F. Schumm (2026):

Images of Lichens
from Japan 07

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With this volume I document a collection of images mainly out of the Exsiccats of Kashiwadani, Kurokawa and Ohmura from Japan 07 I mostly omitted the search for description from the literature because most of them could be found in the earlier Vols. of Vezda

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

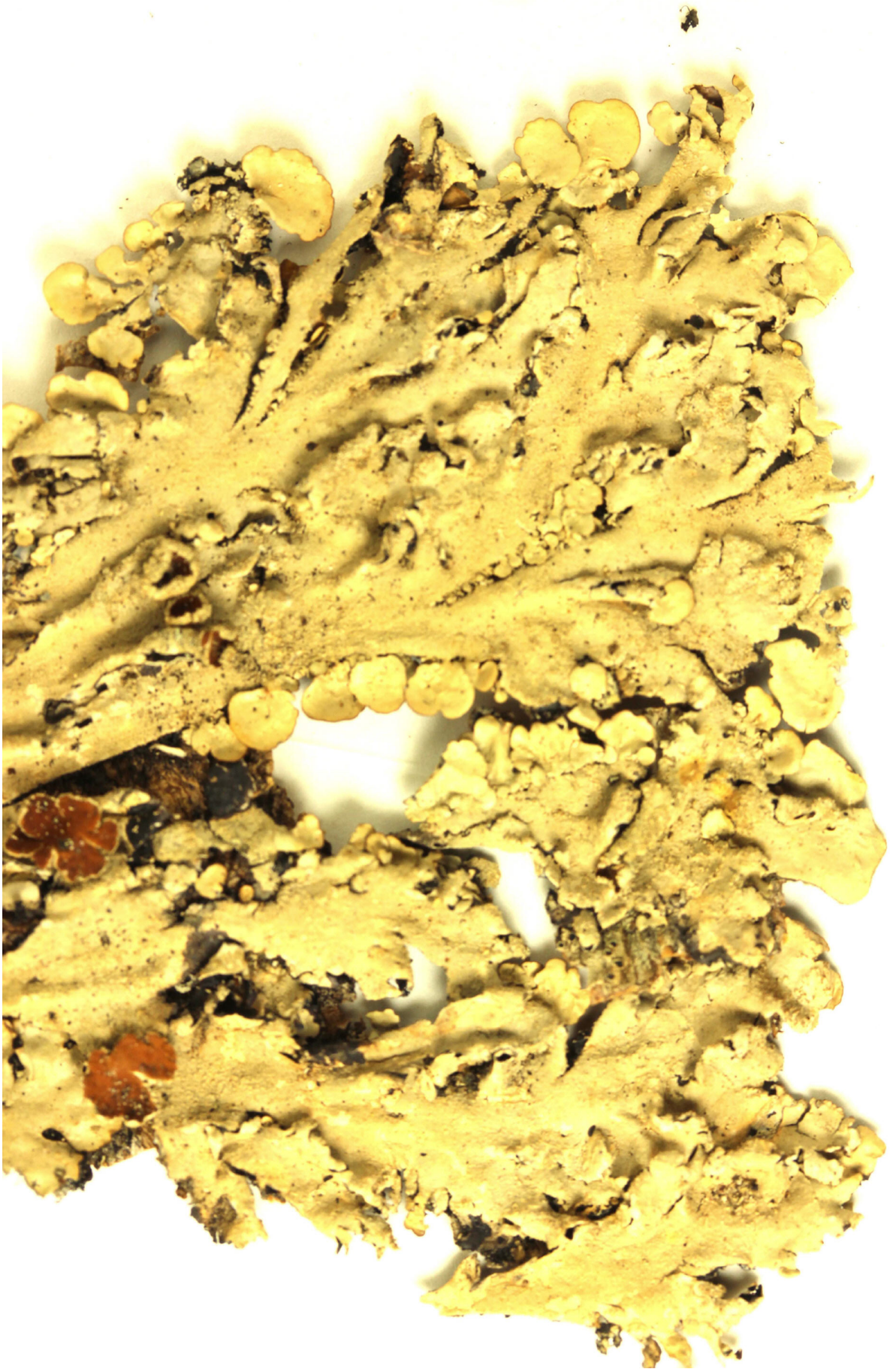
and the Australian Lichenslist under the Url:
https://www.anbg.gov.au/abrs/lichenlist/lichenchecklist_e_o.html

F. Schumm, 2026

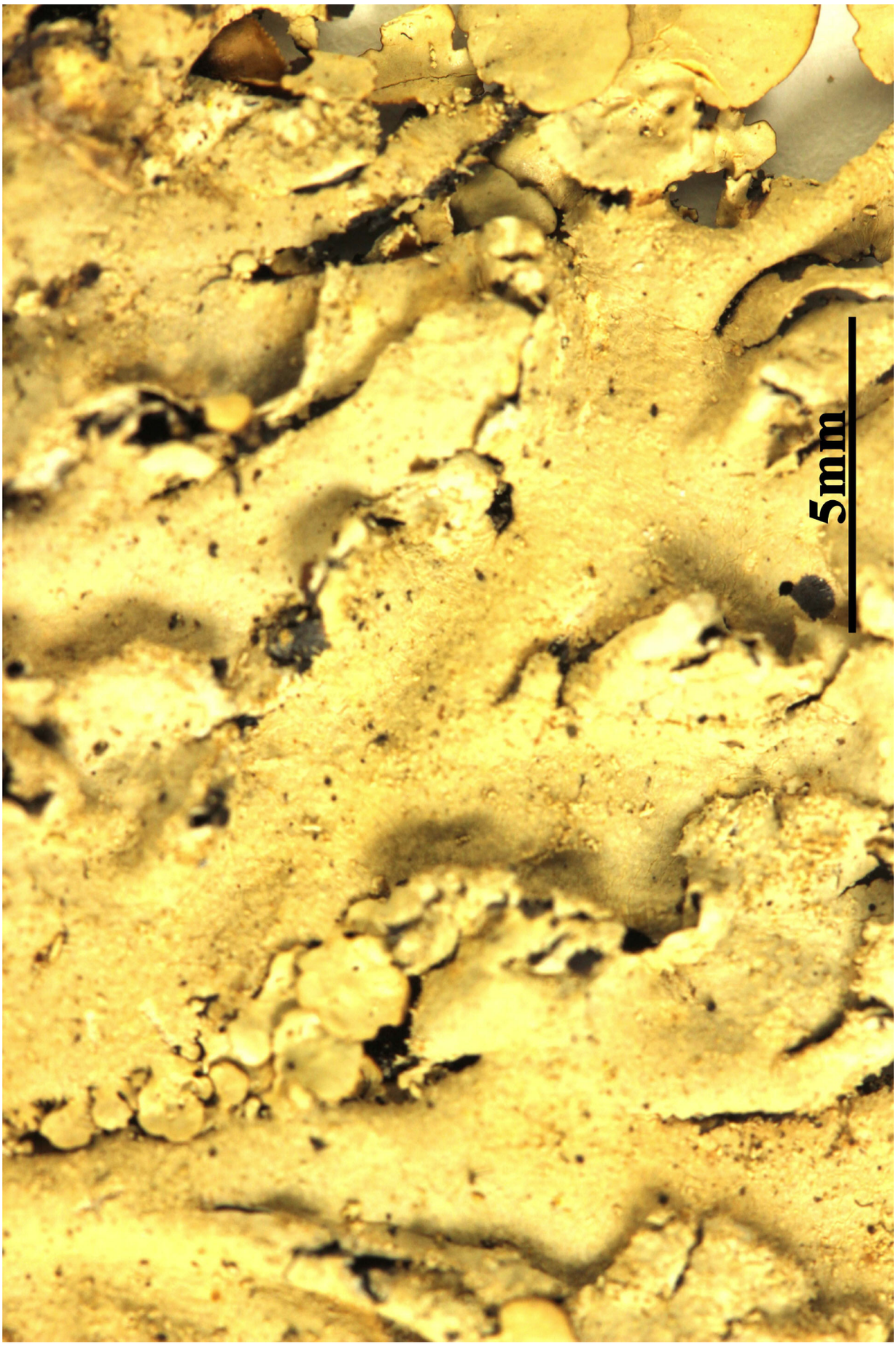
Parmelia bangii Vain. [as 'bangi'], Bot. Tidsskr. 29: 104 (1909)

[KU230], Brazil,Pernambvuco: Serra Negra, 900-1000 m. Leg.SW. Kurokawa (no. 8070), 22.6.1971, det. S. Kurokawa. EX S. KUROKAWA LICHENES RARIORES ET CRITICI EXSICCATI NR. 230.

Parmelia bangii Vain. Bot. Tidsskr. 29:104. 1909:
Thallus loosely attached to bark, 8-15 cm. in diameter, turning buff in the herbarium; lobes rotund, irregular, 5-8 mm. wide, margins entire, very sparsely ciliate, cilia 1.0-1.5 mm. long, mostly along the lateral edges; upper surface dull, continuous or reticulately cracked with age, cortex & integrating in large areas near the margins and developing into sorediate pustules; lower side black and moderately rhizinate, light brown, shiny, and naked along the margins. Apothecia adnate, amphithecium pustulate, disc imperforate; hymenium 70-80 µm high; spores 11-16 x 26-36 µm , episporium 3-4 µm thick; pycnidia not seen. Reactions: Thallus K+ yellow; medulla K+ yellow, C-, KC-, P+ pale orange red, atranorine and stictic acid present. This is a rare species apparently endemic to tropical South America. The spore size and chemistry place it close to P. *pehta* (Huds.) Ach., but the development of extensive lamina1 sorediate pustules is unique.



Parmelia bangii



Parmelia bangii

Parmelia clavulifera Räsänen, Ann. bot. Soc. Zool.-Bot. fenn. Vanamo 20(no. 3): 4 (1944)
= *Parmotrema clavuliferum* (Räsänen) Streimann, Biblioth. Lichenol. 22: 93 (1986)

[KU231}, Japan. Honshu. Prov. Mino: Kirji, Shirakawa-machi, Kamo-gun. 500 m. Leg. S. Kurokawa (no. 68006), 26-27.4.1968, det. S. Kurokawa. EX S. KUROKAWA LICHENES RARIORES ET CRITICI EXSICCATI NR. 231.

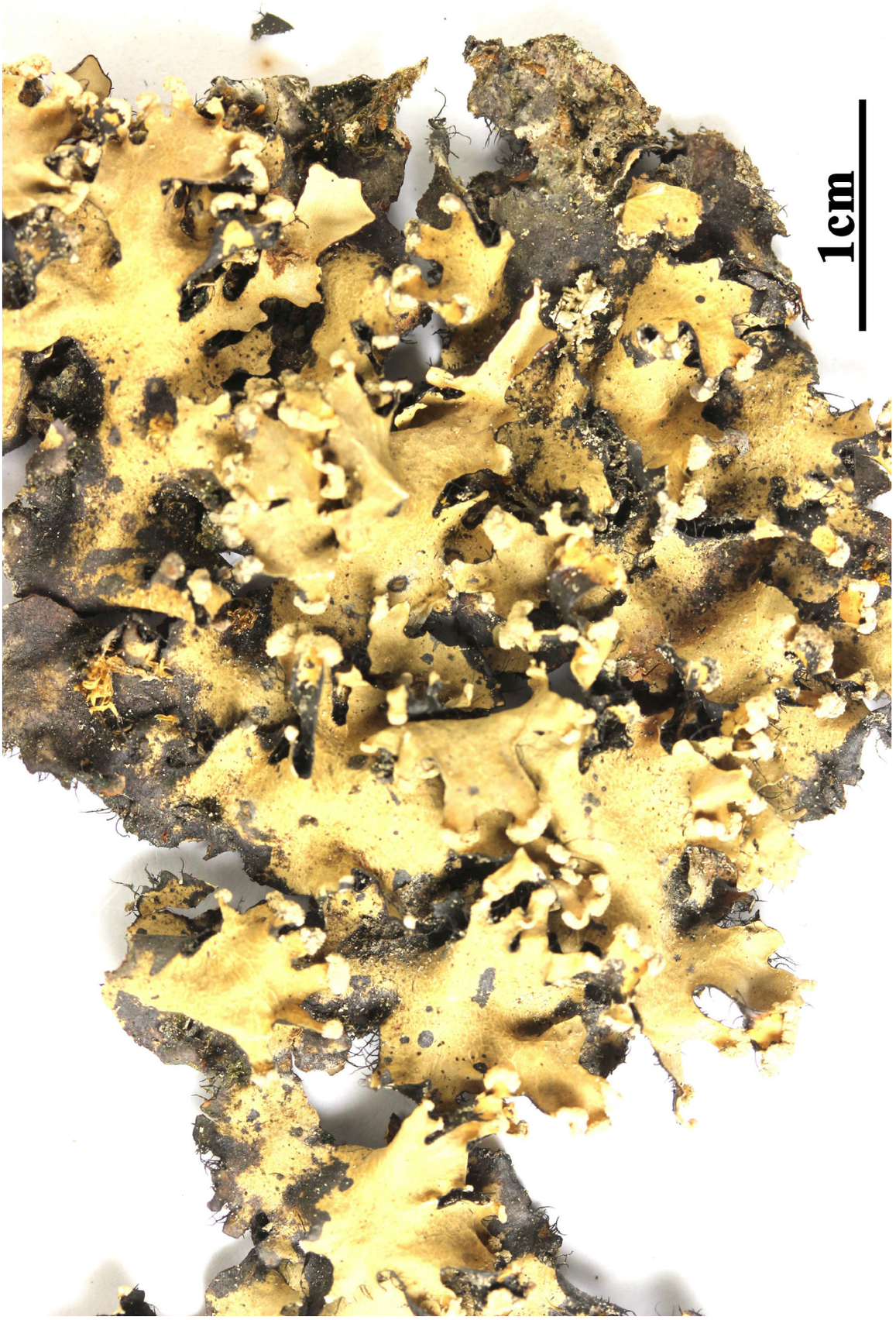
Description ex Bungartz, F. & Spielmann, A.A. (2019) The genus Parmotrema (Parmeliaceae, Lecanoromycetes) in the Galapagos Islands. Plant and Fungal Systematics 64(2): 173–231 MycoBank no. 129346

Thallus corticolous, rarely saxicolous; upper surface white to whitish gray, dull to shiny, epruinose or pruinose, densely reticulate-maculate, often cracked; abundantly sorediate; soralia capitate, conspicuously stalked, at the tip of distinct, short to elongate, laciniate lobes (clavulae); soredia farinose to ± granular, surface creamy white, typically not discolored; lobes moderate-sized to large, broad, 2–6(–10) mm wide, ± angular, abundantly ciliate; cilia short and slender, 0.3–1.5 mm long, black, mostly simple, very rarely branched; lower surface often blackened throughout, the rhizines growing close to the lobe margin, but some lobes typically with a deep brown, erhizinate, 1–2 mm wide margin, particularly the elongate laciniae typically erhizinate and bright white below, lacking pigmentation; rhizines, where present, long, slender, black, mostly simple, rarely sparsely branched; medulla white. Apothecia and pycnidia not observed among the Galapagos specimens. Chemistry. Cortex with atranorin [P+ yellow, K+ yellow, KC–, C–, UV–]; medulla with salazinic acid [P+deep yellow, K+ yellow, soon turning blood-red, KC–, C–, UV–]. Ecology and distribution. Oceania (Lamb 1963; Feuerer 2008; Spielmann 2009), Asia (Feuerer 2008; Ohmura et al. 2012; Ahn & Moon 2016), Hawaii (Moon et al. 2001), Brazil (Barros & Xavier Filho 1972; Jungbluth 2006; Benatti & Marcelli 2008; Spielmann & Marcelli 2009). Previously reported only online (Bungartz et al. 2016); a common and abundant species, from the dry zone through the transition and humid zone into the high altitude dry zone; most abundant within the transition and humid zone; most frequently on bark, wood or cactus pads, often on

twigs or branches of both native and endemic and introduced trees and shrubs; occasionally on rock, typically at sunny and exposed sites. The typical morphotype with long 'clavulae' is the most common one, but a second morphotype apparently does not differ in habitat preferences. - This species with a gray reticulate-maculate surface and salazinic acid in its medulla; usually easily recognized by its clavulae, i.e., the distinctly stalked, capitate soralia protruding from long, slender, laciniate lobes. In some specimens the surface is heavily pruinose; others have a shiny, epruinose cortex. The characteristic reticulate-maculae are not always easily seen in these shiny or heavily pruinose specimens and can often only be distinguished upon closer inspection. Although some authors do not recognize this taxon as distinct from *P. reticulatum* s.str., the Galapagos specimens are easily distinguished already in the field. *Parmotrema clavuliferum* does not only form distinct clavulae; these laciniate lobes are also characteristically unpigmented below, the lower side of the lobes subdividing into clavulae with a mottled appearance of white, unpigmented areas towards their tips, brown pigmented areas further below, eventually blackened towards the thallus center. Whereas the clavulae of P. clavuliferum always lack rhizines, the broad lobes of *P. reticulatum* are typically densely rhizinate even close to the margin; these lobes often lack the broad erhizinate margin otherwise so typical for this genus. Here we consider these two taxa, *P. clavuliferum* and *P. reticulatum*, as distinct, well distinguished, separate species, especially since a recent study by Ahn & Moon (2016) found molecular support for this opinion. Our experience suggests that specimens with less conspicuously stalked but nevertheless capitate soredia also deserve attention. With *P. clavuliferum* and *P. reticulatum* s.str. they share the same chemistry (cortex with atranorin, medulla with salazinic acid), but their capitate soralia are morphologically closer to P. clavuliferum, and these short clavulae also share a mottled white-brown blackened lower lobe side. We have provisionally treated them below as morphotypes – *P. clavuliferum* with long vs. short clavulae. In Brazil, material commonly identified as *P. clavuliferum* is morphologically also rather heterogeneous (e.g., Benatti & Marcelli 2008) and it has be argued that some of these specimens may constitute a separate species (Spielmann 2009). Almost all collections of *P. clavuliferum* in the Galapagos are corticolous. Only one specimen has been found on rock (Spielmann 10450, CDS 51806). The species shares many characteristics with *P. marcellianum*, which grows exclusively on rock and generally has much smaller lobes

Parmelia clavulifera

Parmelia clavulifera



Parmelia clavulifera

Parmelia clavulifera Räsänen, Ann. bot. Soc. Zool.-Bot. fenn. Vanamo 20(no. 3): 4 (1944)

= *Parmotrema clavuliferum* (Räsänen) Streimann, Biblioth. Lichenol. 22: 93 (1986)

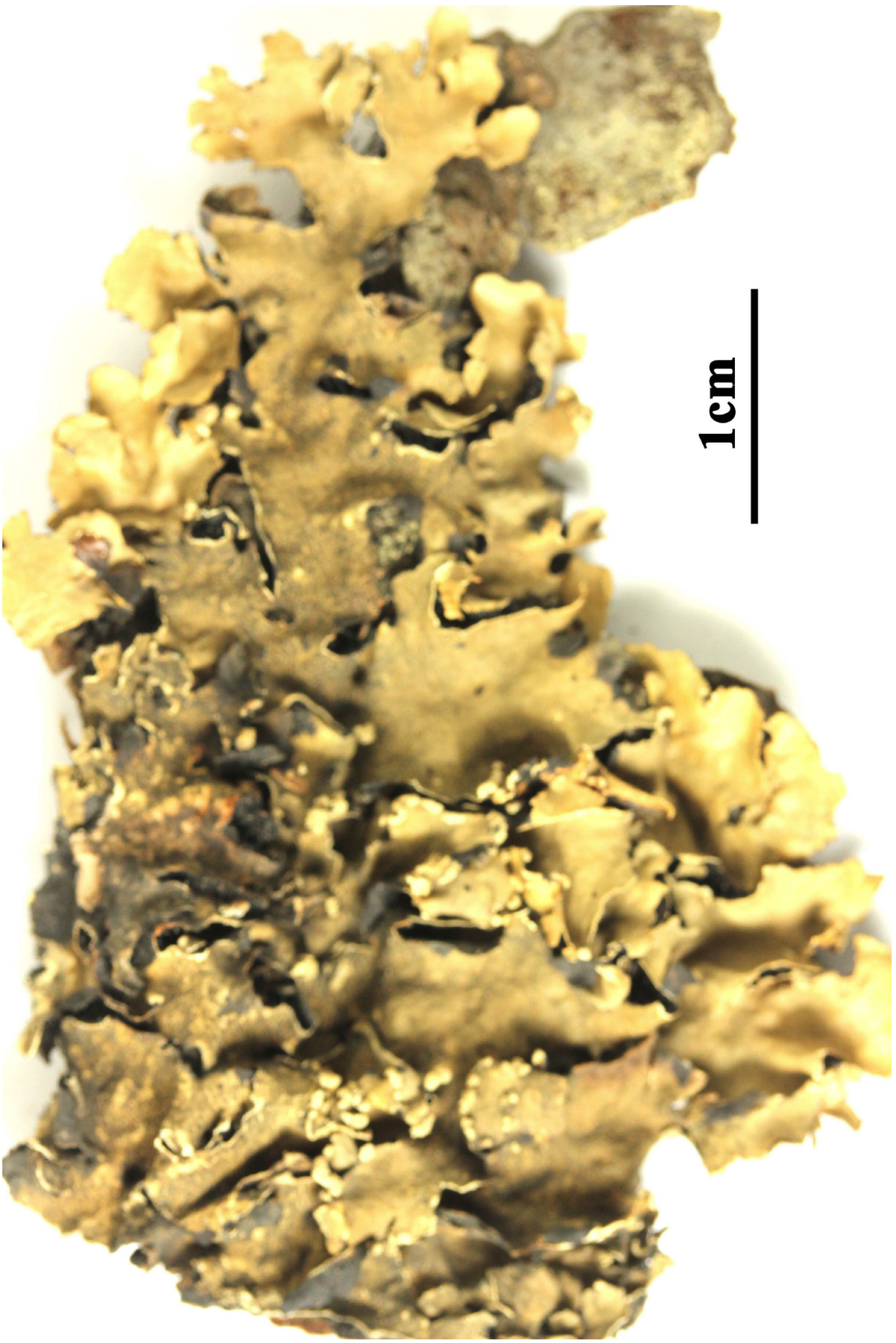
[KU181],Japan. Honshu. Prov. Iwaki:Matsukawa-ura. On trunk of *Pinus thunbergii*, 1m.Leg. S. Kurokawa, 5.12.1964, det. S. Kurokawa. EX S. KUROKAWA LICHENES RARIORES ET CRITICI EXSKICCATI NR. 181.

Description ex Bungartz, F. & Spielmann, A.A. (2019) The genus Parmotrema (Parmeliaceae, Lecanoromycetes) in the Galapagos Islands. Plant and Fungal Systematics 64(2): 173–231 MycoBank no. 129346

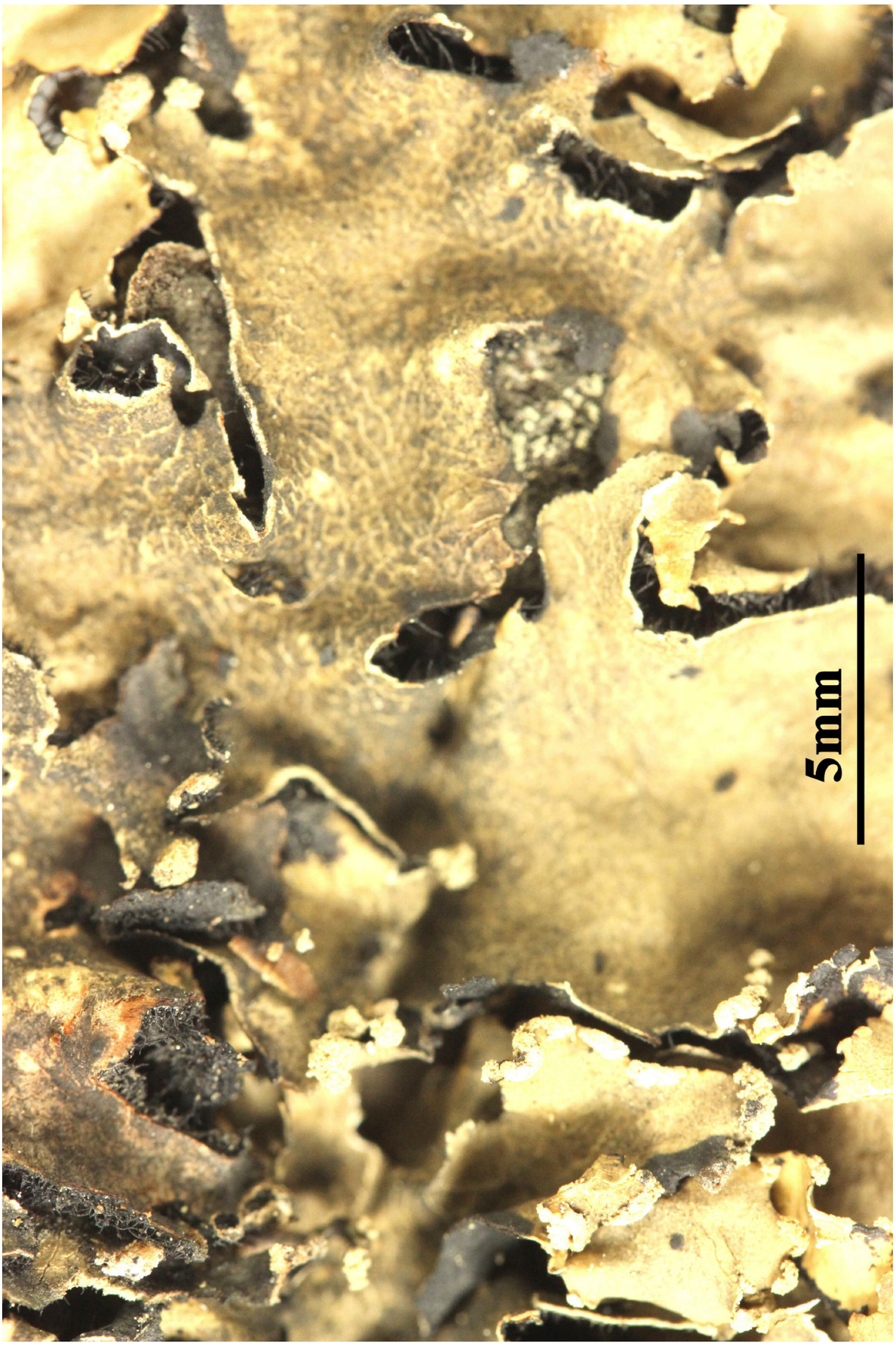
Thallus corticolous, rarely saxicolous; upper surface white to whitish gray, dull to shiny, epruinose or pruinose, densely reticulate-maculate, often cracked; abundantly sorediate; soralia capitate, conspicuously stalked, at the tip of distinct, short to elongate, laciniate lobes (clavulae); soredia farinose to ± granular, surface creamy white, typically not discolored; lobes moderate-sized to large, broad, 2–6(–10) mm wide, ± angular, abundantly ciliate; cilia short and slender, 0.3–1.5 mm long, black, mostly simple, very rarely branched; lower surface often blackened throughout, the rhizines growing close to the lobe margin, but some lobes typically with a deep brown, erhizinate, ~ 1–2 mm wide margin, particularly the elongate laciniae typically erhizinate and bright white below, lacking pigmentation; rhizines, where present, long, slender, black, mostly simple, rarely sparsely branched; medulla white. Apothecia and pycnidia not observed among the Galapagos specimens. Chemistry. Cortex with atranorin [P+ yellow, K+ yellow, KC–, C–, UV–]; medulla with salazinic acid [P+deep yellow, K+ yellow, soon turning blood-red, KC–, C–, UV–]. Ecology and distribution. Oceania (Lamb 1963; Feuerer 2008; Spielmann 2009), Asia (Feuerer 2008; Ohmura et al. 2012; Ahn & Moon 2016), Hawaii (Moon et al. 2001), Brazil (Barros & Xavier Filho 1972; Jungbluth 2006; Benatti & Marcelli 2008; Spielmann & Marcelli 2009). Previously reported only online (Bungartz et al. 2016); a common and abundant species, from the dry zone through the transition and humid zone into the high altitude dry zone; most abundant within the transition and humid zone; most frequently on bark, wood or cactus pads, often on

twigs or branches of both native and endemic and introduced trees and shrubs; occasionally on rock, typically at sunny and exposed sites. The typical morphotype with long 'clavulae' is the most common one, but a second morphotype apparently does not differ in habitat preferences. - This species with a gray reticulate-maculate surface and salazinic acid in its medulla; usually easily recognized by its clavulae, i.e., the distinctly stalked, capitate soralia protruding from long, slender, laciniate lobes. In some specimens the surface is heavily pruinose; others have a shiny, epruinose cortex. The characteristic reticulate-maculae are not always easily seen in these shiny or heavily pruinose specimens and can often only be distinguished upon closer inspection. Although some authors do not recognize this taxon as distinct from *P. reticulatum* s.str., the Galapagos specimens are easily distinguished already in the field. *Parmotrema clavuliferum* does not only form distinct clavulae; these laciniate lobes are also characteristically unpigmented below, the lower side of the lobes subdividing into clavulae with a mottled appearance of white, unpigmented areas towards their tips, brown pigmented areas further below, eventually blackened towards the thallus center. Whereas the clavulae of P. clavuliferum always lack rhizines, the broad lobes of *P. reticulatum* are typically densely rhizinate even close to the margin; these lobes often lack the broad erhizinate margin otherwise so typical for this genus. Here we consider these two taxa, *P. clavuliferum* and *P. reticulatum*, as distinct, well distinguished, separate species, especially since a recent study by Ahn & Moon (2016) found molecular support for this opinion. Our experience suggests that specimens with less conspicuously stalked but nevertheless capitate soredia also deserve attention. With *P. clavuliferum* and *P. reticulatum* s.str. they share the same chemistry (cortex with atranorin, medulla with salazinic acid), but their capitate soralia are morphologically closer to P. clavuliferum, and these short clavulae also share a mottled white-brown blackened lower lobe side. We have provisionally treated them below as morphotypes – *P. clavuliferum* with long vs. short clavulae. In Brazil, material commonly identified as *P. clavuliferum* is morphologically also rather heterogeneous (e.g., Benatti & Marcelli 2008) and it has be argued that some of these specimens may constitute a separate species (Spielmann 2009). Almost all collections of *P. clavuliferum* in the Galapagos are corticolous. Only one specimen has been found on rock (Spielmann 10450, CDS 51806). The species shares many characteristics with *P. marcellianum*, which grows exclusively on rock and generally has much smaller lobes

Parmelia clavulifera



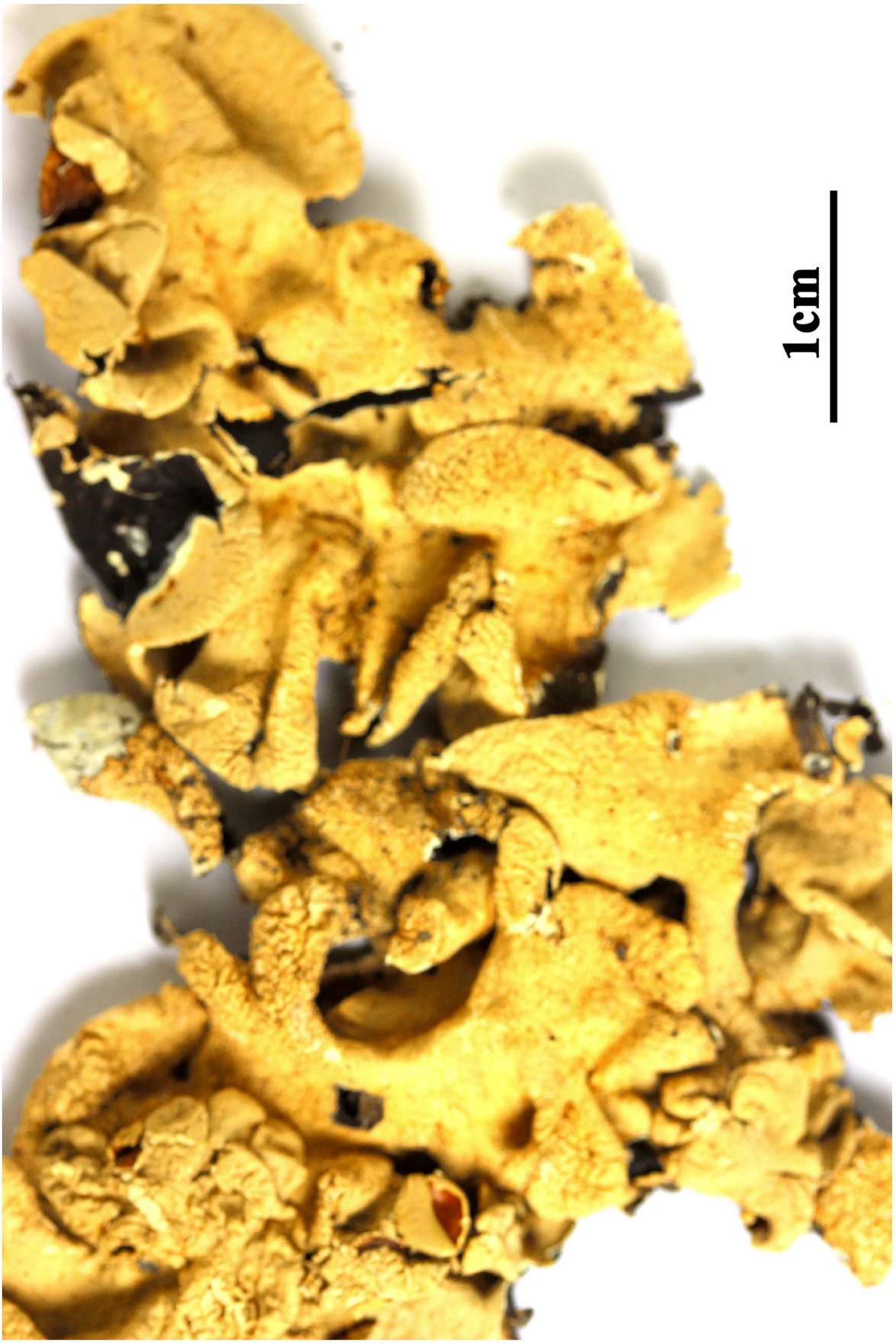
Parmelia clavulifera



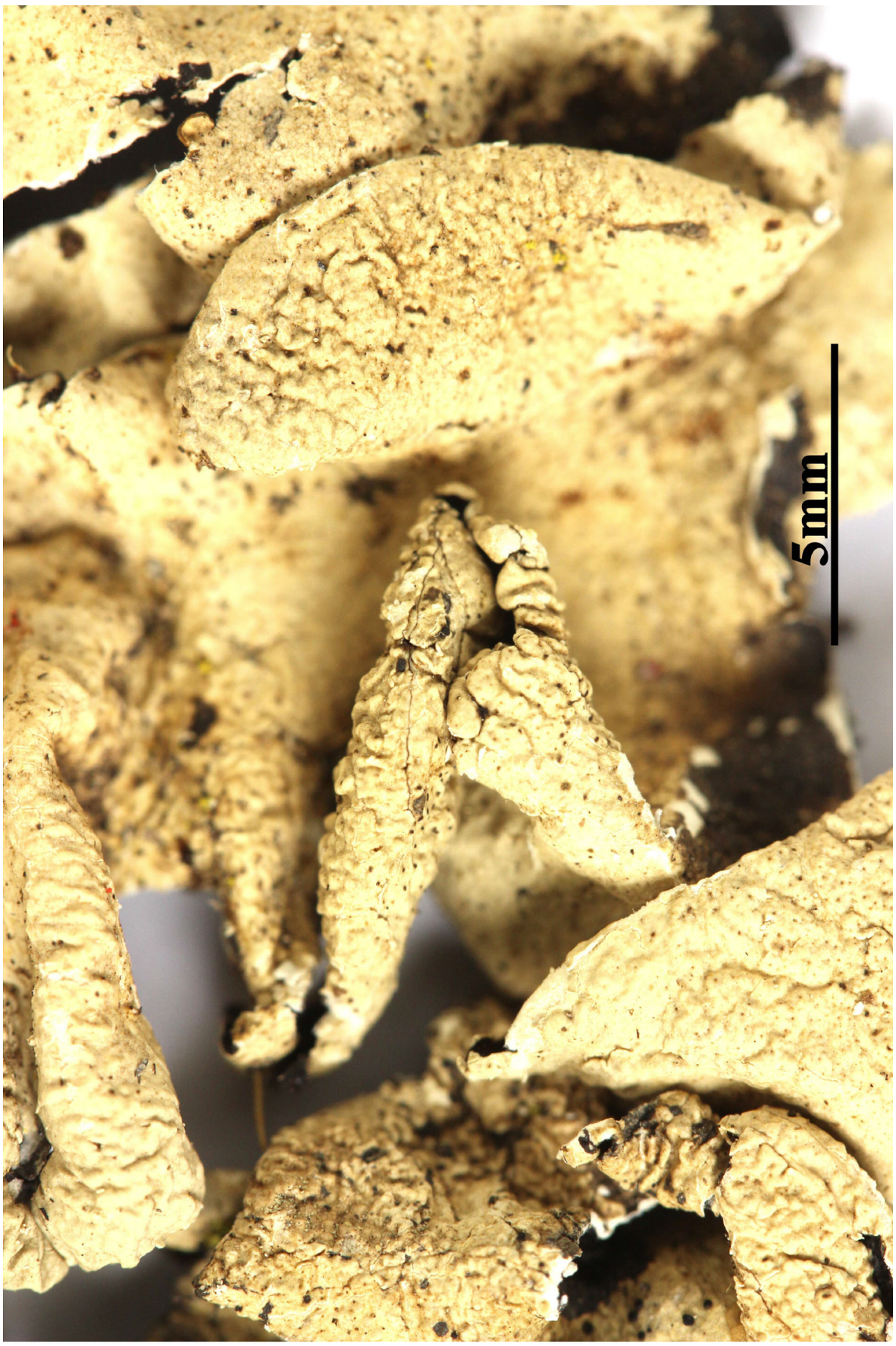
Parmelia clavulifera

Parmelia cryptoxanthoides Kurok., Bull. natn. Sci. Mus., Tokyo 17(4): 297 (1974)

[KU232], Brazi. Parana: Jardin Paraizo, 9 km west of Curitiba. On trees, 800m. Leg. S. Kurokawa (no. 8245=, 8.7.1971, det. S. Kurokawa. EX S. KUROKAWA LICHENES RARIORES ET CRITICI EXSICCATI NR. 232.



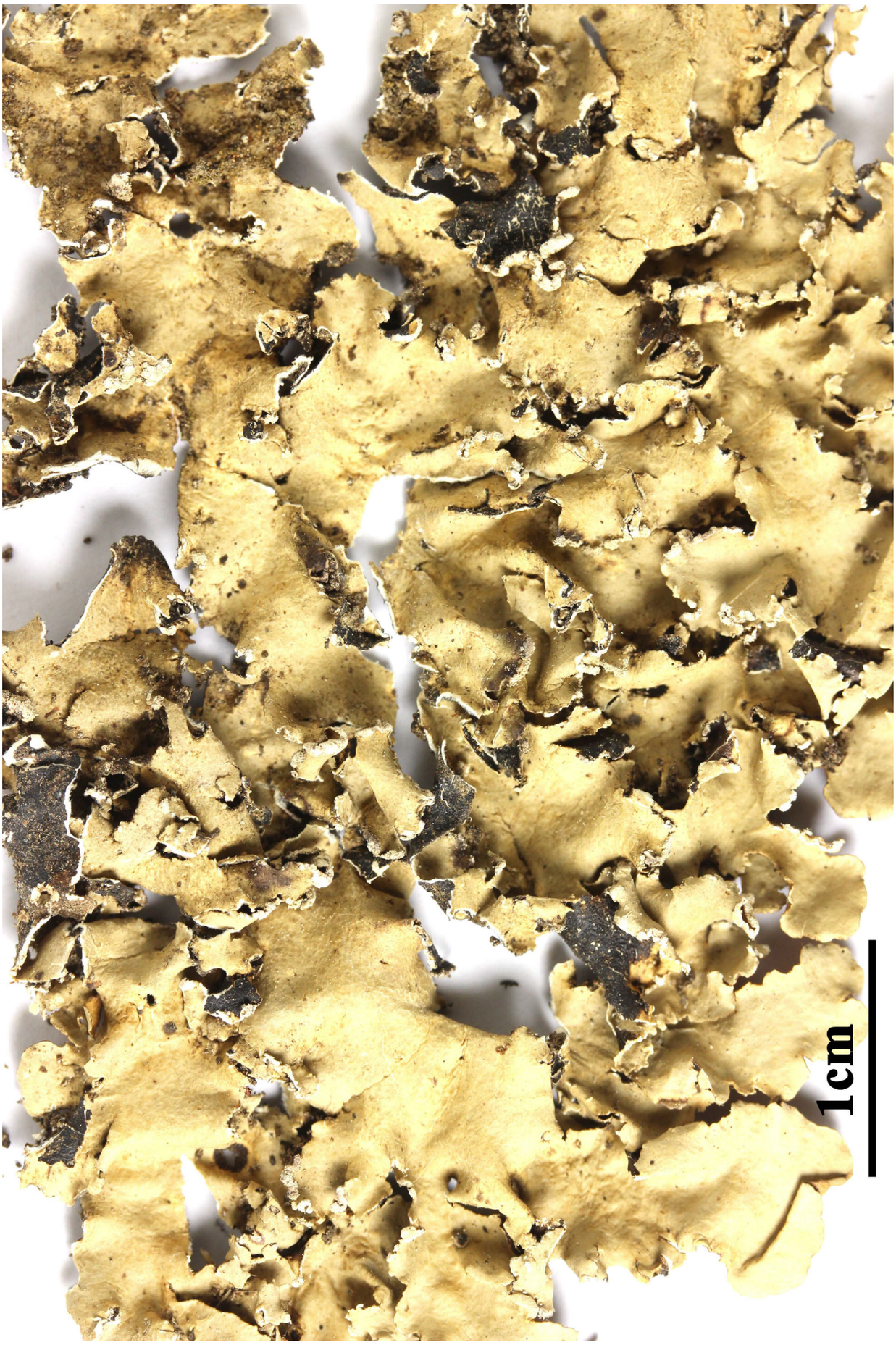
Parmelia cryptoxanthoides



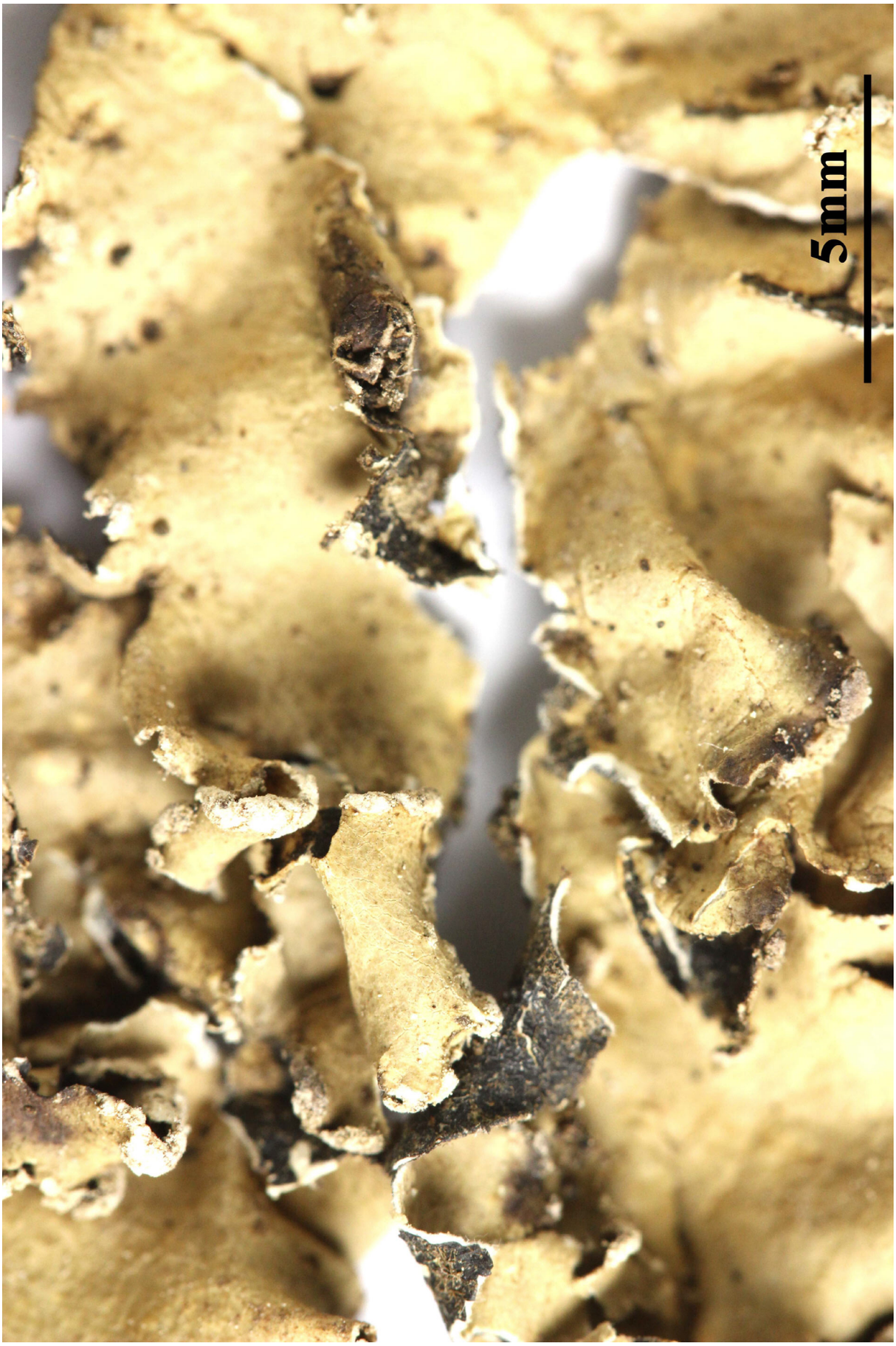
Parmelia cryptoxanthoides

Parmelia dilatata Vain., Acta Soc. Fauna Flora fenn. 7(no. 1): 32 (1890)
= *Parmotrema dilatatum* (Vain.) Hale, Phytologia 28(4): 335 (1974)

[KU578], Japan. Bonin Islands, Hahajima Island: En route between Mt. Kuwanoki and Kita-mura. On trunk of *Pandanus* sp., 120. Leg. S. Kurokawa (no. 77042), 4.8.1977, det. S. Kurokawa. EX S. KUROKAWA AND H. KASHIWADANI LICHENES RARIORES ET CRITICI EXSICCATI NR. 578.



