irregular cups. Apothecia rather frequent, scarlet red, convex, developing at the margins of cups or at the tips of podetia, often clustered, the clusters up to 4 mm across. Asci 8-spored, clavate, thickened at apex, with a K/I+ blue tholus and a K/I+ strongly blue outer gelatinous sheath, Cladonia-type. Ascospores 1-celled, hyaline, ellipsoid. Pycnidia scarlet red, semi-immersed, pyriform to ovoid. Conidia hyaline, curved. Photobiont chlorococcoid. Spot tests: K-, C-, KC+ yellow, P-, UV+ white. Chemistry: usnic and squamatic acids, sometimes bellidiflorin; rhodocladonic acid in apothecia and pycnidia. Note: a cool-temperate to

boreal-montane, circumpolar lichen found on acid soil and mossy rocks in wind-protected and humid situations (e.g. in sites with a long snow lie), most frequent near or above treeline.



Cladonia bellidiflora



Cladonia bellidiflora

Cladonia brevis (Sandst.) Sandst., Abh. naturw. Ver. Bremen 25: 192 (1922) = *Cladonia verticillata f. brevis* Sandst., Cladon. Exsicc.: no. 234 (1918)

[VZ2249], USA. West Virginea. Tucker County: In loco dicto Dolly Sods, 1060 m. Super muscos et plantas emortuas inter saxa rupesque in aprico. Leg. W. L. Culberson (no. 20561) - Annot.: Psoromic and 2-O-demethylpsoromic acids by TLC, anal. A. Johnson et C. F. Culberson. - Ex A. Vězda Lichenes Selecti Exsiccati Nr. 2249.

Primary thallus persistent. Squamules small, 1-3 mm long, shallowly lobed, glaucous green to a rich brown (dry), olive-brown (wet) and ± cracked on the upper surface, white below with a smooth arachnoid surface, not sorediate. Podetia, appear rare in Britain, to 8 mm in length though sometimes undeveloped, clavate, unbranched or branched near the apex, flattened, the surface corticate and areolate. Apothecia brown, at the tips of podetia. Pycnidia large, black, constricted at the base, on the primary thallus. Thallus Pd+ yellow, K–, KC–, C–, UV– (psoromic and 2'-O-demethylpsoromic acids).

Cladonia brevis has a scattered distribution in Europe and is more common in North America, though populations lacking podetia are probably overlooked. It is related to the predominantly northern species *C. macrophylla* which has a similar chemistry but much larger squamulose podetia. In the absence of podetia it can be confused with *C. pulvinata* and *C. symphycarpa* which react Pd+ yellow. However, *C. symphycarpa* grows on basic soils, is much larger and is often K+ yellow becoming red or K+ yellow. The squamules of *C. pulvinata* are slightly larger, more lobed, with a strongly tomentose underside and frequently have pruinose tips. For *Cladonia brevis*, the large black pycnidia constricted at the base are highly distinctive (but can be rare or absent) and are absent on other Pd+ yellow Cladonia species with small squamules. When glaucous green, the small rounded squamules with smooth white undersides are very similar to those of *Cladonia peziziformis*, but this is Pd+ orange-red. Habitats: Over small stones on soil in old lead mines in mid Wales and the Pennines, on acid humus over gravel on a little used tack in short grazed heathland in the New Forest and in open patches in well grazed heath in the New Forest. Associated with *Cladonia firma*, *Cladonia strepsilis* and *Pycnothelia papillaria* at the New Forest track site. Almost certainly overlooked

elsewhere and should be looked for in stable but very open short vegetation on acid soils.



Cladonia brevis



Cladonia brevis

Cladonia calycantha Delise ex Nyl., Syn. meth. lich. (Parisiis) 1(2): 192 (1860)

[VZ1662], USA. North Carolina. Carteret County: 10 km ad occidentem versus a Newport. Ad terram arenariam in silva sparsa (*Pinus palustris*). Leg. W. L. Culberson (no. 17491) et C. F. Culberson, 15.3.1929. - Annot.: Fumarprotocetraric acid, a trace of protocetraric acid, and a trace of unidentified compound by TLC, A. Johnson et C. F. Culberson.- EX A. VěZDA LICHENES SELECTI EXSICCATI NR. 1662.

Primary thallus evanescent, consisting of elongate, slightly incised squamules ca. 6 x 0.5 mm, somewhat veined below. Podetia whitish gray, in sun-exposed apical parts strongly browning, 4-12(-15) cm tall (in- cluding long-persistent dead basal parts), verticillate- scyphose; scyphi in 6-12(-18) tiers; scyphal plates 2- 14 mm wide, 2-3 mm high (flaring very abruptly), incurved or flat when young, recurved when old; margins soon becoming deeply divided into flat to terete teeth 1.5-2 mm long, branching 1-3 times; senile scyphi almost completely split into narrow divisions, or at least fissured; internodes 5-15 mm long, 0.4- 1.5 mm thick. Surface of podetia verruculose, areolate-corticate, with many ecorticate cracks and patches, esorediate, matt, clearly tomentulose, rarely squamulose; medulla soon darkening even near podetial tops, especially scyphal teeth, emorient basal parts blackening conspicuously under paler cortical areolae so as to give podetia a checkered appearance. Podetial wall 280-360 µm, rather soft; cortex up to 40 µm; medulla 160-200 µm; stereome 80-120 µm, not hard cartilaginous, rather distinctly delimited from medulla; surface of central canal usually strongly minutely papillate. Conidiomata on scyphal margins, subspherical, sessile; containing hyaline slime; conidia 9-11 x 1 µm, falciform. Hymenial disks on scyphal margins, with stalks ca. 1 mm long, pale to dark brown; spores oblong, 14-17 x 4-6 µm. Chemistry. P+ orange red, K- or K+ red brown. Fumarprotocetraric acid and trace amounts of protocetraric, convirensic (rarely absent), and confumarprotocetraric acids. Distribution: High Andes from Colombia (rare) and southern Ecuador to Bolivia, at altitudes of (1200-)2000-4100 m, growing on soil or rocks.