Parmelia dilatata

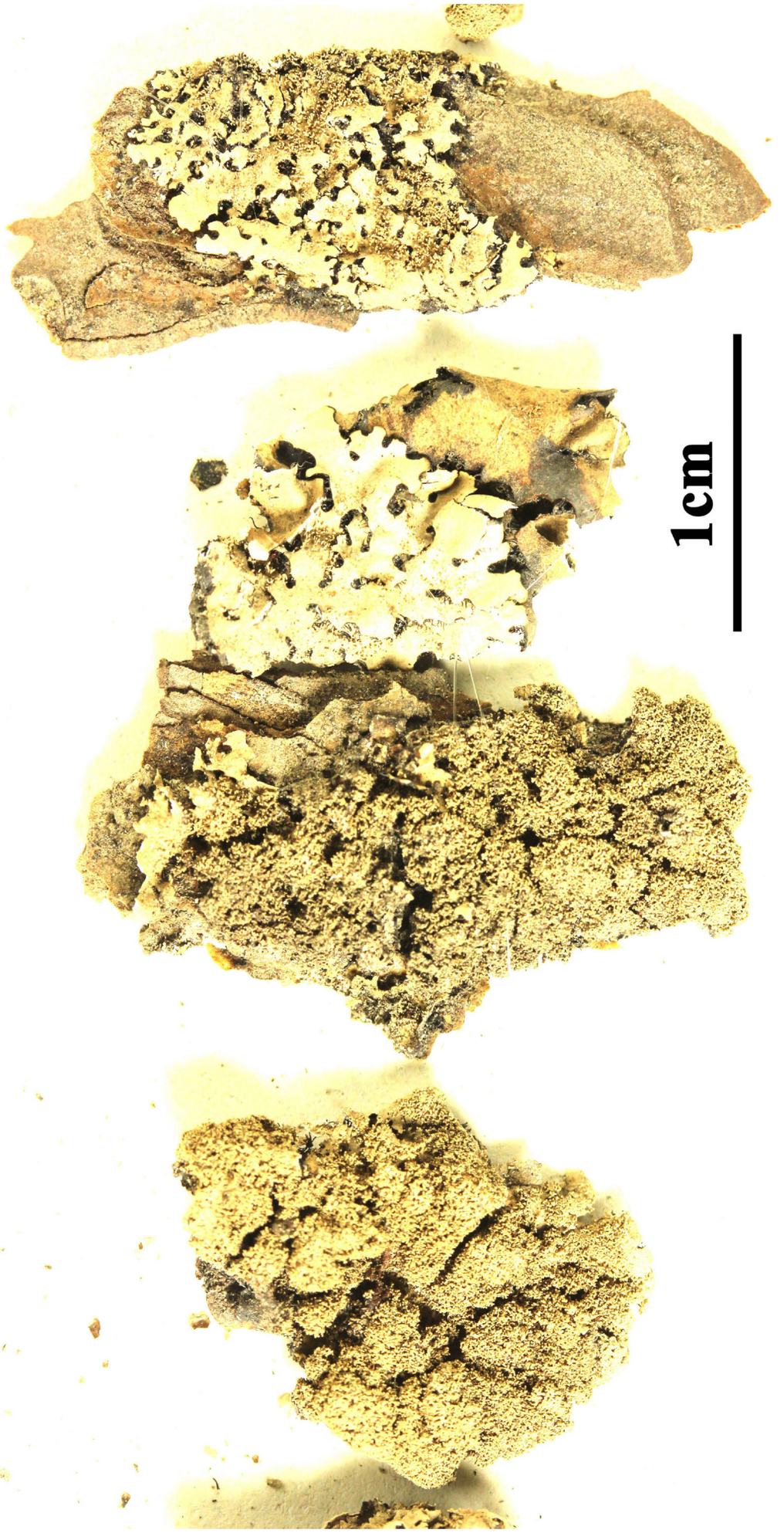


Parmelia dilatata

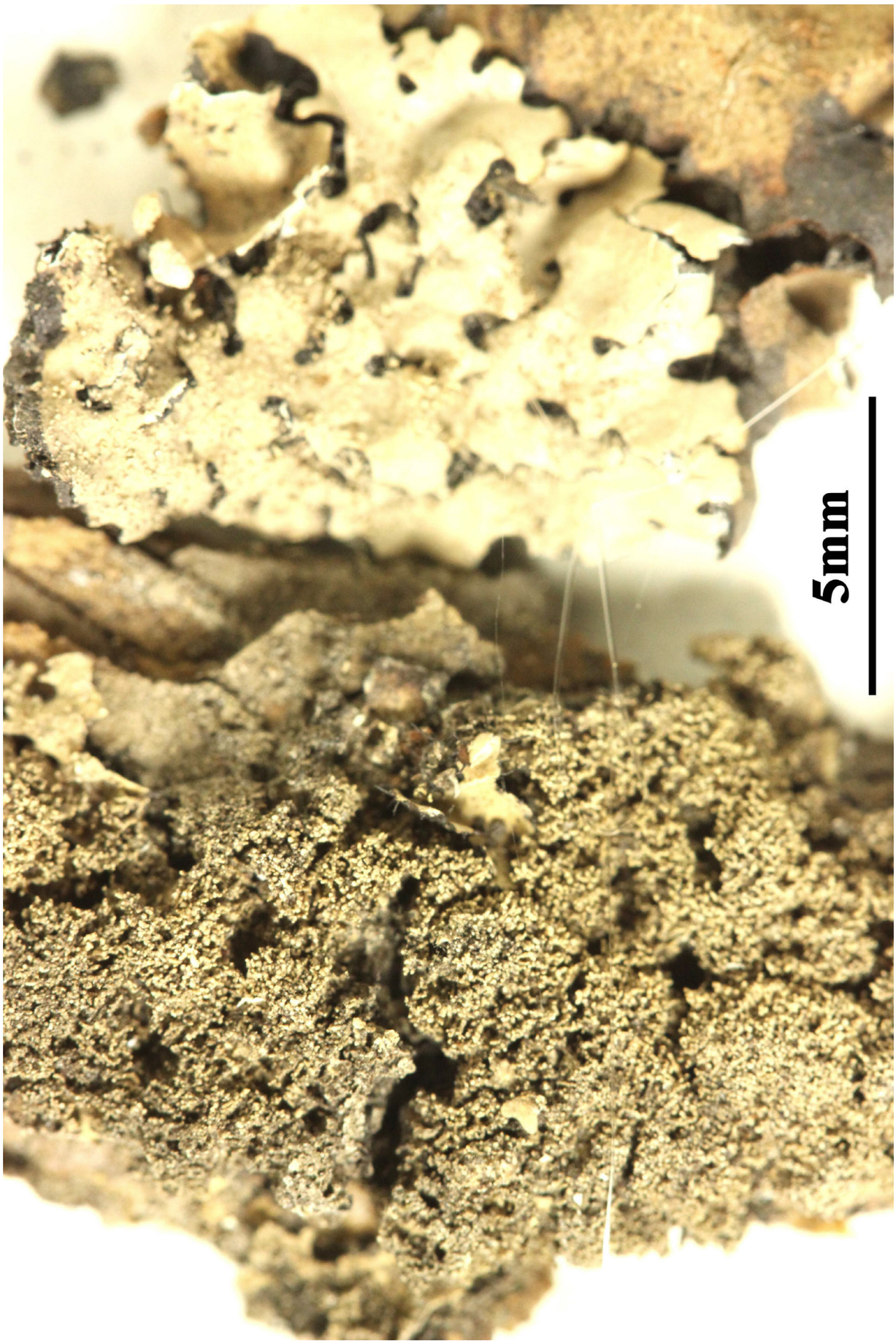
Parmelia dissecta Nyl., Flora, Regensburg 65(29): 451 (1882)
= *Hypotrachyna horrescens* (Taylor) Krog & Swinscow, Lichenologist 19(4): 420 (1987)

[KU624], Japan. Honshu. Prov. Rikuzen: Shobuta, Shishigahama-mura. Miyagi-gun. On bark of *Pinus thunbergii* along th coast. Leg. Y. Asahina & M. Togashi, 20.9.1957, det. S. Kurokawa. Ex S. Kurokawa and H. Kashiwadani Lichenes Rariores Et Critici Exsiccati Nr. 624.

Thallus foliose, heteromerous, dorsiventral, loosely to tightly attached, forming 2-5(-7) cm wide, irregular rosettes, isidiate. Lobes narrow, 0.2-3 mm wide, irregularly branched with rounded axils, contiguous and often imbricate, with truncate to subrotund apices, the margins indented and often laciniate, apparently with simple, black up to 0.8 mm long marginal cilia (actually projecting rhizines). Upper surface whitish grey to greenish grey, smooth, shiny, epruinose, usually emaculate, densely covered in cylindrical to lobulate-coralloid, apically often brownish, short-ciliate isidia, the cilia black, 0.1-0.4 mm long. Lower surface black, shiny, densely rhizinate, with a narrow, naked, brown marginal zone; rhizines black, shiny, simple to rarely dichotomously branched or occasionally squarrose, usually projecting beyond lobe margins. Upper cortex of tightly packed, anticlinally oriented hyphae, with a pored epicortex, the cell walls with isolichenan; medulla white; algal layer continuous; lower cortex brown, of anticlinally oriented hyphae. Apothecia very rare, lecanorine, laminal, to 5 mm across, with a brown disc and an isidiate thalline margin. Epithecium brown; hymenium and hypothecium colourless. Asci 8-spored, clavate, Lecanora-type. Ascospores 1-celled, hyaline, broadly ellipsoid, (12-)15-19 x 7-10(-12) µm. Pycnidia rare, immersed. Conidia cylindrical, 3-5 x c. 0.5 µm. Photobiont chlorococcoid. Spot tests: upper cortex K+ yellow, C-, KC-, P- or P+ faintly yellow; medulla K-, C-, KC+ pink, P-, UV-. Chemistry: upper cortex with atranorin and chloroatranorin; medulla with gyrophoric acid (major), lecanoric and umbilicaric acids (minor), and related accessory substances (hiascic, 4,5-di-0-methylhiascic, 4-0-methylhiascic acids). - Note: a mild-temperate to humid subtropical lichen found on old trees in ancient, open, humid forests.



Parmelia dissecta

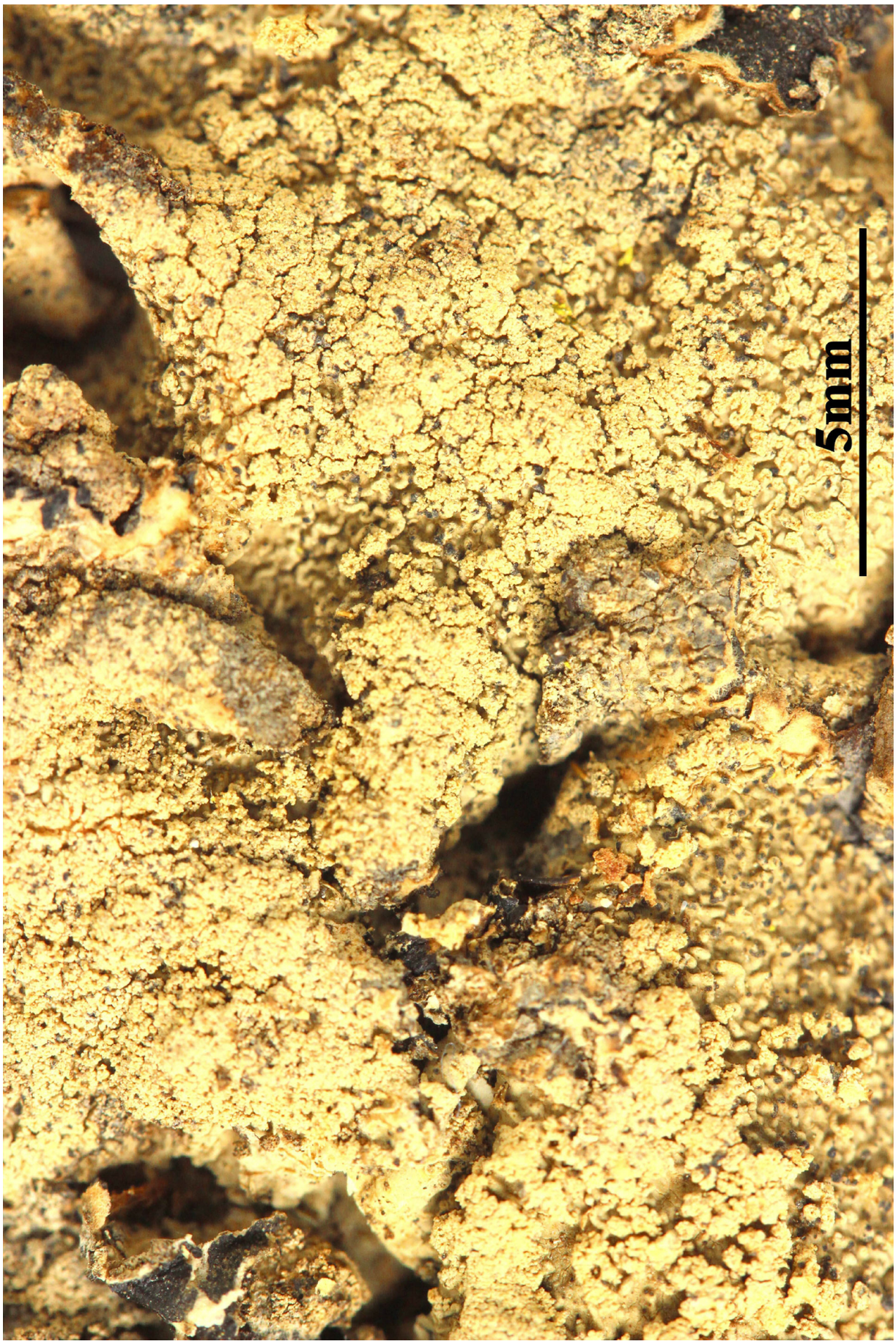


Parmelia dissecta

Parmelia elabens Kurok., Bull. natn. Sci. Mus., Tokyo 17(4): 298 (1974)

[KU233], Brazil. Parana: Jardin Paraizo, 9 km west of Curitiba. On trees, 800 m. Leg. S. Kurokawa (no. 8253), 9.7.1971, det. S. Kurokawa. EX S. KUROKAWA LICHENES RARIORES ET CRITICI EXSICCARI NR. 233.

Parmelia elabens



Parmelia elabens

Parmelia galbina Ach., Syn. meth. lich. (Lund): 195 (1814)
= *Myelochroa galbina* (Ach.) Elix & Hale

[KU625], Japan. Honshu. Prov. Shimotsuke: Mt. Kohsin, Kamitsuga-gun. On bark of Acer mono, 1100m. Leg. H. Shibuichi (no.7747) & K. Yoshida, 25.9.1984. Ex S. Kurokawa and H. Kashiwadani Lichenes Rariores Et Critici Exsiccati Nr. 625.

Chemistry: Atranorin (major) Galbinic acid (major), anal K. Kalb, 4.2000.

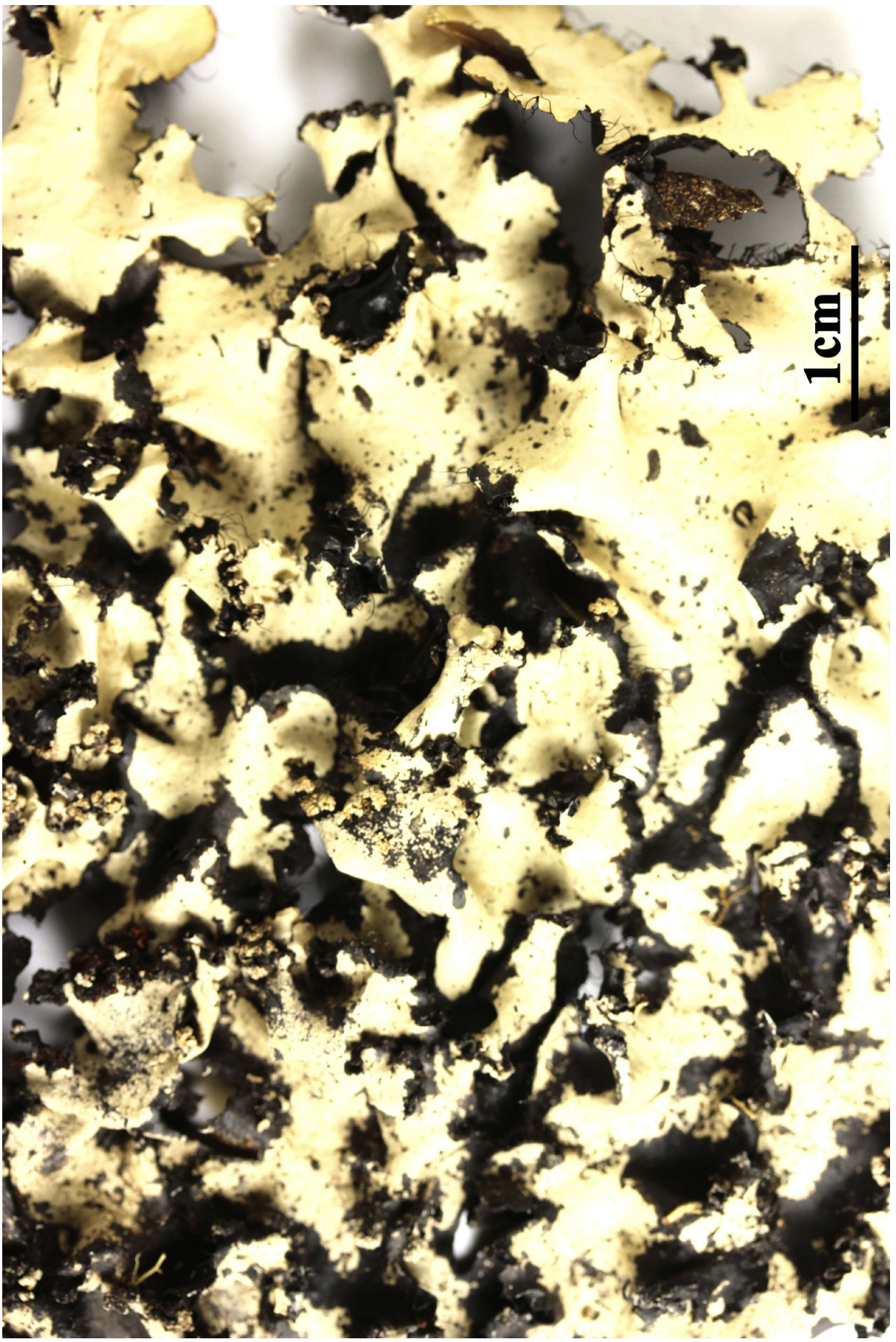
Thallus foliose, adnate. Lobes sublinear to subirregular, tips subrotund, margins ciliate; cilia simple, slender, restricted to lobe axils. Upper surface gray, rugose in center; vegetative diaspores absent. Medulla pale yellow; photobiont Trebouxia alga. Lower surface black, rhizinate; rhizines simple or sparsely branched, black. Ascomata lecanorine apothecia, cup-like, frequent; disk concave, brown. Chemistry. Medulla K-, PD+ red; atranorin, galbinic acid, zeorin, leucotylin and its derivatives, salazinic acid and secalonic acid A. Substrate and Habitat. On bark and wood in forests.

Parmelia galbina

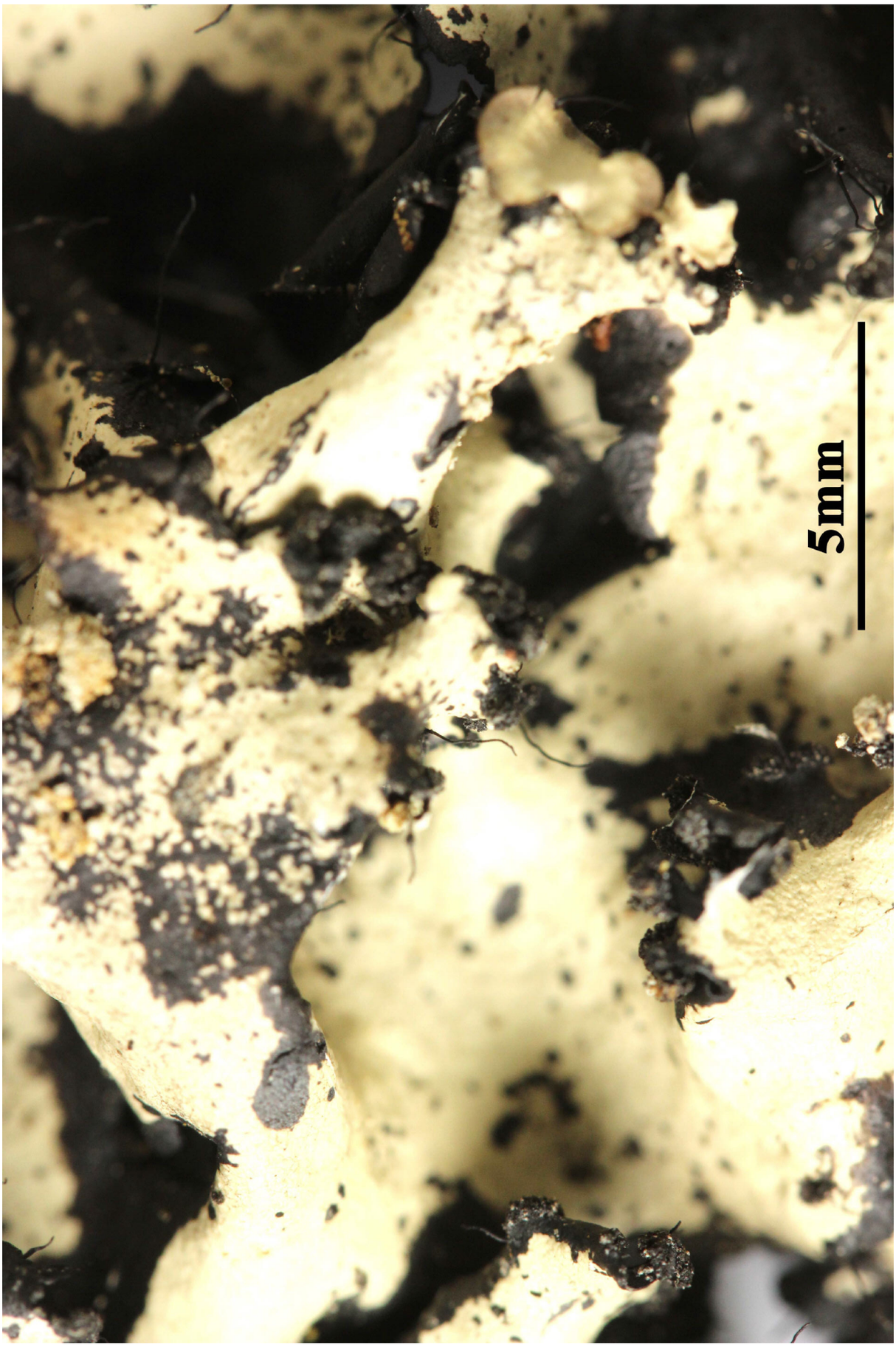
Parmelia galbina

Parmelia gloriosa Kurok., Studies on Cryptogams of Papua New Guinea (Tokyo): 135 (1979)

[KU368], Papua New Guinea. Central District: Mt. Albert Adward, around Abios Hut. On bark of *Pandanus* sp., 2600m. Leg. S. Kurokawa (no. 9113), 31.19.1975, det. S. Kurokawa. EX S. KUROKAWA AND H. KASHIWADANI LICHENES RARIORES ET CRITICI EXSICCATI NR. 368.



Parmelia gloriosa



Parmelia gloriosa

Parmelia irrugans Nyl., Lich. Japon.: 26 (1890)

[KU627], Japan.Kyushu. Prov. Higo: Shirakawa, Shirami-mura, Aso-gun. On bark of *Quercus acutissima*, 600 m. Leg. H. Kashiwadani (no. 40641) &. H. Taoda,20.2.1984, det. H. Kashiwadani. EX S. KUROKAWA AND H. KASHIWADANI LICHENES RARIORES ET CRITICI EXSICCATI NR. 627.

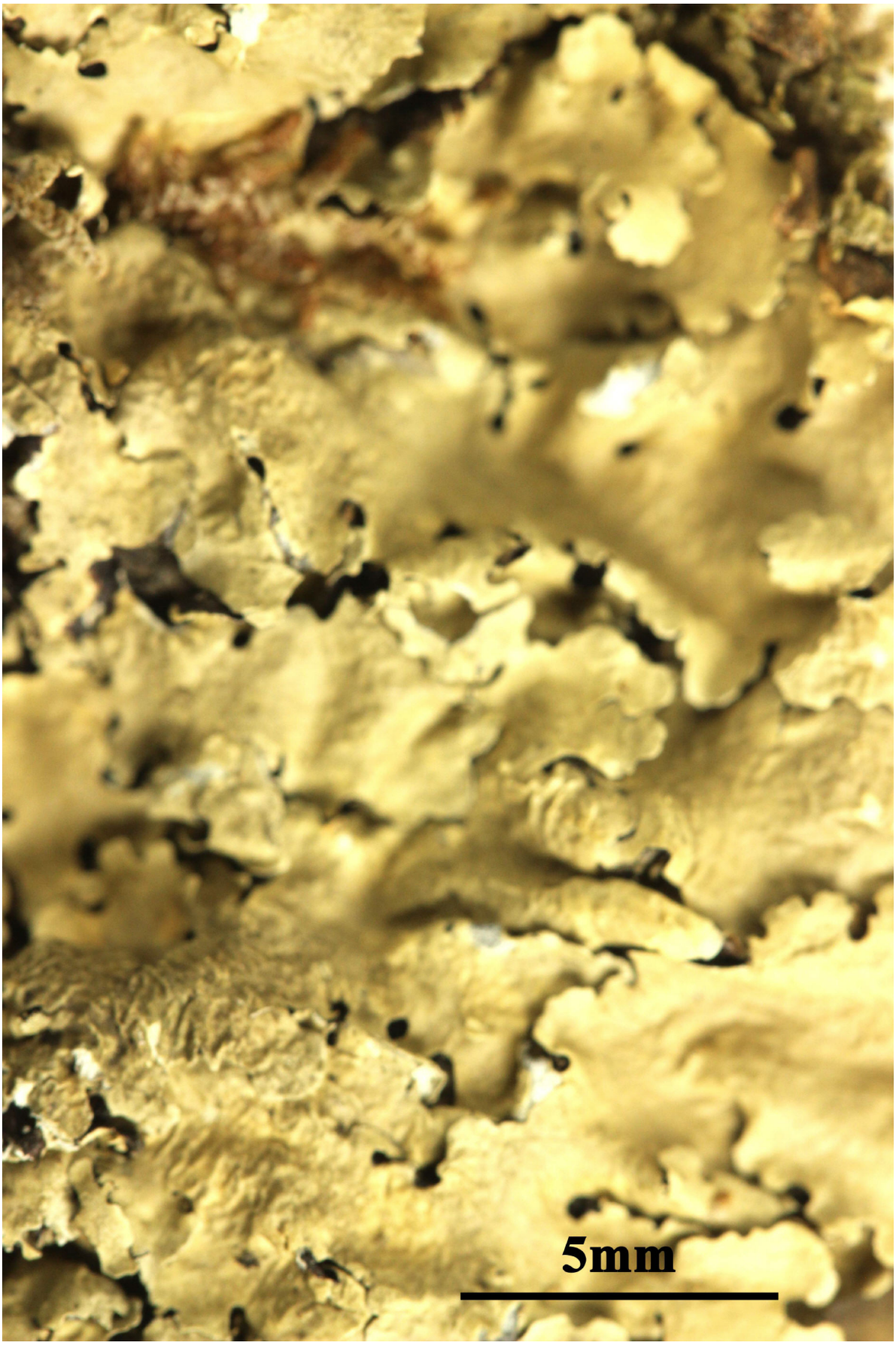
Parmelia irrugans

Parmelia irrugans

Parmelia irrugans Nyl., Lich. Japon.: 26 (1890)

[KU626], Japan. Oki Islands. Prov. Oki; En route from Araki to the top of Mt. Daimanji, Saigo-cho. On bark of *Tsuga diversifolia*, 400 m. Leg. H. Kashiwadani (no. 20800), 28.11.1984, det. H. Kashiwadani. Ex S. Kurokawa and H. Kashiwadani Lichenes Rariores Et Critici Exsiccati Nr. 626.

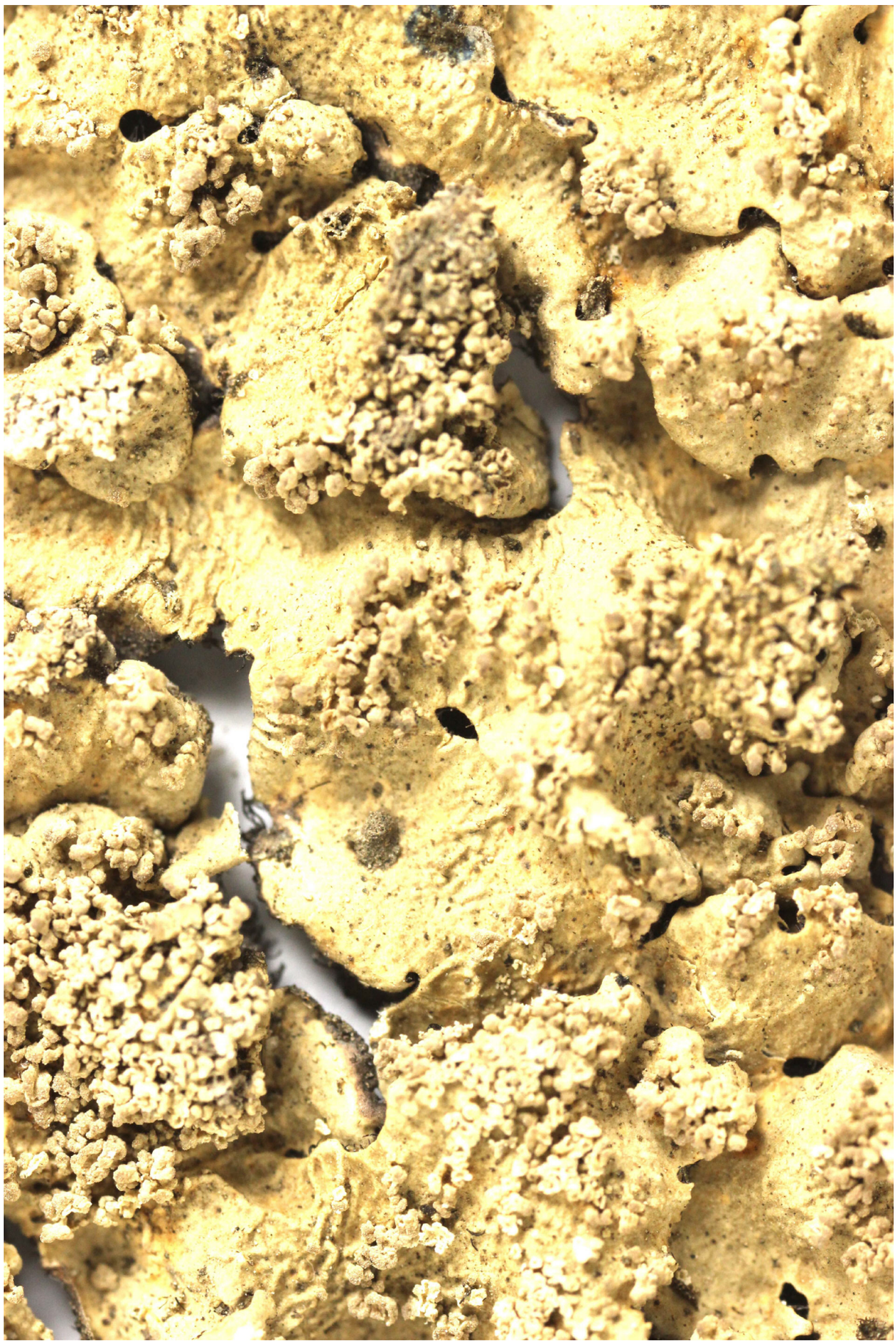
Parmelia irrugans



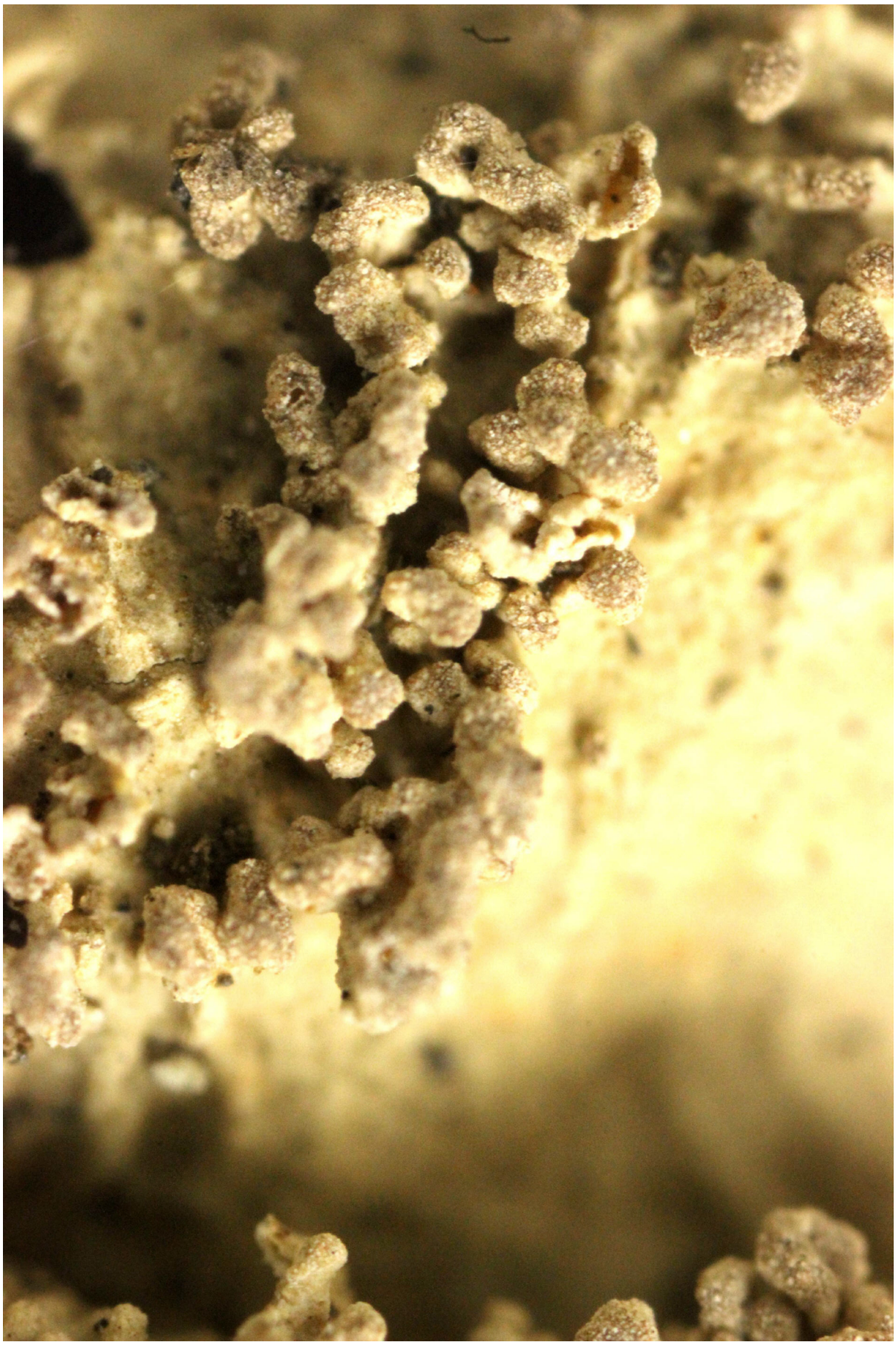
Parmelia irrugans

Parmelia leucotyliza Nyl., Lich. Japon.: 27 (1890)

[KU369], Japan. Shikoku. Prov. Awa: Wajiki, Naka-gun. On rocks, 60 m. Leg. H. Kashiwadani (no. 14326), 26.3.1978, det. S. Kurokawa. Ex S. Kurokawa and H. Kashiwadani Lichenes Raiores Et Critici Exsiccat, Nr. 369.



Parmelia leucotyliza

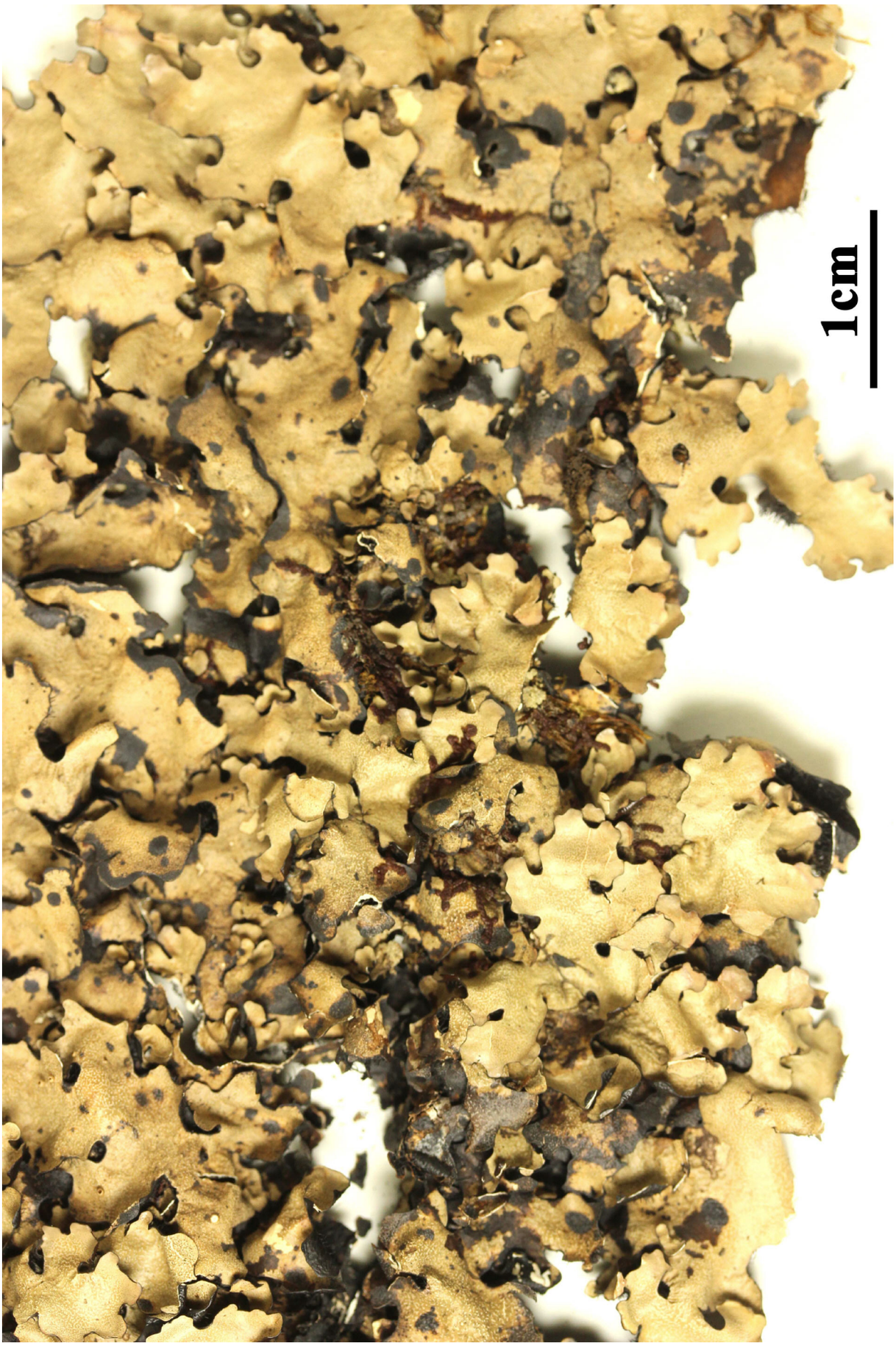


Parmelia leucotyliza

Parmelia leucotyliza

Parmelia marmariza Nyl., Lich. Japon.: 28 (1890)

[KU234], Japan. Honshu. Prov.Kii: Mt.Gomanodan, Hidaka-gun. On trees, 1160 m. Leg.S. Kurokawa (no 71099,23.3.1971,det. S. Kurokawa. EX S. KUROKAWA LICHENES REARIORES ET CRITICI EXSICCATI NR.234.



Parmelia marmariza

Parmelia marmariza

Parmelia olivacea (L.) Ach., Methodus qua omnes detectos Lichenes Secundum Organa Carpomorpha ad Genera, Species et Varietates Redigere atque Observationibus Illustrare Tentavit Erik Acharius: 213 (1803)
= *Lichen olivaceus* L. 1753
= *Melanohalea olivacea* (L.) O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch, Mycol. Res. 108(8): 883 (2004)

[KU427], Japan. Honshu. Prov. Shinano: Mt. Oh-yama, Minami-Sakugun. On twigs of Pinus pentaphylla var. himekomatsu, 2200 m. Leg. H. Shibuichi (no. 5851) and K. Yoshida, 12.1.1979, det. SW. Kurokawa.Ex S. Kurokawa and H. Kashiwadani Lichenes Rariores Et Critici Exsiccati Nr. 427.

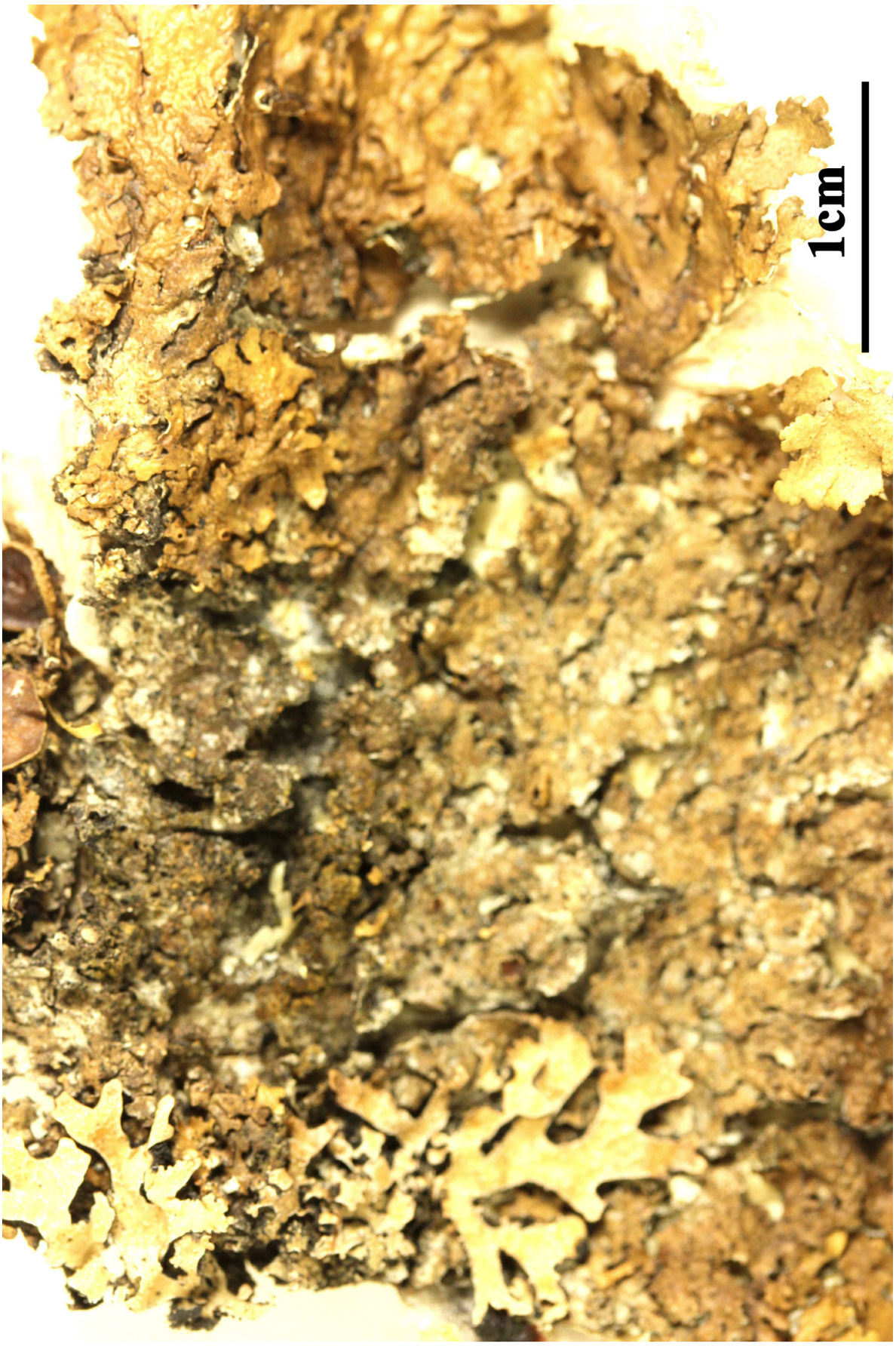
Thallus foliose, heteromerous, dorsiventral, olive-brown to dark brown, dull to slightly glossy in marginal parts, forming up to 15 cm wide rosettes. Lobes to 5 mm wide, slightly raised at margins, wrinkled, bearing obscure to distinctive, punctiform, laminal pseudocyphellae, which are best visible in the marginal parts; lower surface dark brown, paler in marginal parts, with mostly simple rhizines. Upper cortex paraplectenchymatous, with a non-pored epicortex, the cell walls containing isolichenan; medulla white; lower cortex paraplectenchymatous. Apothecia frequent, lecanorine, to 9 mm across, often crowded in central parts of thallus, with a concave to finally convex, brown disc, and an entire to finally strongly crenulate thalline margin with punctiform to somewhat elongated pseudocyphellae. Epithecium brown; hymenium colourless, 50-110 µm high; subhymenium rather thick, 20-45 µm high; hypothecium colourless, 10-40 µm high. Asci 8-spored, clavate, the K/I+ blue tholus penetrated by a faintly amyloid apical cushion with parallel or diverging flanks, the wall K/I-, surrounded by a K/I+ blue outer layer, Lecanora-type. Ascospores 1-celled, hyaline, ovoid to ellipsoid, 12-17 x 7-11 µm. Pycnidia frequent, black, laminal. Conidia more or less dumbbell-shaped, c. 8 x 1 µm. Photobiont chlorococcoid. Spot tests: upper cortex K-, C-, KC-, P-; medulla K- or rarely K+ yellow, C-, KC-, P+ orange. Chemistry: fumarprotocetraric acid, protocetraric acid (sometimes only in traces), sometimes atranorin in low amounts. - Note: a circumboreal-montane species, mostly found on *Betula* in cold, but sunny situations and in upland areas.

Parmelia olivacea

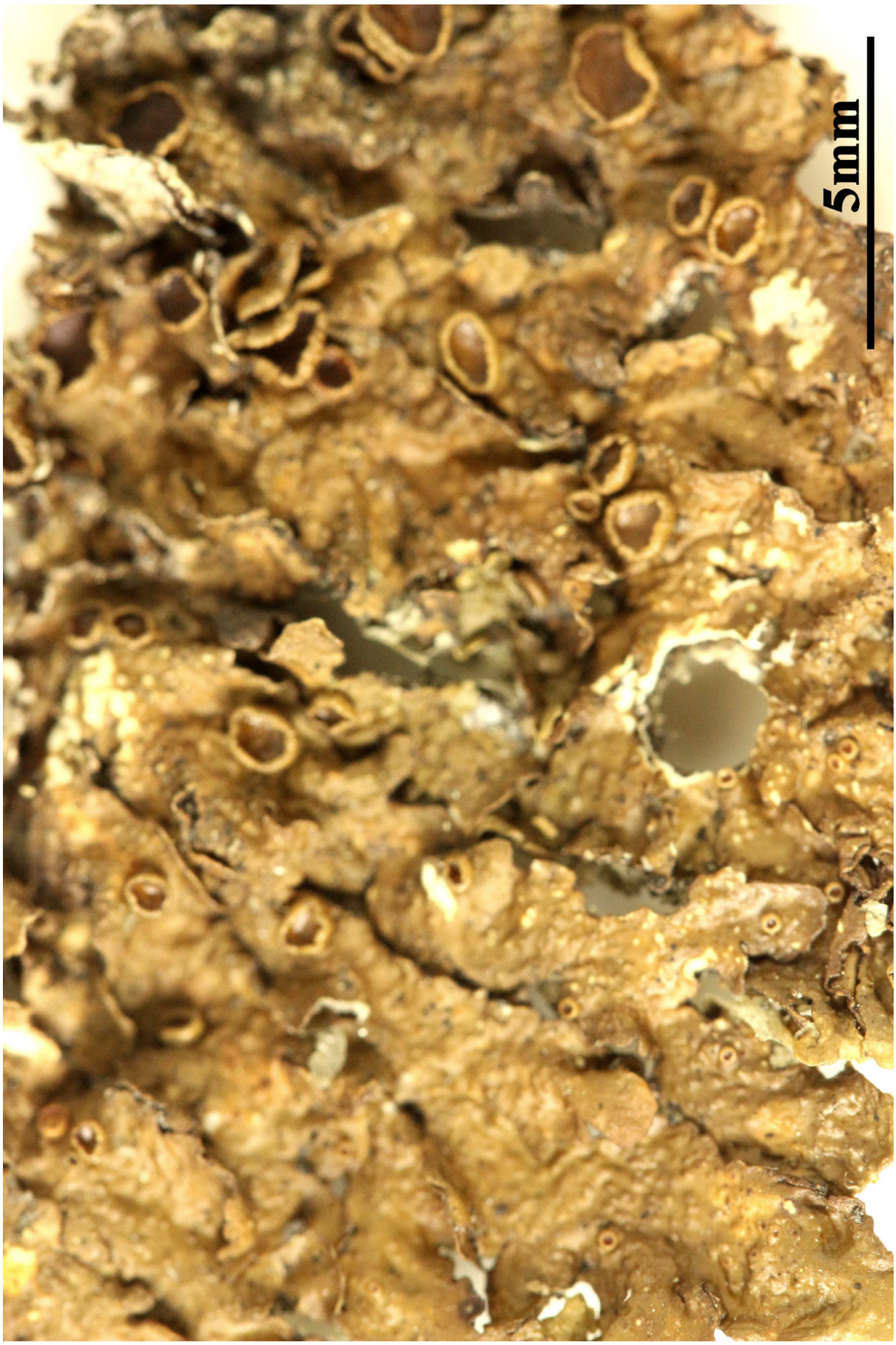
Parmelia olivacea

Parmelia olivacea* var. *albopunctata (Asahina) Ahti, Acta bot. fenn. 70: 11 (1966)
= *Parmelia olivacea* f. *albopunctata* Asahina 1951

[KU481], Japan. Honshu. Prov. Shninano: Oku-Tateshina,Suwa-gun. On trunc of *Larix leptolepis*, 1800 m. Leg. S. Kurokawa (no. 80002), 2.9.1980, det. S. Kurokawa. EX S. KUROKAWA AND H. KASHIWADANI LICHENES RARIORES ET CRITICI EXSICCATI NR. 481.



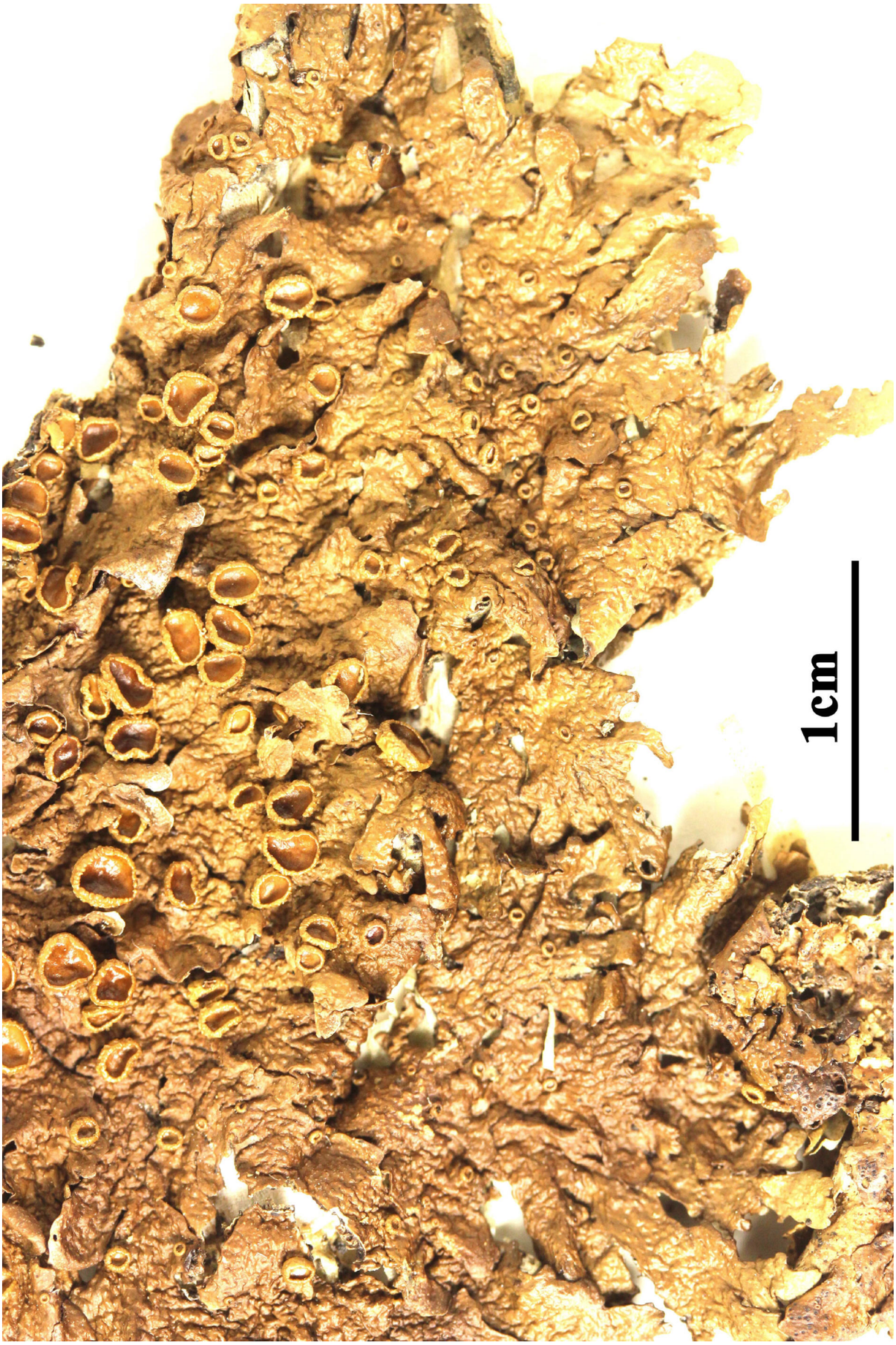
Parmelia olivacea* var. *albopunctata



Parmelia olivacea* var. *albopunctata

Parmelia olivacea* var. *albopunctata (Asahina) Ahti, Acta bot. fenn. 70: 11 (1966)
= *Parmelia olivacea* f. *albopunctata* Asahina 1951

[KU279], Japan. Honshu. Prov. Shinano: En route from Umino-kuchi to Mt. Yokodake, Yatsugatake Mts. On tree trunks, 1680-1760 m. Leg. H, Kashiwadani (no. 13359), 5.7.1976, det. H. Kashiwadani. EX S. KUROKAWA LICHENES RARIORES ET CRITICI EXSICCATI NR. 279.

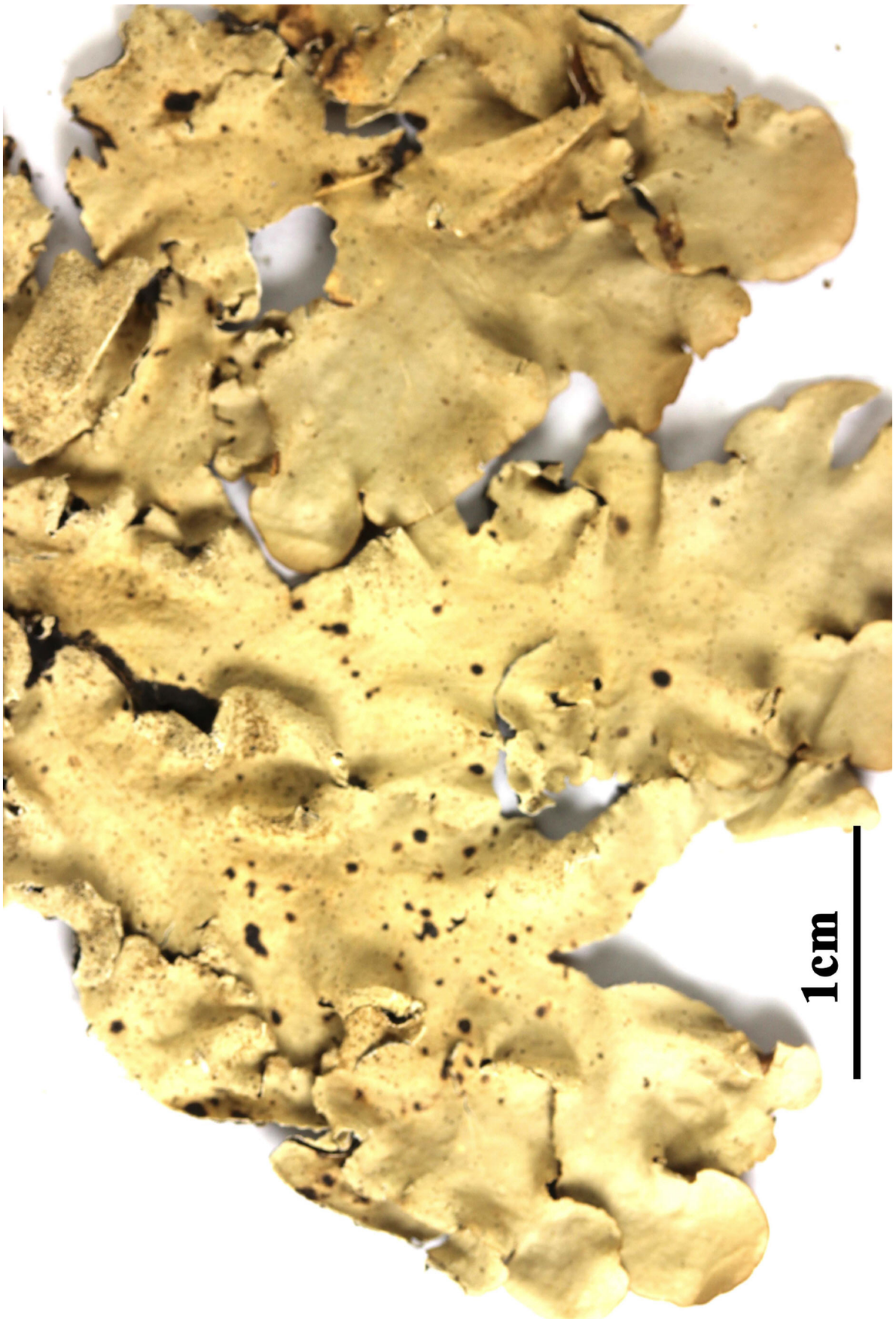


Parmelia olivacea* var. *albopunctata

Parmelia olivacea* var. *albopunctata

Parmelia pacifica Kurok., Mem. Natn Sci. Mus, Tokyo 11: 28 (1978)

[KU522], Japan. Bonin Islands. Hahajima Island: En route between Mt. Kuwanoki and Kita-mura. On trunk of *Pandanus* sp, 120 m. Leg. S. Kurokawa (no. 77041), 4.8.1977, det. S. Kurokawa. EX S. KUROKAWA AND H. KASHIWADANI LICHENES RARIORES ET CRITICI EXSICCATI NR. 522.



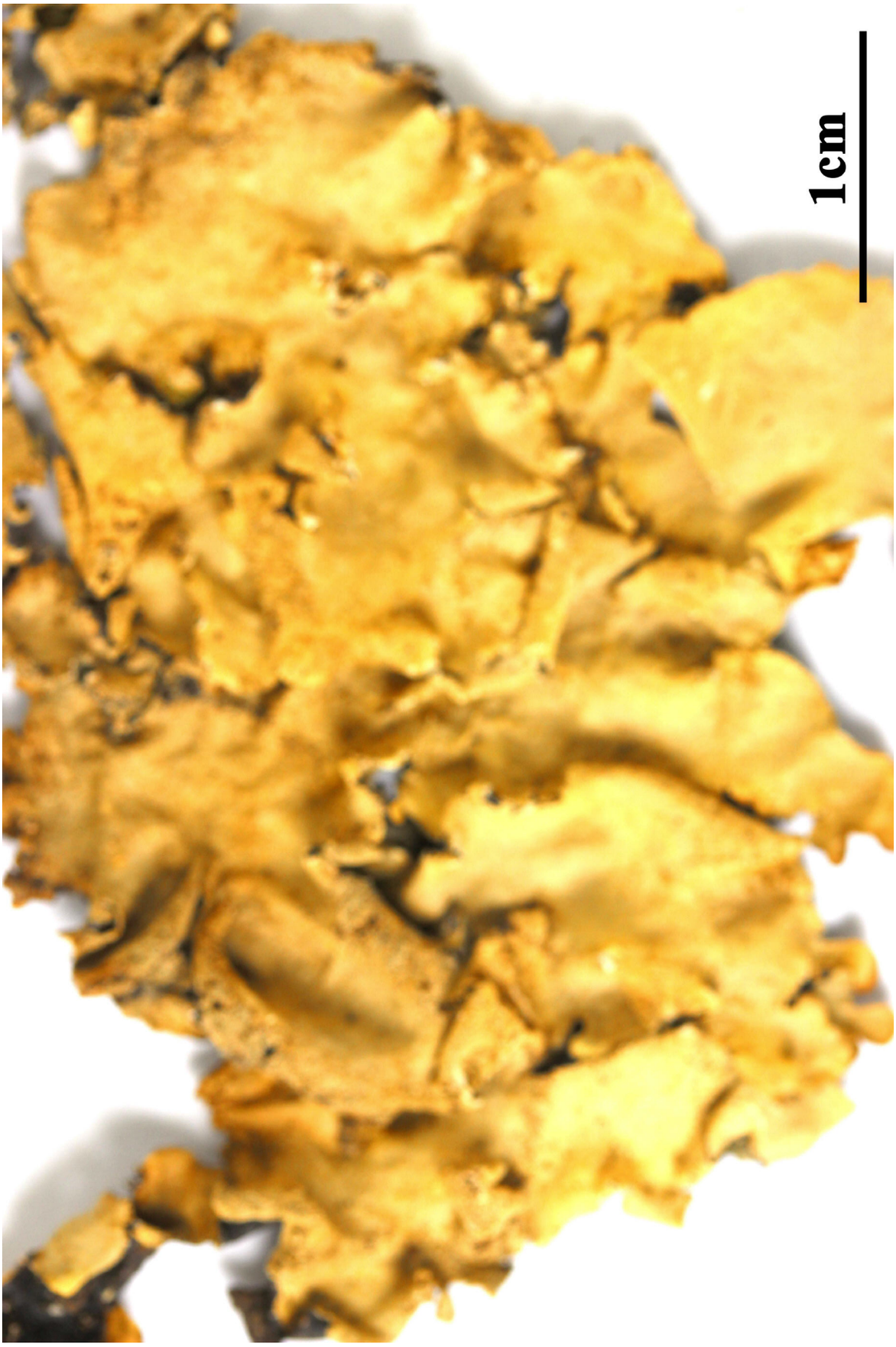
Parmelia pacifica

Parmelia pacifica

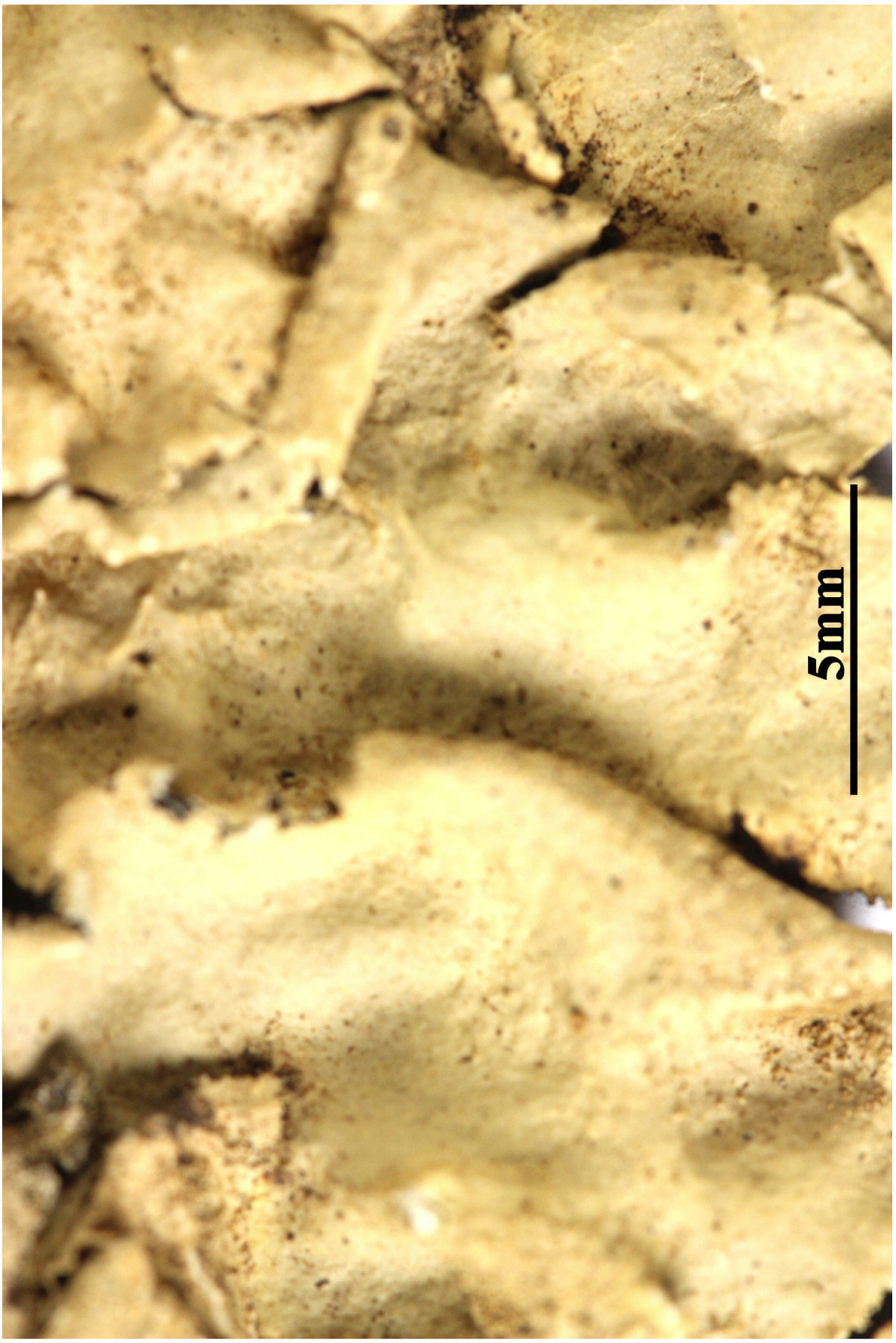
Parmelia pacifica

Parmelia pacifica Kurok., Mem. Natn Sci. Mus, Tokyo 11: 28 (1978)

[KU371], Japan. Bonin Islands. Hahajima Island; En route between Oki-mura and Cape Minami-zaki. Leg. S. Kurokawa (no 77015), 3.8.1977, det. S. Kurokawa. EX S. KUROKAWA AND H. KASHIWADANI LICHENES RARIORES ET CRITICI EXSICCATI NR.371.



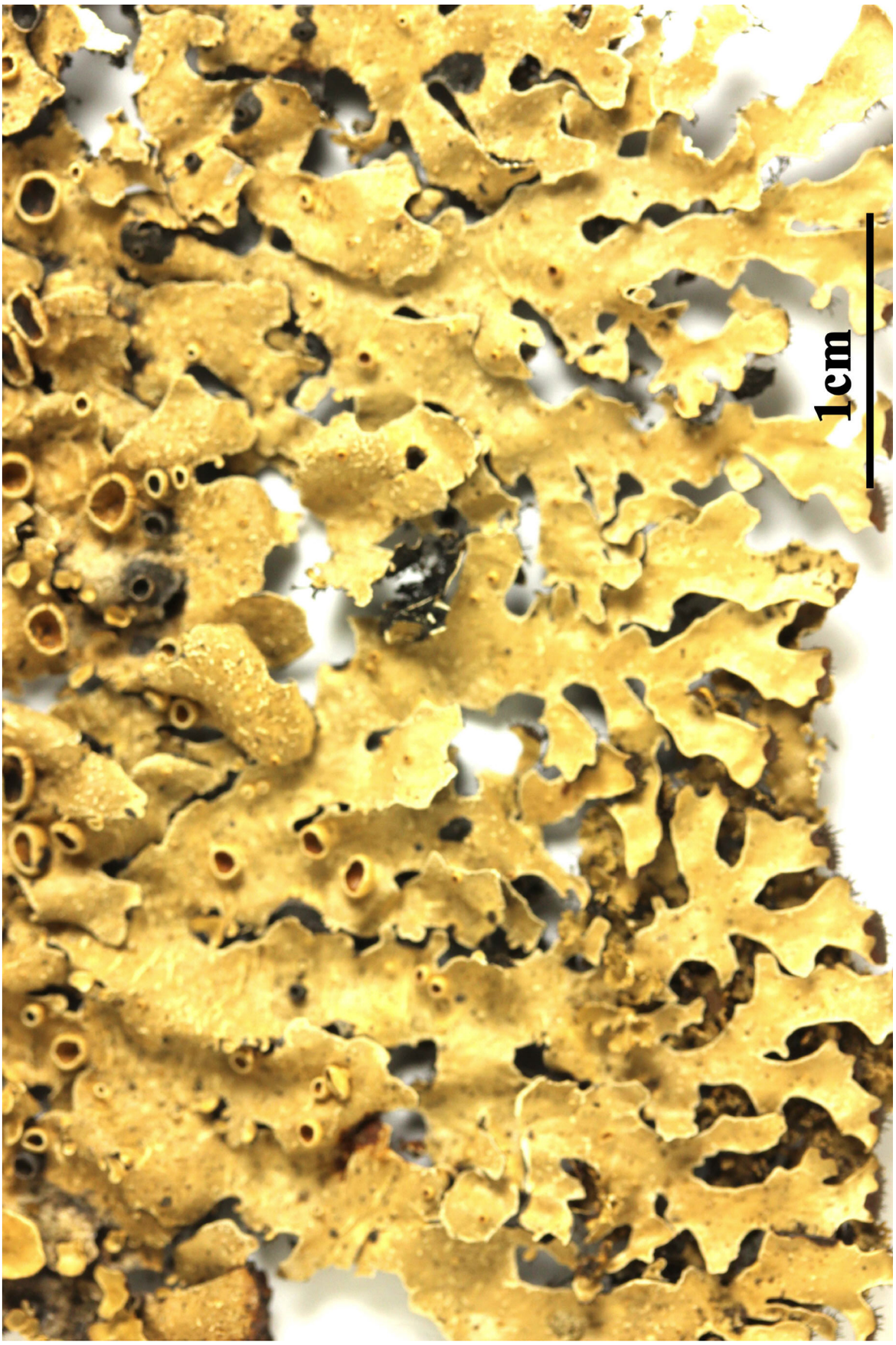
Parmelia pacifica



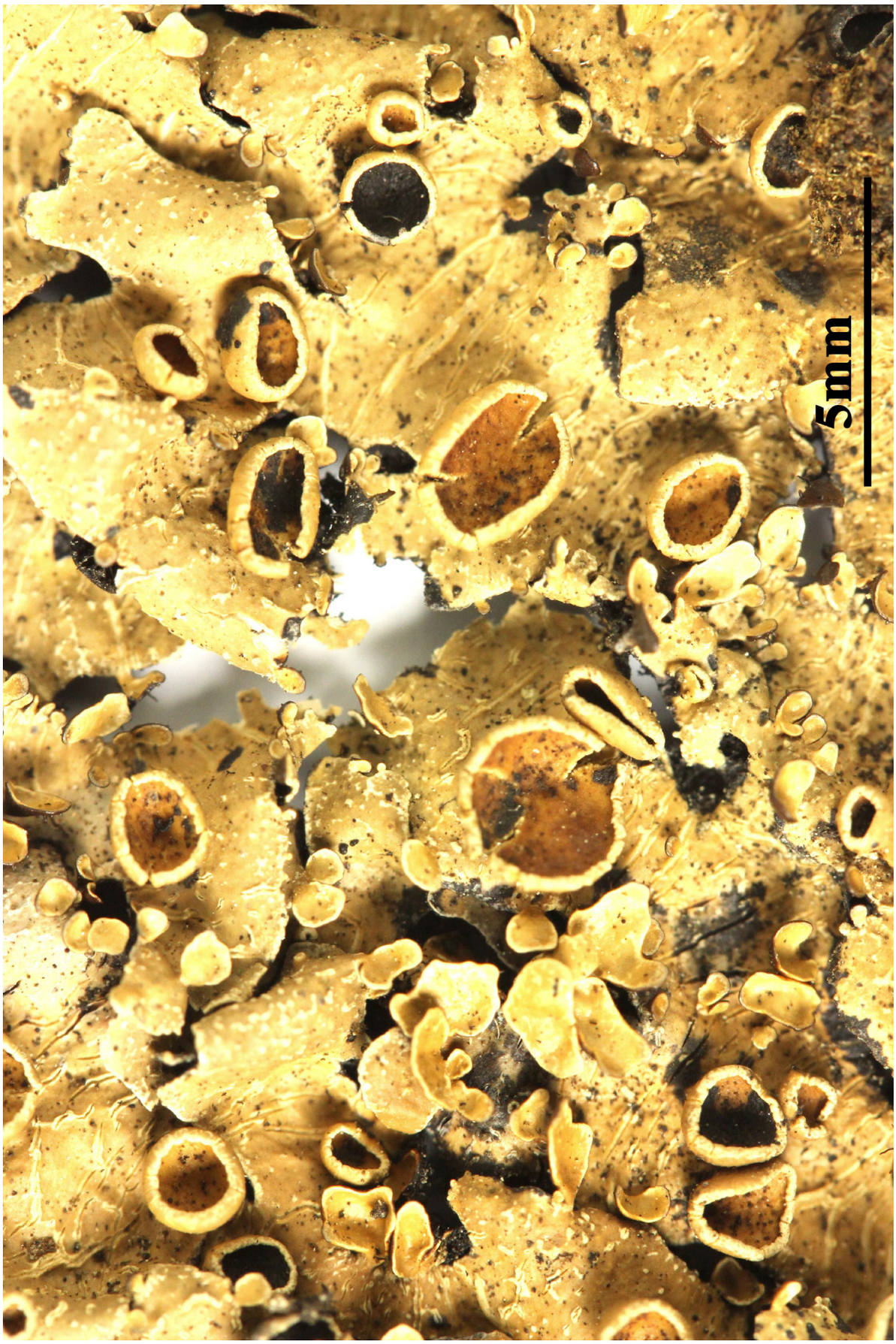
Parmelia pacifica

Parmelia paraesquarrosa Kurok. J. Jpn, . Bot 69: 264. 1995

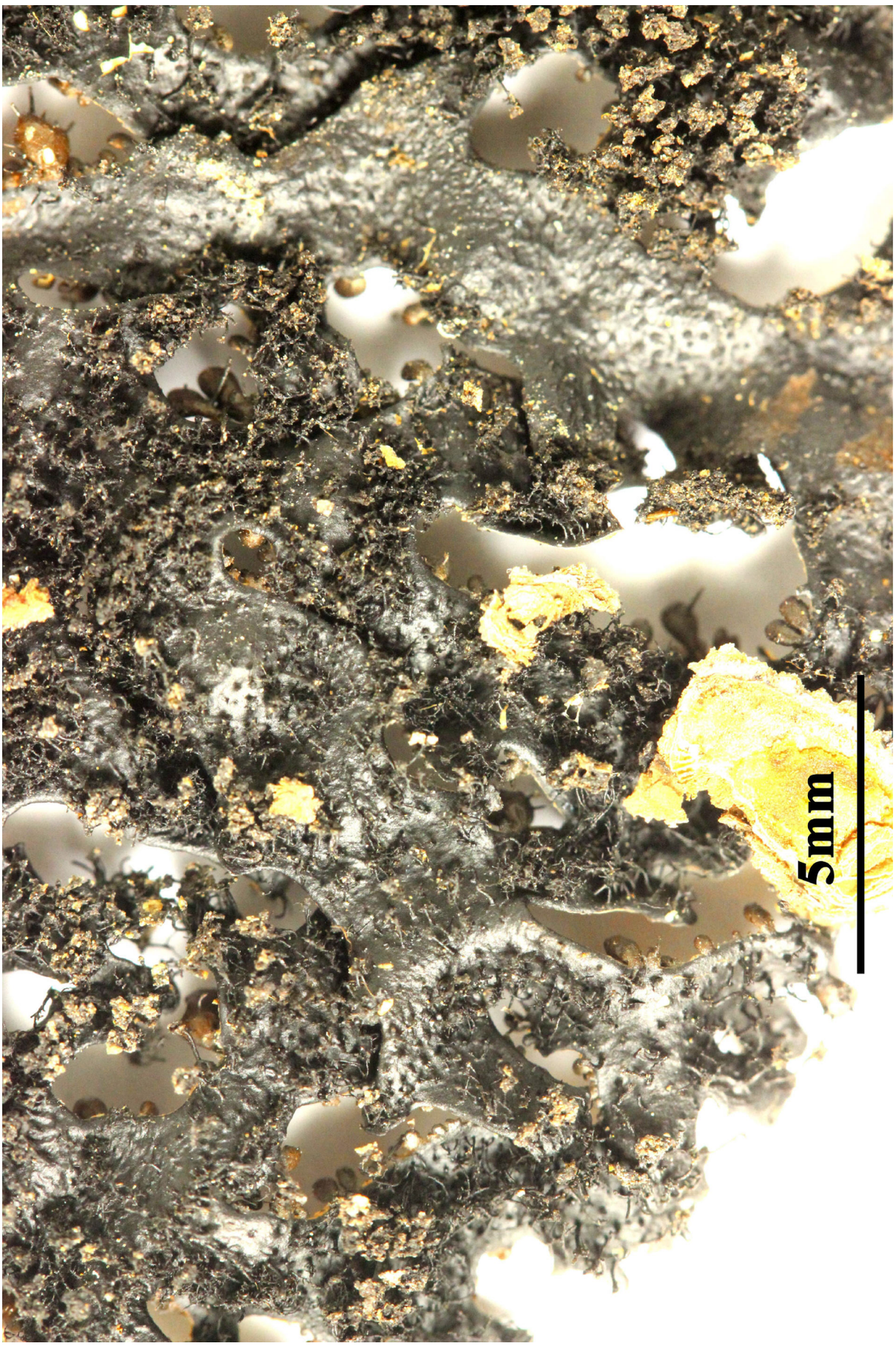
[OH466], Japan. Honshu. Prov. Shinano (Pref.Nagano): Sugadaira Montane Research Center, Sugadaira- KOgen, Ueda-city. On bark of Alnus hirsuta var. sibirica, 1330 m. Leg. G. Tanaka (no. 237A), 31.3.2011, det. Y. Ohmura. EX Y. OHMURA LICHENES MINUS COGNITI EXSICCATI NR. 466.



Parmelia paraesquarrosa



Parmelia paraesquarrosa



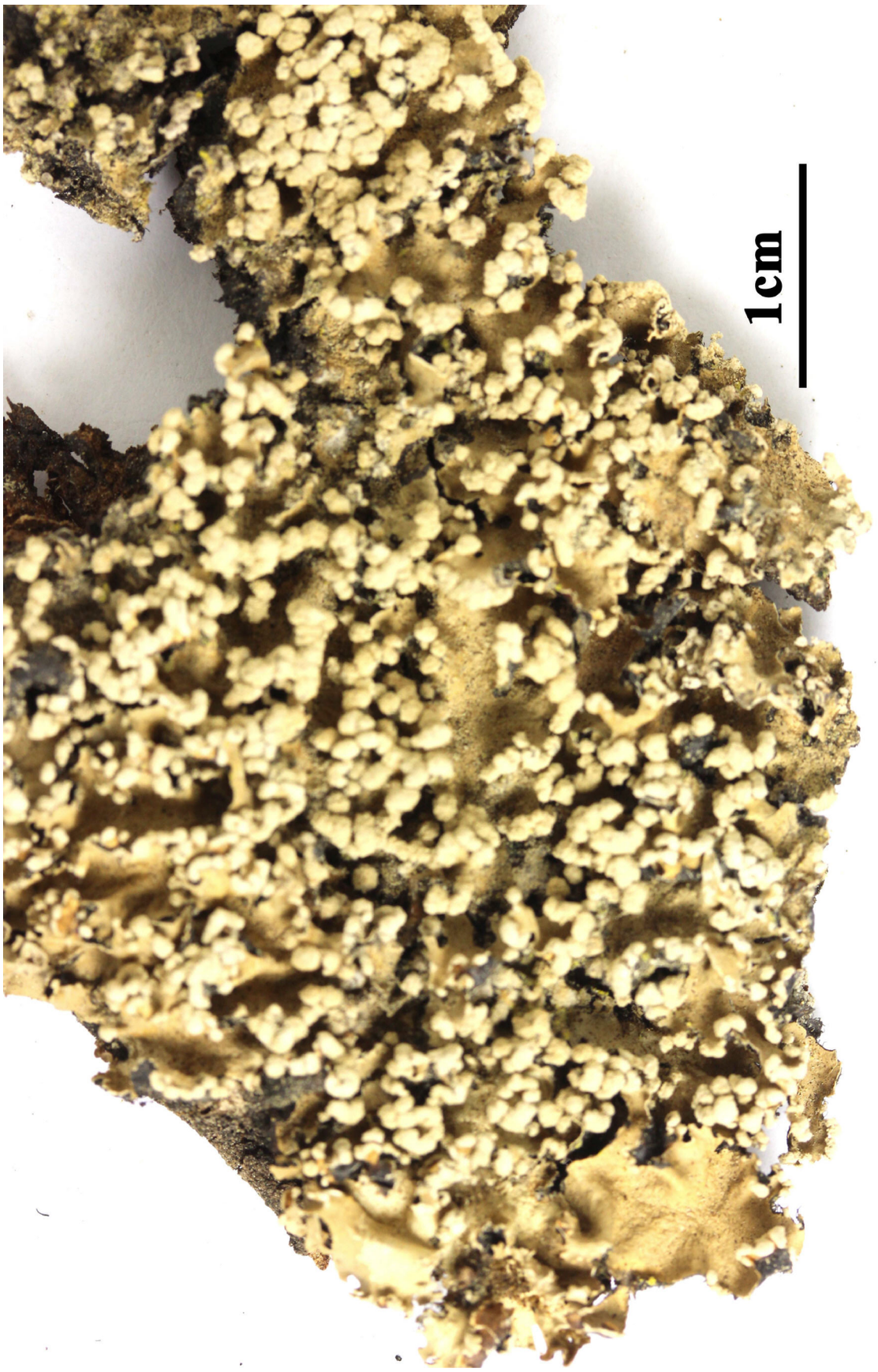
Parmelia paraesquarrosa

Parmelia perlata (Huds.) Ach., Methodus qua omnes detectos Lichenes Secundum Organa Carpomorpha ad Genera, Species et Varietates Redigere atque Observationibus Illustrare Tentavit Erik Acharius: 216 (1803)

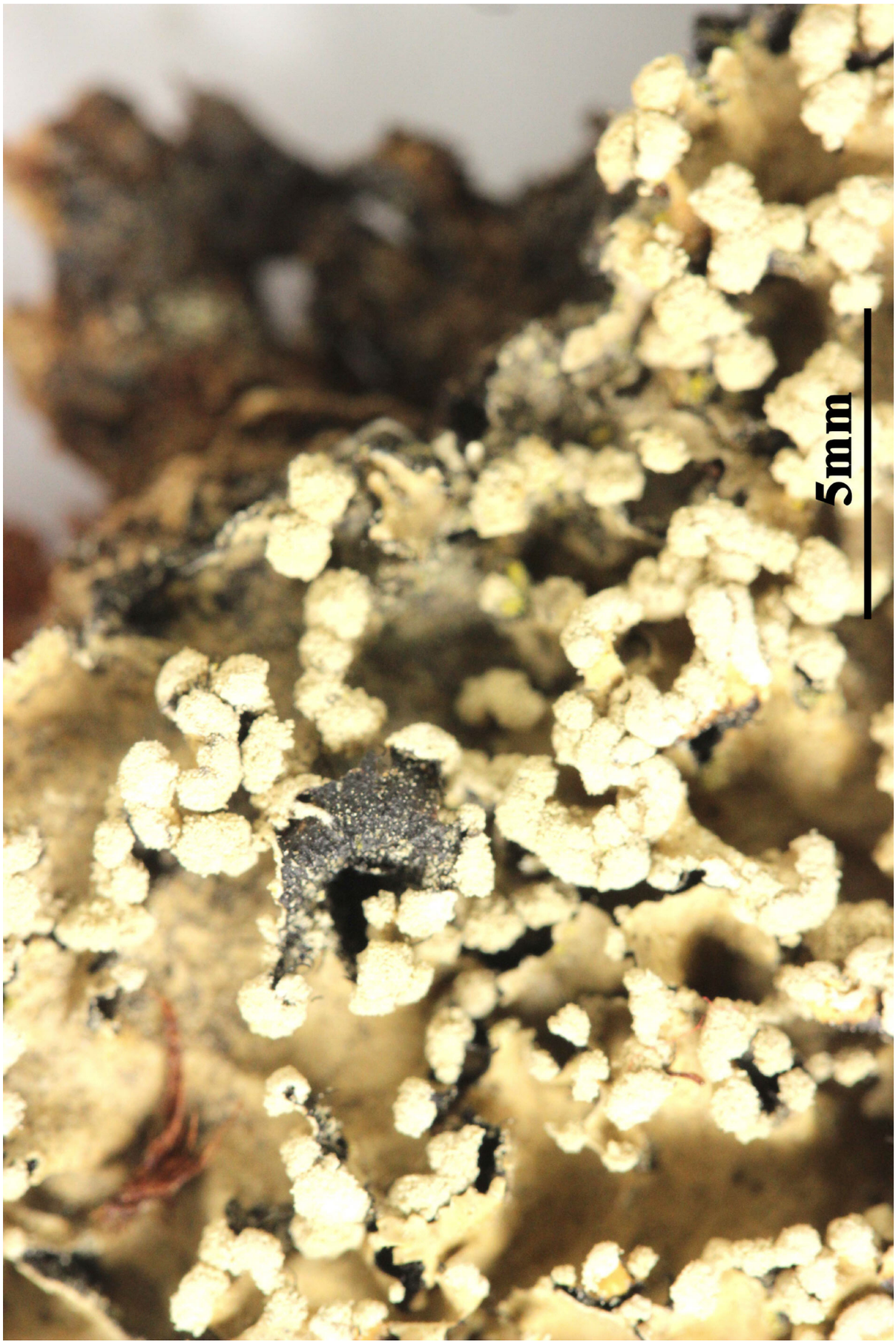
= *Parmotrema perlatum* (Huds.) M. Choisy, Bull. mens. Soc. linn. Soc. Bot. Lyon 21: 174 (1952)

[KU236], Urugay. Department of Canelones: Carrasco (Franklin Roosevelt) National Park. On trunk of *Eucalyptus* sp. Leg. S. Kurokawa (no. 8508), 12.8.1971, det. S. Kurokawa. EX A. KUROKAWA LICHENES RARIORES ET CRITICI EXSICCATI NR. 236.

Thallus foliose, heteromerous, dorsiventral, broad-lobed, loosely adnate, 3-20 cm in diam., sorediate. Lobes flat to concave, usually ascending, 4-15 mm wide, with rounded apices, with up to 2 mm long, black marginal cilia (very short and barely visible in some samples). Upper surface grey, smooth, emaculate to faintly white-maculate, with marginal to submarginal, white, capitate soralia. Lower surface black, with a brown, erhizinate peripheral zone, centrally with scattered, simple, black rhizines. Upper cortex of tightly packed, anticlinally oriented hyphae, with a pored epicortex, the cell walls with lichenan intermediate between the Cetraria- and the Xanthoparmelia-types; medulla white; algal layer continuous; lower cortex prosoplectenchymatous, with rounded and thick-walled cells. Apothecia very rare, lecanorine, substipitate, to 7 mm across, with a brown, imperforate disc and a sorediate thalline margin. Epithecium brownish; hymenium and hypothecium colourless. Asci 8-spored, Lecanora-type. Ascospores 1-celled, hyaline, ellipsoid, 21-30 x 13-18 µm. Pycnidia rare, black, immersed, submarginal. Conidia long-bacilliform to thread-like. Photobiont chlorococcoid. Spot tests: upper cortex K+ yellow, C-, KC-, P- or P+ faintly yellow; medulla K+ yellow-orange, C-, KC-, P+ orange, UV-. Chemistry: upper cortex with atranorin and chloroatranorin; medulla with stictic acid (major), constictic acid (minor), norstictic, menegazziaic and cryptostictic acids (traces). - Note: a mainly mild-temperate lichen found on bark and mossy siliceous rocks, on isolated trees only in humid areas, otherwise on trees in light woodlands and often restricted to the mossy base of trunks, exceptionally reaching the dry-continental Alpine valleys in sheltered situations.



Parmelia perlata



Parmelia perlata

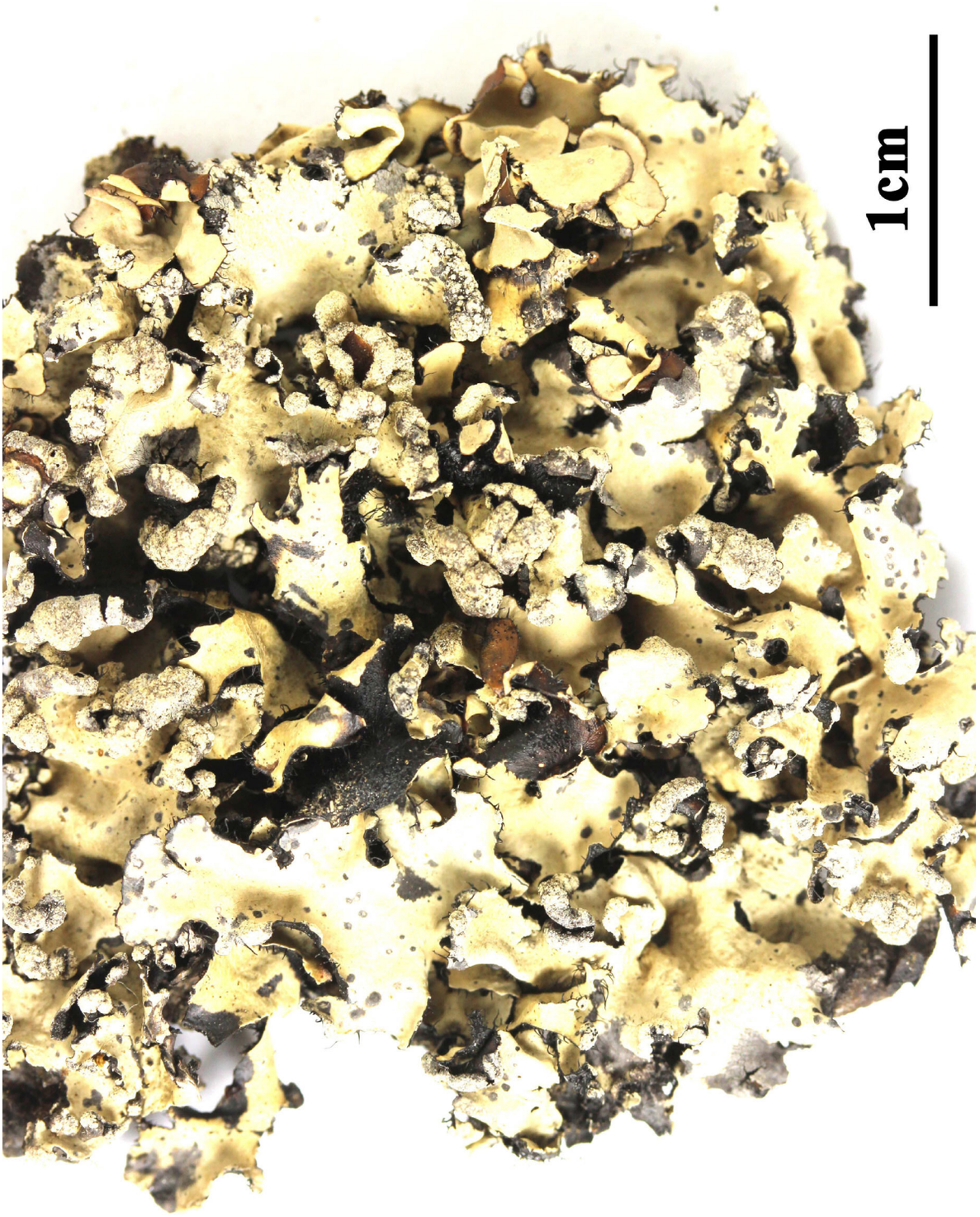
Parmelia perlata (Huds.) Ach., Methodus qua omnes detectos Lichenes Secundum Organa Carpomorpha ad Genera, Species et Varietates Redigere atque Observationibus Illustrare Tentavit Erik Acharius: 216 (1803)

= *Lichen perlatus* Huds. 1762

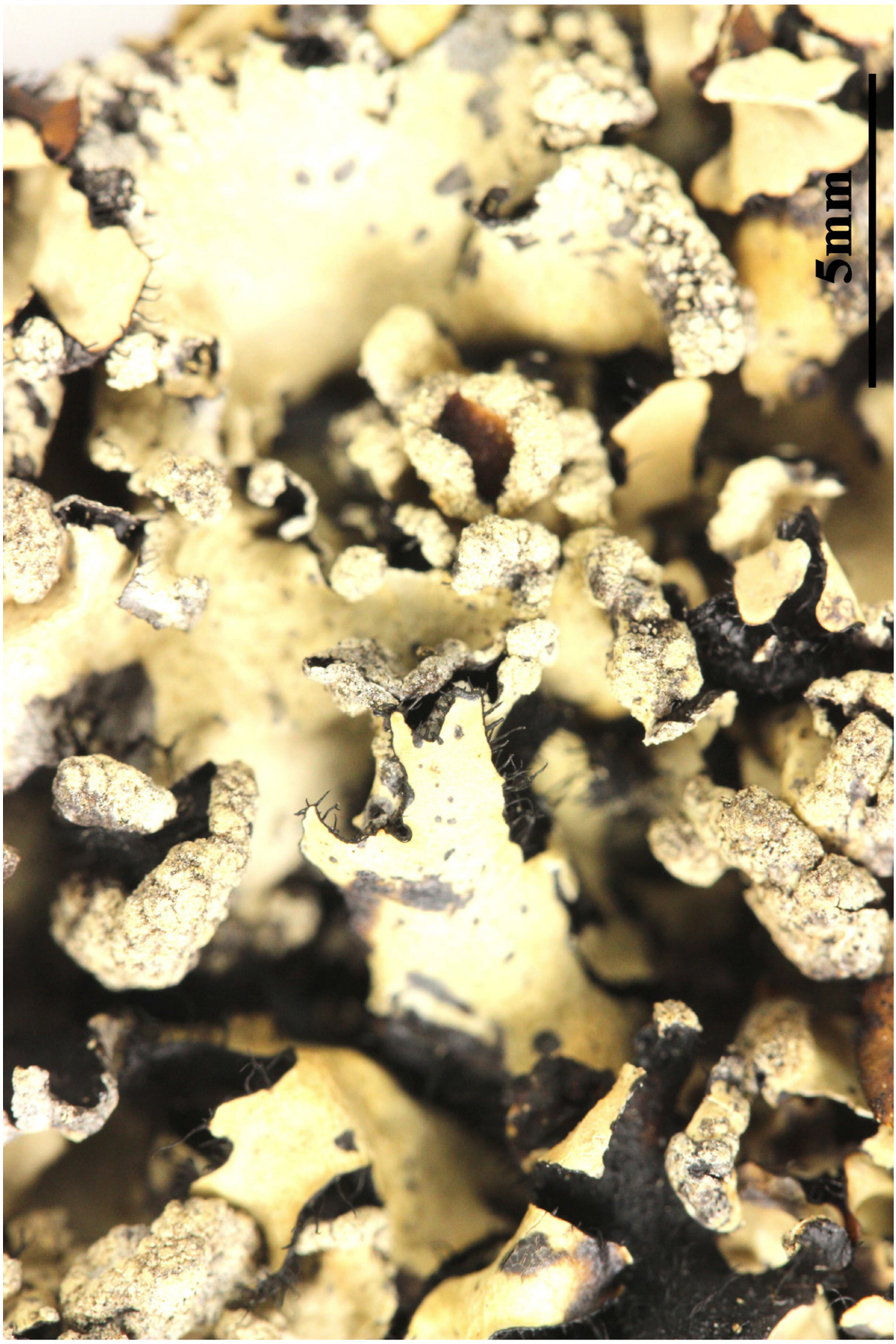
= *Parmotrema perlatum* (Huds.) M. Choisy, Bull. mens. Soc. linn. Soc. Bot. Lyon 21: 174 (1952)

[KU630], Chile. Llanquibus: Between Puerto Varas and Ensenada. On bark of tree, 90 m. Leg. H. Kashiwadani (no. 17113), 9.11.1981, det. S. Kurokawa. EX S. KUROKAWA AND H. KASHIWADANI LICHENES RARIORES EWT CRITICI EXSICCATI NR. 630.

Thallus foliose, heteromerous, dorsiventral, broad-lobed, loosely adnate, 3-20 cm in diam., sorediate. Lobes flat to concave, usually ascending, 4-15 mm wide, with rounded apices, with up to 2 mm long, black marginal cilia (very short and barely visible in some samples). Upper surface grey, smooth, emaculate to faintly white-maculate, with marginal to submarginal, white, capitate soralia. Lower surface black, with a brown, erhizinate peripheral zone, centrally with scattered, simple, black rhizines. Upper cortex of tightly packed, anticlinally oriented hyphae, with a pored epicortex, the cell walls with lichenan intermediate between the Cetraria- and the Xanthoparmelia-types; medulla white; algal layer continuous; lower cortex prosoplectenchymatous, with rounded and thick-walled cells. Apothecia very rare, lecanorine, substipitate, to 7 mm across, with a brown, imperforate disc and a sorediate thalline margin. Epithecium brownish; hymenium and hypothecium colourless. Asci 8-spored, Lecanora-type. Ascospores 1-celled, hyaline, ellipsoid, 21-30 x 13-18 µm. Pycnidia rare, black, immersed, submarginal. Conidia long-bacilliform to thread-like. Photobiont chlorococcoid. Spot tests: upper cortex K+ yellow, C-, KC-, P- or P+ faintly yellow; medulla K+ yellow-orange, C-, KC-, P+ orange, UV-. Chemistry: upper cortex with atranorin and chloroatranorin; medulla with stictic acid (major), constictic acid (minor), norstictic, menegazziaic and cryptostictic acids (traces). - Note: a mainly mild-temperate lichen found on bark and mossy siliceous rocks, on isolated trees only in humid areas, otherwise on trees in light woodlands and often restricted to the mossy base of trunks.