Cladonia calycantha



Cladonia calycantha

Cladonia capitata (*Michx.)* Spreng., Syst. veg., Edn 16 4(1): 271 (1827)
= *Cladonia peziziformis* (With.) J.R. Laundon, Lichenologist 16(3): 223 (1984)
= *Cenomyce leptophylla* Ach., Lich. Univ.: 563 (1810)
= *Cladonia cariosa* var. *leptophylla* (Ach.) Hepp, Flecht. Europ.: no. 543 (1860)
= *Cladonia leptophylla* (Ach.) Flörke, De Cladoniis, difficillimo Lichenum genere commentatio prima (Rostock): 19 (1828)
= *Cladonia pyxidata* subsp. *leptophylla* (Ach.) Nyl., Syn. meth. lich. (Parisiis) 1(2): 193 (1860)
= *Cladonia pyxidata* var. *leptophylla* (Ach.) Leight., Lich.-Fl. Great Brit.: 61 (1871)
= *Cladonia squamosa* var. *leptophylla* (Ach.) Rabenh., Deutschl. Krypt.-Fl. (Leipzig) 2(1): 102 (1845)
= *Cladonia ventricosa* var. *leptophylla* (Ach.) Schaer., Lich. helv. spicil. 6: 318 (1833)
= *Helopodium leptophyllum* (Ach.) Gray, Nat. Arr. Brit. Pl. (London) 1: 416 (1821)
= *Lichen capitatus* Michx., (1803)
= *Lichen peziziformis* With. [as 'pezizaeformis'], Bot. arr. veg. Gr. Brit. (London) 2: 720 (1776)

[VZ2269]. USA. Arkansas. Perry County: 5 km ad orientem versus a Hollis, secus viam dictam Route 83. Ad terram inter herbas, Leg. W. L. Culberson (no. 20586) et C. F. Culberson, 23.5.1988. - Annot.: Fumarprotocetraric acid and a trace of protocetraric acid by TLC from A. Johnson et C. F. Culberson. - Ex A. Vězda Lichenes Selecti Exsiccati Nr. 2269.

Primary thallus: squamulose, evanescent or occasionally persistent; squamules: very small (0.5-2 x 0.5-1 mm), undivided to somewhat laciniate, forming flat crusts podetia: often abundant, 5-15 (22) mm tall, 0.5-1.5 mm thick, pale gray, usually unbranched or with some apical branchlets, in part flattened surface: longitudinally grooved and cracked, almost continuously areolate-corticate and verruculose, esorediate, often slightly squamulose at the base Apothecia: constantly present, 1-3 mm wide, dark brown to pale ochraceous ascospores: oblong, 7-13 x 2-2.5 µm meter Pycnidia: common, on primary squamules, ampullaceous to ovoid, constricted at base, with hyaline gelatin conidia: 7-8 x 1 µm. Spot tests: K- or K+ dingy brown, C-, KC-, P+ red, UV- Secondary metabolite: fumarprotocetraric acid. Habitat and ecology: on

bare soil banks; collected at 1700 m World distribution: Asia, Australasia, Europe, North America and South America.



Claudonia capitata



Cladonia capitata

Cladonia capitellata (Hook. f. & Taylor) C. Bab., in Hooker, Bot. Antarct. Voy. Erebus Terror 1839-1843, II, Fl. Nov.-Zeal.: 296 (1855)
= *Cenomyce capitellata* Hook. f. & Taylor [as 'capillata'], London J. Bot. 3: 652 (1844)
= *Cladina interhiascens* Nyl., C. r. hebd. Séanc. Acad. Sci., Paris 83: 89 (1876)
= *Cladonia amaurocraea var. capitellata* (Hook. f. & Taylor) Nyl., Mém. Soc. Imp. Sci. Nat. Cherbourg 5: 95 (1858) [1857]
= *Cladonia capitellata f. interhiascens* (Nyl.) Vain., Acta Soc. Fauna Flora fenn. 10: 466 (1894)
= *Cladonia capitellata subsp. xanthoclada* (Müll. Arg.) Vain., Acta Soc. Fauna Flora fenn. 4(no. 1): 277 (1887)
= *Cladonia capitellata var. interhiascens* (Nyl.) Sandst., Reprium nov. Spec. Regni veg. 103: 36 (1938)
= *Cladonia capitellata var. squamatica* A.W. Archer, Proc. Linn. Soc. N.S.W. 108(3-4): 193 (1985) [1986]
= *Cladonia xanthoclada* Müll. Arg., Flora, Regensburg 65(19): 297 (1882)

[VZ2161], Australia. Tasmania. Montes Hartz, 880 m. Ad terram in regione subalpina. Leg. G. Kantvoilas (49/87). Ex A. VěZDA Lichenes Selecti Exsiccati Nr. 2161.

Basal squamules evanescent, small, inconspicuous, 0.5–2 mm long, 0.5–1 mm diam., lobed, with crenate margins. Podetia growing from basal squamules, or dying at base, 1–5 tall, rarely to 8 cm, 0.5–2.5 mm diam., simple or branching near apices, cylindrical or subcylindrical, brittle when dry, escyphiferous, esorediate, yellowish green; branches erect, parallel, with open axils; apices open to interior of podetia, with marginal brown pycnidia or apothecia; cortex smooth, subcontinuous, areolate, occasionally squamulose near base. Apothecia terminal, single or clustered, small, 0.2–0.5 mm diam., convex, dark brown. CHEMISTRY: K+ yellow or K-, KC+ yellow, P+ yellow. Usnic acid (major), thamnolic acid (major), ±barbatic acid in apothecia. Occurs in W.A., S.A., N.S.W., A.C.T., Vic. and Tas.; also in New Zealand; grows on soil.



Cladonia capitellata



Cladonia capitellata

Cladonia carassensis Vain., Acta Soc. Fauna Flora fenn. 4(no. 1): 313 (1887)
= *Cladonia crispata* (Ach.) Flot., Flechten Hirschberg-Warmbrunn: 4 (1839)
= *Baeomyces crispatus* (Ach.) Wahlenb., Fl. lapp.: 456 (1812)
= *Baeomyces turbinatus* var. *crispatus* Ach., Methodus, Sectio post. (Stockholmiæ): 341 (1803)
= *Cenomyce allotropa* var. *crispata* (Ach.) Ach., Lich. Univ.: 555 (1810)
= Cenomyce crispata (Ach.) Ach., Syn. meth. lich. (Lund): 272-273 (1814)
= *Cenomyce furcata* var. *crispata* (Ach.) Sommerf., Suppl. Fl. lapp. (Oslo): 134 (1826)
= *Cenomyce gracilis* var. *cetrariiformis* Delise, in Duby, Bot. Gall., Edn 2 (Paris) 2: 625 (1830)=
= *Cladonia arborea* Stirt., Scott. Natural., N.S. 2 ('8'): 121 (1886) [1885-1886]
= *Cladonia crispata* f. *cetrariiformis* (Delise) J.W. Thomson [as 'cetrariaeformis'], The Lichen Genus Cladonia in North America (Toronto): 131 (1968) [1967]
= *Cladonia crispata* f. *gracilescens* (Rabenh.) Dalla Torre & Sarnth., Fl. Tirol, Vorarlberg, Liechtenstein, IV Band. Die Flechten von Tirol: 50 (1902)
= *Cladonia crispata* f. *infundibulifera* (Schaer. ex Vain.) J.W. Thomson , The Lichen Genus Cladonia in North America (Toronto): 131 (1968) [1967]
= *Cladonia crispata* var. *cetrariiformis* (Delise) Vain., Acta Soc. Fauna Flora fenn. 4(no. 1): 392 (1887)
= *Cladonia crispata* var. *gracilescens* (Rabenh.) Vain., Acta Soc. Fauna Flora fenn. 4(no. 1): 395 (1887)
= *Cladonia crispata* var. *infundibulifera* Schaer. ex Vain., Acta Soc. Fauna Flora fenn. 4(no. 1): 382 (1887)
= *Cladonia divulsa* f. *crispata* (Ach.) Vain., Meddn Soc. Fauna Flora fenn. 2: 45 (1878)
= *Cladonia furcata* f. *crispata* (Ach.) Fr., Lich. eur. reform. (Lund): 229 (1831)
= *Cladonia furcata* subsp. *crispata* (Ach.) Nyl., Syn. meth. lich. (Parisiis) 1(2): 207 (1860)
= *Cladonia furcata* subsp. *diffisa* Stirt., Scott. Natural., N.S. 2 ('8'): 121 (1886) [1885-1886]
= *Cladonia furcata var. crispata* (Ach.) Flörke, De Cladoniis, Difficillimo lichenum genere, Commentatio nova (Rostock): 148 (1828)
= *Cladonia rangiferina* f. *gracilescens* Rabenh., Mycological Society of China, Academic Annual Meeting Summary: tab. XXXI, no. 22 (1863)

[VZ2091], Venezuela. Estado Taricha: Laguna Garcia, prope Pregoneros, 1900 m. In saxeto. Leg. M. López-Figueiras (no. 32451) et A. Morales, 8.7.1985, det. T. Ahti. EX A. VĚZDA LICHENES SELECTI EXSICCATI NR. 2091.

Primary thallus made of scattered basal squamules up to 1-2 mm long, indented, upper surface grey-greenish, lower surface whitish, sometimes persisting. Secondary thallus made of erect podetia, 3-10 cm, arranged in a small dense bushes, axils widely open, squamulose towards the base, shortly branched and spiny in upper parts, reticulate and spotted, grey-greeenish when moist and grey-brown when exposed to sun; sometimes podetia end in a narrow cup-like structure consisting of a single perforation surrounded by short spines, subsequently one of these spines may proliferate to form an additional extension, a process which may be repeated several times.Podetia 2–6 cm tall, ± clustered, pale to dark brown-grey to brown-green, unbranched or irregularly branched, particularly in the upper parts, when mature initially terminating in a very narrow cup-like structure consisting of a single perforation surrounded by short spines, subsequently one of these spines may proliferate to form an additional extension, a process which may be repeated several times; surface ± smooth, corticate and ± faintly pale areolate, sometimes partly squamulose. Basal squamules 1–2 mm in size, indented, the underside white and smooth, often disappearing when the podetia mature. Apothecia to 1 mm diam., pale to dark brown, on terminal spines, ± corymbose, rather frequent. Pycnidia dark brown, at apices of podetia, frequent, associated with terminal spines. Thallus C–, K–, KC–, Pd–, UV+ white (squamatic and ± barbatic acids). Characterised by the dark colour (paler in shade morphs), irregular branching, podetia terminating in a single perforation surrounded by short spines (<0.5 mm) and in being Pd– and UV+ white. Immature specimens may resemble *Cladonia furcata* which is Pd+ red and UV–. The coarser and very sparingly branched *C. gracilis* entirely lacks perforations with spines, has a more continuous cortex and is Pd+ red (fumarprotocetraric acid) and UV– (squamatic acid absent). Sterile squamules are similar to those of *C. callosa*, but these are UV+ bright mauve and have finely tomentosa under sides.