Parmelia perlata

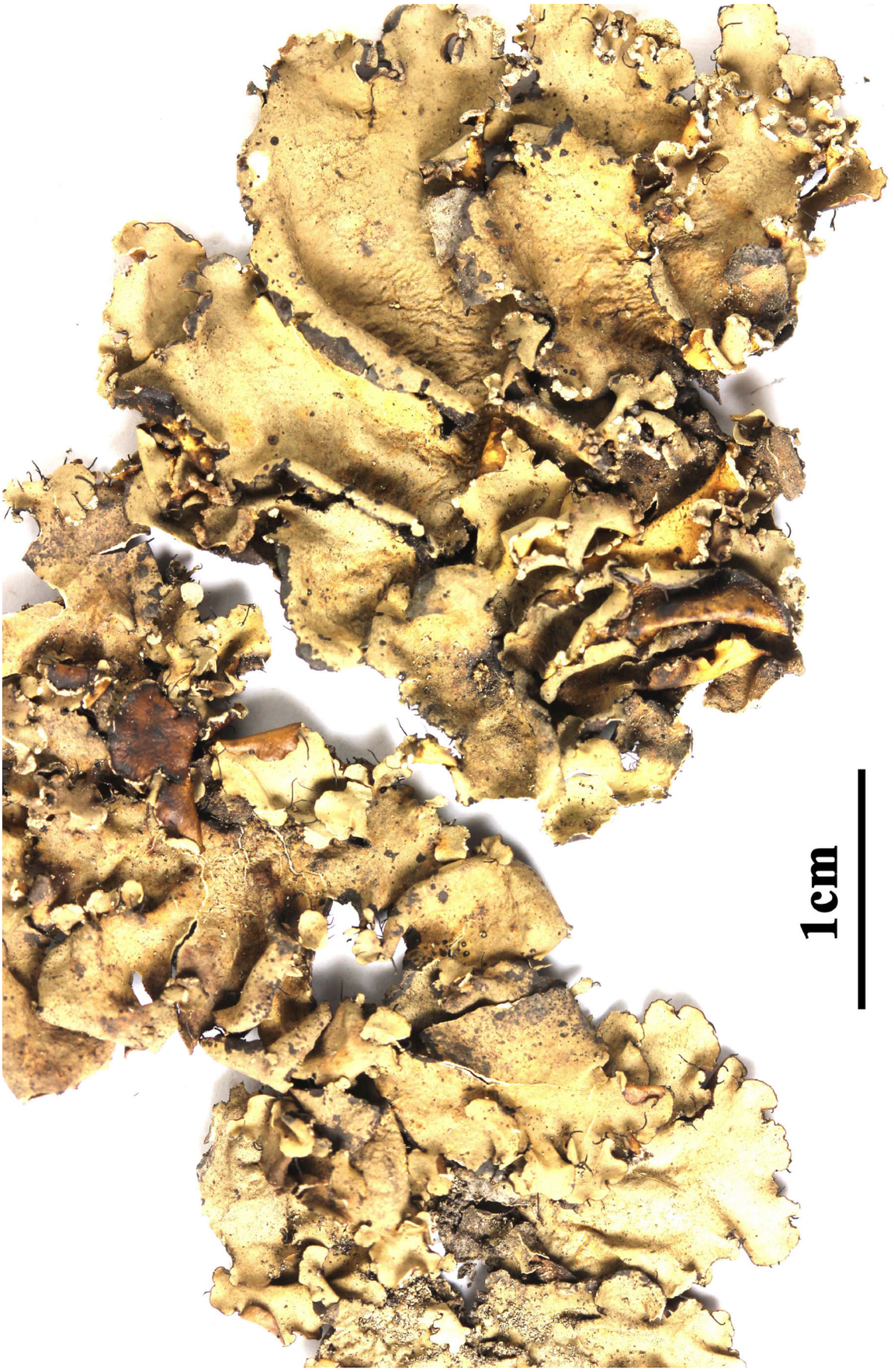


Parmelia perlata

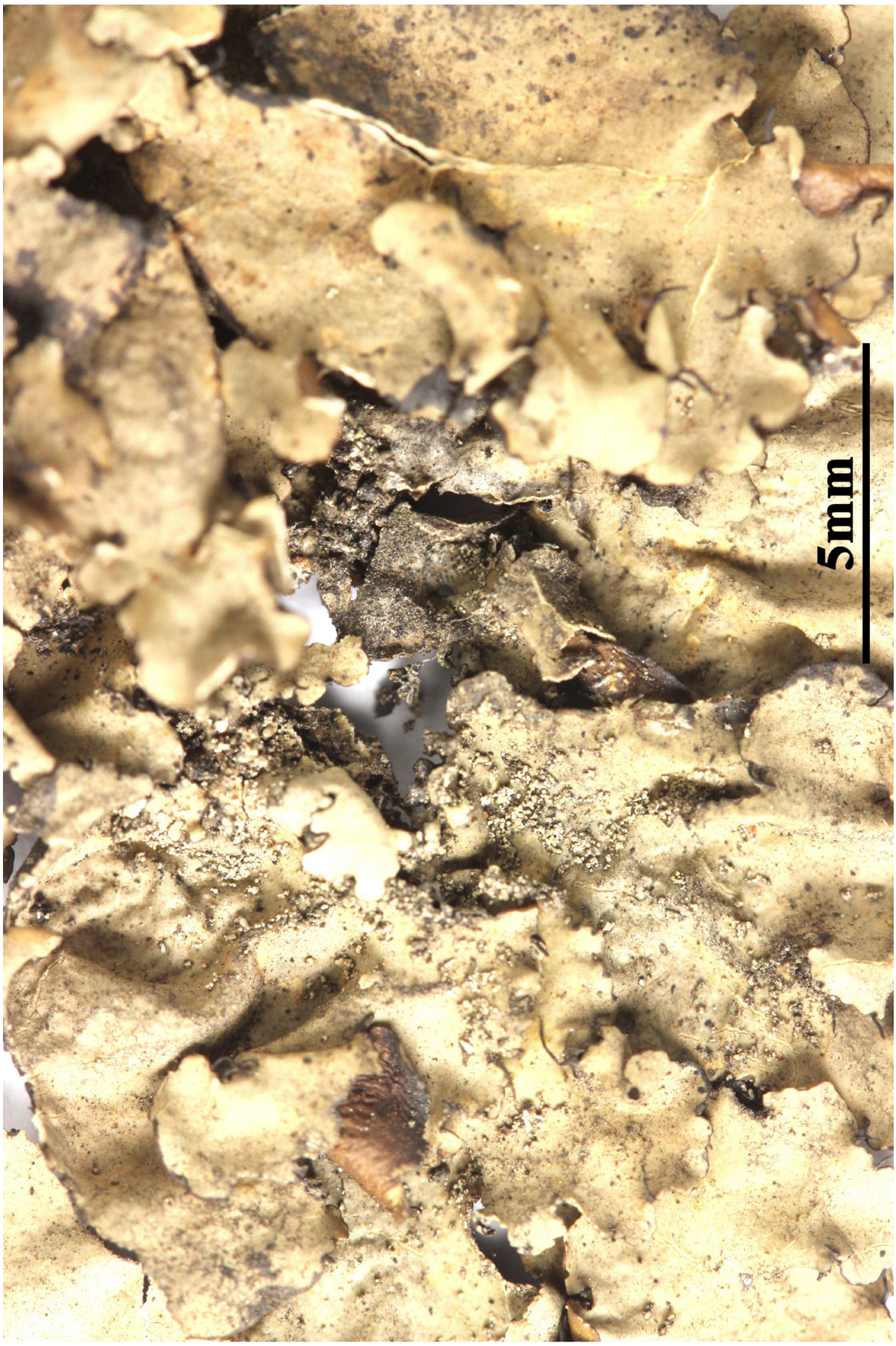
Parmelia permutata Stirt., Scott. Natural. 4: 252 (1878) [1877-78]
= *Parmotrema permutatum* (Stirt.) Hale, Phytologia 28(4): 338 (1974)

[KU237], Brazil. São Paulo: Jardin Botanica do São Paulo. Leg. S. Kurokawa (no. 8305), 14.7.1971, det. S. Kurokawa. EX S. KUROKAWA LICHENES RARIORES EXSICCATI NR. 237.

Thallus loosely adnate, membranaceous to coriaceous, to 5–15 cm wide. Lobes rounded, 5–15 mm wide; margins entire to weakly crenate, often suberect; cilia moderately dense to dense, conspicuous, 1–3 (–4) mm long. Upper surface pale grey to grey-green, emaculate, smooth to faintly foveolate, becoming cracked, sorediate, lacking isidia; soralia marginal, linear, often spreading submarginally. Medulla white in upper half, lower part yellow, orange-yellow or salmon pink. Lower surface black, with a broad, brown, erhizinate marginal zone; rhizines in groups, sparse, simple. Apothecia and pycnidia not seen. CHEMISTRY: cortex K+ yellow; medulla K-, C+ pink, KC+ pale red, P-; pigmented medulla K-; containing atranorin, chloroatranorin, gyrophoric acid and unidentified pigment. A scattered species on bark of trees in coastal and hinterland forests of Qld and N.S.W. Australia; also known from eastern and southern Africa, India, Sumatra, Papua New Guinea, Haiti and Brazil.



Parmelia permutata



Parmelia permutata

Parmelia piedmontensis Hale, Bryologist 67(4): 468 (1964)

[KU482], Japan. Hokkaido. Prov. Kitami: Otoineppu Cape, 6 km northwest of Ohmu. On rocks along the sea. Leg. S. Kurokawa (no. 70967), 20.8.1920, det. S. Kurokawa. Ex S. Kurokawa and H. Kashiwadani Lichenes Rariores Et Critici Exsiccati Nr. 482.

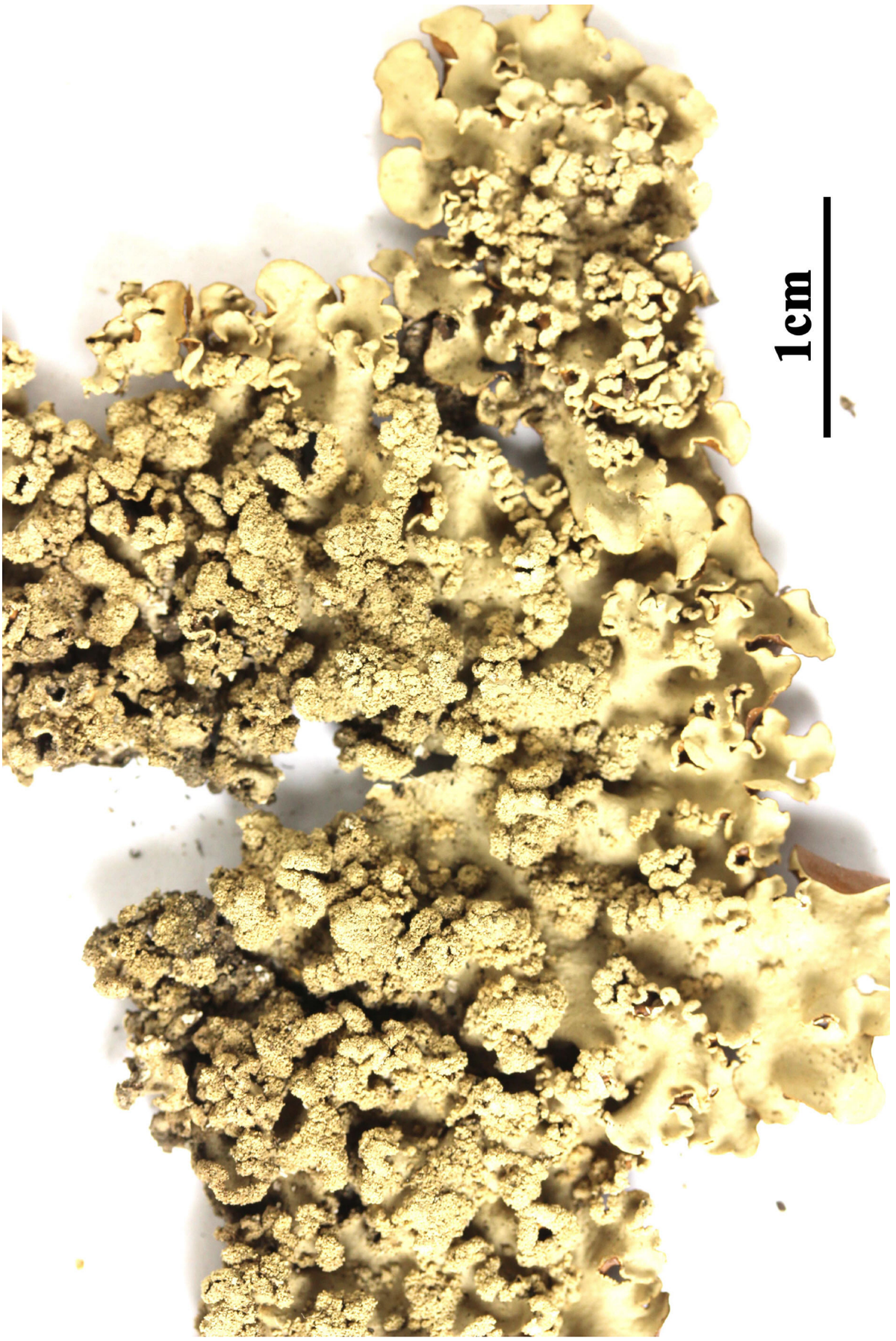
Parmelia piedmontensis

Parmelia piedmontensis

Parmelia praesorediosa Nyl., Sert. Lich. Trop. Labuan Singapore: 18 (1891) = *Parmotrema praesorediosum* (Nyl.) Hale, Phytologia 28(4): 338 (1974)

[KU631], Japan. Kyushu. Prov. Satsuma: Akime,Bohnotsu-cjo, Kawanabe-gun. On stone works, 10 m. Leg. H. Kashiwadani (no 20604), 18.2.1984, det. H. Kashiwadani. Ex S. Kurokawa and H. Kashiwadani Lichenes Rariores Et Critici Exsiccati Nr. 631.

Thallus foliose, adnate, 3-10 cm in diam., lobate; lobes subirregular, elongate, slightly imbricate, plane, separate, 4-10 mm wide; apices rotund, often suberect, eciliate; upper surface gray, smooth, dull, emaculate to faintly white maculate, becoming cracked with age; soredia granular, common, in linear to crescent-shaped, marginal or submarginal; soralia isidia and pustulae absent; medulla white with continuous algal layer; lower surface black with brown to mottled ivory naked zone peripherally, centrally rhizinate; rhizines scattered, simple. Apothecia rare, substipitate, up to 10 mm in diam.; margin sorediate; disc brown, imperforate; ascospores ellipsoid, 15-21 x 7-10 µm; Pycnidia rare, punctiform; conidia sublageniform, 7-8 x 1 µm; Spot tests upper cortex K+ yellow, C-, KC-, P-; medulla K-, C-, KC-, P-; Secondary metabolites upper cortex with atranorin and chloroatranorin; medulla with protopraesorediosic and praesorediosic acids (major), unknown fatty acids (minor). Substrate and ecology on rocks and trees in open habitats. World distribution pantropical and pantemperate-

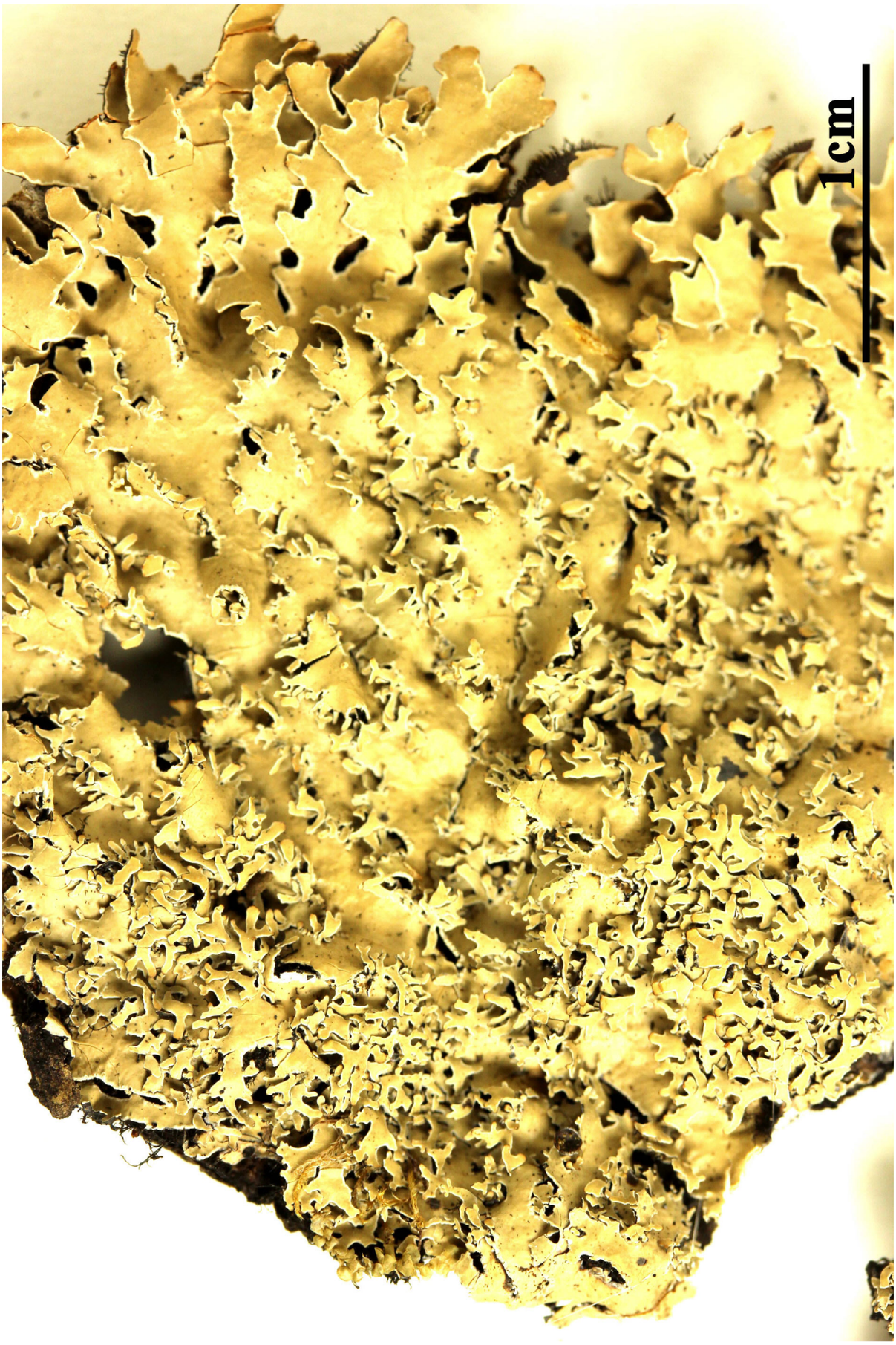


Parmelia praesorediosa

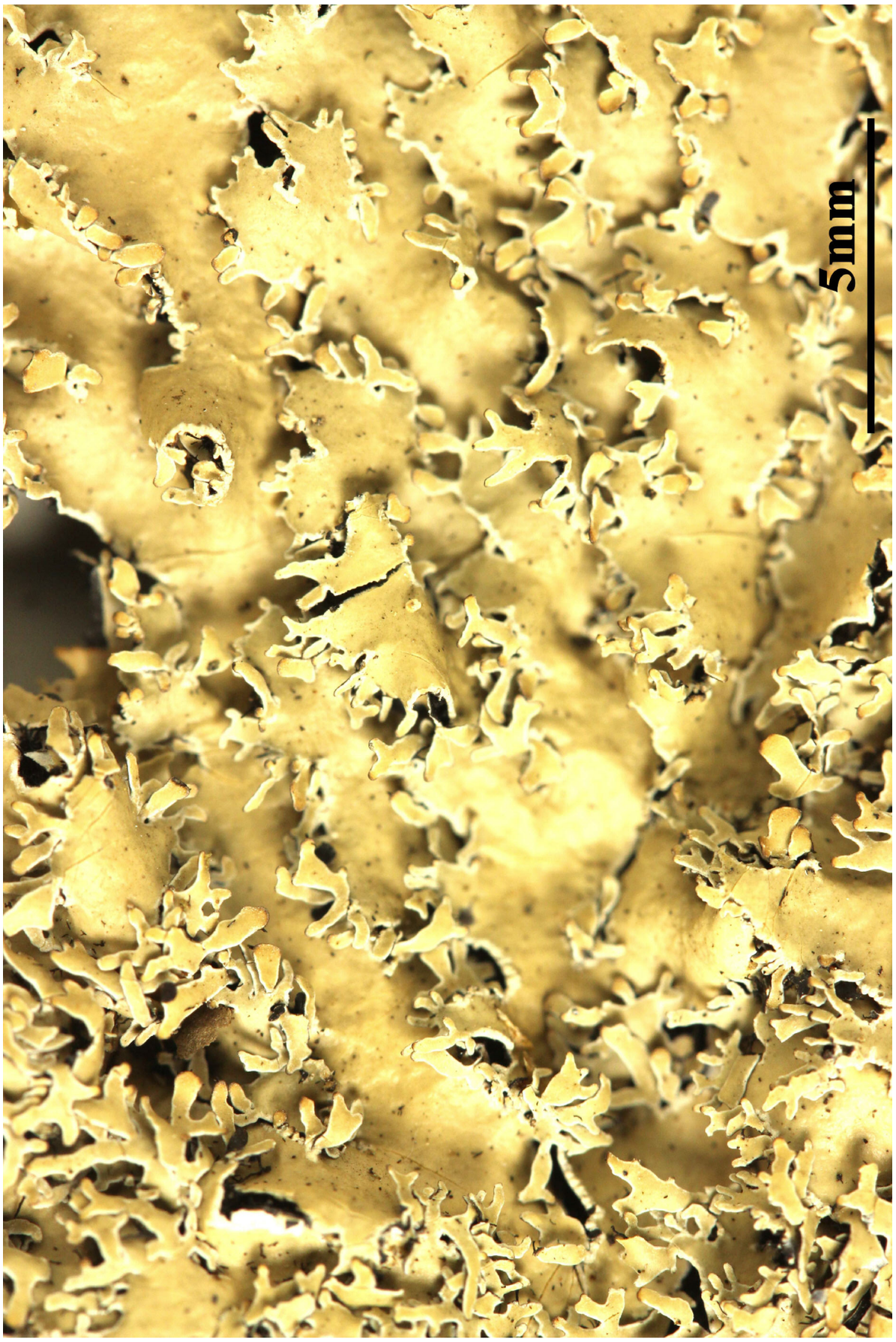
Parmelia praesorediosa

Parmelia pseudoshinanoana Asahina, J. Jap. Bot. 26(11): 334 (1951)

[KU129], Japan. Honshu. Prov. Musashi: Karisaka Pass. On trunk of *Abies veitchii*, 1770. Leg. S. Kurokawa (no. 70132), 24.5.1970, det. S. Kurokawa. Ex S. Kurokawa Lichenes Rariores Et Critici Exsiccati Nr. 129.



□***Parmelia pseudoshinanoana***

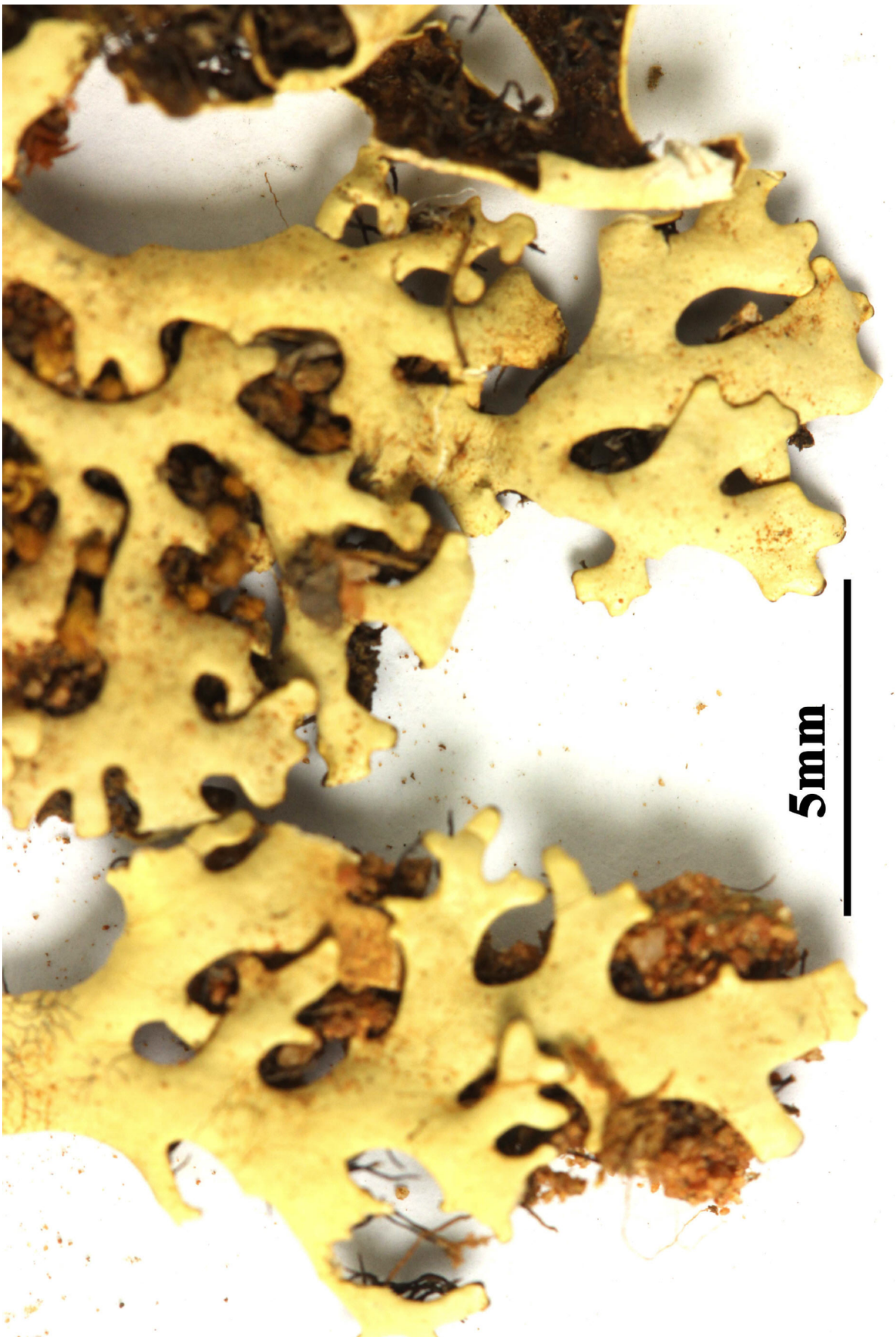


Parmelia pseudoshinanoana

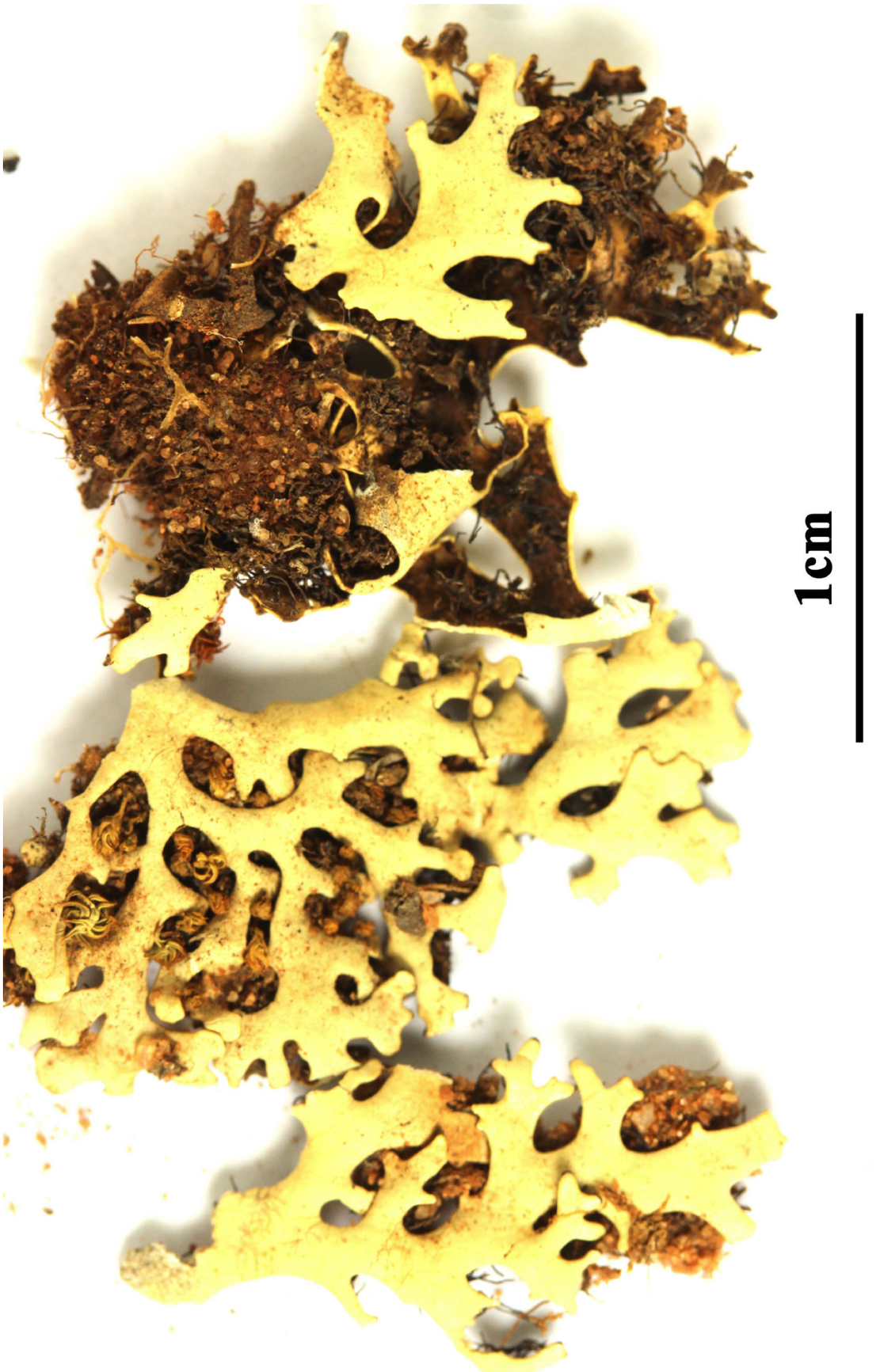
Parmelia reptans Kurok., in Baker et al., Aust. J. Bot. 21: 137 (1973)
= *Xanthoparmelia reptans* (Kurok.) Elix & J. Johnst., in Elix, Johnston & Armstrong, Bull. Br. Mus. nat. Hist., Bot. 15(3): 316 (1986)

[KU372], Australia. Victoria: 6 miles west of Cliffs along the Werimull Road. On soil, 50 m - ISOTYPE -.Leg. S. Kurokawa (no. 6621), 8.12.1965, det S. Kurokawa. Ex S. Kurokawa and H. Kashiwadani Lichenes Rariores Et Critici Exsiccati Nr. 372.

Thallus foliose, loosely adnate, forming rosettes to 1–5 cm wide. Lobes often imbricate, ±separated near thallus margin, sublinear-elongate, dichotomously branched, 0.7–2 mm wide, without lobules. Upper surface pale yellow, convex, dull, maculate particularly towards lobe apices, smooth, neither isidiate nor sorediate; lobes not black-margined, often pale blackish brown near apices. Medulla white. Lower surface partly canaliculate, brownish yellow or grey-brown; lobe margins yellow; rhizines sparse to moderately dense, simple or rarely sparsely branched, 1–2 mm long, black. Apothecia very rare, subpedicellate, 0.5–1.5 mm wide; disc weakly concave to ±flat, dark brown; thalline exciple smooth, thick, entire, involute, crenulate. Ascospores 6–7 × 4–5 µm. Pycnidia not seen. CHEMISTRY: cortex K-, UV-; medulla K+ brown, C-, P+ orange-red; containing usnic acid, fumarprotocetraric acid, ±succinprotocetraric acid, ±protocetraric acid (trace) and ±physodalic acid (trace). Widespread and common, on soil in drier areas of W.A., S.A., Qld, N.S.W., A.C.T. and Vic.; also on the South Is. of New Zealand (central Otago, Canterbury).



Parmelia reptans

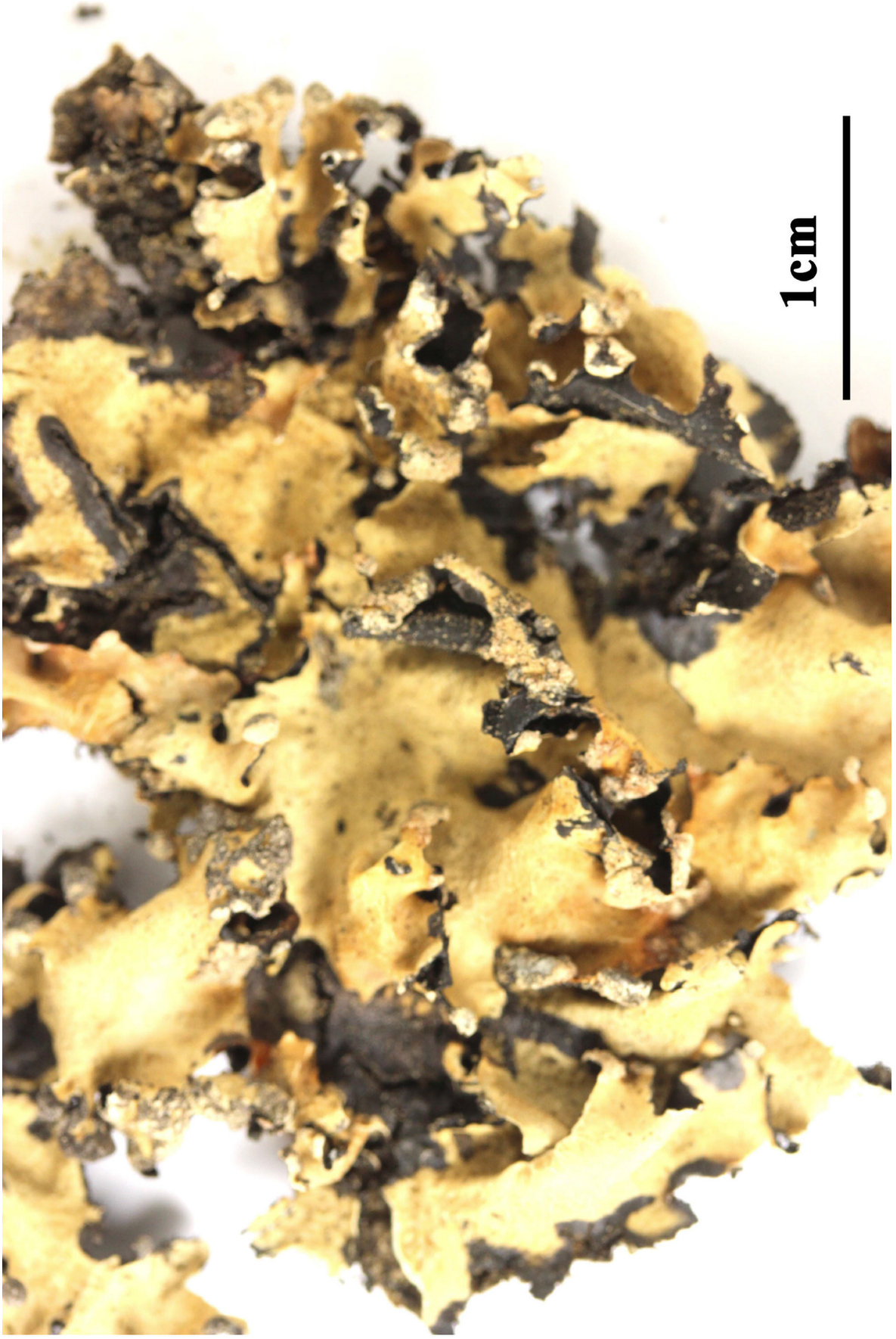


Parmelia reptans

Parmelia reticulata Taylor 1836
= *Parmotrema reticulatum* (Taylor) M. Choisy, Bull. mens. Soc. linn. Soc. Bot. Lyon 21: 148 (1952)

[KU633], Chile. Llanquihue: Between Puerto Varas and Ensenada, along route 225. On bark of trees,20 m. Leg. H. Kashiwadani (no. 17112), 6.11.1981, det. S. Kurokawa. EX S. KURROKAWA AND H. KASHIWADANI LICHENES RARIORES ET CRITICI EXSICCATI NR. 633.

Thallus foliose, heteromerous, dorsiventral, broad-lobed, loosely attached, 4-20(-30) cm in diam., sorediate. Lobes elongate, slightly overlapping, 5-15 mm wide, crenate at margins, rounded and sometimes subascending at apices, the margins thin, with black, simple, up to 3 mm long cilia, sometimes eciliate. Upper surface pale grey to grey-green, smooth, dull, strongly reticulately white-maculate, with mostly marginal, convex to subcapitate soralia which often arise on small lacinulate lobes (sometimes becoming diffuse in old specimens). Lower surface black, with a narrow, papillate and erhizinate zone at margin, centrally with mostly simple, black rhizines. Upper cortex of tightly packed, anticlinally oriented hyphae, with a pored epicortex, the cell walls with lichenan intermediate between the Cetraria- and the Xanthoparmelia-types; medulla white; algal layer continuous; lower cortex prosoplectenchymatous, with rounded and thick-walled cells. Apothecia extremely rare, lecanorine, submarginal, substipitate, up to 8 mm across, with a sometimes perforate, brown disc and a raised thalline margin. Epithecium brownish; hymenium and hypothecium colourless. Asci 8-spored, Lecanora-type. Ascospores 1-celled, hyaline, ellipsoid, 10-18 x 7.5-11 µm. Pycnidia rare, punctiform, black, immersed. Conidia filiform, (7.5-)12-16 x 1-1.5 µm. Photobiont clorococcoid. Spot tests: upper cortex K+ yellow, C-, KC-, P- or P+ faintly yellow; medulla K+ yellow turning orange-red, C-, KC- or KC+ red, P+ orange-red, UV-. Chemistry: upper cortex with atranorin and chloroatranorin; medulla with salazinic acid (major) and consalazinic acid (minor). - Note: a Mediterranean-Atlantic to mild-temperate lichen found on bark, rarely on mossy siliceous rocks.



Parmelia reticulata

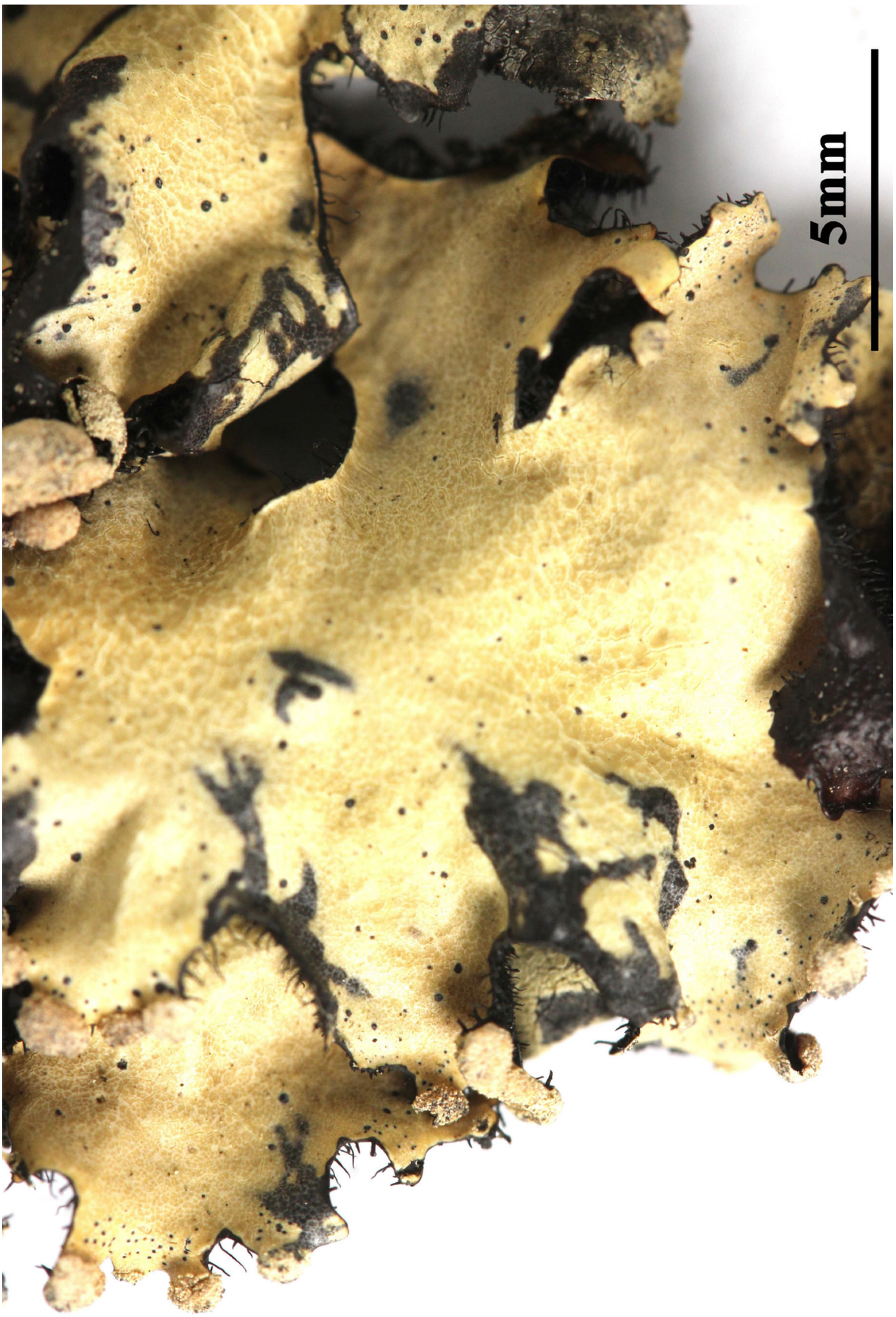
Parmelia reticulata

Parmelia reticulata Taylor 1836
= *Parmotrema reticulatum* (Taylor) M. Choisy, Bull. mens. Soc. linn. Soc. Bot. Lyon 21: 148 (1952)

[KU632], Chile. Llanquihue: Between Puerto Montt and El Tepúal. On bark of *Drimys winteri*, 20 m. Leg. H. Kashiwadani (no. 17036), det. S. Kurokawa. Ex S. Kurokawa and H. Kashiwadani Lichenes Rariore Et Critici Exsiccati Nr. 632.

Thallus foliose, heteromerous, dorsiventral, broad-lobed, loosely attached, 4-20(-30) cm in diam., sorediate. Lobes elongate, slightly overlapping, 5-15 mm wide, crenate at margins, rounded and sometimes subascending at apices, the margins thin, with black, simple, up to 3 mm long cilia, sometimes eciliate. Upper surface pale grey to grey-green, smooth, dull, strongly reticulately white-maculate, with mostly marginal, convex to subcapitate soralia which often arise on small lacinulate lobes (sometimes becoming diffuse in old specimens). Lower surface black, with a narrow, papillate and erhizinate zone at margin, centrally with mostly simple, black rhizines. Upper cortex of tightly packed, anticlinally oriented hyphae, with a pored epicortex, the cell walls with lichenan intermediate between the Cetraria- and the Xanthoparmelia-types; medulla white; algal layer continuous; lower cortex prosoplectenchymatous, with rounded and thick-walled cells. Apothecia extremely rare, lecanorine, submarginal, substipitate, up to 8 mm across, with a sometimes perforate, brown disc and a raised thalline margin. Epithecium brownish; hymenium and hypothecium colourless. Asci 8-spored, Lecanora-type. Ascospores 1-celled, hyaline, ellipsoid, 10-18 x 7.5-11 µm. Pycnidia rare, punctiform, black, immersed. Conidia filiform, (7.5-)12-16 x 1-1.5 µm. Photobiont clorococcoid. Spot tests: upper cortex K+ yellow, C-, KC-, P- or P+ faintly yellow; medulla K+ yellow turning orange-red, C-, KC- or KC+ red, P+ orange-red, UV-. Chemistry: upper cortex with atranorin and chloroatranorin; medulla with salazinic acid (major) and consalazinic acid (minor). - Note: a Mediterranean-Atlantic to mild-temperate lichen found on bark, rarely on mossy siliceous rocks.

Parmelia reticulata

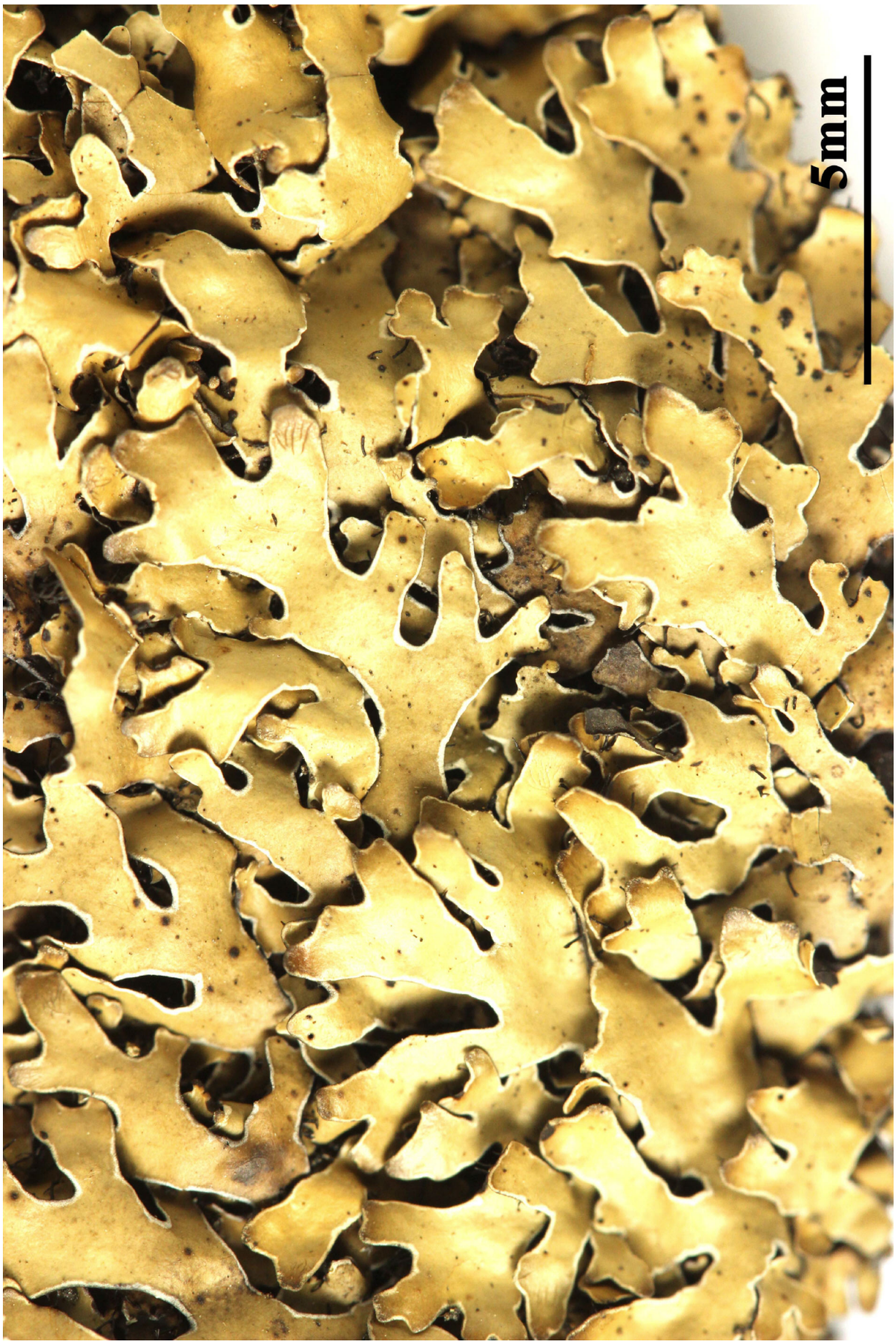


Parmelia reticulata

Parmelia shinanoana Zahlbr., Bot. Mag., Tokyo 41: 349 (1927)

[KU524], Japan. Honshu. Prov Shimotsuke: Ryuzunotaki Fall, Nikko. On rocks, 1300 m. Leg. S. Kurokawa (no. 81098), 23.9.1981, det. S. Kurokawa. Ex S. Kurokawa and H. Kashiwadani Lichenes Rariores Et Critici Exsiccati Nr.524.