- Apothecia usually rare, ± corymbose on terminal spines, globose, dark brown. Subcylindrical pycnidia, brown. Photobiont : trebouxioid. C-, K-, KC-, Pd-, UV+ white. Relatively rare in our prospection area, in Calluna acid heathlands with or without trees, sometimes on dead wood.
- Not to be confused with *Cladonia furcata* much more common, thinner and Pd+ red and UV- and with *Cladonia gracilis* of which podetia are not perforate and with a very narrow cup and Pd+ red.

Cladonia carassensis



Cladonia carassensis



Cladonia carassensis

Cladonia cariosa (Lilj.) Spreng., Syst. veg., Edn 16 4(1): 272 (1827)
= *Baeomyces cariosus* (Lilj.) Ach., Methodus, Sectio post. (Stockholmiæ): 326-327 (1803)
= *Cenomyce cariosa* (Lilj.) Ach., Lich. Univ.: 567 (1810)
= *Cladonia cariosa* f. *cribrosa* Fink, Lich. Fl. U.S.: 261 (1935)
= *Cladonia cariosa* var. *cribrosa* Vain., Acta Soc. Fauna Flora fenn. 10: 50 (1894)
= *Cladonia degenerans* var. *cariosa* (Lilj.) Tuck., Enum. N. America Lich.: 52 (1845)
= *Cladonia fimbriata* var. *cariosa* (Lilj.) Körb., Syst. lich. germ. (Breslau): 23 (1855)
= *Cladonia gracilis* e *cariosa* (Lilj.) Mudd, Man. Brit. Lich.: 55 (1861)
= *Cladonia pyxidata* var. *cariosa* (Lilj.) Rabenh., Deutschl. Krypt.-Fl. (Leipzig) 2(1): 107 (1845)
= *Lichen cariosus* Lilj., Utkast Sv. Fl., Edn 2 (Upsala): 435 (1798)
= *Patellaria symphycarpa var. cribrosa* Wallr., Fl. crypt. Germ. (Norimbergae) 1: 397-398 (1831)
= *Scyphophorus cariosus* (Lilj.) Sm., in Smith & Sowerby, Engl. bot., Edn 2 11: 88 (1844)

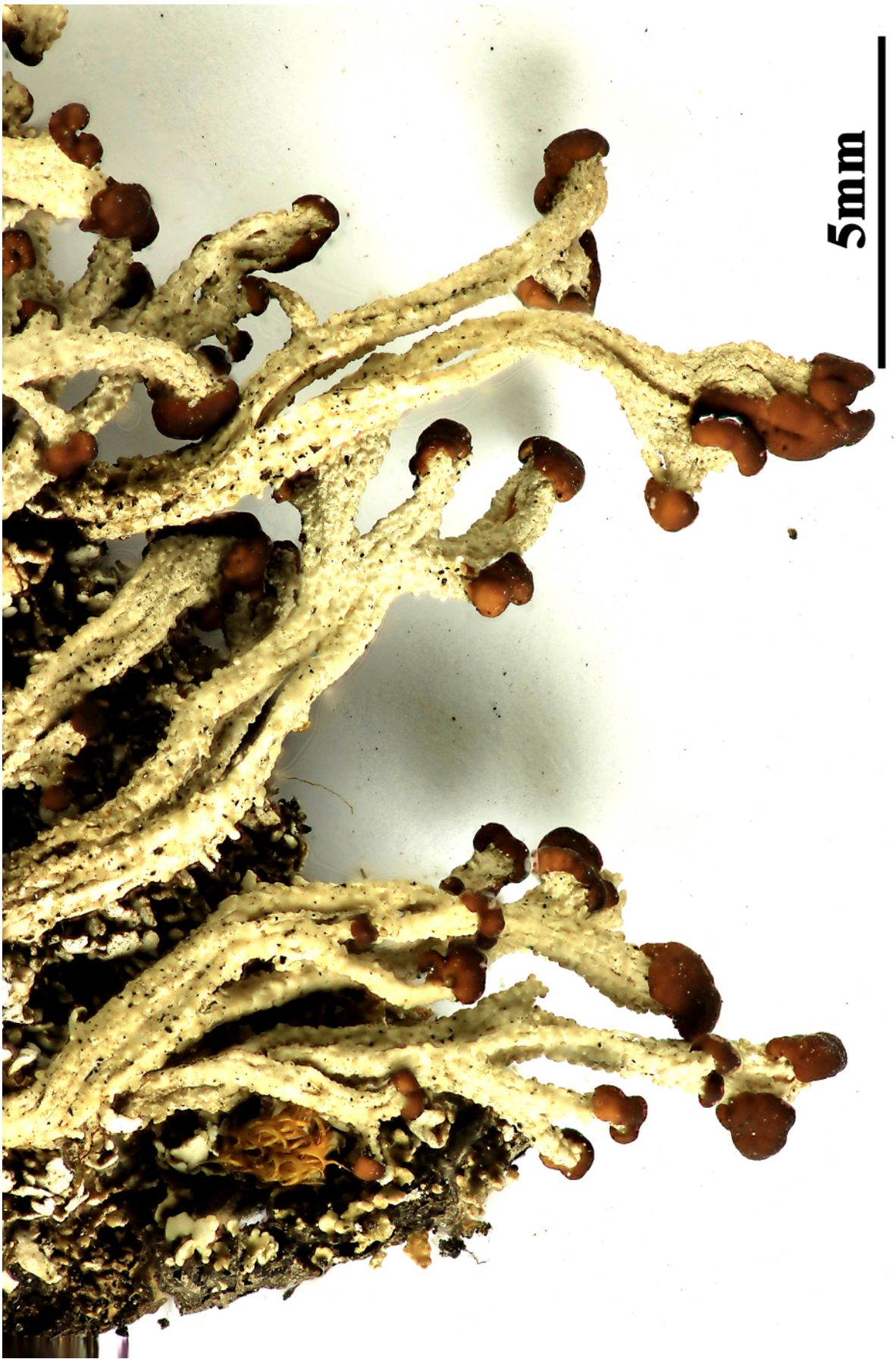
[VZ1208], Suecia. Västmanland. Sala. Sala gruva (ambitus metallorum) Herr Stens botten. Supra terram saxum tenuiter obtectam in fodina vetusta. Leg. R. Santesson (no. 24324), 13.6.1973. Ex A. Vězda Lichenes Selecti Exsiccati Nr. 1208.

Primary thallus squamulose, persistent, forming cushions, the squamules small to middle-sized, 1-7(-10) mm long, 1-2(-3) mm broad, entire to incised, concave to reflexed-convex, greenish white to olive-green above, white and fibrillose beneath. Podetia rather rare, 0.5-2(-3) cm tall, up to 3 mm thick (often more below the apothecia), cupless, simple or sparingly branched in upper part, often terminated by large apothecia, partly decorticate-granulose, sometimes sparsely squamulose in lower part, longitudinally fissured, very thick-walled, with medullary hyphae running parallel to the surface. Apothecia frequent, terminal, dark brown, convex, usually clustered into corymb-like clusters. Asci 8-spored, clavate, thickened at apex, with a K/I+ blue tholus and a K/I+ strongly blue outer gelatinous sheath, Cladonia-type. Ascospores 1-celled, hyaline, ellipsoid. Pycnidia dark, ovoid to conical, semi-immersed in the primary squamules. Conidia hyaline, curved. Photobiont chlorococcoid. Spot tests and chemistry: different chemotypes (all of them K+ yellow, C-, KC-, UV-): 1) P- (atranorin only, the

most frequent chemotype), 2) P+ yellow (atranorin, norstictic and connorstictic acids), 3: P+ red (atranorin and fumarprotocetraric acid), 4) P– (atranorin and rangiformic acid), 5) P+ red (atranorin, fumarprotocetraric and rangiformic acids). - Note: a cool-temperate to subarctic-subalpine, circumpolar lichen found on disturbed mineral, often sandy soil; most frequent in the Alps.



Cladonia cariosa



Cladonia cariosa

Cladonia ceratophylla (Sw.) Spreng., Syst. veg., Edn 16 4(1): 271 (1827)
= *Baeomyces ceratophyllus* (Sw.) Ach., Methodus, Sectio post. (Stockholmiæ): 352 (1803)
= *Cenomyce ceratophylla* (Sw.) Ach., Lich. Univ.: 533 (1810)
= *Imbricaria ceratophylla* (Sw.) Hepp, Flecht. Europ.: no. 52 (1853)
= *Lichen ceratophyllus* Sw. [as 'cerotophyllus'], Prodr.: 147 (1788)

[VZ2105], Venezuela. Estado Mérida: Finca "San Isidro", La Carbonera, in vicinitate urbis Mérida, 2300 m. Ad terram. Leg. M. López-Figueiras (15528) et M. Keogh, 4.3.1978, det. T. Ahti. Ex A. VěZDA Lichenes Selecti Exsiccati Nr. 2105.

Primary thallus persistent, consisting of large, broadly laciniate squamules to 1.5(-2.5) cm x 2-7 mm, with ascending, laterally recurved lobes, forming cush- ions to 4 cm thick; scattered, white to black, 1.3 mm- long, branching rhizines along margins. Podetia 1-3 cm tall, 0.5-1 mm thick, greenish gray, not melanotic, simple or somewhat branched; tips subulate; fertile podetia much differentiated, becoming branchy, nar- rowly scyphose. Surface of podetia usually with a smoothly corticate sheath at base, ecorticate upward, bearing dense to scattered isidioid, recurved, some- times bullate microsquamules or sometimes granulose to slightly sorediate; fertile podetia smoothly corti- cate, without isidioid squamules. Podetial wall 200- 320(-440) µm; cortex 20-25 µm; medulla 60-100 gpm; stereome 120-200(-320) jim; central canal minutely papillate. Conidiomata usually at tips of young podetia, sometimes on primary thallus, 160-260 gm diam., ampullaceous to ovoid, constricted at base, con- taining hyaline slime; conidia 5-7 x 1 µm, falciform. Hymenial disks rare, at tips of usually branched, much differentiated fertile podetia, 0.5-1.5 mm wide; spores oblong, 8-13 x 2.5-3.5 µm. Chemistry. P+ orange red, K+ yellow or K-. Atranorin (absent in ca. 50% of the specimens), fumar- protocetraric acid, and traces of protocetraric and con- fumarprotocetraric acids. Distribution (Fig. 139). Widespread in the area. South and Middle America, India, Reunion. In some- what shady woodland habitats in moist forest regions rather than in open areas. Primarily a soil-inhabiting lichen, in some areas very common. Usually absent from high mountains but has been recorded at elevations of 750-2380(-3900) m in Mexico and to 2800 m in the northern Andes.