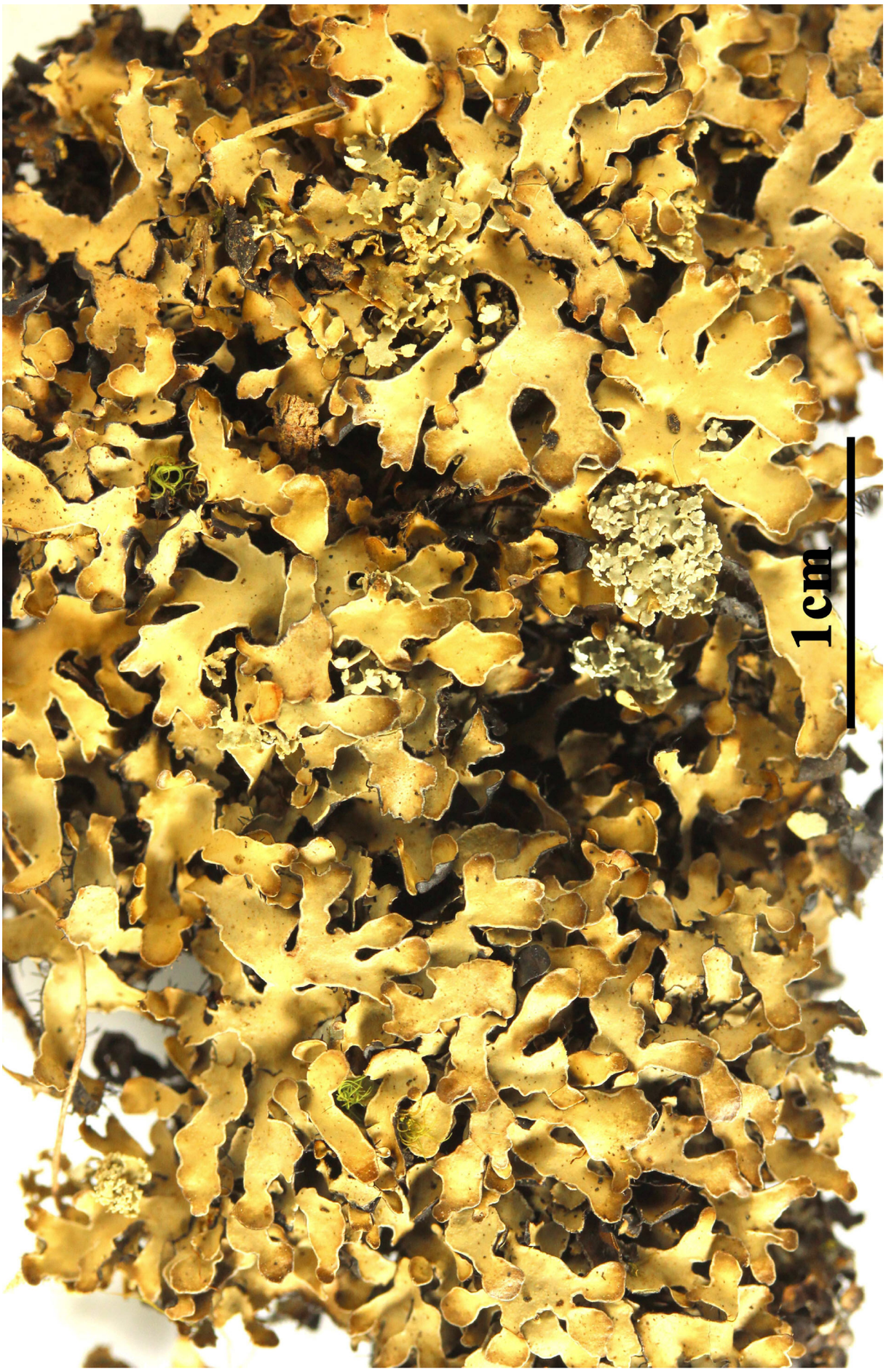
Parmelia shinanoana



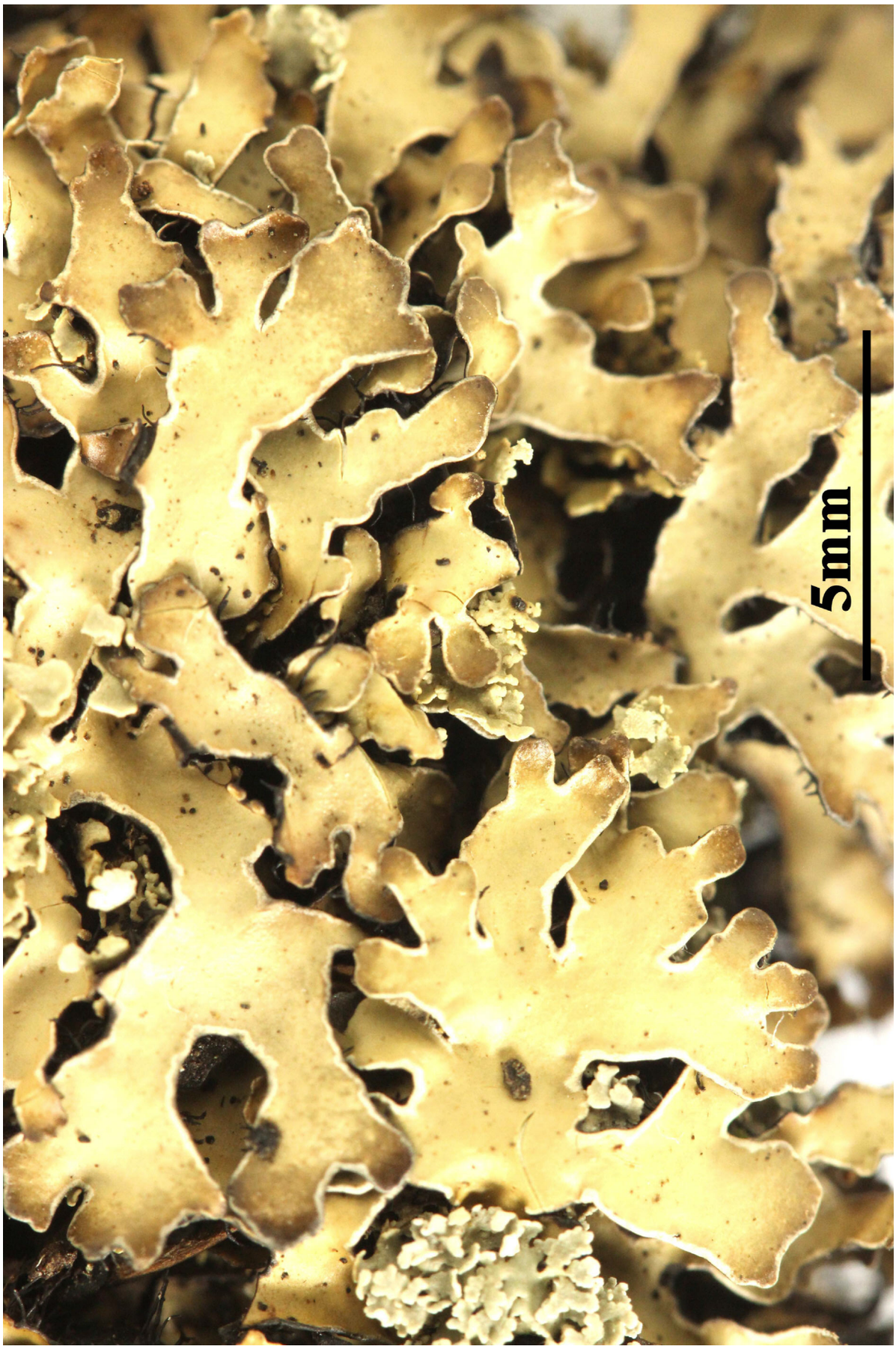
Parmelia shinanoana

Parmelia shinanoana Zahlbr., Bot. Mag., Tokyo 41: 349 (1927)

[OH584],Japan. Shikoku, Prov. Awa (pref. Tokushima): Mt. Tsurugi, Miyoshi-city (33°52'16" N, 134°04'24"). On rock, 1460 m. Leg. Y. Ohmura (no. 11577), S. Takeshira & H. Kashiwadani, 26.10.2016, det. Y. Ohmura. EX Y. OHMURA LICHENES MINUS COGNITI EXSICCATI NR. 585.



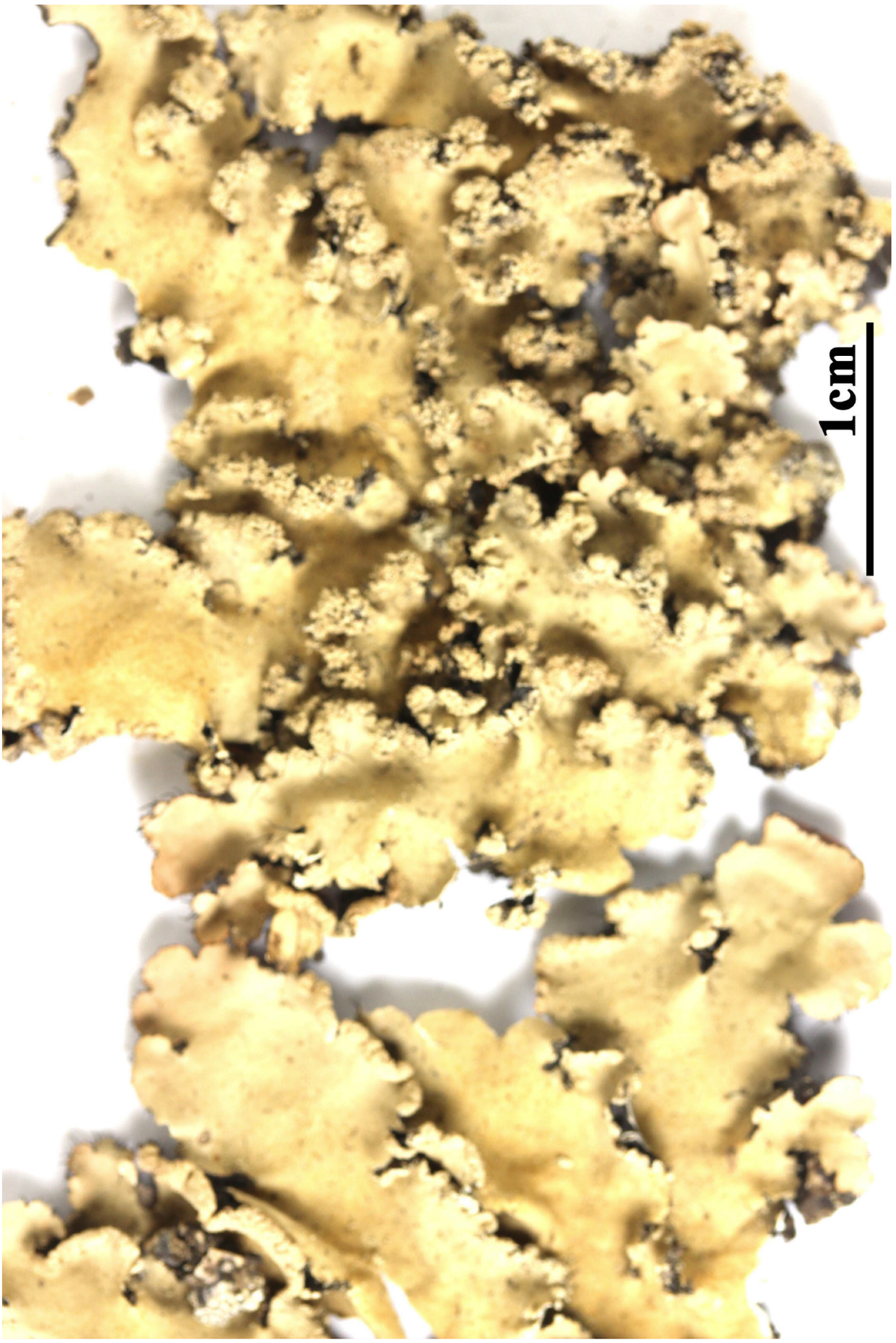
Parmelia shinanoana



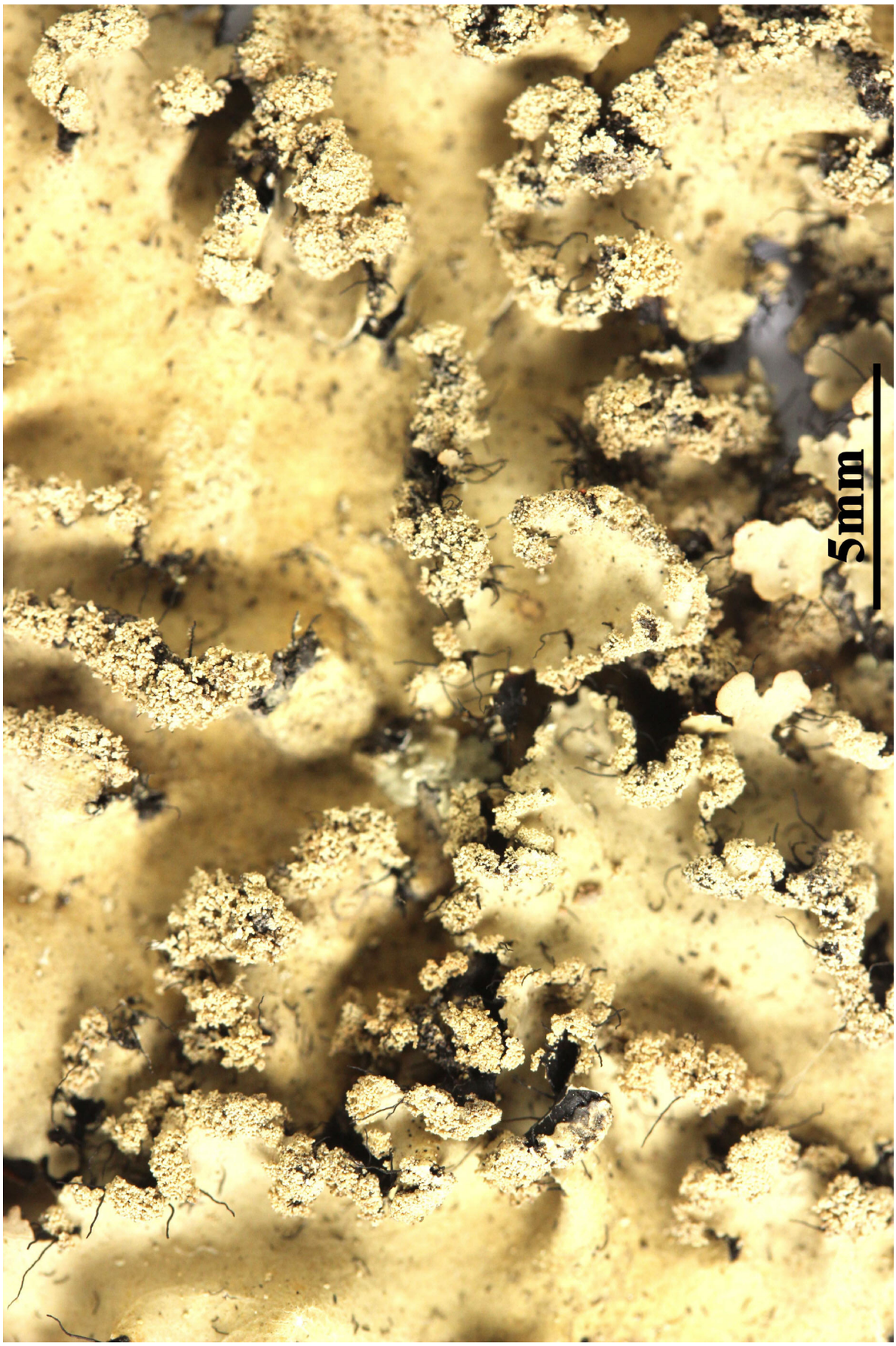
Parmelia shinanoana

Parmelia spinibarbis Kurok., Bull. natn. Sci. Mus., Tokyo 17(4): 299 (1974)
= *Parmotrema spinibarbe* (Kurok.) Hale ex DePriest & B.W. Hale, Mycotaxon 67: 204 (1998)

[KU238], Brazil. Rio de Janeiro: Petrópolis. On trees, 810 m. Leg. S. Kurokawa (no, 8348), 17.7.1971, det. S. Kurokawa. EX S. KUROKAWA LICHENES RARIORES ET CRITICI EXSICCATI NR. 238.



Parmelia spinibarbis

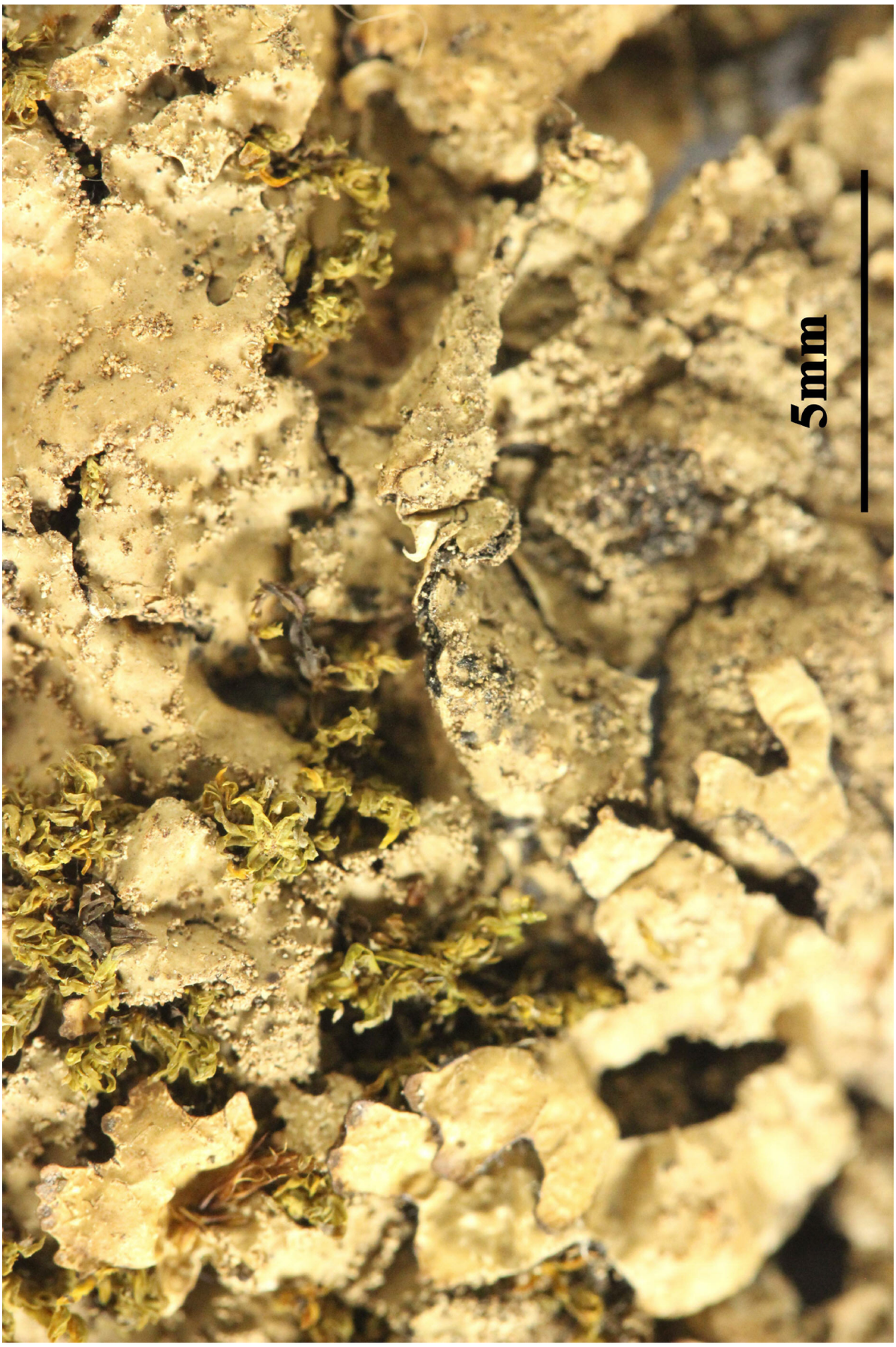


Parmelia spinibarbis

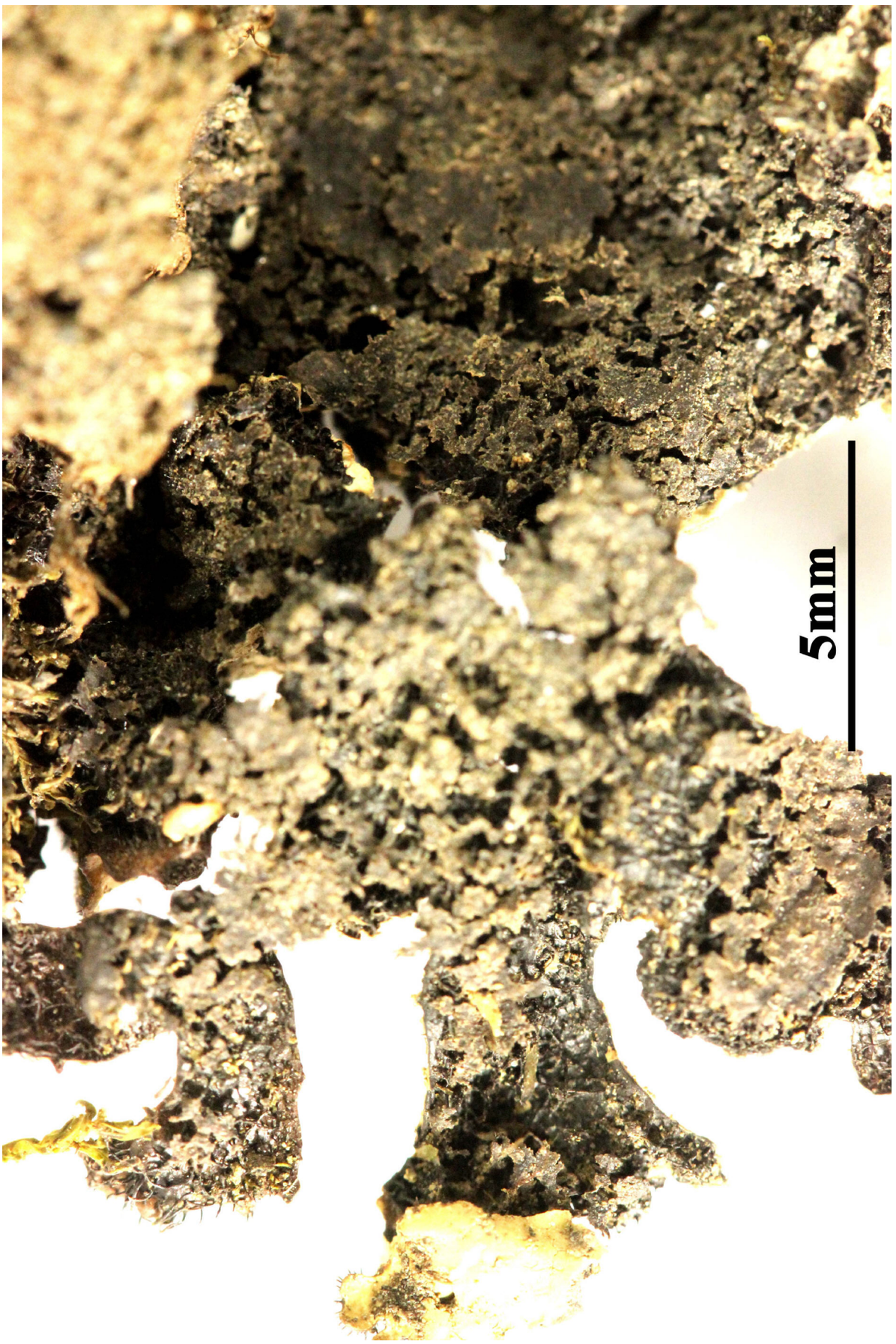
Parmelia squarrosa Hale, Phytologia 22(1): 29 (1971)

[KA287], China. Sichuan. Pref. Aba.Jiuzhaigou Co: Punan (32°58' N, 104°15' E). On rocks, 2470 m. Leg. K. H. Moon (no. 5162), 12.10.1999, det. S. Kurokawa. EX H. KASHIWADANI LICHENES MINUS COGNITI. NR. 287.

Thallus foliose, heteromerous, dorsiventral, adnate to rather loosely attached, forming 3-10 cm wide, regular rosettes. Lobes relatively thin, dichotomously branched, 1-3(-5) mm wide, usually divergent, sometimes overlapping, sublinear, with angular apices. Upper surface pale greenish-grey to whitish-grey, weakly ridged, epruinose, with a conspicuous network of laminal, whitish, at first punctiform but soon linear pseudocyphellae, and with cylindrical, laminal or marginal, simple or branched isidia that are up to 0.5 mm tall. Lower surface black, with dense, squarrosely branched (simple at margins), black rhizines. Upper cortex paraplectenchymatous, of 2-6 layers of densely packed cells, with a usually non-pored epicortex, the cell walls with isolichenan; medulla white; algal layer continuous; lower cortex paraplectenchymatous, thinner than upper cortex. Apothecia very rare, lecanorine, with a concave, brown disc and an isidiate thalline margin. Epithecium brownish; hymenium and hypothecium colourless. Asci 8-spored, clavate, Lecanora-type. Ascospores 1-celled, hyaline, broadly ellipsoid, 13-15 x 8-9 µm. Pycnidia rare, black. Spot tests: upper cortex K+ yellow (but often slowly turning orange-red due to medullary substances), C-, KC-, P- or P+ faintly yellow; medulla K+ yellow turning red, C-, KC-, P+ orange-red. Chemistry: upper cortex with atranorin; medulla with salazinic acid (major), and consalazinic acid (minor). - Note: this species, which is fairly common in North America and in Japan, also occurs, albeit rarely, in very humid beech forests of the Alps.



Parmelia squarrosa

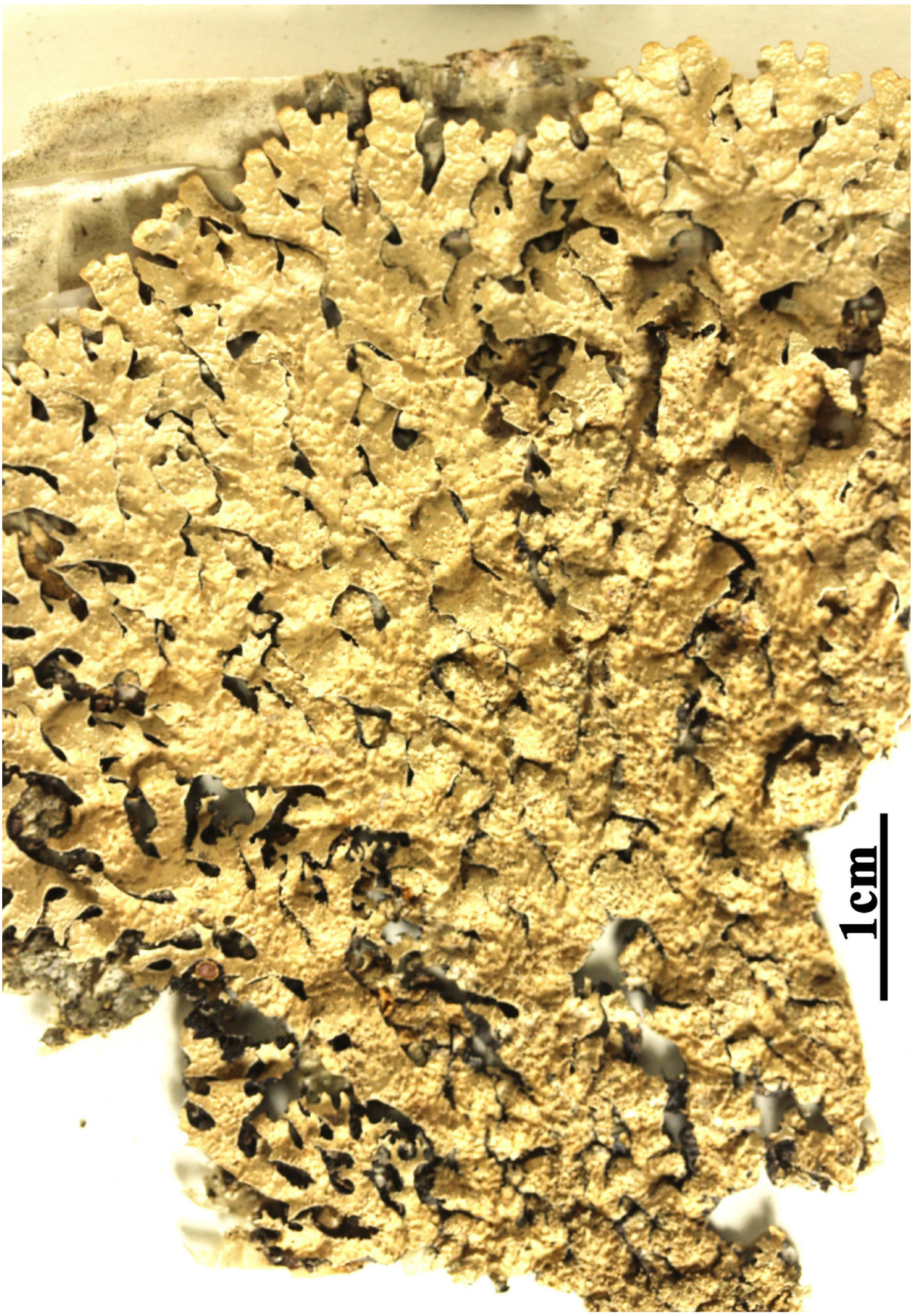


Parmelia squarrosa

Parmelia squarrosa Hale, Phytologia 22(1): 29 (1971)

[KU438], Japan. Honshu. Prov. Shinano: Oku-Tateshina, Yatsugadake Mts. On bark of *Betula ermani*, 1800 m. Leg. S. Kurokawa (no. 80003), 2.9.1980, det. S. Kurokawa. Ex S. Kurokawa and H. Kashiwadani Lichenes Rariores Et Critici Exsiccati Nr. 483.

Thallus foliose, heteromerous, dorsiventral, adnate to rather loosely attached, forming 3-10 cm wide, regular rosettes. Lobes relatively thin, dichotomously branched, 1-3(-5) mm wide, usually divergent, sometimes overlapping, sublinear, with angular apices. Upper surface pale greenish-grey to whitish-grey, weakly ridged, epruinose, with a conspicuous network of laminal, whitish, at first punctiform but soon linear pseudocyphellae, and with cylindrical, laminal or marginal, simple or branched isidia that are up to 0.5 mm tall. Lower surface black, with dense, squarrosely branched (simple at margins), black rhizines. Upper cortex paraplectenchymatous, of 2-6 layers of densely packed cells, with a usually non-pored epicortex, the cell walls with isolichenan; medulla white; algal layer continuous; lower cortex paraplectenchymatous, thinner than upper cortex. Apothecia very rare, lecanorine, with a concave, brown disc and an isidiate thalline margin. Epithecium brownish; hymenium and hypothecium colourless. Asci 8-spored, clavate, Lecanora-type. Ascospores 1-celled, hyaline, broadly ellipsoid, 13-15 x 8-9 µm. Pycnidia rare, black. Spot tests: upper cortex K+ yellow (but often slowly turning orange-red due to medullary substances), C-, KC-, P- or P+ faintly yellow; medulla K+ yellow turning red, C-, KC-, P+ orange-red. Chemistry: upper cortex with atranorin; medulla with salazinic acid (major), and consalazinic acid (minor). - Note: this species, which is fairly common in North America and in Japan, also occurs, albeit rarely, in very humid beech forests of the Alps.



Parmelia squarrosa

Parmelia squarrosa

Parmelia stygia (L.) Ach., Methodus qua omnes detectos Lichenes Secundum Organa Carpomorpha ad Genera, Species et Varietates Redigere atque Observationibus Illustrare Tentavit Erik Acharius: 201 (1803)
= *Lichen stygius* L. 1753
= *Melanelia stygia* (L.) Essl., Mycotaxon 7(1): 47 (1978)

[KU428], Japan. Honshu. Prov. Uzen: Tengu-iwa, Mt. Nishi-Azuma. On rocks, 2000 m. Leg. H. Kashiwadani (no. 15415), 11.8.1979, det. H.Kashiwadani. Ex S. Kurokawa and H. Kashiwadani Lichenes Rariores Et Critici Exsiccati Nr. 428.

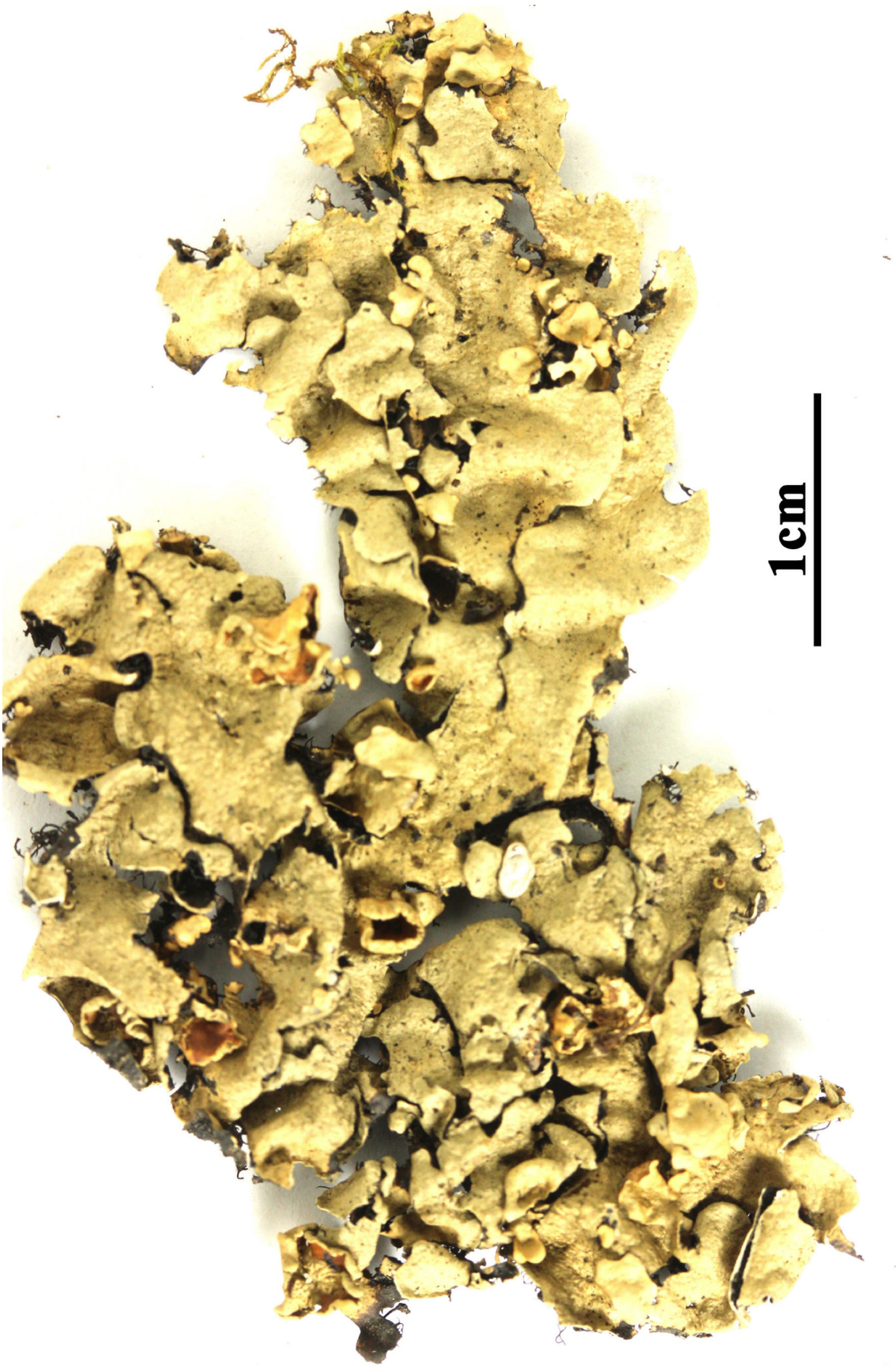
Thallus foliose, heteromerous, dorsiventral, adnate to ascending, forming 3-6(-10) cm wide rosettes. Lobes 1-5 mm long, (0.5-)1-2(-3) mm wide, convex (flattened in upper part), contiguous to imbricate, with thickened and usually down-turned margins. Upper surface dark brown to black (greenish brown in shade-forms), more or less glossy, with rounded to elongate, whitish, mostly marginal pseudocyphellae which are often surrounded by a raised, often darker margin; lower surface dark brown to black, matt, with scattered, mostly simple, black rhizines. Upper cortex paraplectenchymatous, with a non-pored epicortex, the cell walls containing isolichenan; medulla white; lower cortex paraplectenchymatous. Apothecia lecanorine, mostly submarginal, (2-)4-6(-8) mm across, with a dark disc and a usually knobby, pseudocyphellate thalline margin. Epithecium brownish; hymenium and hypothecium colourless. Asci 8-spored, broadly clavate, the K/I+ blue tholus penetrated by a faintly amyloid apical cushion with parallel or diverging flanks, the wall K/I-, surrounded by a K/I+ blue outer layer, Lecanora-type. Ascospores 1-celled, hyaline, broadly ellipsoid, 7-12 x 4-6 µm. Pycnidia frequent, usually numerous, black, laminal, globose, mostly immersed, often with a gaping ostiole. Conidia simple, swollen at both ends, 3.5-5.5 x c. 1 µm. Photobiont chlorococcoid. Spot tests: upper cortex K-, C-, KC-, P-, N-; medulla K+ yellow turning dirty red-brown (rarely K-), C-, KC-, P+ orange-red (rarely P-), I-. Chemistry: several chemotypes, with 1) stictic and norstictic acids (major), 2) fumarprotocetraric and protocetraric acids (major), 3) no lichen substances. Capperatic, cryptostictic, menegazziaic and constictic acids have been also reported as minor substances. - Note: a circumpolar, arctic-alpine lichen found on siliceous rocks in open habitats, with optimum near and above treeline.

Parmelia stygia

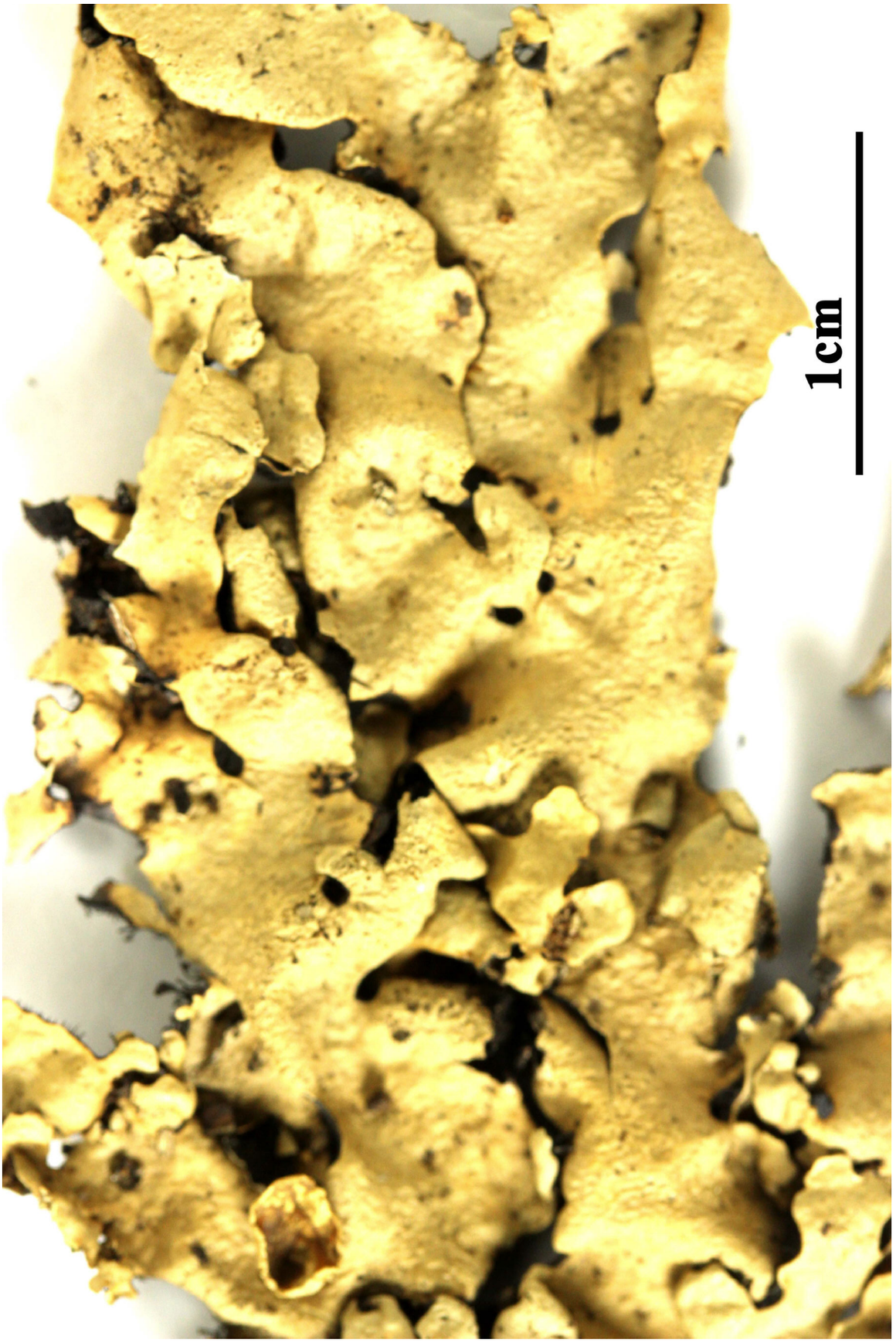
Parmelia stygia

Parmelia subaurulenta Nyl., Flora, Regensburg 68: 606 (1885)

[KU373], Japan. Honshu. Prov. Musashi. Mt. Ryogami. On rocks, 1200 m. Leg. H. Kashiwadani (no. 14583), H. Shibuichi and K. Yoshida, 10.7.1978, det. S. Kurokawa. Ex S. Kurokawa and H. Kashiwadani Lichenes Rariores Et Critici Exsiccati Nr. 373.



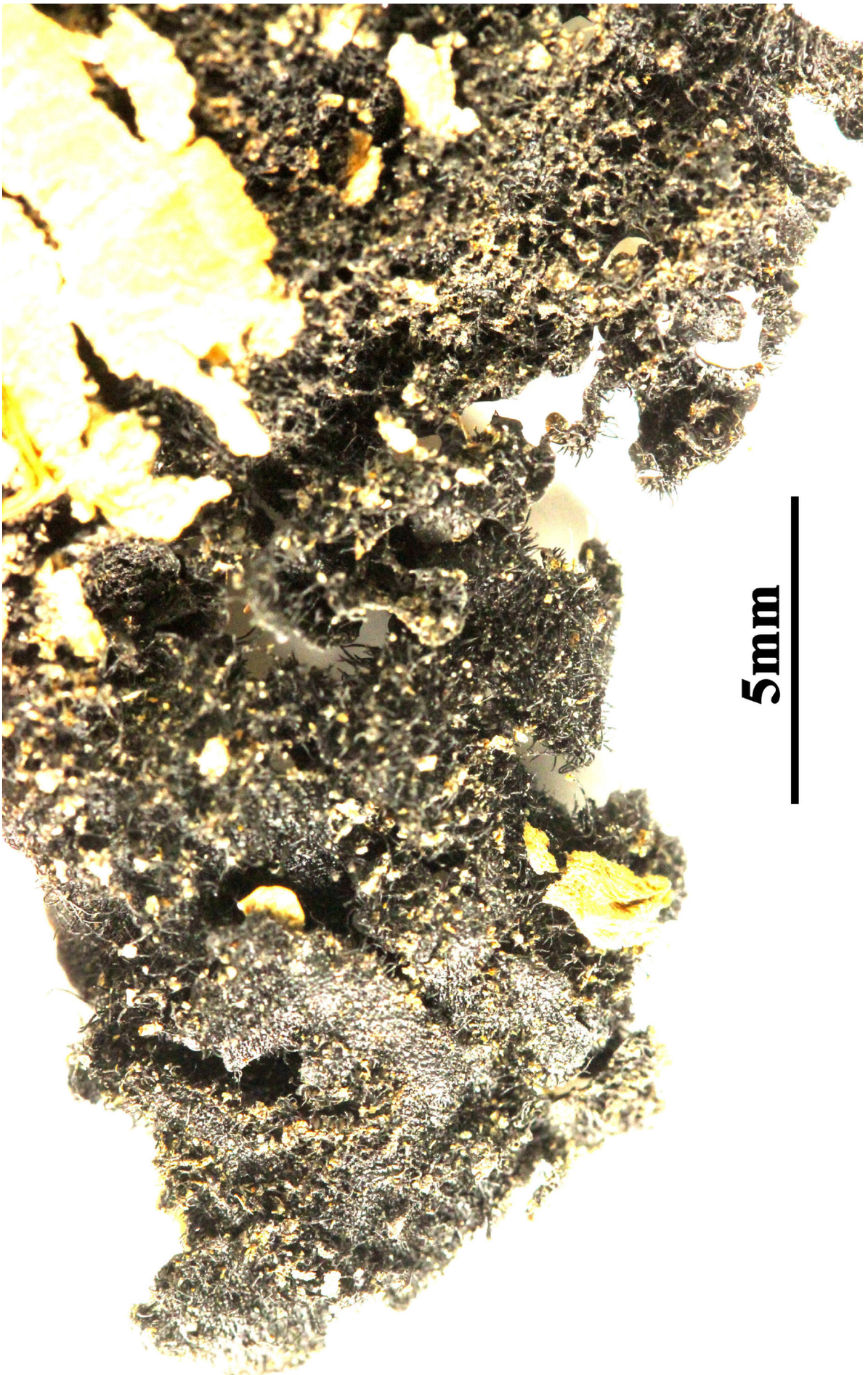
Parmelia subaurulenta



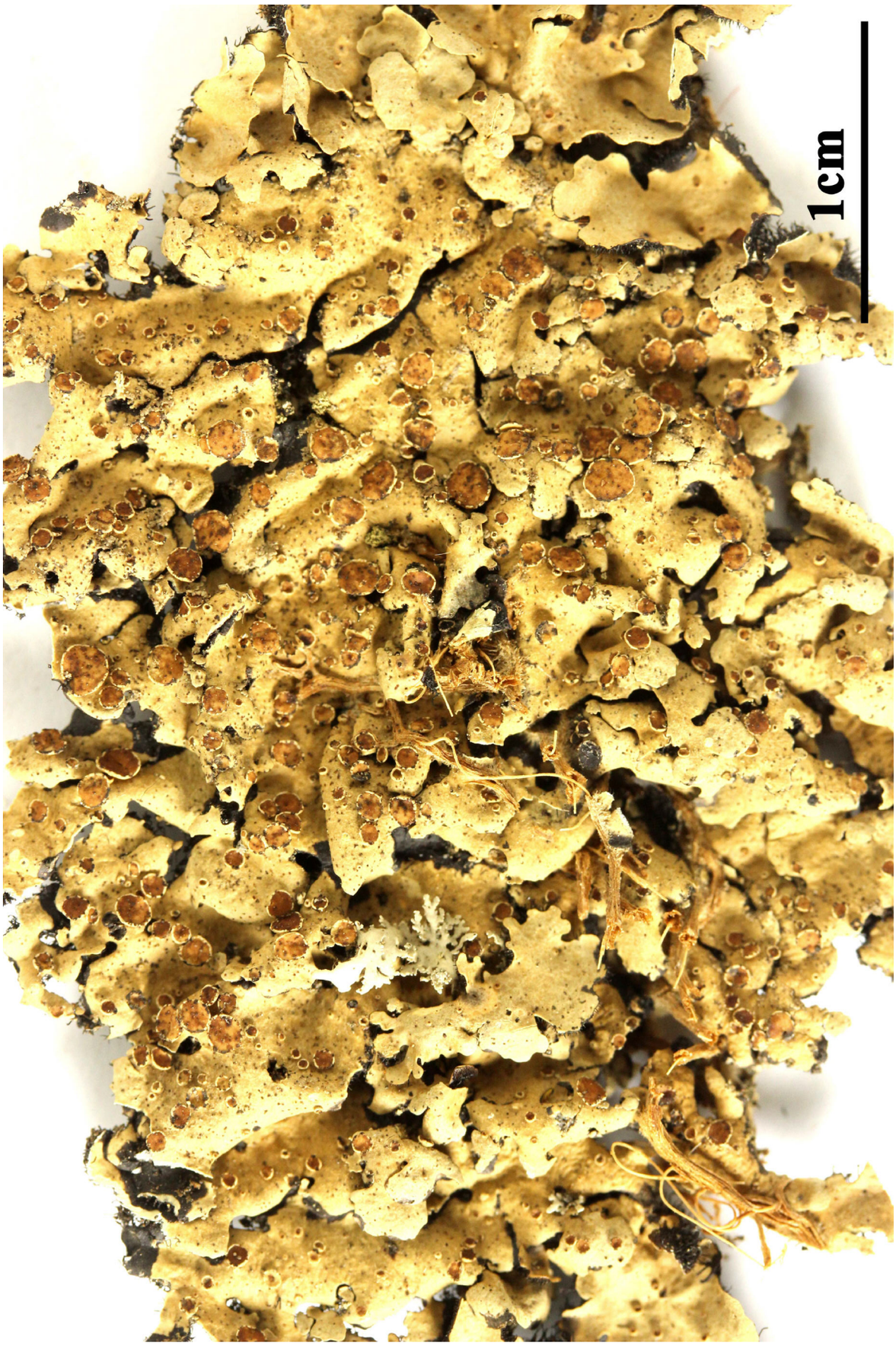
Parmelia subaurulenta

Parmelia subaurulenta* var. *myriocarpa Asahina, J. Jap. Bot. 26: 227 (1951)

[KU322], Japan. Honshu. Prov. Kai: Aokigahara-marubi. Mt. Fuji. On bark of *Fagus crenata*, 1100 m. Leg. H. Kashiwadani (no. 14011), 12.4.1977, det. S. Kurokawa. EX S. KUROKAWA AND H. KASHIWADANI LICHENES RARIORES ET CRITICI EXSICCATI NR. 322.



Parmelia subaurulenta* var. *myriocarpa



Parmelia subaurulenta* var. *myriocarpa

Parmelia subdistorta Kurok., J. Hattori bot. Lab. 32: 212 (1969)
= *Xanthoparmelia subdistorta* (Kurok.) Hale, Phytologia 28(5): 489 (1974)

[KI184], Australia. Victoria: 6 Miles west of Red Cliffs along the Werrimull Road. On soil, 50 m. - Isotype -. Leg. S. Kurokawa (no. 6617), 8.12.1965, det. S. Kurokawa. EX S- KUROKAWA LICHENES RARIOIRES ET CRITICI EXSICCATI NR. 184.

Type collection: 6 mi W of Werrimull Road, Vict., Australia, Kurokawa 6617
Thallus loosely adnate, less commonly soil, firm, 4-10 cm broad, yellowish green; lobes 0.8-1.2 mm wide, rather strongly convoluted, dichotomously branched, separate to subimbricate, revolute tips, secondary subterete lobes sometimes developing center; upper surface continuous, emaculate, shiny, soredia lacking; medulla white; lower surface plane canaliculate, usually with a conspicuous yellow rim, darkening at the tips, sparsely to moderately rhizinate, pale brown, simple, 0.2-0.8 mm long. Pycnidia conidia bifusiform, 0.5 x 6-8 µm. Apothecia substipitate, 2-5 mm in diameter; spores 6-7 x 9-10 µm. Chemistry:Norlobaridone, loxodin, and usnic acid. Distribution: Australia COMMENTS: This species occurs rather rarely in scrub and shrublands. ILLUSTRATION.-Kurokawa, 1969, PI. 1: fig. 3.

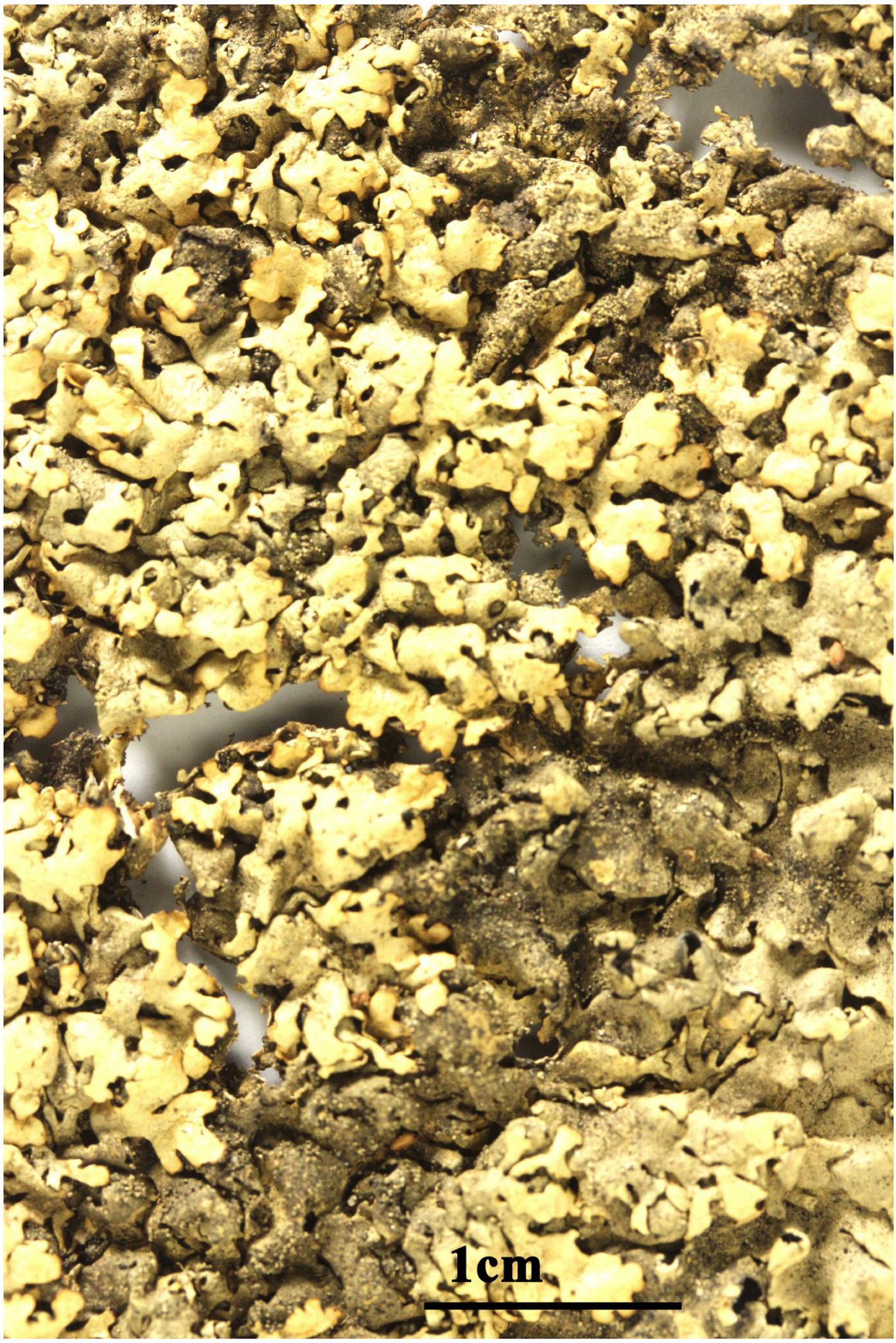
Parmelia subdistorta

Parmelia subdistorta

Parmelia subramigera Gyeln., Feddes Repert. Spec. Nov. Regni veg. 29: 281/409 (1931)

[KU239], Japan. Honshu. Prov. Shinano: Kawahake,Minami-Saku-gun. On rocks, 1300 m. Leg. H. Shibuichi (no. 4632b) and K. Yoshida, 23.7.1972, det. S. Kurokawa. Ex S. Kurokawa Lichenes Rariores Et Critici Exsiccati Nr. 239.

Diagnosis: Thallus lobatus, lobis primariis praesentibus, rotundatis, sat latis, non imbricatis, sat nigro-marginatis, lobis adventivis deficientibus, superne viridi-stramineus, levis, esorediosis, plus minusve nitidus, isidiosus , isidiis numerosis, cylindricis, cc. 1/10 mm crassis, sat longis, ,subtus partim nigrescens, partim pallidus. Medulla alba, K + cerina deindeque rubra, C- KC + rubra (lentement disparu), J- . Similis *Parmeliae ramigerae* . typo sed isidia tenuiores et thallus subtus non omninus niger.



Parmelia subramigera

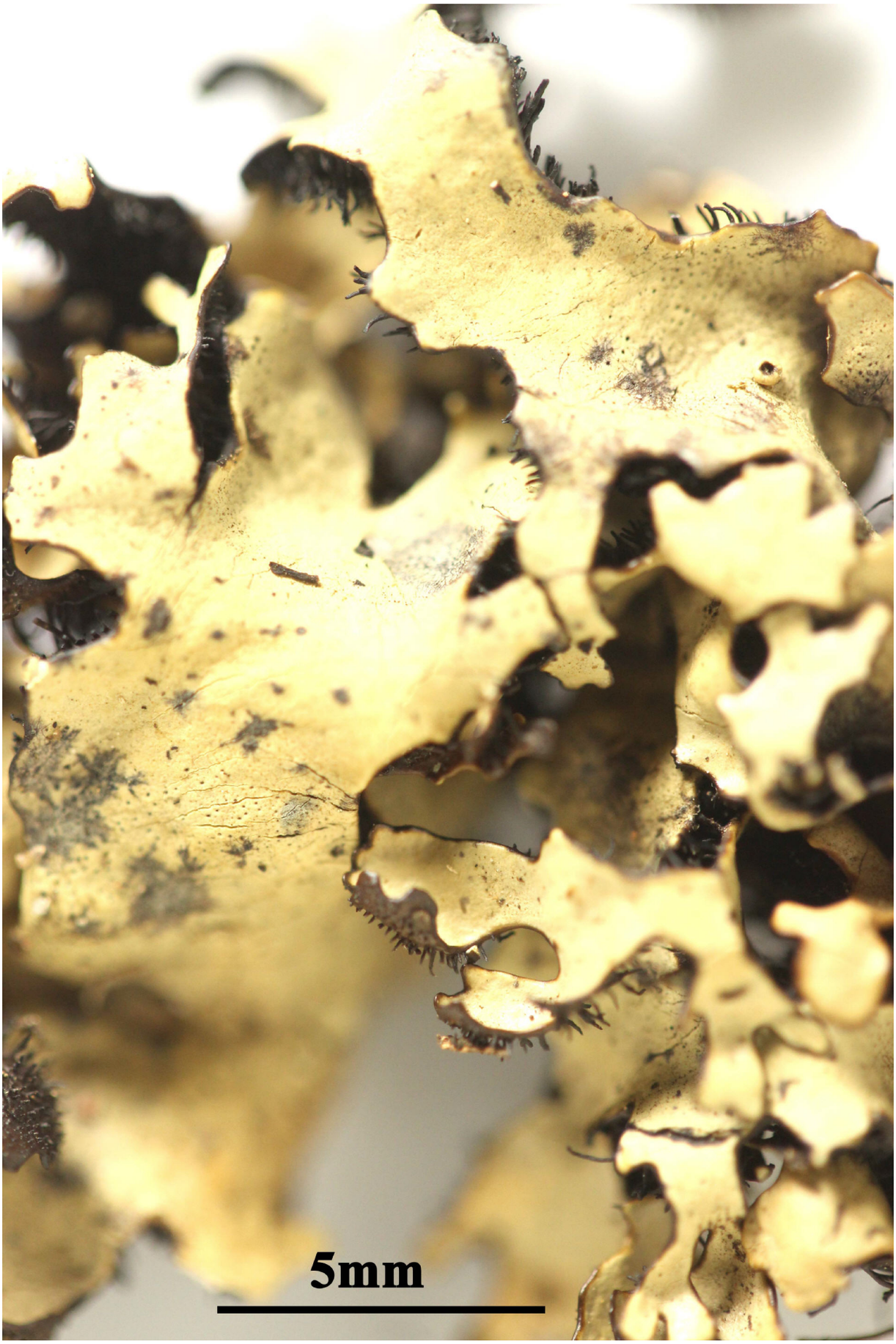
Parmelia subramigera

Parmelia substrigosa Hale, in Weber, Lich. Exsicc. 9: 338 (1971)
= *Xanthoparmelia substrigosa* (Hale) Hale, Phytologia 28(5): 489 (1974)

[KU374], Australia. Australian Capital Territory: On summit of Mt. Coree: On rocks, 1390 m. Leg. S. Kurokawa (no. 6352), 30.11.1965, det. S. Kurokawa. EX S. KUROKAWA AND H. KASHIWADANI LICHENES RARIORES ET CRITICI EXSICCATI NR. 374.

Thallus foliose, loosely adnate, to 7–12 cm wide. Lobes rarely imbricate, ±flat, irregular to linear-elongate, subdichotomously or irregularly branched, subascending or not, 1.5–4 (–5) mm wide, lacking lobules; margins broadly sinuate. Upper surface yellow-green, shiny, becoming dull and darkening, emaculate, smooth, lacking soredia and isidia; lobe margins commonly black. Medulla white. Lower surface pale brown to dark blackish brown; rhizines very dense, fasciculate to simple or often dichotomously branched, dark brown. Apothecia subpedicellate, 8–12 mm wide; disc concave, becoming flattened or slightly convex, dark brown; thalline exciple entire, undulating. Ascospores 8–10 × 4–6 μm. Pycnidia common. Conidia bifusiform, 5–6 × 0.5 μm. CHEMISTRY: cortex K-, UV-; medulla K+ yellow then dark red, C-, P+ orange; containing usnic acid, norstictic acid (major), connorstictic acid, ±salazinic acid and ±consalazinic acid. Very common and variable, grows on rock and spreads from rock onto soil, found in tableland and mountain areas of southern and eastern Australia (W.A., S.A., Qld, N.S.W., A.C.T., Vic. and Tas.); also on both islands of New Zealand (in particular Canterbury, Otago).

Parmelia substrigosa

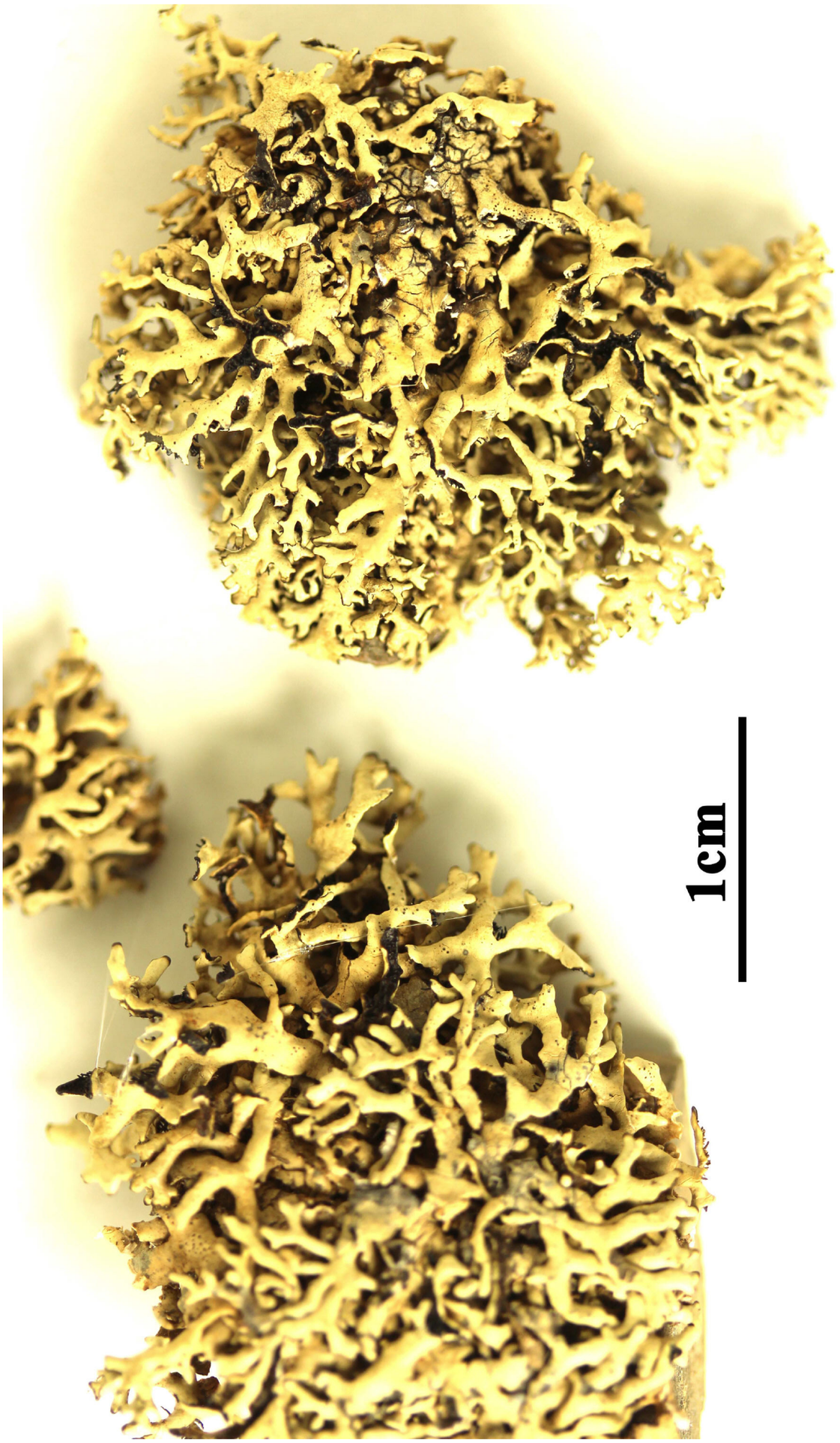


Parmelia substrigosa

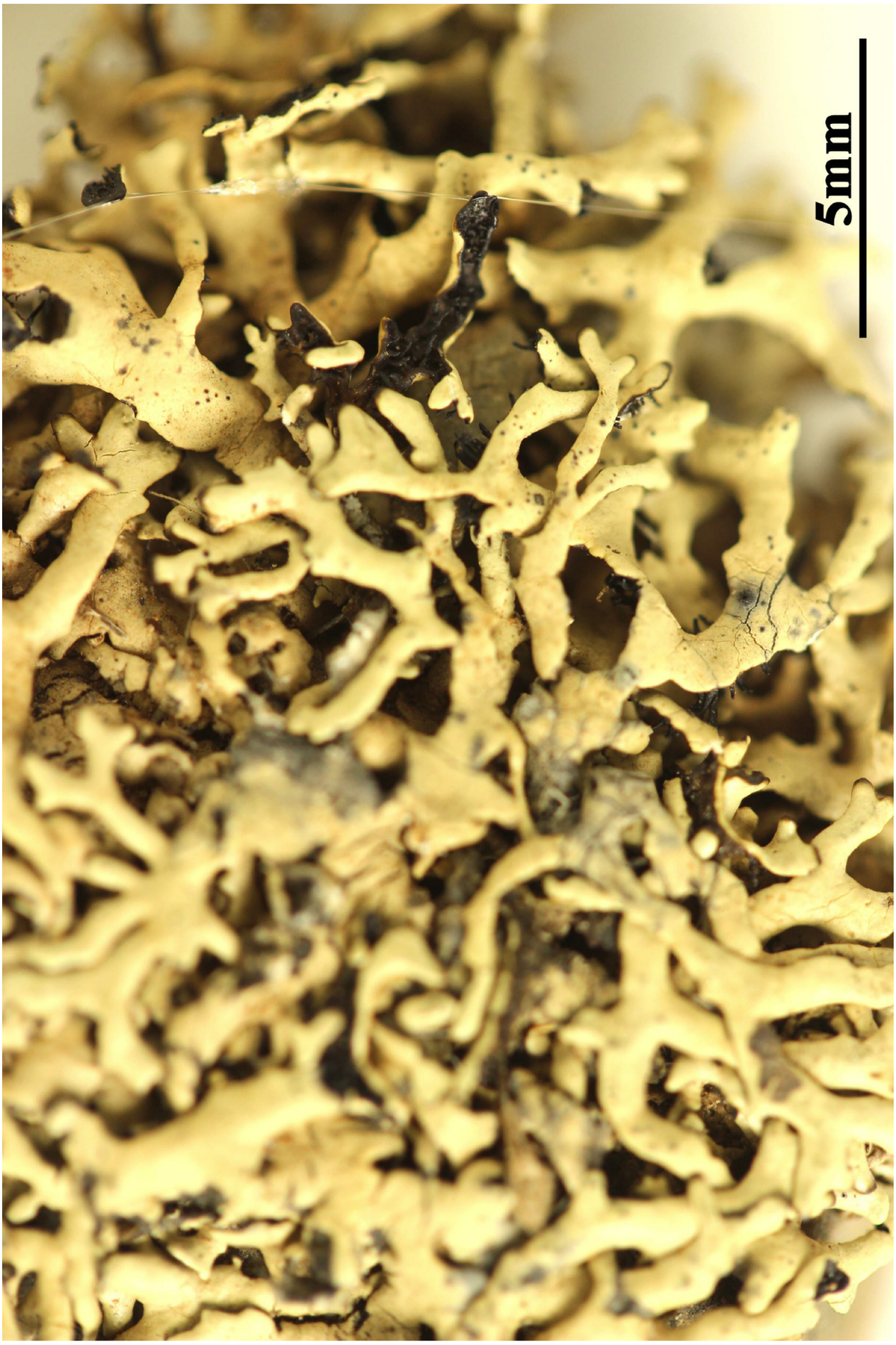
Parmelia sulcifera Kurok., Bull. natn. Sci. Mus., Tokyo, B 8(2): 37 (1982)
= *Xanthoparmelia sulcifera* (Kurok.) Hale, Mycotaxon 20(1): 79 (1984)

[KU583], Australia: New South Wales: 9 miles east of Cooma and Numeralla Road. On rocks, 850 m. Leg. S. Kurokawa (no 6450)-Isotype -, 2.12.1965, det. S. Kurokawa. EX S. KUROKAWA AND H. KASHIWADANI LICHENES RARIORES ET CRITICI EXSICCATI NR. 583.

Thallus foliose, loosely adnate to unattached but remaining intact, becoming pulvinate, to 6 cm wide. Primary lobes imbricate or not, sublinear, irregularly branched, 0.7–2 mm wide; primary lobes and laciniae revolute to convolute; laciniae subdichotomously branched, often entangled and growing over primary lobes, ±subascending at apices, 0.3–0.5 (–1) mm wide; without lobules. Upper surface pale yellow-green, convex, dull, emaculate, smooth to slightly rugulose, lacking soredia and isidia; lobe margins often blackened towards apices. Medulla white. Lower surface partly canaliculate, straw-yellow to light brown, usually dark brown or black towards apices; rhizines sparse to moderately dense, often grouped subapically, simple, tufted or not, 0.2–0.6 mm long, concolorous. Apothecia rare, subpedicellate, 1–3 mm wide; disc concave, red to dark brown; thalline exciple smooth, thick, involute, ±undulating. Ascospores 10–11 × 4–6 µm. Pycnidia common. Conidia bifusiform, 5–6 × 0.5 µm. CHEMISTRY: cortex K-, UV-; medulla K+ yellow then pale reddish, C-, P-; containing usnic acid, hypostictic acid, hyposalazinic acid and ±hypoconstictic acid. Rare, endemic, found on soil and rarely spreading over pebbles in rain shadow areas of central and southern tablelands of N.S.W.



Parmelia sulcifera



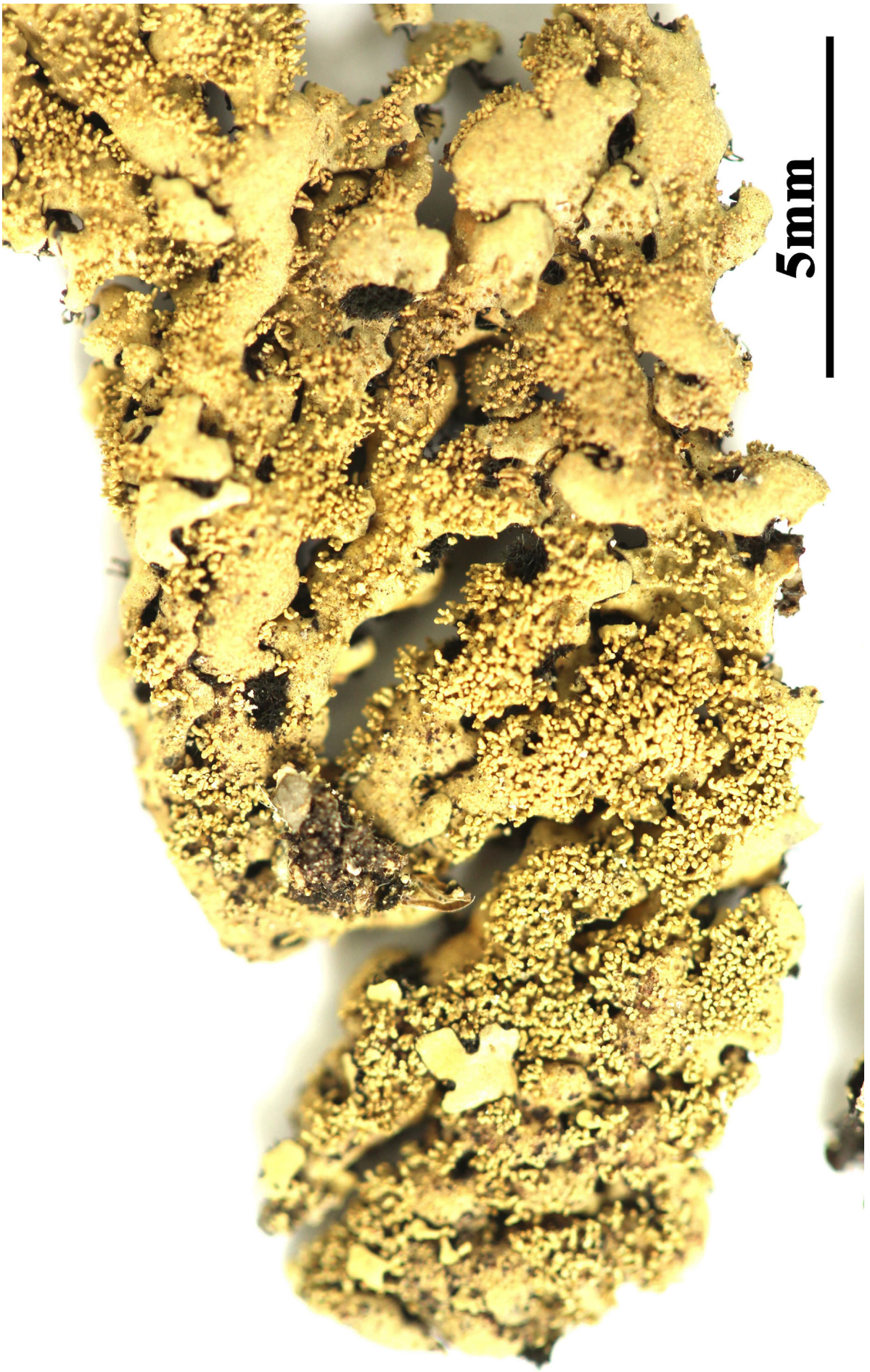
Parmelia sulcifera

Parmelia sydneyensis Gyeln., Annls mycol. 36(4): 292 (1938)
= Relicina sydneyensis (Gyeln.) Hale, Phytologia 28(5): 485 (1974)

[KU375], Japan. Honshu. Prov. Kii: Kotono-taki Water Fall, Susami-cho, Nishimuro-gun. On rocks, 250 m. Leg. H. Kashiwadani (no. 14628), 1.8.1978, det. S. Kurokawa. EX S. KUROKAWA AND H. KASHIWASADNI LICHENES RARIORES ET CRITICI EXSICCATI NR. 375.

Thallus foliose, adnate, to 3–8 cm wide. Lobes contiguous, sparingly imbricate, sublinear-elongate, dichotomously to subdichotomously branched, 0.8–1.5 mm wide, elobulate; cilia moderately dense, tapered to strongly inflated, black. Upper surface yellow-green, flat, shiny at lobe apices, weakly maculate, irregularly cracked on older lobes; isidia dense, cylindrical, sparingly branched or rarely becoming coralloid. Lower surface brown to dark brown; rhizines moderately dense, simple or occasionally dichotomously branched, coarse, brown to black. Apothecia rare, 1.5–3.5 mm wide; disc ±flat or shallowly concave, cinnamon-brown; thalline exciple ecoronate, retrorsely rhizinate. Ascospores ellipsoidal, 7–8 × 4–5 µm. Pycnidia immersed, punctiform. Conidia weakly bifusiform, 7–9 × 1 µm. CHEMISTRY: cortex K-, UV-; medulla K+ yellow, C-, P+ orange; containing usnic acid, norstictic acid (trace), stictic acid (major), constictic acid (minor), cryptostictic acid (trace), ±menegazziaic acid (trace), ±hypostictic acid (trace) and ±atranorin. Common on rock and trees in coastal and hinterland areas in eastern Australia, occurring from north Qld to southern N.S.W. In tropical areas this species is more common on trees, while in temperate regions the reverse is observed. Also known from Japan, Taiwan, Indonesia and Papua New Guinea.

Parmelia sydneyensis

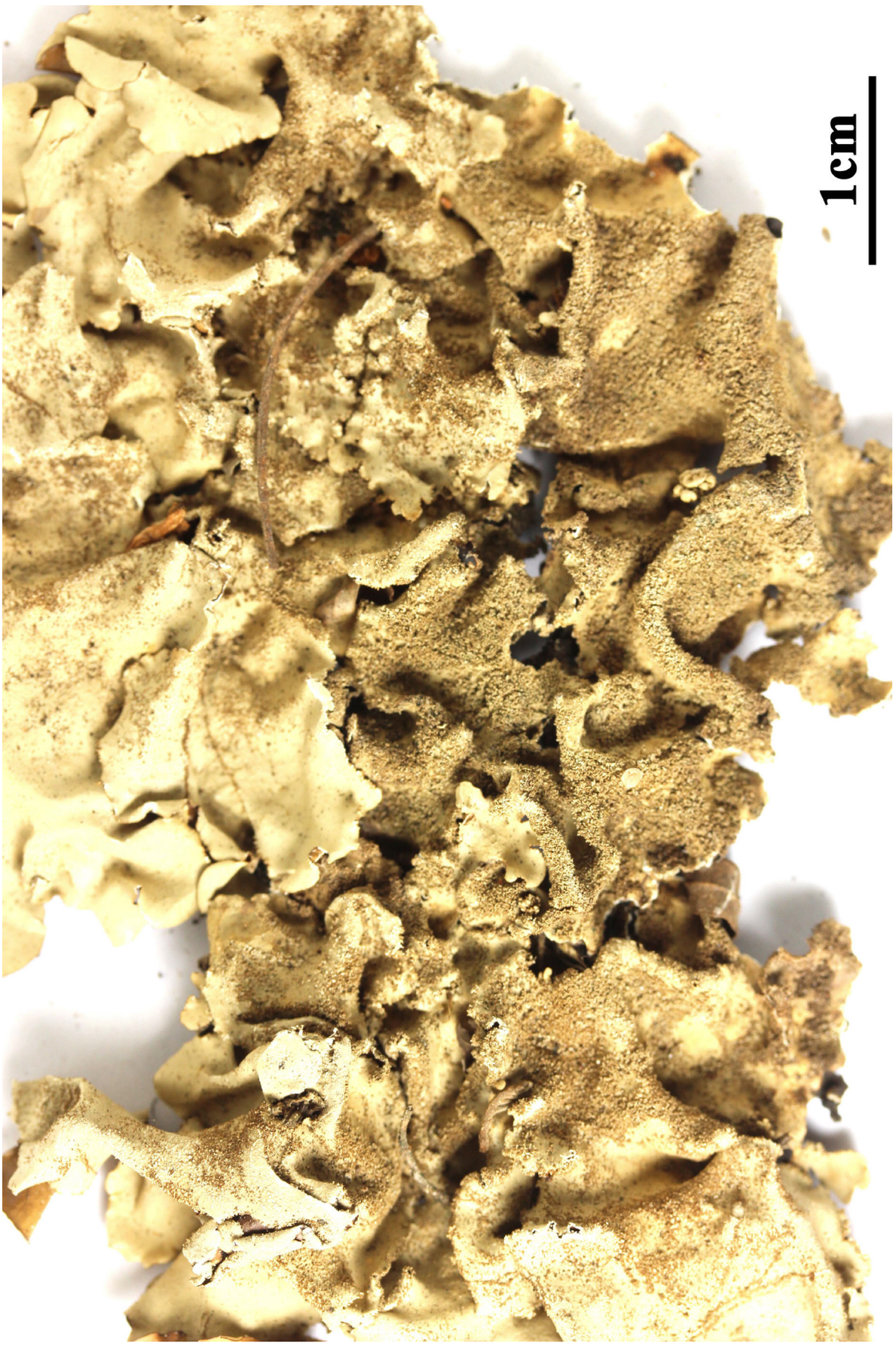


Parmelia sydneyensis

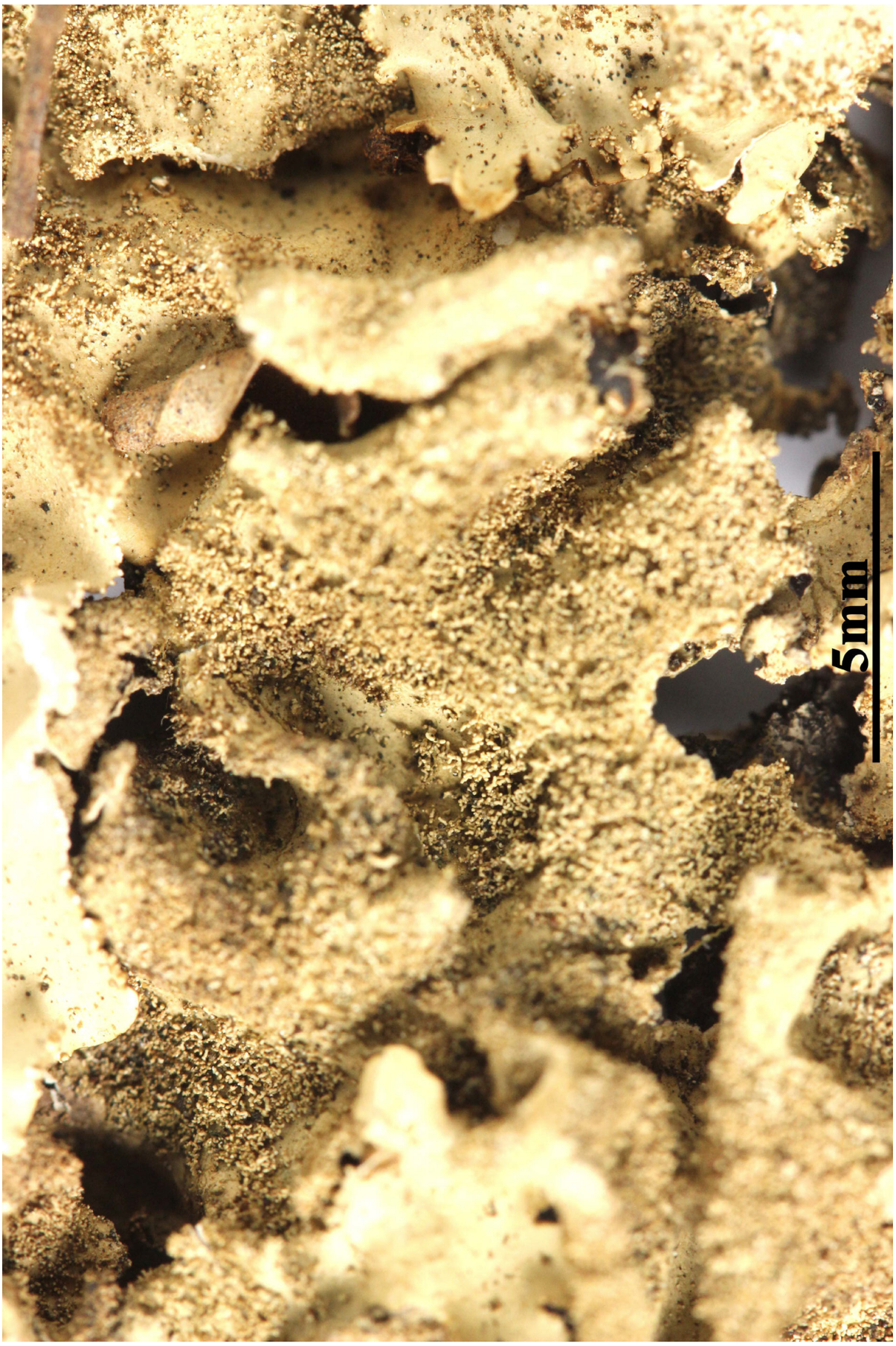
Parmelia tinctorum Dèspr. ex Nyl. 1872
= *Parmotrema tinctorum* (Dèspr. ex Nyl.) Hale, Phytologia 28(4): 339 (1974)

[KU635], Malaya. Bukit Timali Road, Singapore. Leg. M. Togashi (Herb Y. Asahina no. 62250), 2.3.1962, det. Y. Asahina. Ex S. Kurokawa and H. Kashiwadani Lichenes Rariore Et Critici Exsiccati Nr. 635.

Thallus large, 8-20 cm. broad, loosely adnate on rock or bark, whitish mineral gray; lobes rotund, 10-15 mm. wide, margins entire, cilia lacking; upper surface plane, dull, densely isidiate, isidia papillate-granular to cylindrical,' coarse, 0.06-0.10 mm. in diameter, to 2 mm. high, simple to rarely coralloid-branched; lower side black and sparsely rhizinate at the center, brown, shiny, and naked in a broad zone at the margins. Apothecia very rare, to 20 mm. in diameter, exciple isidiate-dentate, amphithecium rugose, white-maculate, isidiate, disc imperforate; hymenium 55-65 µm high; spores 7-10 x 13-15 µm, episporium 1.5 µm thick; pycnidia rare, conidia 12-15 µm long. Reactions: Thallus K+ yellow; medulla K-, C+ blood red, KC+ red, P-, atranorine and lecanoric acid present. This common weedy pantropical species is well known to all lichenologists. It is immediately identi£ied by the brilliant C + red reaction and by the simple often granular or papillate isidia.



Parmelia tinctorum

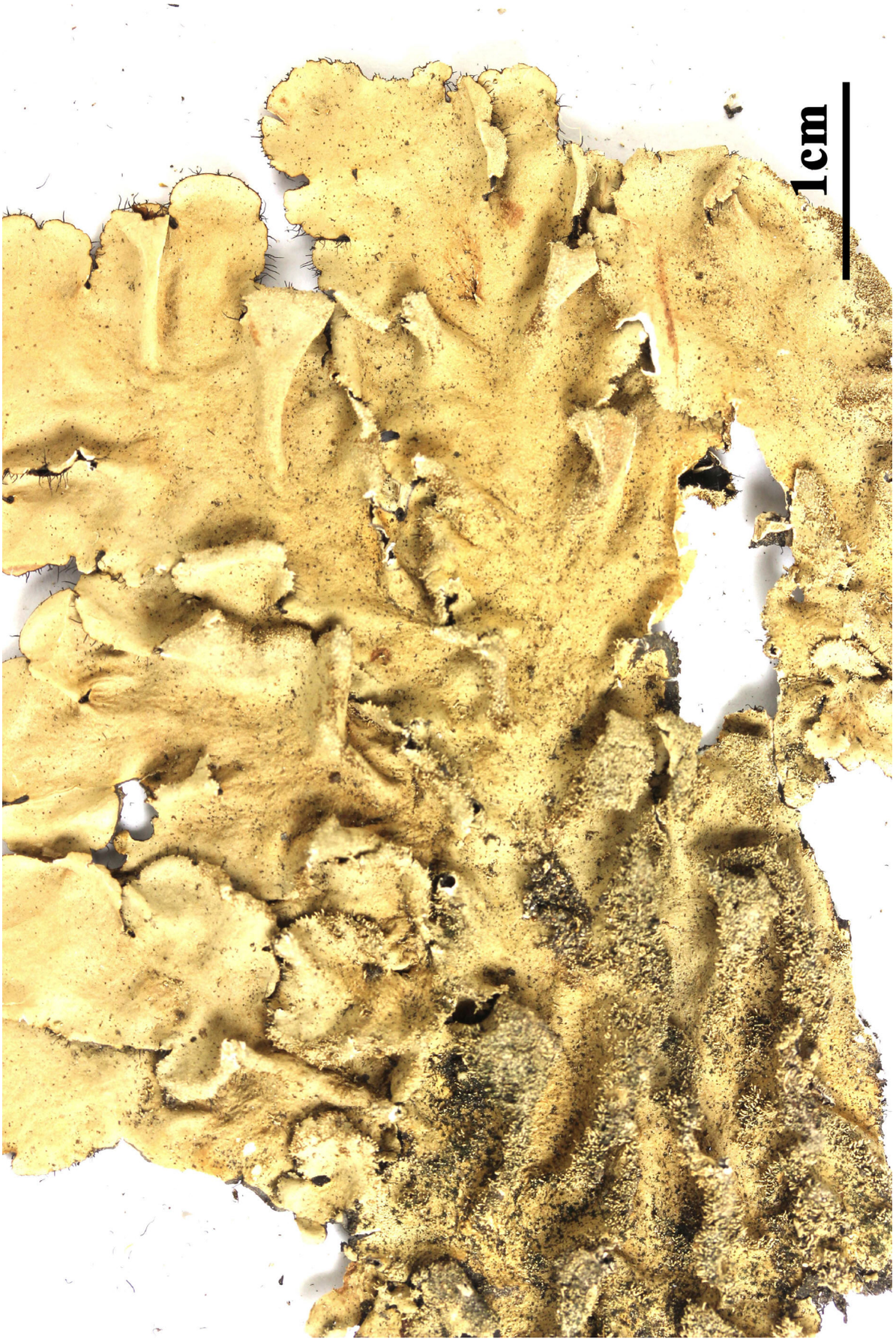


Parmelia tinctorum

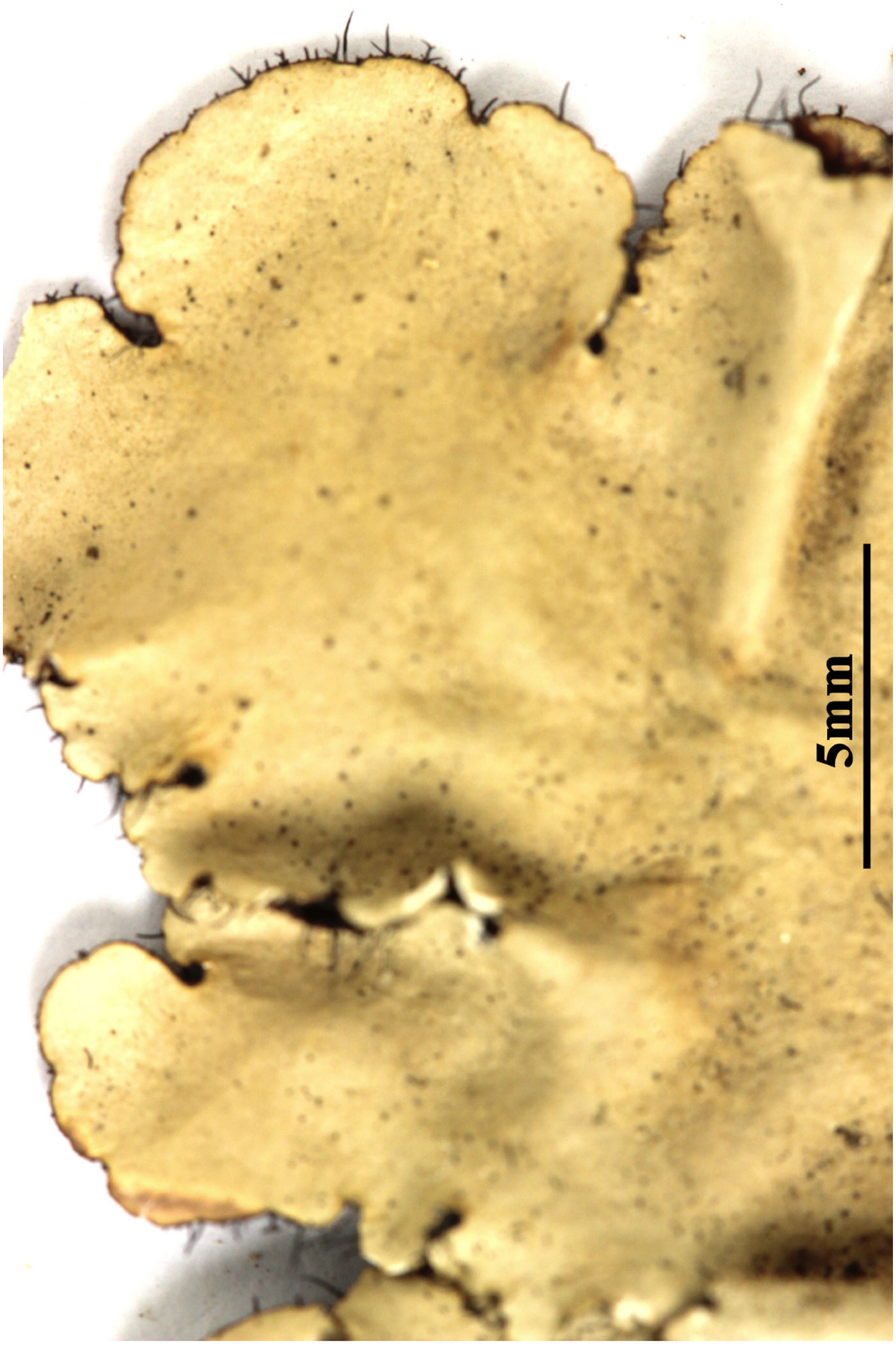
Parmelia ultralucens Krog, Bryologist 77(2): 253 (1974)
= *Parmotrema ultralucens* (Krog) Hale, Phytologia 28(4): 339 (1974)

[KU636], Japan. Kyushu. Prov. Higo: Tomioka, Amakusa Islands. On rocks along the coast. Leg. M. Togashi, 27.11.1959, det. S. Kurokawa. EX S. KUROKAWA AND H. KASHIWADANI LICHENES RARIORES ET CRITICI EXSICCATI NR. 636.

Thallus loosely attached, pale grey. Lobes 0.8-1.5 em wide, crenate, ciliate, cilia 0.52 mm fong. Upper side dull, emaculate, irregularly cracked towards the centre. Medulla white. Under side black, with a wide, brown, naked marginal zone, rhizines dense, of varying length. Isidia laminal, unevenly distributed, brown tipped, often ciliate. Apothecia and pycnidia not seen in East African specimens. (In extra-African material apothecia are rare, with imperforate discs and spores 15-17 x 10-12 μtm.). CHEMISTRY: Salazinic acid (K+ red, PD+ orange), lichexanthone (in the medulla, which reacts UV+ bright yellow), atranorin. ECOLOGY: Corticolous and saxicolous in open woodland. DISTRIBUTION: Widespread in tropical and warm temperate regions.



Parmelia ultralucens



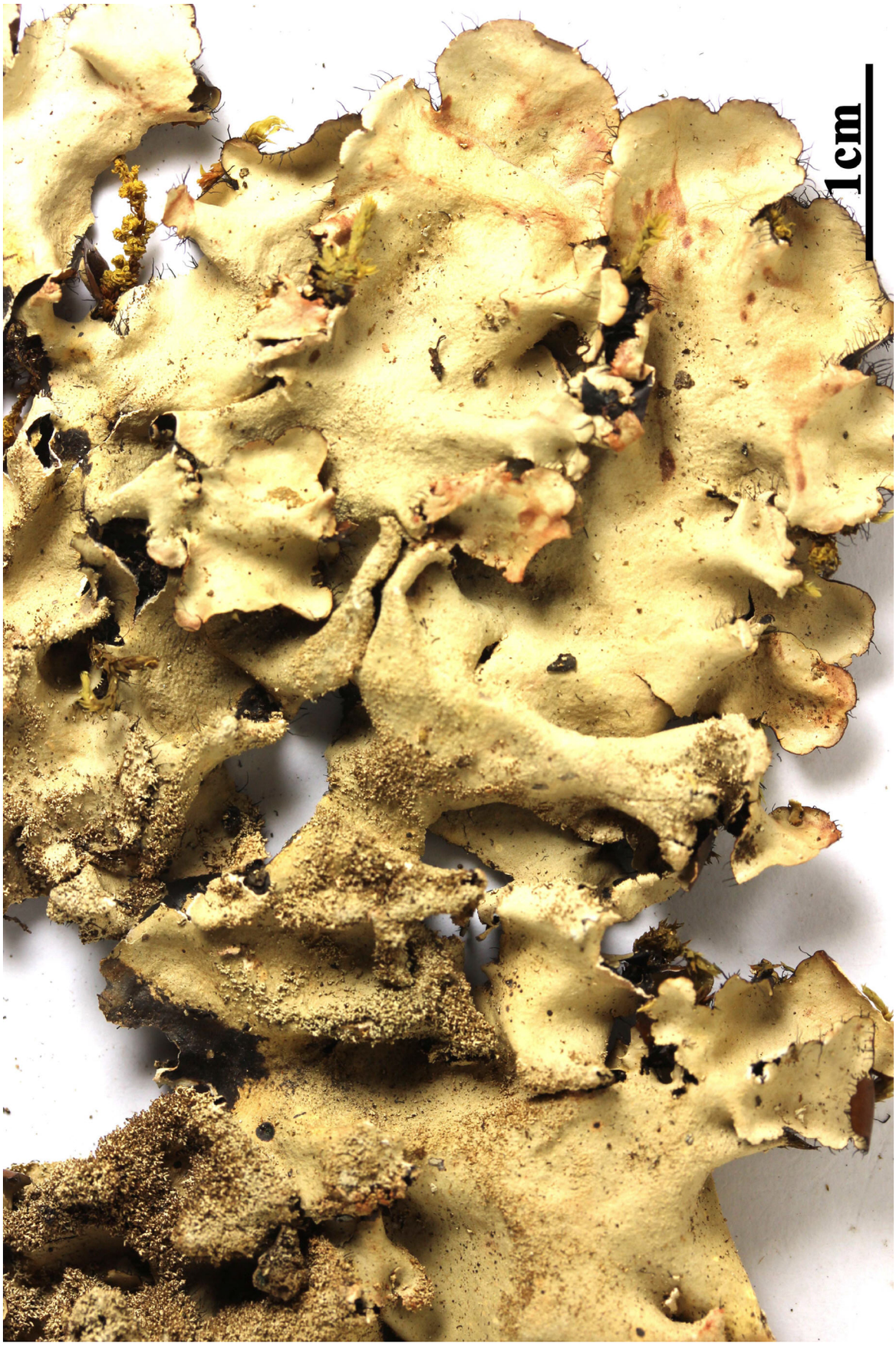
Parmelia ultralucens

Parmelia ultralucens

Parmelia ultralucens Krog, Bryologist 77(2): 253 (1974)
= *Parmotrema ultralucens* (Krog) Hale, Phytologia 28(4): 339 (1974)

[KU429], Japan. Honshu. Prov. Izu: Matsuzaki, Kamo-gun. On rocks, 5 m. Leg. H. Kashiwadani (no. 15027), 14.2.1979, det. H. Kashiwadani. EX S. KUROKAWA AND H. KASHIWADANI LICHENES RARIORES ET CRITICI EXSICCATI NR. 429.