Cladonia ceratophylla



Cladonia ceratophylla

Cladonia ceratophylla (Sw.) Spreng., Syst. veg., Edn 16 4(1): 271 (1827)
= *Baeomyces ceratophyllus* (Sw.) Ach., Methodus, Sectio post. (Stockholmiæ): 352 (1803)
= *Cenomyce ceratophylla* (Sw.) Ach., Lich. Univ.: 533 (1810)
= *Imbricaria ceratophylla* (Sw.) Hepp, Flecht. Europ.: no. 52 (1853)
= *Lichen ceratophyllus* Sw. [as 'cerotophyllus'], Prodr.: 147 (1788)

[VZ1613], Jamaica Insula, Portland: Prope Hardwar Gap. Ad saxum secus viam. Leg. W. L. Culberson (no. 13942) et C. F. Culberson, 11.1968. - Annot.: Atranorin, fumarprotocetraric acid and traces of protocetraric and salazinic acid by TLC; C. F. Culberson and A. Johnson. - Ex A. Vězda Lichenes Selecti Exsiccati Nr. 1613.

Primary thallus persistent, consisting of large, broadly laciniate squamules to 1.5(-2.5) cm x 2-7 mm, with ascending, laterally recurved lobes, forming cush- ions to 4 cm thick; scattered, white to black, 1.3 mm- long, branching rhizines along margins. Podetia 1-3 cm tall, 0.5-1 mm thick, greenish gray, not melanotic, simple or somewhat branched; tips subulate; fertile podetia much differentiated, becoming branchy, nar- rowly scyphose. Surface of podetia usually with a smoothly corti- cate sheath at base, ecorticate upward, bearing dense to scattered isidioid, recurved, some- times bullate microsquamules or sometimes granulose to slightly sorediate; fertile podetia smoothly corti- cate, without isidioid squamules. Podetial wall 200- 320(-440) µm; cortex 20-25 µm; medulla 60-100 gpm; stereome 120-200(-320) jim; central canal minutely papillate. Conidiomata usually at tips of young podetia, sometimes on primary thallus, 160-260 gm diam., ampullaceous to ovoid, constricted at base, con- taining hyaline slime; conidia 5-7 x 1 µm, falciform. Hymenial disks rare, at tips of usually branched, much differentiated fertile podetia, 0.5-1.5 mm wide; spores oblong, 8-13 x 2.5-3.5 µm. Chemistry. P+ orange red, K+ yellow or K-. Atranorin (absent in ca. 50% of the specimens), fumar- protocetraric acid, and traces of protocetraric and con- fumarprotocetraric acids. Distribution (Fig. 139). Widespread in the area. South and Middle America, India, Reunion. In some- what shady woodland habitats in moist forest regions rather than in open areas. Primarily a soil-inhabiting lichen, in some areas very common. Usually absent from high mountains but has been recorded at elevations of 750-2380(-3900) m in Mexico and to 2800 m in the northern Andes.



Cladonia ceratophylla



Cladonia ceratophylla

Cladonia cervicornis* subsp. *cervicornis (Ach.) Flot., Übers. Arbeiten Veränd. Schles. Ges. Vaterl. Kultur [27]: 105 (1850) [1849]
= *Lichen cervicornis* Ach. 1799

[VZ2136], Austria. Vorarlberg. Montes Verwall, ad meridiem a pago Klösterle, in valle Nezigast, 1450 m. Ad terram in prato. Leg. A. Vězda, 26.7.1986. Ex A. Vězda Lichenes Selecti Exsiccati Nr. 2136.

Primary thallus squamulose, persistent, usually forming 5-10 cm wide, dense pillows or mats, the squamules large, to 2.5 cm long, 1-4 mm wide, contiguous, ascending, grey-green above, brownish or bluish grey and very finely arachnoid beneath, with entire to indented margins. Podetia rather rare, greyish to brownish green, sometimes slightly melanotic at base, funnel-shaped, 7-20(-30) mm tall, flaring from the base, often proliferating from the centre with one to several additional cups originating from a single cup (forming 1-4 superimposed tiers), more rarely proliferating from the margins, with a continuous to areolate cortex, sometimes sparingly squamulose at the base. Apothecia rare, dark brown, convex, located on the margins of cups. Asci 8-spored, clavate, thickened at apex, with a K/I+ blue tholus and a K/I+ strongly blue outer gelatinous sheath, Cladonia-type. Ascospores 1-celled, hyaline, ellipsoid. Pycnidia dark, semi-immersed in the margins of cups, subglobose to ovoid, with a colourless jelly. Conidia hyaline, curved. Photobiont chlorococcoid. Spot tests: K- or K+ yellowish slowly turning brown, C-, KC-, P+ red, UV-. Chemistry: fumarprotocetraric acid complex. - Note: a temperate to southern boreal-montane lichen found on mineral siliceous soil in open grasslands and garrigues.



Cladonia cervicornis* subsp. *cervicornis



Cladonia cervicornis* subsp. *cervicornis

Cladonia convoluta (Lam.) Anders, Strauch-Blattflecht. Nordböhhm.: 29 (1906)
= *Lichen convolutus* Lam. 1792
= *Cladonia alcicornis* (Lightf.) Fr.
= *Cladonia endiviifolia* auct. p.p.
= *Cladonia foliacea f. convoluta* (Lam.)
= *Cladonia foliacea subsp. convoluta* (Lam.) Cretz.
= *Cladonia foliacea var. alcicornis* (Lightf.) Schaer.
= *Cladonia foliacea var. convoluta* (Lam.) Vain.

[VZ1790], Hispania. Tarragona: Prope Molás. Ad terram, in loco apricoso. Leg. W. L. Culberson (no. 11632) et C. F. Culberson, 25.6.1964. - Annot.: Usnic acid, fumarprotocetraric acid and traces of protocetraric acid and unknown compound bei TLC from A. Johnson and C. F. Culberson. EX A. VěZDA LICHENES SELECTI EXSICCATI NR. 1790.

Primary thallus squamulose, the squamules large, 6-40 mm long, 2-20 mm wide, sometimes with black or white hairs at the margins, persistent, forming more or less dense, 4-10 cm broad mats, the upper surface yellowish green to greenish-grey above, the lower surface cream-coloured or more rarely white, finely arachnoid. Podetia very rare, hollow inside, up to 1.5(-2) cm tall, with irregular cups, the surface corticate, smooth, very rarely with squamules on the margin of cups. Apothecia pale brown, convex, often confluent. Asci 8-spored, clavate, thickened at apex, with a K/I+ blue tholus and a K/I+ strongly blue outer gelatinous sheath, Cladonia-type. Ascospores 1-celled, hyaline, ellipsoid. Pycnidia frequent on the primary squamules or at the margins of cups, sessile to prominent, with a colourless jelly. Conidia hyaline, curved. Photobiont chlorococcoid. Spot tests: K- or K+ yellowish slowly turning brown, C-, KC+ yellowish, P+ red, UV-. Chemistry: fumarprotocetraric and usnic acids, rarely with additional psoromic acid, frequently with traces of zeorin. - Note: a mild-temperate lichen found on both calcareous and siliceous soil in dry grasslands, or in intradunal depressions, also occurring in dry-continental Alpine valleys. The *C. foliacea-C. convoluta* complex was revised by Pino-Bodas & al. (2010): neither morphological characters nor phylogenetic analyses gave evidence to delimit two taxa.



Cladonia convoluta



Cladonia convoluta

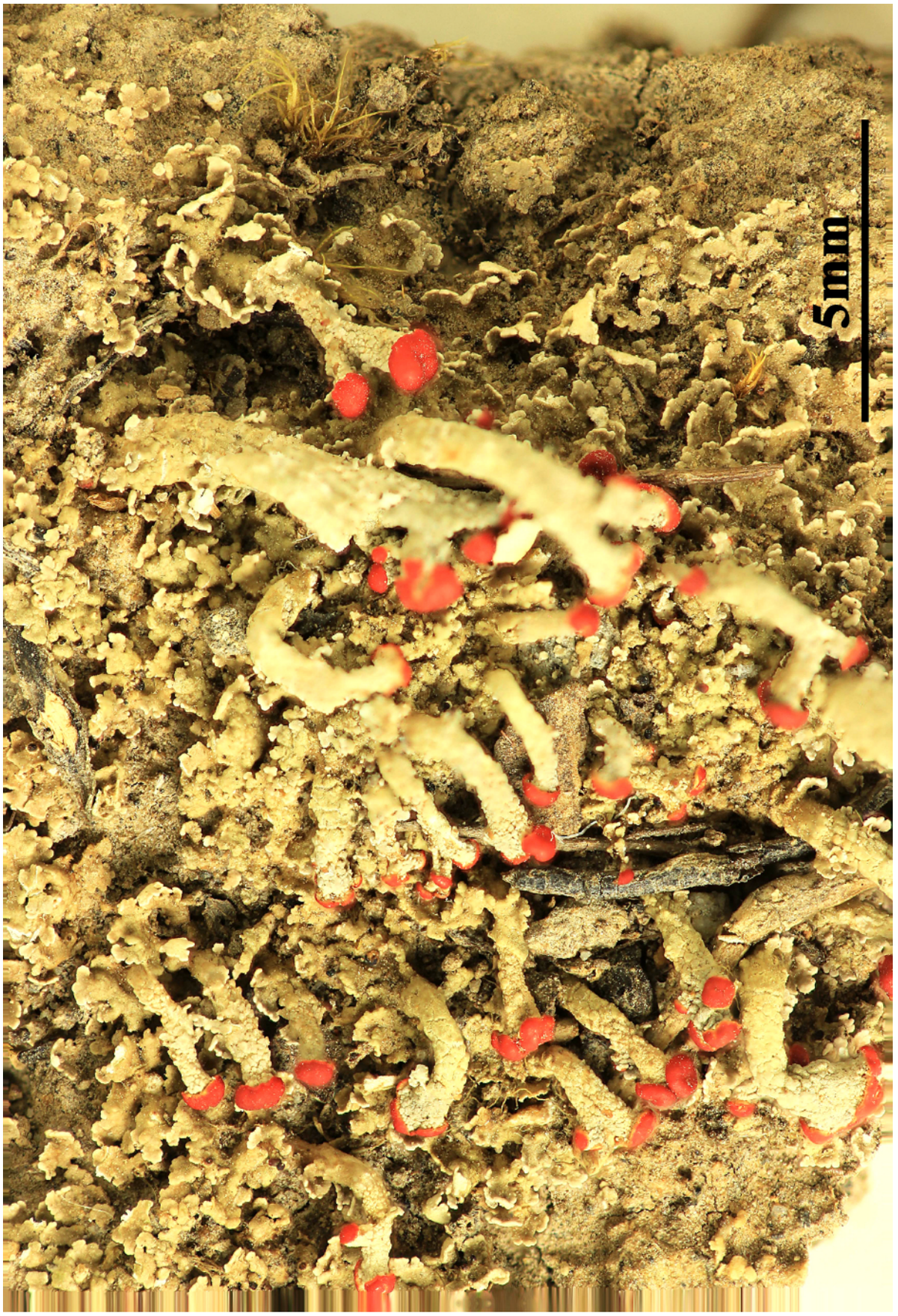
Cladonia cristatella Tuck., Amer. J. Sci. Arts, Ser. 2 25: 428 (1858)