Thallus loosely attached, pale grey. Lobes 0.8-1.5 em wide, crenate, ciliate, cilia 0.52 mm fong. Upper side dull, emaculate, irregularly cracked towards the centre. Medulla white. Under side black, with a wide, brown, naked marginal zone, rhizines dense, of varying length. Isidia laminal, unevenly distributed, brown tipped, often ciliate. Apothecia and pycnidia not seen in East African specimens. (In extra-African material apothecia are rare, with imperforate discs and spores 15-17 x 10-12 μtm.). CHEMISTRY: Salazinic acid (K+ red, PD+ orange), lichexanthone (in the medulla, which reacts UV+ bright yellow), atranorin. ECOLOGY: Corticolous and saxicolous in open woodland. DISTRIBUTION: Widespread in tropical and warm temperate regions.



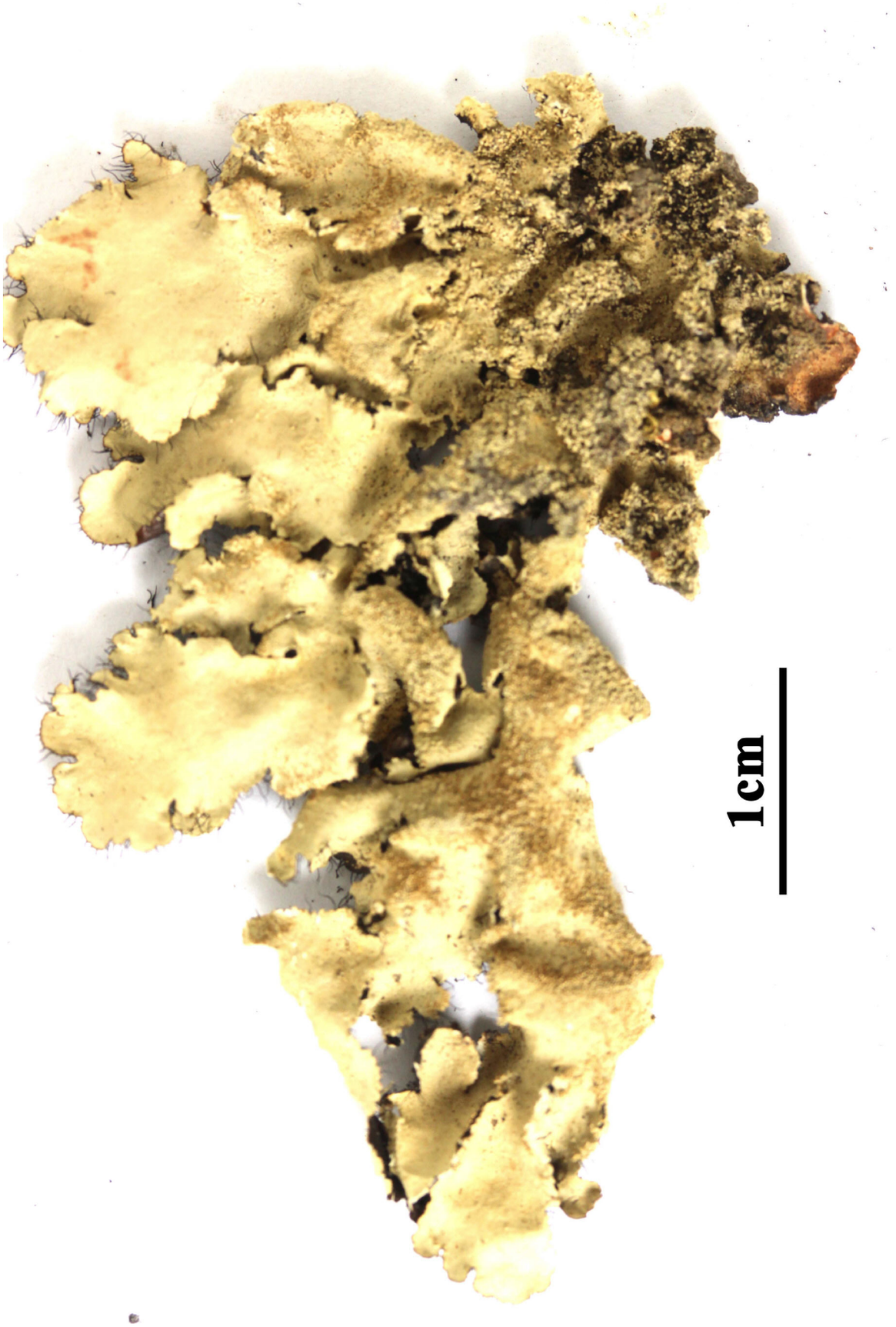
Parmelia ultralucens

Parmelia ultralucens

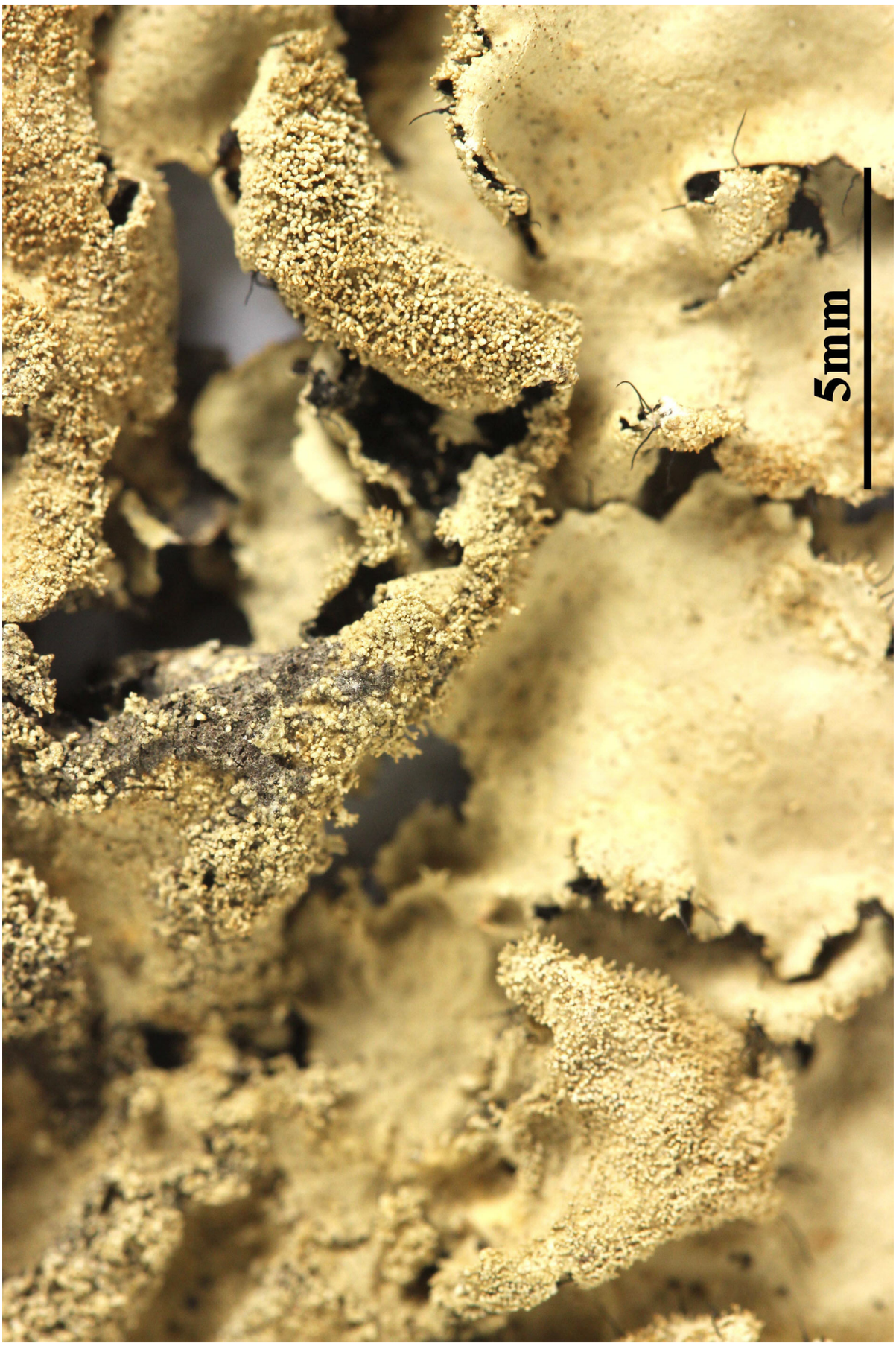
Parmelia ultralucens Krog, Bryologist 77(2): 253 (1974)
= *Parmotrema ultralucens* (Krog) Hale, Phytologia 28(4): 339 (1974)

[KU323], Japan. Honshu. Prov. Izu: Honryuji Temple, Nirayama, Tagata-gun. On rocks, 10 m. Leg. S. Kurokawa (No. 75012), 4.3.1975, det. S. Kurokawa. EX S. KUROKAWA AND H. KASIWADANI LICHENES RARIORES ET CRITICI EXSICCATI NR. 323.

Thallus loosely attached, pale grey. Lobes 0.8-1.5 em wide, crenate, ciliate, cilia 0.52 mm fong. Upper side dull, emaculate, irregularly cracked towards the centre. Medulla white. Under side black, with a wide, brown, naked marginal zone, rhizines dense, of varying length. Isidia laminal, unevenly distributed, brown tipped, often ciliate. Apothecia and pycnidia not seen in East African specimens. (In extra-African material apothecia are rare, with imperforate discs and spores 15-17 x 10-12 µtm.). CHEMISTRY: Salazinic acid (K+ red, PD+ orange), lichexanthone (in the medulla, which reacts UV+ bright yellow), atranorin. ECOLOGY: Corticolous and saxicolous in open woodland. DISTRIBUTION: Widespread in tropical and warm temperate regions.



Parmelia ultralucens

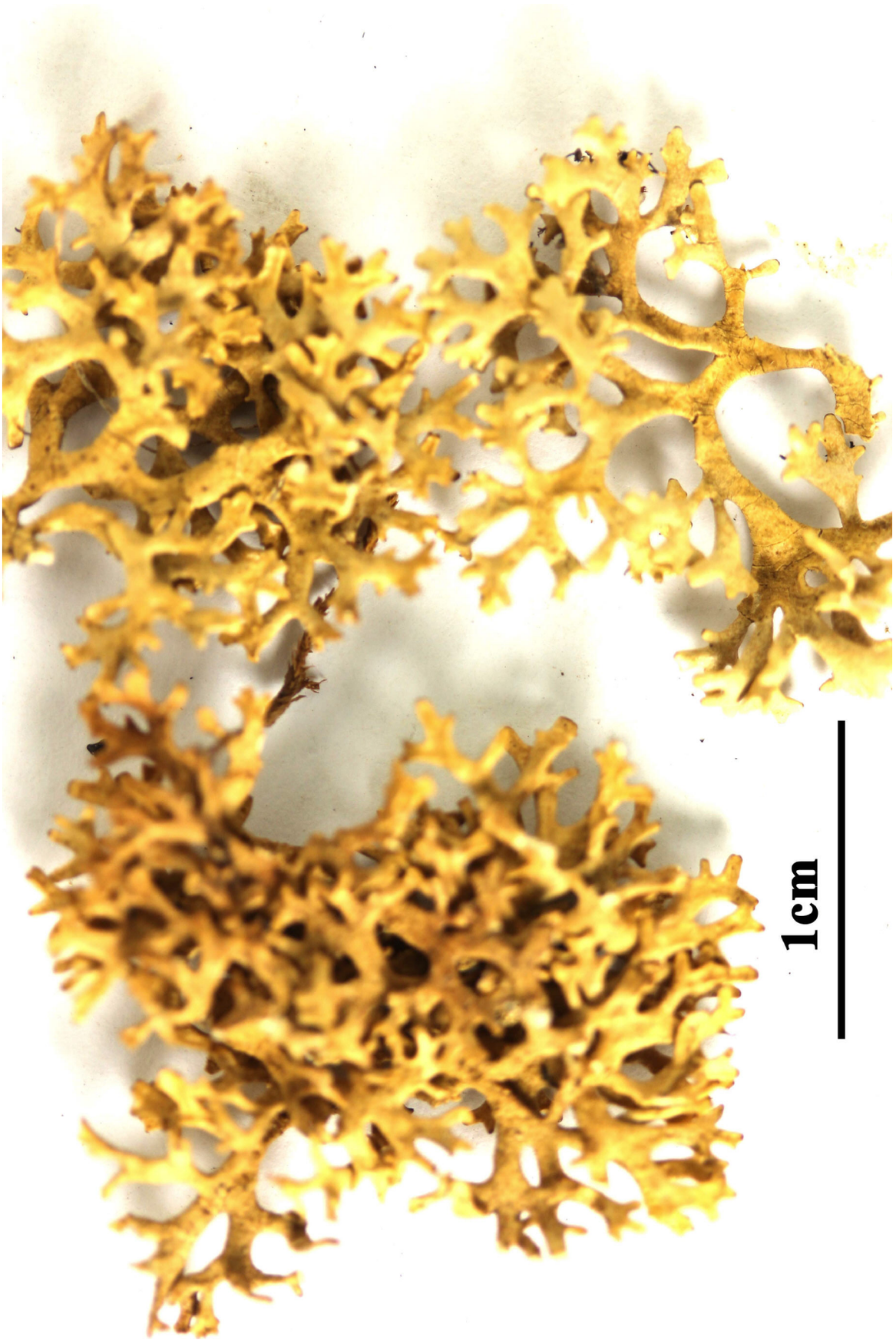


Parmelia ultralucens

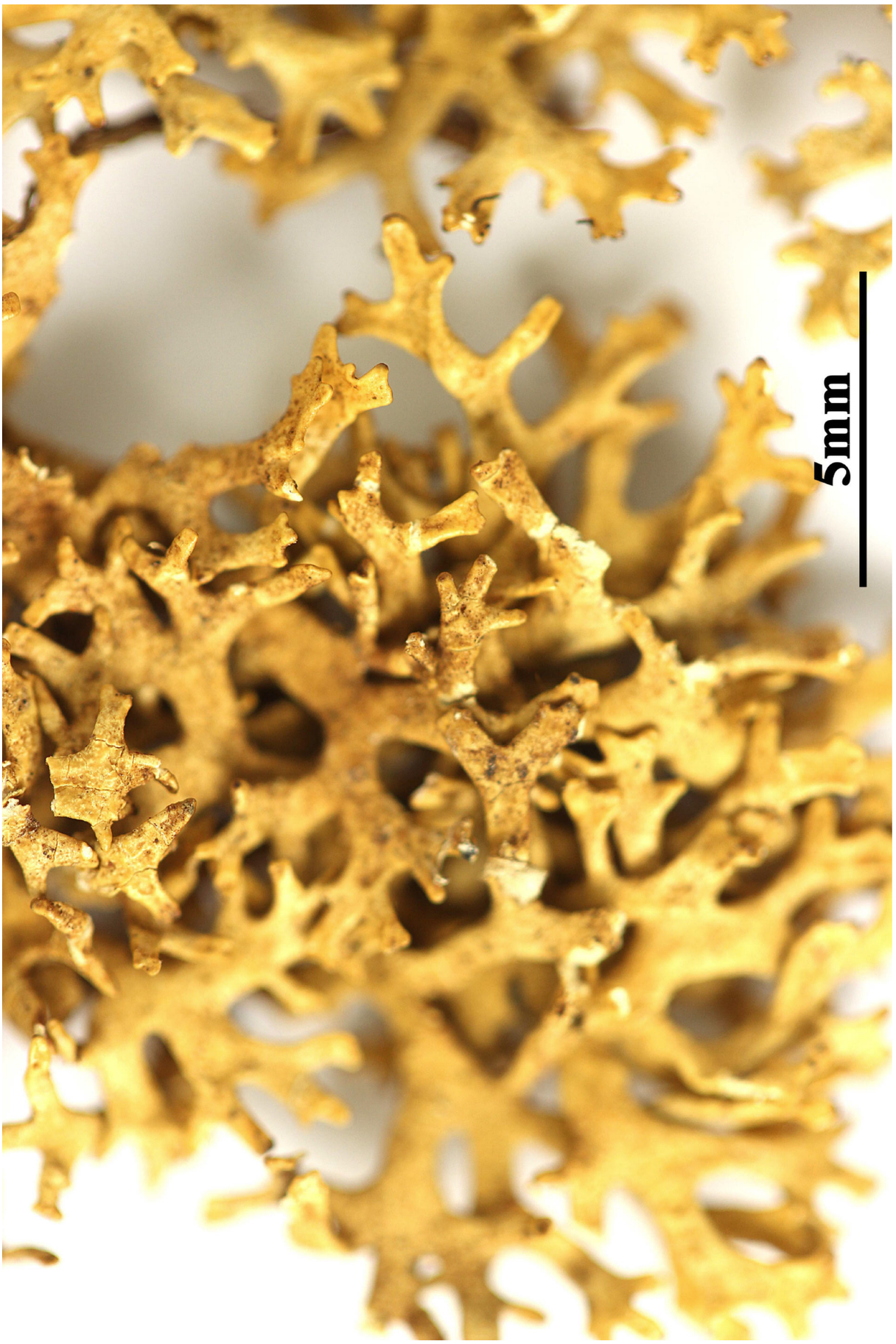
Parmelia willisii Kurok. & Filson, in Filson, Aust. J. Bot. 30(5): 577 (1982)
= *Xanthoparmelia willisii* (Kurok. & Filson) Elix & J. Johnst., in Elix, Johnston & Armstrong, Bull. Br. Mus. nat. Hist., Bot. 15(3): 355 (1986)

[KU637], Tasmania. Ross Lake, Tooms Road, 4.9 miles from Ross. On soil, 600 ft. Leg. G, C. Bratt & J. A. Cashin (no. 69/961), 5.12.1982, det. S. Kurokawa. Ex S. Kurokawa and H. Kashiwadani Lichenes Rariores Et Critici Exsiccati Nr. 637.

Thallus foliose, subpulvinate, unattached, forming irregular rosettes or cushions, to 1–3 cm wide. Lobes separate to subimbricate, often weakly convoluted, sublinear-elongate, subdichotomously to irregularly branched, exposing lower surface, 1–2.5 mm wide, lacking lobules. Upper surface pale yellow to pale yellow-green, flat to slightly convex, shiny, maculate, smooth or slightly rugulose in older lobes, lacking soredia and isidia. Medulla white. Lower surface flat to canaliculate, concolorous with upper surface; rhizines very sparse, simple or rarely sparsely branched, 1–3 mm long, black. Apothecia and pycnidia not seen. CHEMISTRY: cortex K-, UV-; medulla K+ faint gold, C-, KC-, P+ yellow then orange-red; containing usnic acid, fumarprotocetraric acid, succinprotocetraric acid, ±protocetraric acid (trace) and ±physodalic acid (trace). Scattered, endemic, on soil in drier areas of southern Australia (W.A., S.A., southern Qld, N.S.W. and Tas.).



Parmelia willisii



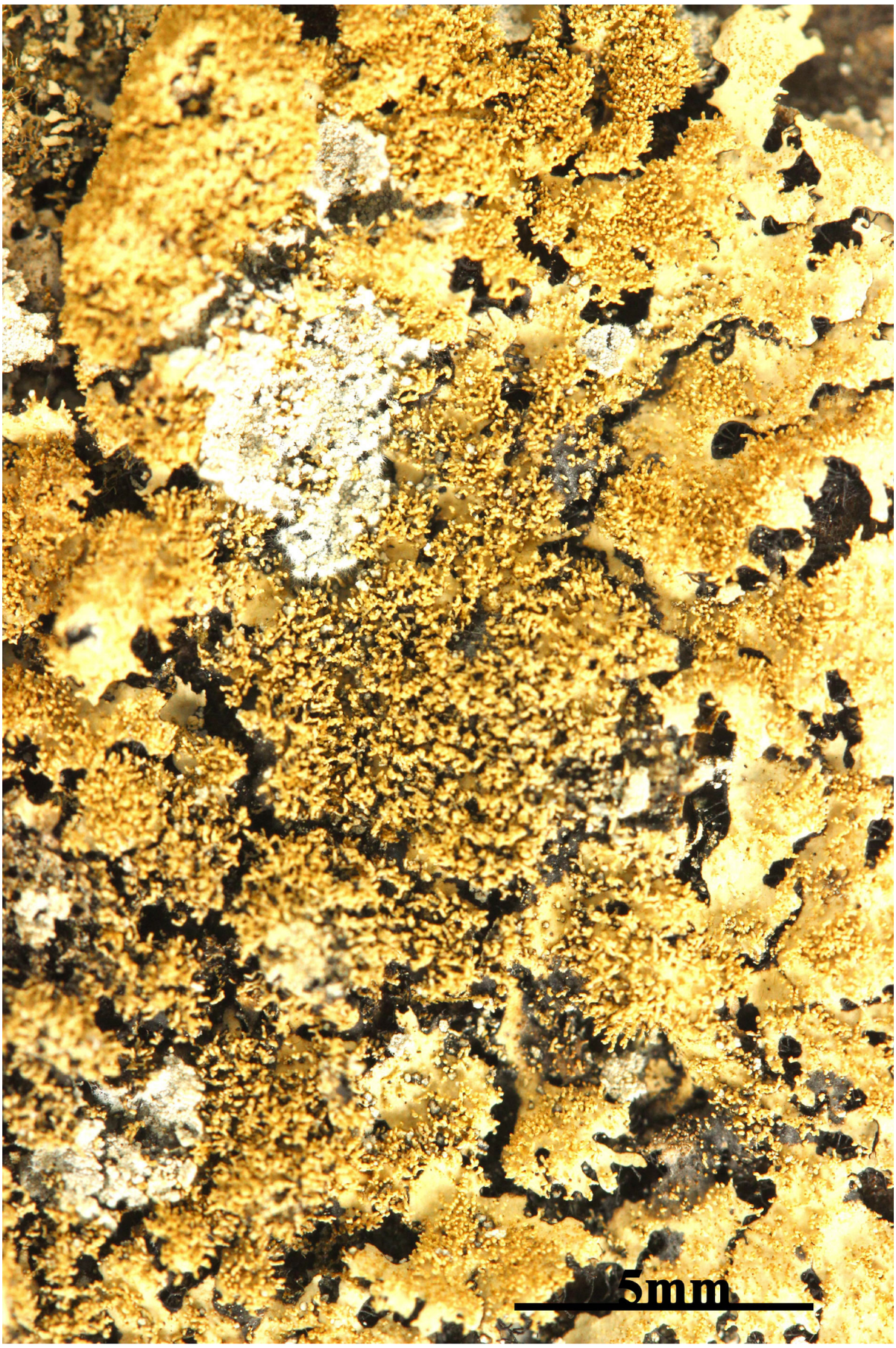
Parmelia willisii

Parmelinopsis minarum (Vain.) Elix & Hale, Mycotaxon 29: 243 (1987)
= *Parmelia minarum* Vain. 1890
= *Hypotrachyna minarum* (Vain.) Krog & Swinscow, Lichenologist 19(4): 420 (1987)

[OH415], Japan. Honshu. Prov. Hitachi (Pref. Ibaraki): Kokuzodo Temple, Muramatsu, Tokai-mura, Naka-gun. On bark of *Picea densiflora*, 30 m. Leg. Y. Ohmura (no. 7739) & H. Ebihara, 19.10.2010, det. Y. Ohmura. EX Y. OHMURA LICHENES MINUS COGNITI EXSICCATI NR. 415.

Thallus foliose, heteromerous, dorsiventral, rather loosely appressed, forming up to 8 cm wide, irregular, more or less compact rosettes. Lobes irregularly branched with rounded axils, elongate, contiguous to imbricate, (0.5-)1-3(-5) mm wide, with truncate to subrotund, crenulate tips, apparently with to 0.7 mm long, black marginal cilia (actually projecting rhizines). Upper surface pale ash-grey, sometimes slightly glaucescent, rarely browned at margins, smooth, emaculate, rather shiny; isidia dark grey, simple to branched-coralloid, eciliate or rarely with very short, black cilia visible only at high magnification, sometimes apically browned. Lower surface black in central parts, brown at margins, slightly shiny, with simple to irregularly branched, black rhizines which often project beyond lobe margins. Upper cortex of tightly packed, anticlinally oriented hyphae, with a pored epicortex, the cell walls with isolichenan; medulla white or rarely pale yellow; algal layer continuous; lower cortex brown, of anticlinally oriented hyphae. Apothecia very rare, lecanorine, 1-5 mm across, with a dark brown disc and an isidiate thalline margin. Epithecium brownish; hymenium and hypothecium colourless. Asci 8-spored, clavate, Lecanora-type. Ascospores 1-celled, hyaline, ellipsoid, 10-17 x (5-)8-10 µm. Pycnidia rare, laminal, immersed. Conidia cylindrical. Photobiont chlorococcoid. Spot tests: upper cortex K+ yellow; C-, KC-, P-; medulla K- or K+ pink, C+ pink, KC+ pink, P-, UV-. Chemistry: upper cortex with atranorin and chloroatranorin; medulla with gyrophoric acid (major), 5-O-methylhiascic, lecanoric and umbilicaric acids (minor), 4,5-di-O-methylhiascic and 2,4,5-tri-O-methylhiascic acids (trace). - Note: a mainly tropical species, also occurring in Western Europe and in the most humid parts of the Alps, on trees, more rarely on mossy siliceous rocks in old, humid forests.

Parmelinopsis minarum



Parmelinopsis minarum

Parmeliopsis aleurites (Ach.) Nyl., Lich. Lapp. Orient.: 121 (1866)
= *Lichen aleurites* Ach. 1799
= *Imshaugia aleurites* (Ach.) S.L.F. Mey., Mycologia 77(2): 338 (1985)

[KU249], USA. Tennessee: Cherokee National Forest Farr Gap, Monroe Co. On barkof *Pinus echinata*, 2840 m. Leg. I. Yoshimura (no. 600831) and G. Morton, 20.10.1966, det. I. Yoshimura. EX S. KUROKAWA ;ICHENES RARIORES ET CRITICI EXSICCATI NR. 240.

Thallus foliose, heteromerous, dorsiventral, adnate, forming orbicular to irregular (2-)3-5(-7) cm wide rosettes. Lobes 1-4 mm long, 0.5-1.5(-3) mm wide, flat, linear to sublinear, divergent to contiguous, irregularly branched, with rounded, often forked tips. Upper surface whitish grey to bluish grey, sometimes wrinkled or shallowly pitted in older parts, shiny at the tips of lobes, with abundant, laminal, cylindrical, simple to branched, to c. 2 mm tall, fragile isidia that with age tend to break and coalesce into a granulose mass. Lower surface white to tan, somewhat wrinkled, with brownish, simple, c. 0.2-0.5(-1) mm long rhizines. Upper cortex paraplectenchymatous, of tightly packed, anticlinally oriented hyphae, with a pored epicortex, the cell walls with Cetraria-type lichenan; medulla white; lower cortex paraplectenchymatous. Apothecia rare, lecanorine, constricted at base, 2-7 mm across, with a convex to flat, brown, epruinose disc and a persistent, often isidiate thalline margin. Epithecium brown; hymenium and hypothecium colourless; paraphyses mostly simple, the apical cells hardly swollen. Asci 8-spored, clavate, the K/I+ blue tholus penetrated by a faintly amyloid apical cushion with parallel or diverging flanks, the wall K/I-, surrounded by a K/I+ blue outer layer, Lecanora-type. Ascospores 1-celled, hyaline, ellipsoid, (5-)6-7(-9) x (3.5-)4-5(-6) µm. Pycnidia rare, black, mostly marginal, clearly projecting. Conidia ellipsoid to dumbbell-shaped, 3-4(-5) x c. 1 µm, Psora-type, borne terminally from joints of conidiogenous hyphae. Photobiont chlorococcoid. Spot tests: K+ deep yellow, C-, KC-, P+ deep yellow-orange, UV-. Chemistry: upper cortex with atranorin and chloroatranorin; medulla with thamnolic acid (major) and decarboxythamnolic acid (trace). - Note: a circumboreal-montane to cool-temperate species found on acid bark, mostly of conifers and on decorticated stumps, with optimum near treeline.

Parmeliopsis aleurites

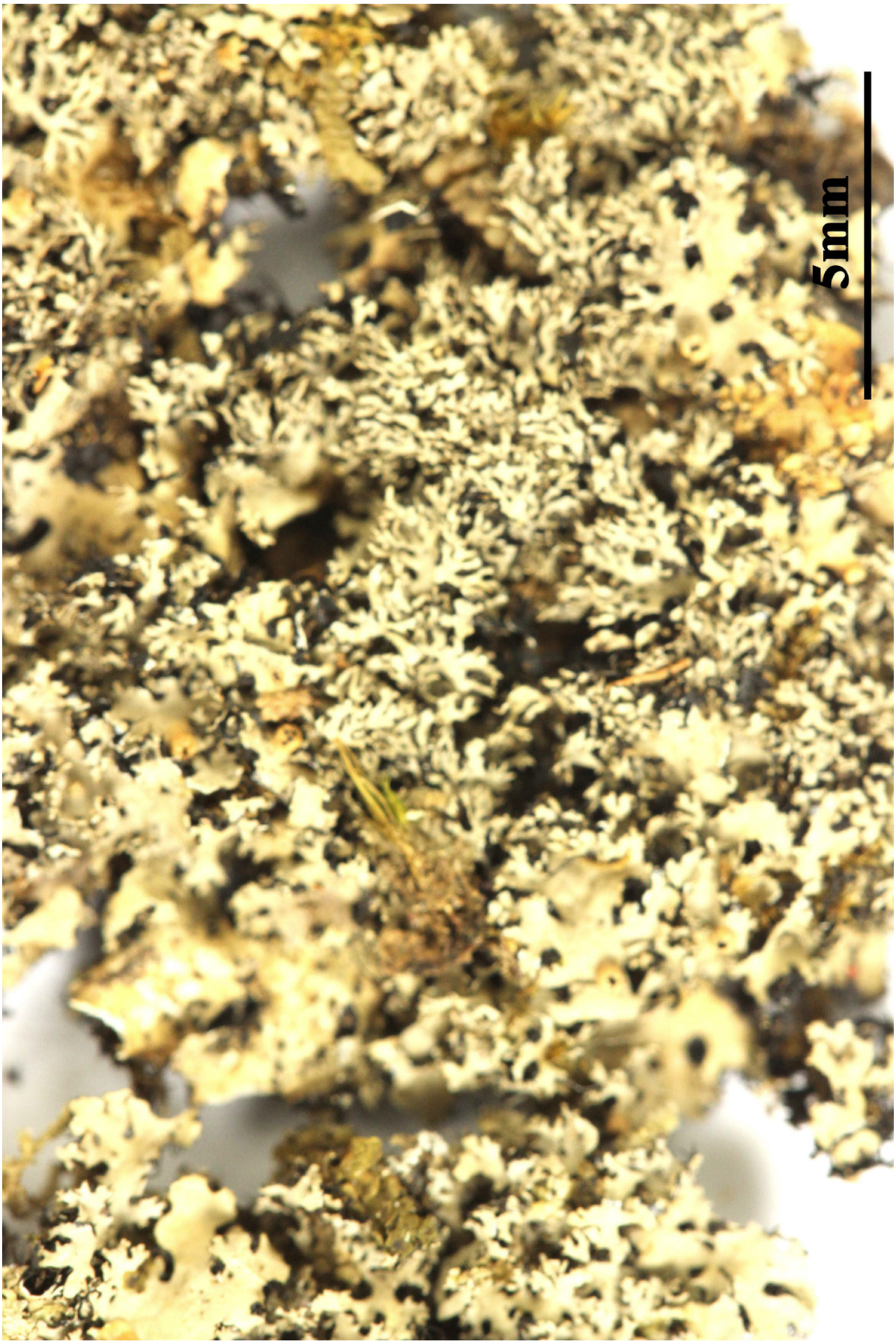
Parmeliopsis aleurites

Parmelina schindleri Hale, Smithson. Contr. bot. 33: 44 (1976)
= *Hypotrachyna schindleri* (Hale) Divakar, A. Crespo, Sipman, Elix & Lumbsch, in Divakar, Crespo, Núñez-Zapata, Flakus, Sipman, Elix & Lumbsch, Phytotaxa 132(1): 34 (2013)

[KU523], Brazil. Rio de Janeiro: Petrópolis. Om bark of tree,810 m. Leg. S. Kurokawa (no. 8364), 17.7.1971, det S. Kurokawa. Ex S. Kurokawa and H. Kashiwadani Lichenes Rariores Et Critici Exsiccati Nr. 523.

ThallUs adnatus vel appressus, fragilis, corticola, pallide albo-cinereus, 2-4 cm latus, lobis sublinearibus, brevibus, contiguis, ca. 1-1.5 mm latis, margine ciliatis, ciliis 0.2-0.4 mm longis, simplicibus, margine et pro parte superficie lobulatis, lobulis congestis, suberectis, ramosis, 0.1-0.2 mm latis et usque ad 1 mm longis, margine breve ciliatis; superne nitidus, planus; cortex superior 14-15 µm crassus, epicorticatus, stratum gonidiale 12 µm crassum, medulla alba, 50-65 µm crassa, cortex inferior paraplectenchymatus, 12 µm crassus; subtus niger, modice rhizinosus, rhizinis nigris, simplicibus vel sparse furcatis. Apothecia rara, sessilia, margine crenato, 3-4 mm diametro, sporis 8:nae, 10 x 16-18 µm. Chemiastry: Cortex K + yellow (atranorin); medulla K-, C-, KC+ rose, P- (traces of gyrophoric acid and the “horrescens” unknown). Remarks: The chemical constituents place thisspecies in the “horrescens” group, where it is the lobulate morph of a parent species represented by *P. damaziana* or a now extinct progenitor similar to it. The dense lobules are easily recognized. They do not originate from isidia and for this reason *P. schindleri* cannot be considered as a modified form of *P. horrescens*, which may occasionally have cylindrical and flattened isidia intermixed. The species is named in honor of Dr. H. Schindler, the first lichenologist to collect the species since Vainio in 1885, although this region has been visited by many lichen collectors.

Parmelina schindleri

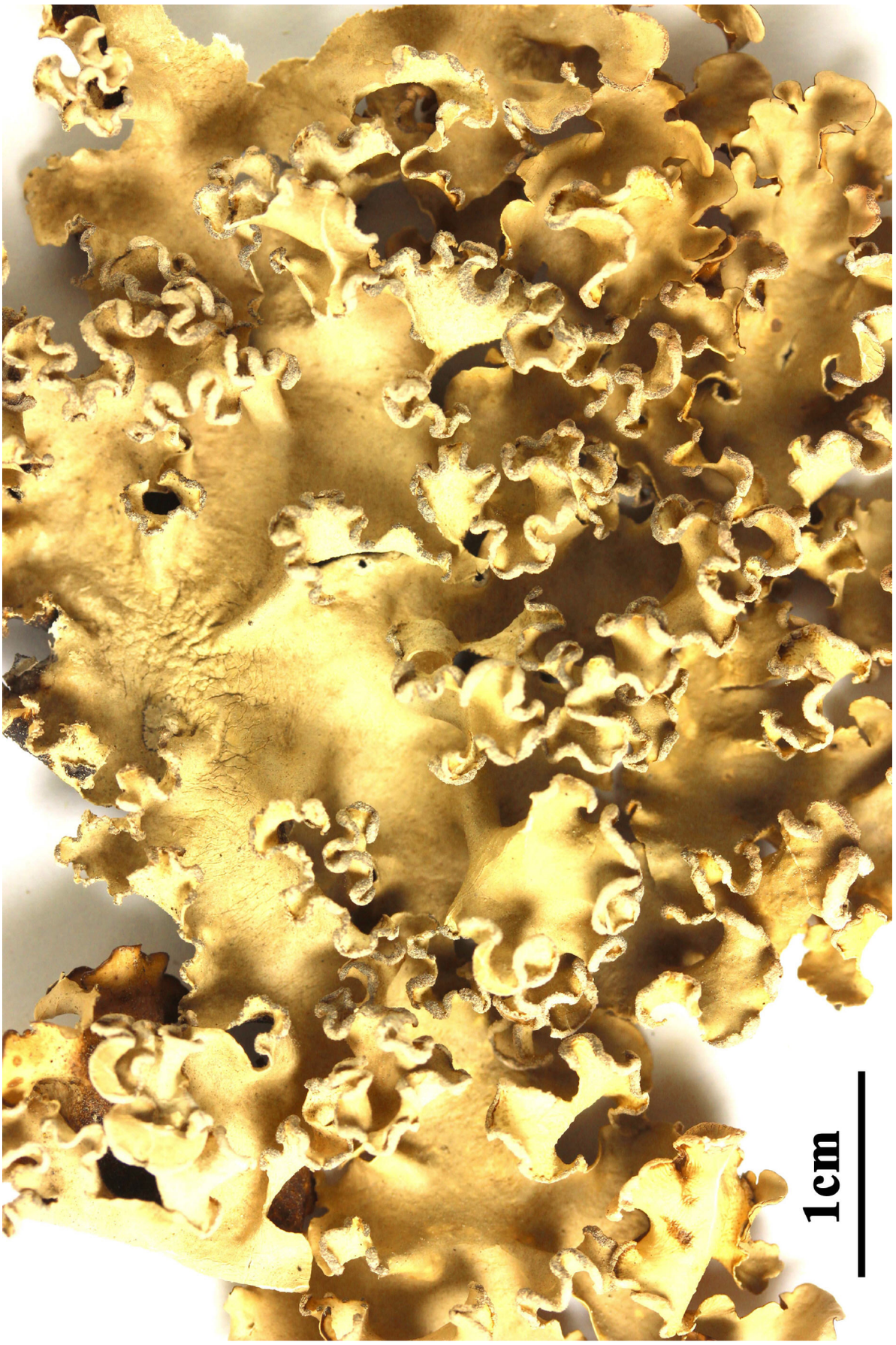


Parmelina schindleri

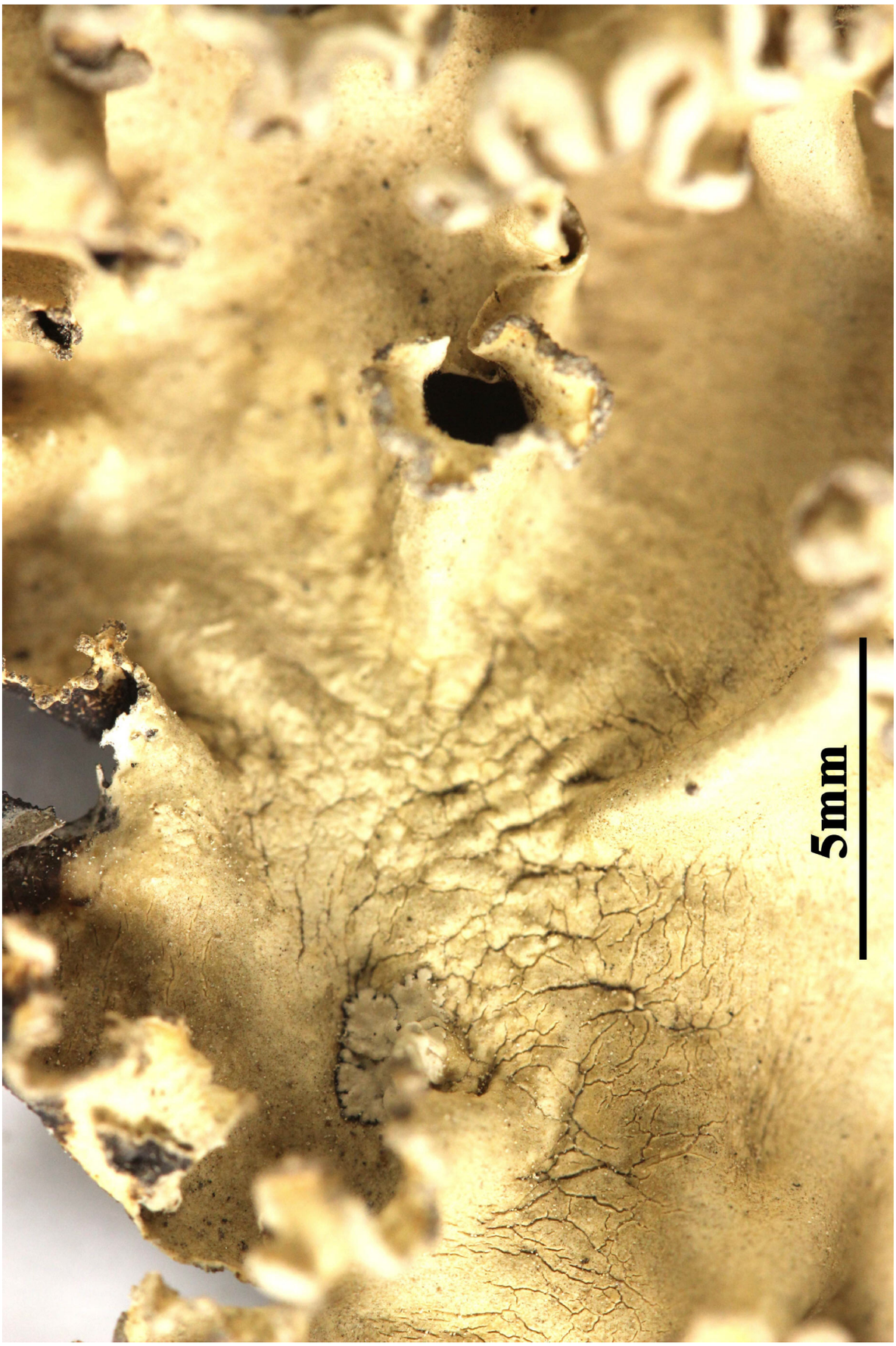
Parmotrema austrosinense *(Zahlbr.) Hale, Phytologia 28(4): 335 (1974)*
= *Parmelia austrosinensis* Zahlbr. 1930

[OH636], Japan. Honshu. Prov. Bizen (Okayama Pref.): Mino, Kita-ku, Okayama-city (34°41'13" N, 133°56'10" E). On guardrail. 8 m. Leg. M Sugimoto (no. 629), 10.2.2019, det. M. Sugimoto & Y. Ohmura. Ex Y. Ohmura Lichenes Minus Cogniti Exsiccati Nr. 636.

Thallus loosely adnate, coriaceous, to 6–10 cm wide. Lobes rounded, 10–30 mm wide, lacking laciniae; margins entire or crenate, eciliate, sinuate, often ascending. Upper surface pale grey, ash grey, or grey-green, weakly maculate, sometimes distinctly maculate especially in thallus centre, ±rugose and reticulately cracked, without isidia; soralia marginal and submarginal, linear; soredia granular. Medulla white. Lower surface black, with a white, brown, or mottled erhizinate marginal zone; rhizines sparse, simple, unevenly distributed, short. Apothecia rare, subpedicellate, to 10 mm wide; disc perforate or imperforate; thalline exciple sorediate. Ascospores 12–20 × 7–10 µm. Pycnidia uncommon. Conidia filiform, 10–14 × 1 µm. CHEMISTRY: cortex K+ yellow; medulla K-, C+ red, KC+ red, P-; containing atranorin, chloroatranorin and lecanoric acid. Common on bark of trees, and, more rarely, on rock, in moist subtropical and tropical areas.



Parmotrema austrosinense



Parmotrema austrosinense

Parmotrema clavuliferum (Räsänen) Streimann, Biblioth. Lichenol. 22: 93 (1986)

= *Parmelia clavulifera* Räsänen, Ann. bot. Soc. Zool.-Bot. fenn. Vanamo 20(no. 3): 4 (1944)

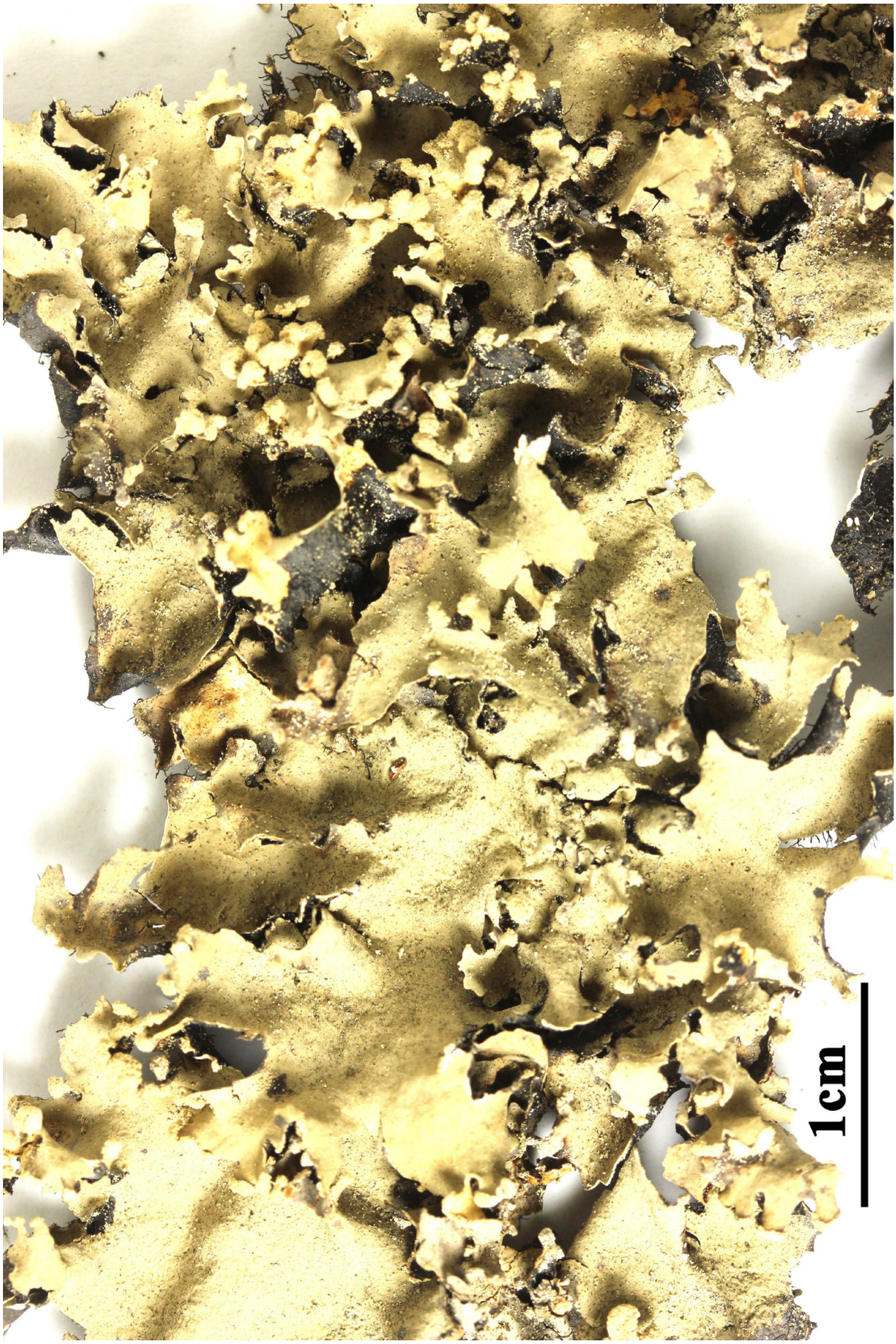
[OH513], Japan. Honshu. Prov. Aki (Pref. Hiroshima): Hiroshima University, Kagamiyama, Higashiroshima-city (34°24'10" N, 132°43'03" E). On trunk of Zelkova serrata, 230 m. Leg. Y. Ohmura (no10528), 20.2.2015, det. Y. Ohmura. EX Y. OHMURA LICHENES MINUS COGNITI EXSICCATI NR. 513.