[VZ1614], USA. Carolina Borealis. Orange County: Inter oppidos Hillsborough et Chapel Hill, in silva dicta Duke Forest, 165 m. Ad terram. Leg. W. L. Culberson (no. 17401) et C. F. Culberson, 10.9.1978. - Annot.: Usnic acid (trace), barbatic acid, obtusatic acid, 4-O-demethylbarbatic acid (trace), 3-α-hydroxybarbatic acid (trace) and rhodocladonic acid by TLC; anal: C. F. Culberson and A. Johnson. - Ex A. VěZDA Lichenes Selecti Exsiccati Nr. 1514.

Thallus dimorphic. Primary thallus squamulose; squamules finely divided and abundant, yellowish (in exposed areas) to greenish to grayish (in shade); vegetative diaspores absent; photobiont Asterochloris erici alga. Podetia unbranched or slightly branched at tips, lacking cups, podetial surface corticate, continuous to areolate, smooth to verruculose. Ascomata biatorine apothecia atop of podetia, red, 0.3-3 mm diam. Chemistry. K-, C-, KC+ gold, P-; usnic, barbatic and didymic acids. Substrate and Habitat. On wood, soil or bark of tree bases. Distribution. Eastern North America; in North Carolina throughout.



Cladonia cristatella



Cladonia cristatella

Cladonia cryptochlorophaea Asahina, J. Jap. Bot. 16(12): 711 (1940)

[VZ1663], USA. North Carolina. Carteret County: 13 km ad occidentem versus a Morehead City. Ad terram arenariam in arvo aprico. Leg. W. L. Culberson (no. 17493) et C. F. Culberson, 16.3.1979. - Annot.: Cryptochlorophaeic acid, a trace of paludosic acid, and traces of unidentified compounds by TLC; anal: A. Johnson et C. F. Culberso.- Ex A. Vězda Lichenes Selecti Exsiccati Nr. 1663.

Primary thallus persistent, consisting of squamules 0.3-1(-5) x 0.2-0.5 mm, esorediate. Podetia 0.8-1(-3) cm tall, 0.5-1 mm thick, dark greenish gray, in part browned, occasionally slightly melanotic at base, scyphose; scyphi usually single, rarely proliferating from margins, (2-)4-6 mm wide, fairly regular; margins subentire. Surface of podetia rough, without continuous cortex, but surface (including upper surface of scyphus) beset with corticate, soredioid granules, phyllidia, and microsquamules, all of which are easily shed to reveal white, arachnoid medulla; granules spherical, to 80 µm; macrosquamules on podetia rare. Podetial wall 250-275 µm; cortex 25-35 µm; medulla 50-75 µm, indistinctly delimited; stereome 120-150 µm; central canal papillulate. Conidiomata infrequent, on scyphal margins (not seen in mature condition). Hymenial disks infrequent, dark brown; spores not observed. Chemistry. P+ red, rarely P-, K+ wine red, C- or C+ fugitive red, KC+ red. Cryptochlorophaeic and paludosic acids, and usually fumarprotocetraric acid plus trace amounts of protocetraric, confumarprotocetraric, 4-0-methly- cryptochlorophaeic, and subpaludosic acids, and minor unknowns. Apparently rare through- out the area. All records from high mountains, mainly Andes, from elevations of 1900-3365 m, at and above timberline. In general, a boreal-temperate species, known from South and North America, Europe, Asia, and Australia. On humous, acidic soils, often over rock outcrops.



Cladonia cryptochlorophaea



Cladonia cryptochlorophaea

A
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Baeomyces amaurocraeus (Flörke) Wahlenb..... 127
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Calicium chrysocephalum var. melanocephalum Nyl..... 44
Calicium claviculare var. pusillum Ach..... 65
Calicium consociatum Nádv..... 60
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Calicium ferrugineum Turner ex Sm..... 48
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Calicium floerkei Zahlbr..... 65
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Calicium melanophaeum Ach..... 48
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Calicium stemoneum var. aeruginosum Turner ex Schaer..... 52

Calicium stemoneum var. ferrugineum (Turner ex Sm.) H. Olivier.. 48
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Calicium trichiale var. brunneolum (Ach.) Nyl..... 39, 41
Calicium trichiale var. ferrugineum (Turner ex Sm.) Nyl..... 48
Calicium trichiale var. melanophaeum (Ach.) Nyl..... 48
Calicium trichiale var. stemoneum Ach..... 52
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Cenomyce furcata var. crispata (Ach.) Sommerf..... 158
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