Description ex Bungartz, F. & Spielmann, A.A. (2019) The genus Parmotrema (Parmeliaceae, Lecanoromycetes) in the Galapagos Islands. Plant and Fungal Systematics 64(2): 173–231 MycoBank no. 129346

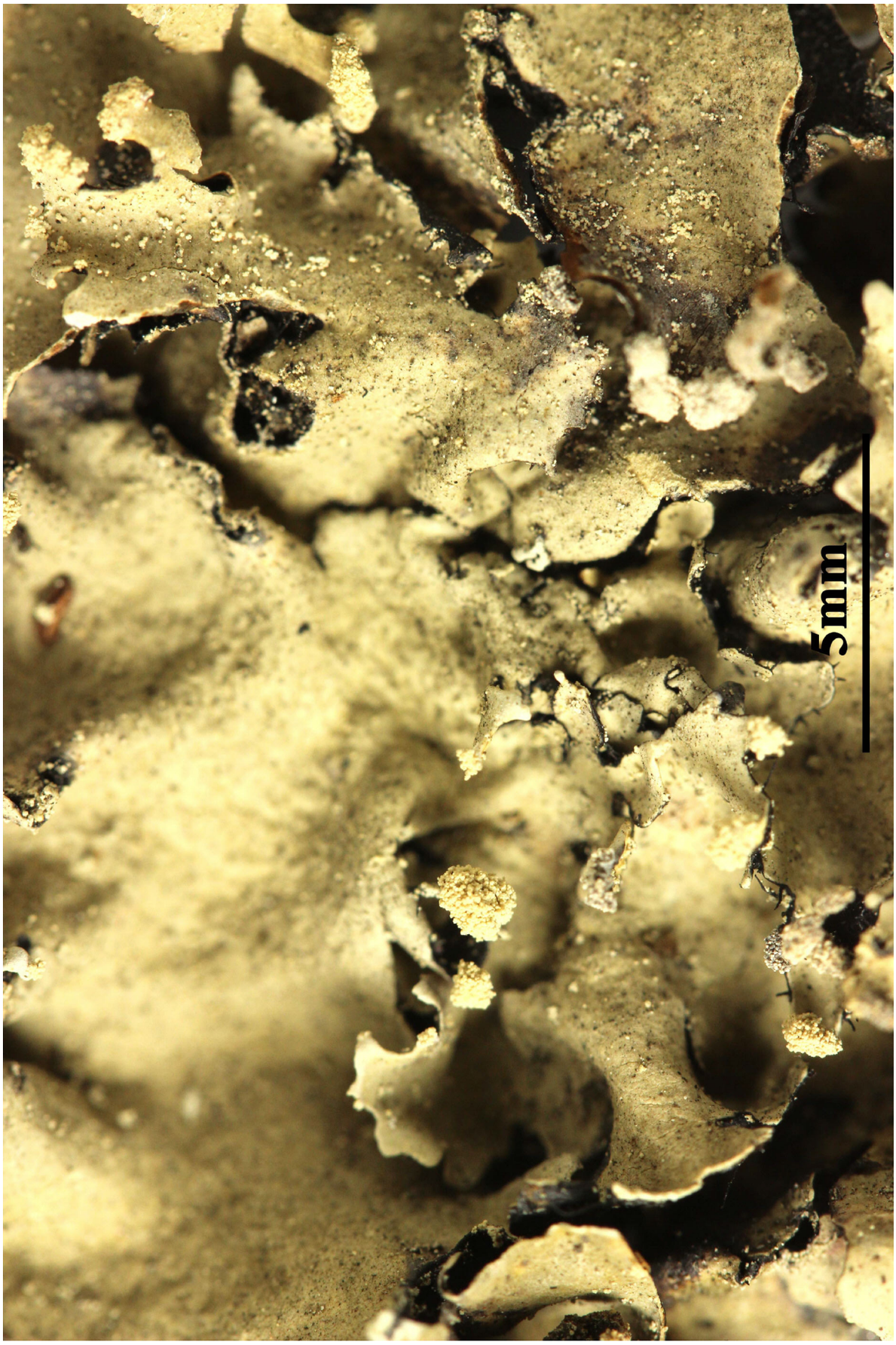
Thallus corticolous, rarely saxicolous; upper surface white to whitish gray, dull to shiny, epruinose or pruinose, densely reticulate-maculate, often cracked; abundantly sorediate; soralia capitate, conspicuously stalked, at the tip of distinct, short to elongate, laciniate lobes (clavulae); soredia farinose to ± granular, surface creamy white, typically not discolored; lobes moderate-sized to large, broad, 2–6(–10) mm wide, ± angular, abundantly ciliate; cilia short and slender, 0.3–1.5 mm long, black, mostly simple, very rarely branched; lower surface often blackened throughout, the rhizines growing close to the lobe margin, but some lobes typically with a deep brown, erhizinate, 1–2 mm wide margin, particularly the elongate laciniae typically erhizinate and bright white below, lacking pigmentation; rhizines, where present, long, slender, black, mostly simple, rarely sparsely branched; medulla white. Apothecia and pycnidia not observed among the Galapagos specimens. Chemistry. Cortex with atranorin [P+ yellow, K+ yellow, KC–, C–, UV–]; medulla with salazinic acid [P+deep yellow, K+ yellow, soon turning blood-red, KC–, C–, UV–]. Ecology and distribution. Oceania (Lamb 1963; Feuerer 2008; Spielmann 2009), Asia (Feuerer 2008; Ohmura et al. 2012; Ahn & Moon 2016), Hawaii (Moon et al. 2001), Brazil (Barros & Xavier Filho 1972; Jungbluth 2006; Benatti & Marcelli 2008; Spielmann & Marcelli 2009). Previously reported only online (Bungartz et al. 2016); a common and abundant species, from the dry zone through the transition and humid zone into the high altitude dry zone; most abundant within the transition and humid zone; most frequently on bark, wood or cactus pads, often on

twigs or branches of both native and endemic and introduced trees and shrubs; occasionally on rock, typically at sunny and exposed sites. The typical morphotype with long 'clavulae' is the most common one, but a second morphotype apparently does not differ in habitat preferences. - This species with a gray reticulate-maculate surface and salazinic acid in its medulla; usually easily recognized by its clavulae, i.e., the distinctly stalked, capitate soralia protruding from long, slender, laciniate lobes. In some specimens the surface is heavily pruinose; others have a shiny, epruinose cortex. The characteristic reticulate-maculae are not always easily seen in these shiny or heavily pruinose specimens and can often only be distinguished upon closer inspection. Although some authors do not recognize this taxon as distinct from *P. reticulatum* s.str., the Galapagos specimens are easily distinguished already in the field. *Parmotrema clavuliferum* does not only form distinct clavulae; these laciniate lobes are also characteristically unpigmented below, the lower side of the lobes subdividing into clavulae with a mottled appearance of white, unpigmented areas towards their tips, brown pigmented areas further below, eventually blackened towards the thallus center. Whereas the clavulae of P. clavuliferum always lack rhizines, the broad lobes of *P. reticulatum* are typically densely rhizinate even close to the margin; these lobes often lack the broad erhizinate margin otherwise so typical for this genus. Here we consider these two taxa, *P. clavuliferum* and *P. reticulatum*, as distinct, well distinguished, separate species, especially since a recent study by Ahn & Moon (2016) found molecular support for this opinion. Our experience suggests that specimens with less conspicuously stalked but nevertheless capitate soredia also deserve attention. With *P. clavuliferum* and *P. reticulatum* s.str. they share the same chemistry (cortex with atranorin, medulla with salazinic acid), but their capitate soralia are morphologically closer to P. clavuliferum, and these short clavulae also share a mottled white-brown blackened lower lobe side. We have provisionally treated them below as morphotypes – *P. clavuliferum* with long vs. short clavulae. In Brazil, material commonly identified as *P. clavuliferum* is morphologically also rather heterogeneous (e.g., Benatti & Marcelli 2008) and it has be argued that some of these specimens may constitute a separate species (Spielmann 2009). Almost all collections of *P. clavuliferum* in the Galapagos are corticolous. Only one specimen has been found on rock (Spielmann 10450, CDS 51806). The species shares many characteristics with *P. marcellianum*, which grows exclusively on rock and generally has much smaller lobes

Parmotrema clavuliferum



Parmotrema clavuliferum

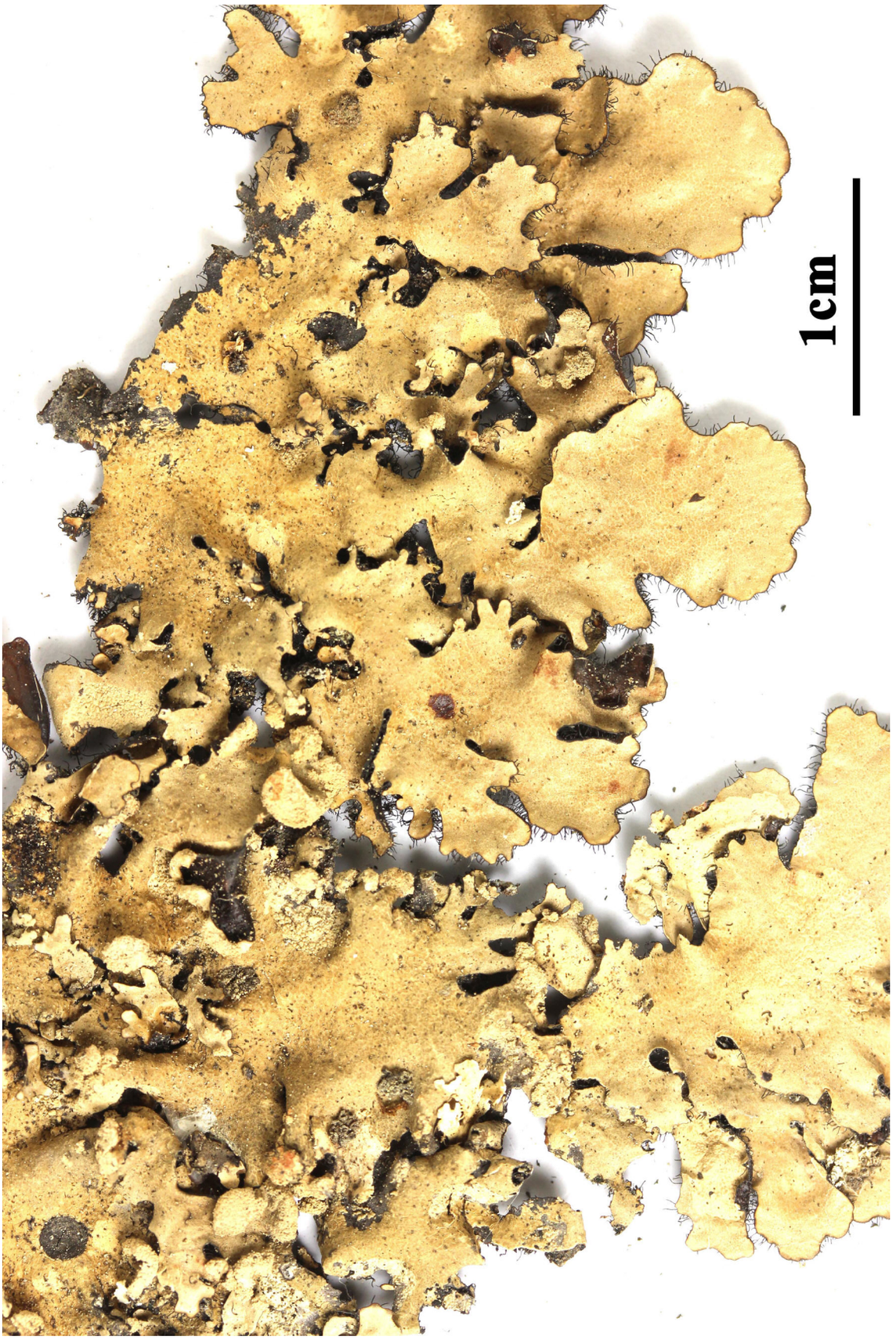


Parmotrema clavuliferum

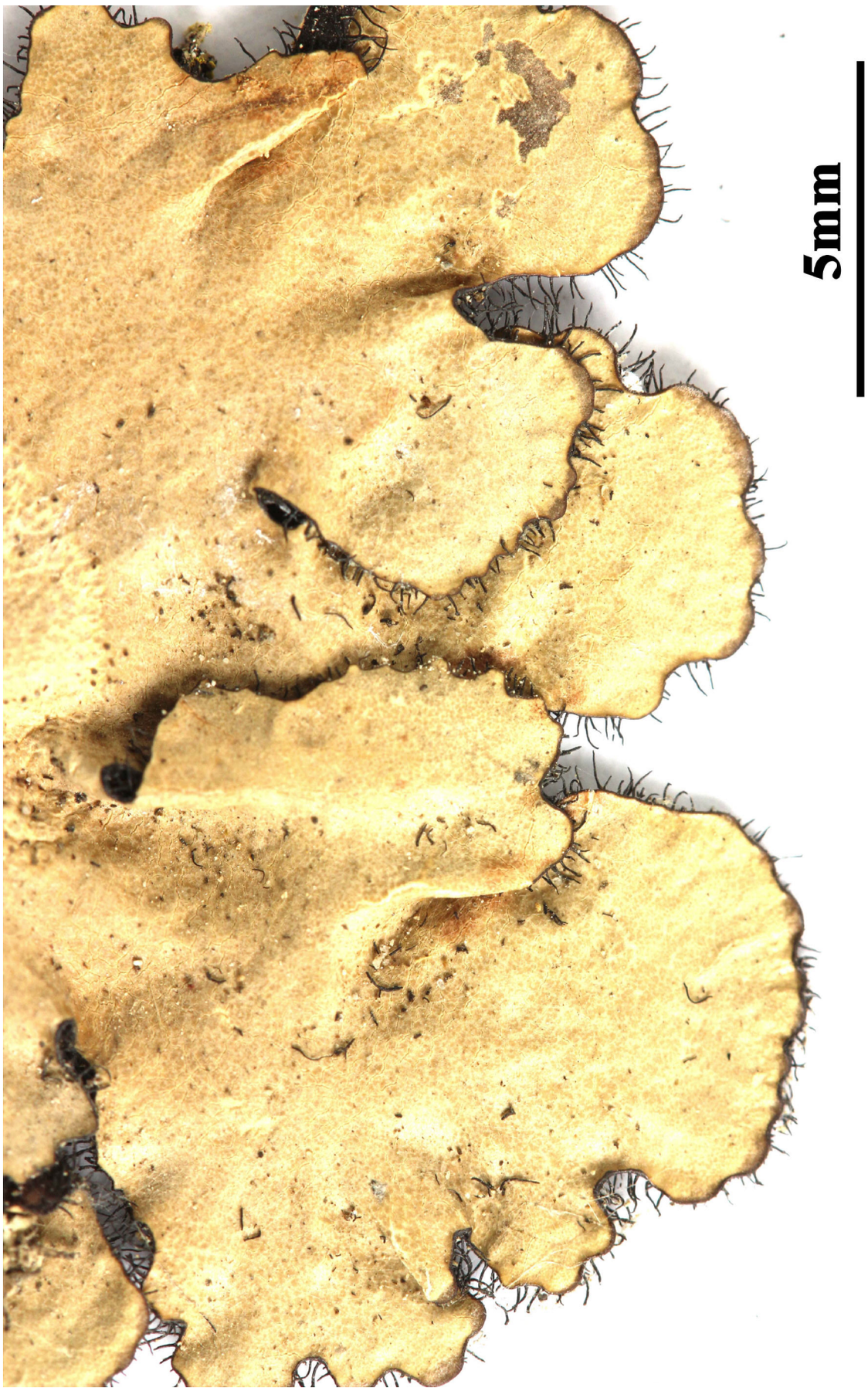
Parmotrema reticulatum (Taylor) M. Choisy, Bull. mens. Soc. linn. Soc. Bot. Lyon 21: 148 (1952)
= *Parmelia reticulata* Taylor 1836

[OH514], Japan. Kyushu. Prov. Higo (Pref. Kumamoto): Myotokuji Temple, Amakusa, Hondo-city (32°27'42" N, 130°10'56" E). On rock, 39 m. Leg. M. Togashi, 1.12.1959, det. Y. Ohmura. EX Y. OHMURA LICHENES MINUS COGNITI EXSICCATI NR. 514.

Thallus foliose, heteromerous, dorsiventral, broad-lobed, loosely attached, 4-20(-30) cm in diam., sorediate. Lobes elongate, slightly overlapping, 5-15 mm wide, crenate at margins, rounded and sometimes subascending at apices, the margins thin, with black, simple, up to 3 mm long cilia, sometimes eciliate. Upper surface pale grey to grey-green, smooth, dull, strongly reticulately white-maculate, with mostly marginal, convex to subcapitate soralia which often arise on small lacinulate lobes (sometimes becoming diffuse in old specimens). Lower surface black, with a narrow, papillate and erhizinate zone at margin, centrally with mostly simple, black rhizines. Upper cortex of tightly packed, anticlinally oriented hyphae, with a pored epicortex, the cell walls with lichenan intermediate between the Cetraria- and the Xanthoparmelia-types; medulla white; algal layer continuous; lower cortex prosoplectenchymatous, with rounded and thick-walled cells. Apothecia extremely rare, lecanorine, submarginal, substipitate, up to 8 mm across, with a sometimes perforate, brown disc and a raised thalline margin. Epithecium brownish; hymenium and hypothecium colourless. Asci 8-spored, Lecanora-type. Ascospores 1-celled, hyaline, ellipsoid, 10-18 x 7.5-11 µm. Pycnidia rare, punctiform, black, immersed. Conidia filiform, (7.5-)12-16 x 1-1.5 µm. Photobiont clorococcoid. Spot tests: upper cortex K+ yellow, C-, KC-, P- or P+ faintly yellow; medulla K+ yellow turning orange-red, C-, KC- or KC+ red, P+ orange-red, UV-. Chemistry: upper cortex with atranorin and chloroatranorin; medulla with salazinic acid (major) and consalazinic acid (minor). - Note: a Mediterranean-Atlantic to mild-temperate lichen found on bark, rarely on mossy siliceous rocks.



Parmotrema reticulatum

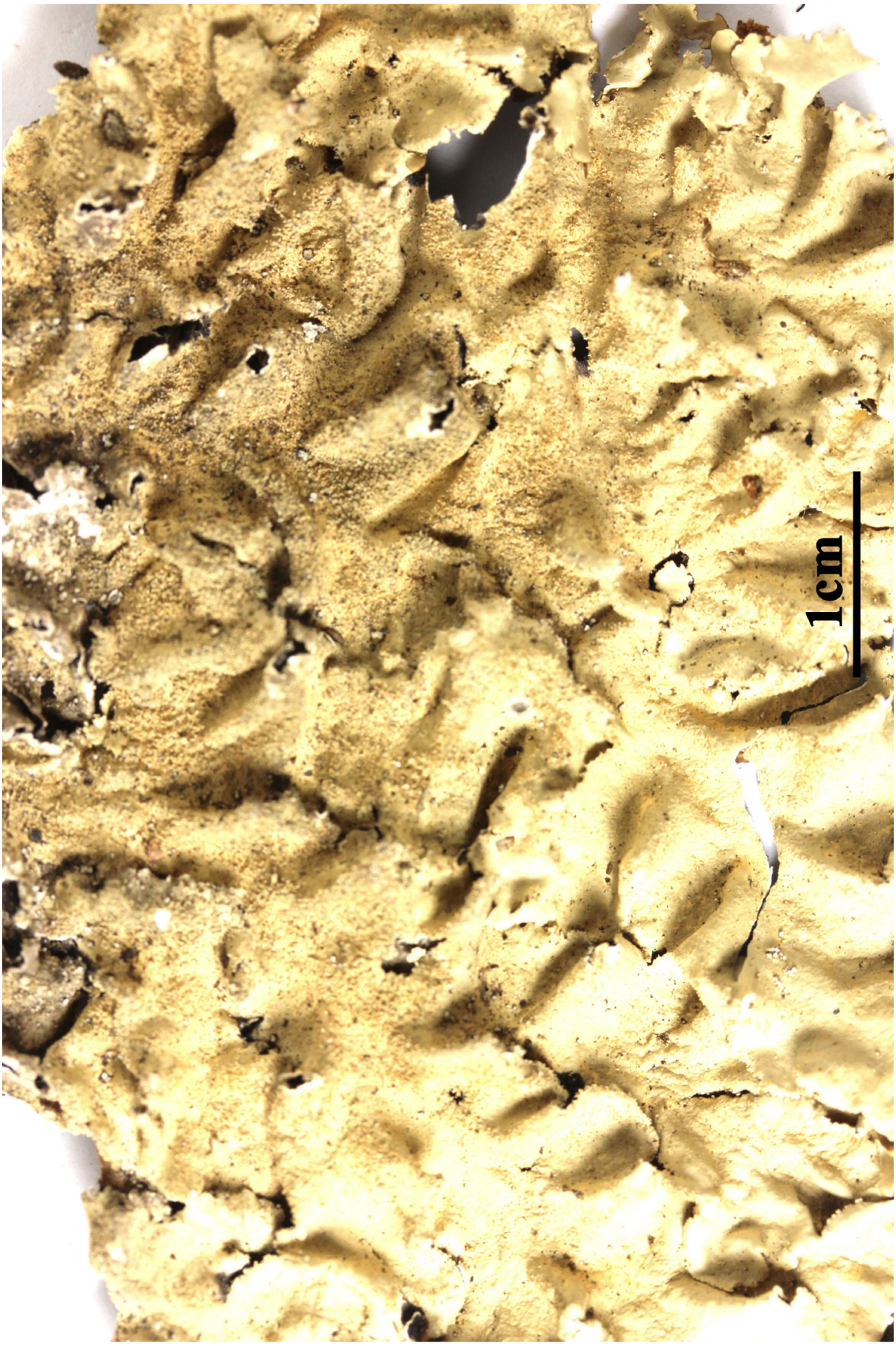


Parmotrema reticulatum

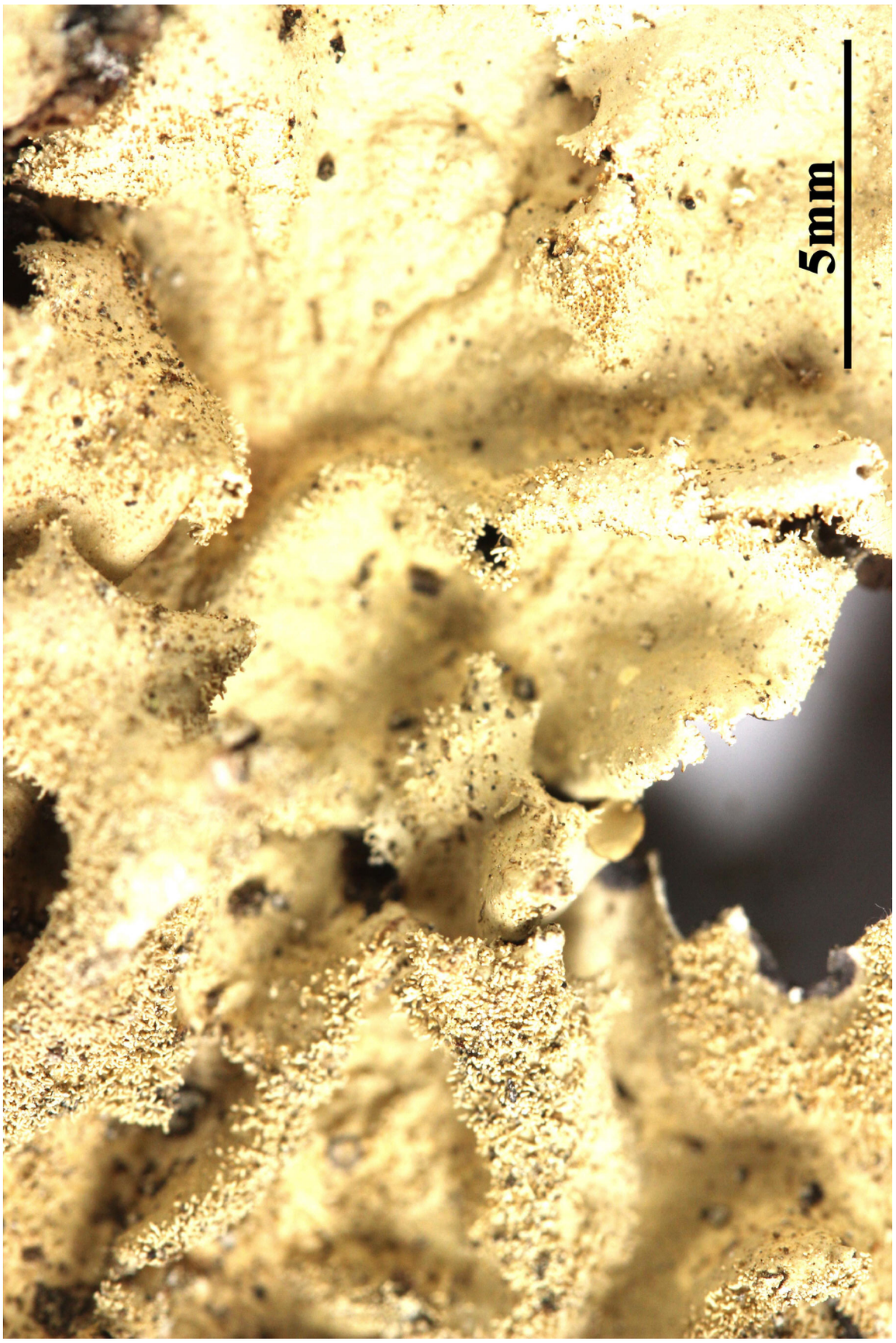
Parmotrema tinctorum (Dèspr. ex Nyl.) Hale, Phytologia 28(4): 339 (1974)
= *Parmelia tinctorum* Dèspr. ex Nyl. 1872

[OH386], Japan. Honshu. Prov. Hitachi (Pref.Ibraki): Oarai-Isomae Shrine, Isohama-cho.Oarai-machi. Higashhi_Ibraki-gun. On bark of *Pinus thunbergii*, 25 m. Leg. Y. Ohmura (no. 6879) & H. Ebihara, 16.9.2008, det. Y. Ohmura. EX Y. OHMURA LICHENES MINUS COGNITI EXSICCATI NR. 396.

Thallus large, 8-20 cm. broad, loosely adnate on rock or bark, whitish mineral gray; lobes rotund, 10-15 mm. wide, margins entire, cilia lacking; upper surface plane, dull, densely isidiate, isidia papillate-granular to cylindrical,' coarse, 0.06-0.10 mm. in diameter, to 2 mm. high, simple to rarely coralloid-branched; lower side black and sparsely rhizinate at the center, brown, shiny, and naked in a broad zone at the margins. Apothecia very rare, to 20 mm. in diameter, exciple isidiate-dentate, amphithecium rugose, white-maculate, isidiate, disc imperfo-rate; hymenium 55-65 µm high; spores 7-10 x 13-15 µm, episporium 1.5 µm thick; pycnidia rare, conidia 12-15 µm long. Reactions: Thallus K+ yellow; medulla K-, C+ blood red, KC+ red, P-, atranorine and lecanoric acid present. This common weedy pantropical species is well known to all lichenologists. It is immediately identi£ied by the brilliant C + red reaction and by the simple often granular or papillate isidia.



Parmotrema tinctorum



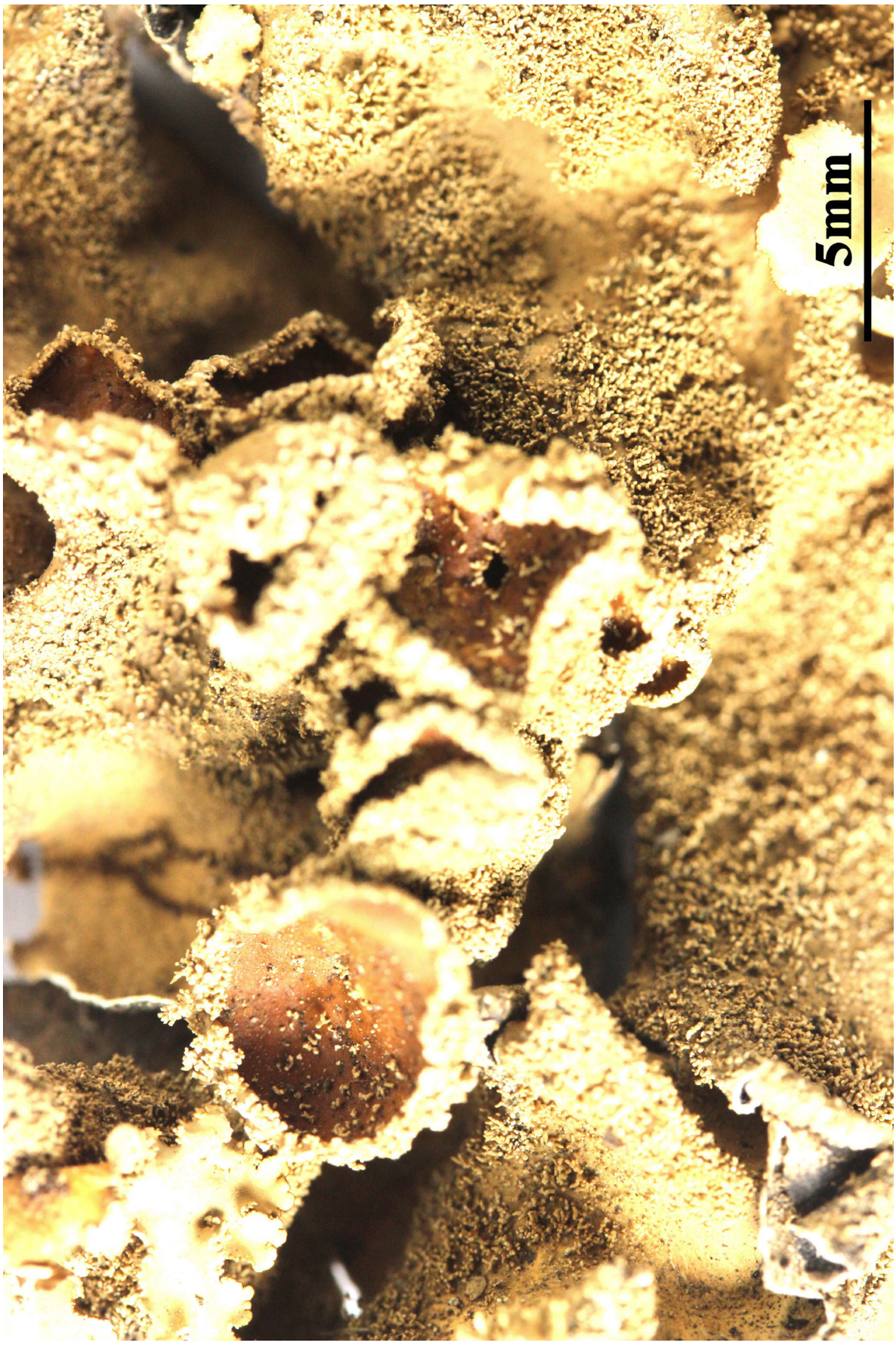
Parmotrema tinctorum

Parmotrema tinctorum (Dèspr. ex Nyl.) Hale, Phytologia 28(4): 339 (1974)
= *Parmelia tinctorum* Dèspr. ex Nyl. 1872

[KA314],Honshu. Prov. Kazusa (pref. Chiba): Ichinomyia Chosei-gun. On bark of *Pinus thunbergii*, 10 m. Leg. M Togashi, 18.11.1962, det. K. H. Moon. Ex H Kashiwadani Lichenes Minus Cogniti Exsiccati Nr. 314.

Thallus large, 8-20 cm. broad, loosely adnate on rock or bark, whitish mineral gray; lobes rotund, 10-15 mm. wide, margins entire, cilia lacking; upper surface plane, dull, densely isidiate, isidia papillate-granular to cylindrical,' coarse, 0.06-0.10 mm. in diameter, to 2 mm. high, simple to rarely coralloid-branched; lower side black and sparsely rhizinate at the center, brown, shiny, and naked in a broad zone at the margins. Apothecia very rare, to 20 mm. in diameter, exciple isidiate-dentate, amphithecium rugose, white-maculate, isidiate, disc imperforate; hymenium 55-65 µm high; spores 7-10 x 13-15 µm, episporium 1.5 µm thick; pycnidia rare, conidia 12-15 µm long. Reactions: Thallus K+ yellow; medulla K-, C+ blood red, KC+ red, P-, atranorine and lecanoric acid present. This common weedy pantropical species is well known to all lichenologists. It is immediately identi£ied by the brilliant C + red reaction and by the simple often granular or papillate isidia.

Parmotrema tinctorum

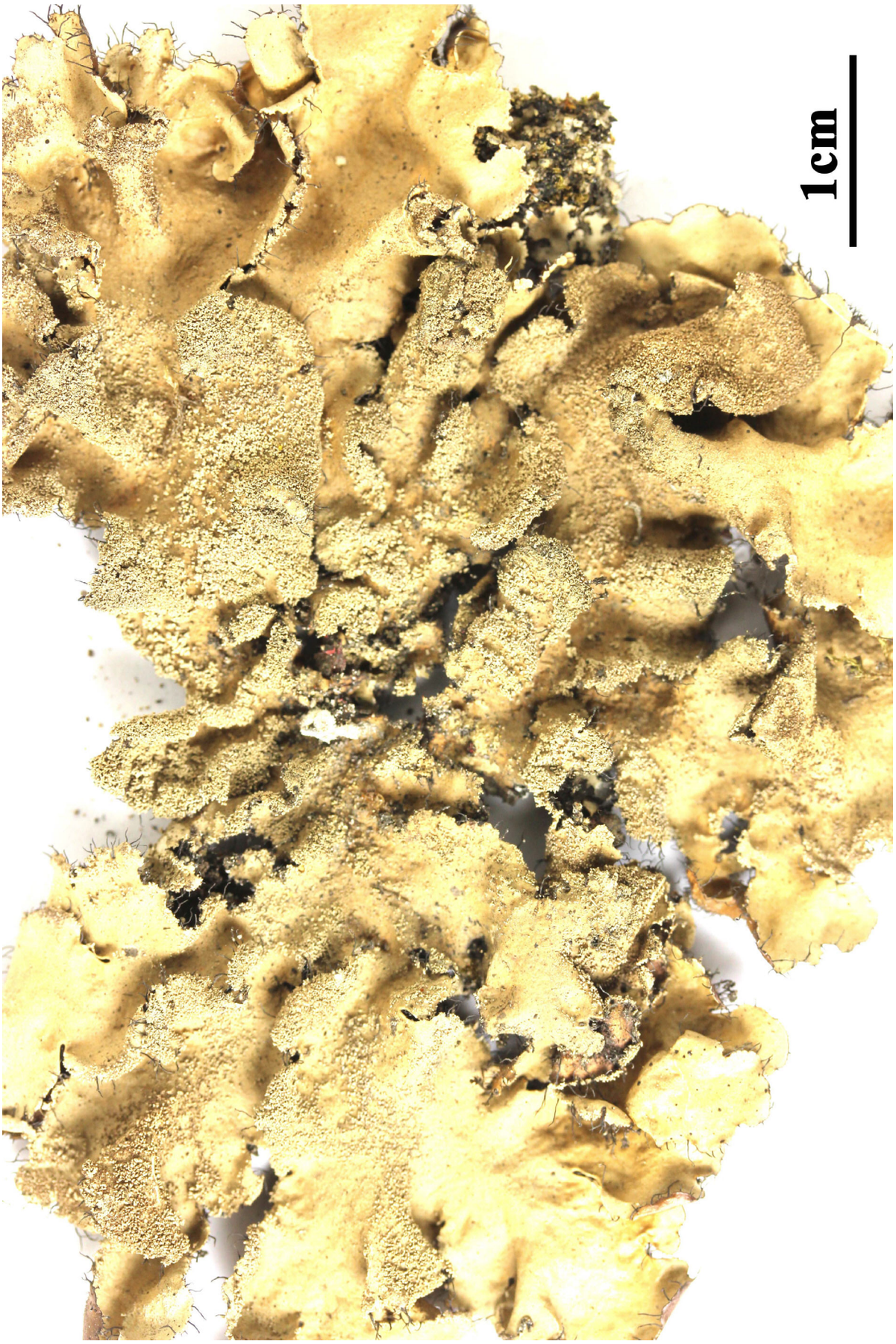


Parmotrema tinctorum

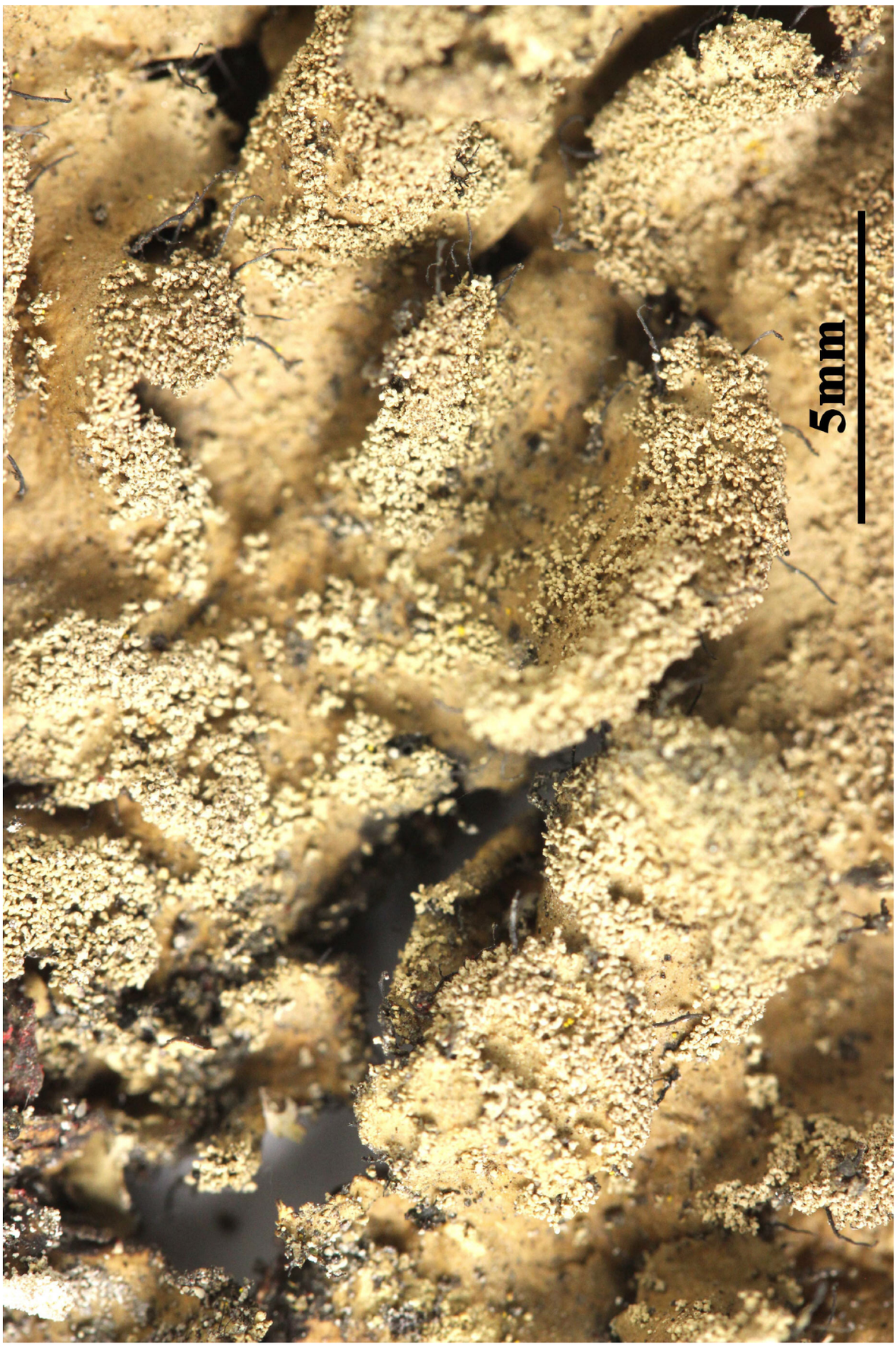
Parmotrema subtinctorium (Zahlbr.) Hale, Phytologia 28(4): 339 (1974)
= *Parmelia subtinctoria* Zahlbr. 1930

[KA362], Taiwan, Nantou Co: 10 km SE from Lishan, along route 8, Hohuanshan Mts. Jen-Ai Hasing (24°17' N, 120°30' E). On rock along road, 2100 m. Leg. H. Kashiwadani (no. 45681), 10.3.2003, det. H. Kashiwadani. EX H. KASHIWADANI LICHENES MINUS COGNITI EXSICCATI NR. 362.

Lobes narrow, sublinear to subirregular, contiguous to imbricate, elongate, plane, separate, 7-13 mm wide; tips rotund, sparsely to moderately ciliate; cilia simple, black, up to 4 mm long; upper surface mineral gray (but turning buff in herbarium), smooth but cracked with age, shiny, becoming rimose, strongly effigurate maculate, becoming rugose; isidia cylindrical, simple to coralloid branched, laminal, rarely ciliate apically; soredia and pustulae absent; medulla white; lower surface pale brown to dark brown in center, densely rhizinate; rhizines black, simple. Apothecia rare, 3-8 mm diam.; margin isidiate; disc imperforate when young; asci clavate, 8-spored; ascospores ellipsoid, 8-11 x 5-8 µm. Pycnidia: laminal, immersed; conidia cylindrical-fusiform, 4-7 x 1 µm. Spot tests: cortex K+ yellow, C-, KC-, P+ yellow; medulla K+ yellow turning dark red, C-, KC-, P+ orange Secondary metabolites: upper cortex with atranorin and chloroatranorin (both major) and usnic acid (accessory); medulla with salazinic acid (major), consalazinic acid and norlobaridone (both minor) and protolichesterinic acid (accessory). Substrate and ecology: frequent on bark in woodlands, rare on rock. World distribution pantropical and into adjacent temperate regions; North America, Europe, Asia and Australasia.



Parmotrema subtinctorium

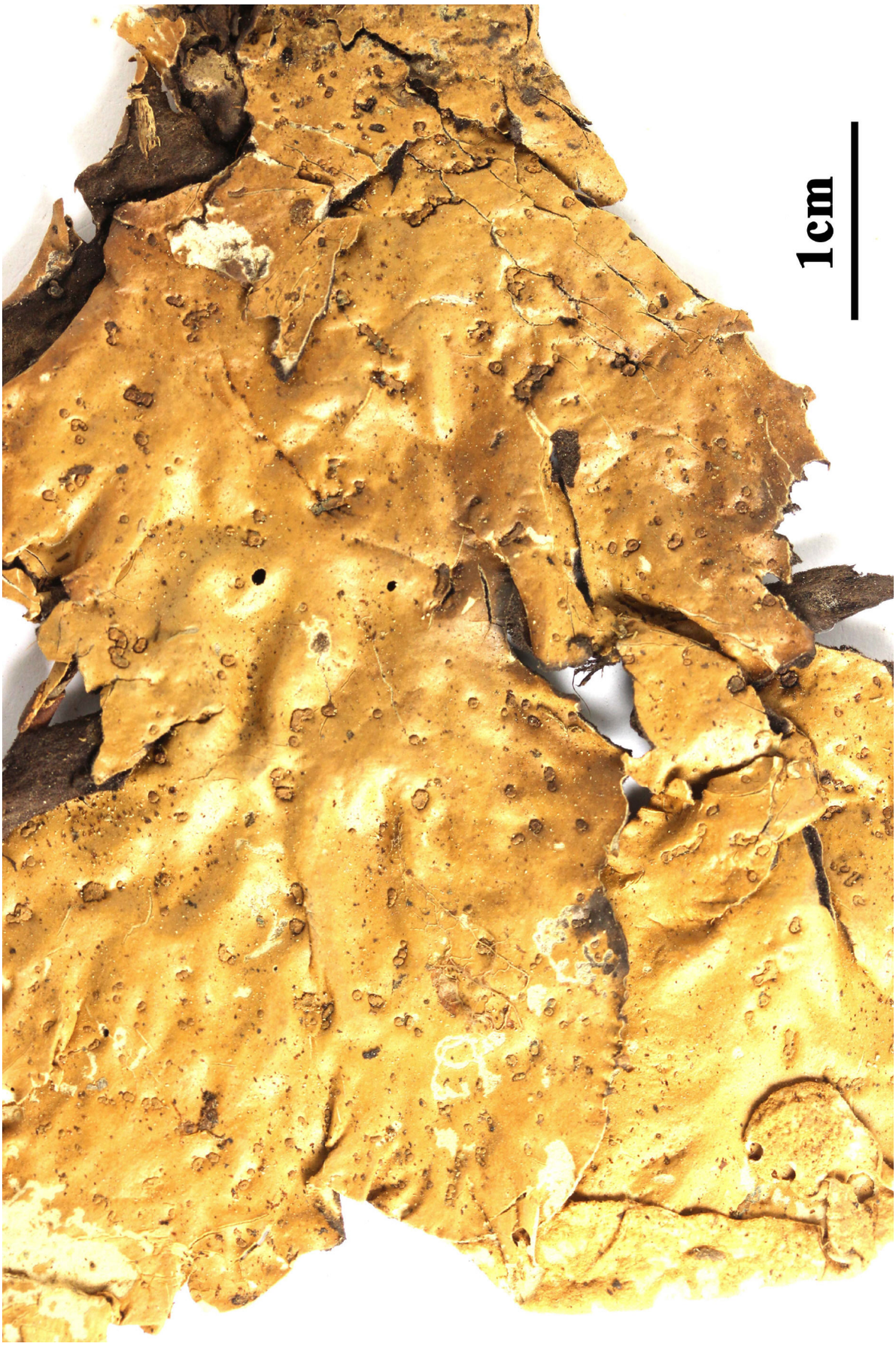


Parmotrema subtinctorium

Peltigera aphthosa (L.) Willd. [as 'aphtosa'], Fl. berol. prodr.: 347 (1787)
= *Lichen aphthosus* L. 1753

[OH487], Japan. Honshu. Prov. Shinano (Pref. Nagano), along the route of Maruike Shimizu Hut-Kumanoyo, Shiga Plateau. Over mosses, 1400-1700 m. Leg. Y. Asahina & M. Togashi, 8.6.1959, det. Y. Asahuna. Ex Y. Ohmura Lichenes Minus Cogniti Exsiccati Nr. 487.

Thallus foliose, heteromerous and dorsiventral, broad-lobed, loosely attached, forming 15(-24) cm wide rosettes. Lobes elongate, concave, contiguous, 1.5-3(-5) cm broad, up to 12 cm long, usually obtuse to boat-shaped, with ascending, entire to crenate margins. Upper surface erect-tomentose in marginal parts, glabrous in central parts, grey to greenish-grey when dry, bright green when wet, smooth, with up to 2 mm wide, numerous, scattered, dark grey, flattened to wart-like cephalodia containing Nostoc. Lower surface tomentose, whitish in marginal parts, abruptly blackening in central parts, with a few, indistinct, broad veins or veinless, and with a few dark, simple to fasciculate, often confluent, up to 5 mm long rhizines. Upper cortex pseudoparenchymatous; medulla white; lower cortex absent. Apothecia rare, saddle-shaped, terminal, brown, with a continuous, smooth to warted cortex, 7-15 mm. Paraphyses simple, distinctly thickened in upper part. Asci 8-spored, fissitunicate, the thickened apex with a K/I+ blue ring, Peltigera-type. Ascospores 3-7-septate, hyaline to pale brown at maturity, acicular, thin-walled, (47-)53-67(-75) x 4-5 µm. Photobiont chlorococcoid (Coccomyxa), cephalodia with Nostoc. Spot tests: K-, C-, KC-, P-, UV-; or medulla faintly and fleeting C+ and KC+ pink. Chemistry: at least five chemotypes with different combinations of tenuiorin, methyl gyrophorate, gyrophoric acid and triterpenoids. - Note: a mainly boreal-montane, circumpolar acidophytic vicariant of *P. leucophlebia*, found on terricolous mosses and soil rich in humus, mostly in forests but also above treeline; common in the Alps.



Peltigera aphthosa

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Peltigera aphthosa (L.) Willd. [as 'aphtosa'], Fl. berol. prodr.: 347 (1787)
= *Chloropeltigera aphthosa* (L.) Gyeln., Annls Mus. natn. Hung., Pars bot. 28: 279 (1934)
= *Chloropeltis aphthosa* (L.) Clem., Gen. fung. (Minneapolis): 174 (1909)
= *Lichen aphthosus* L. [as 'aphtosus'], Sp. pl. 2: 1148 (1753)
= *Lichen caninus [unranked] aphthosus* (L.) Weiss, Plant. Cryptog.-Fl. Goettingens: 80 (1770)
= *Lichen caninus var. aphthosus* (L.) Weiss, Pl. crypt. fl. Gott.: 80 (1770)
= *Peltidea aphthosa* (L.) Ach., Methodus, Sectio post. (Stockholmiæ): 287 (1803)

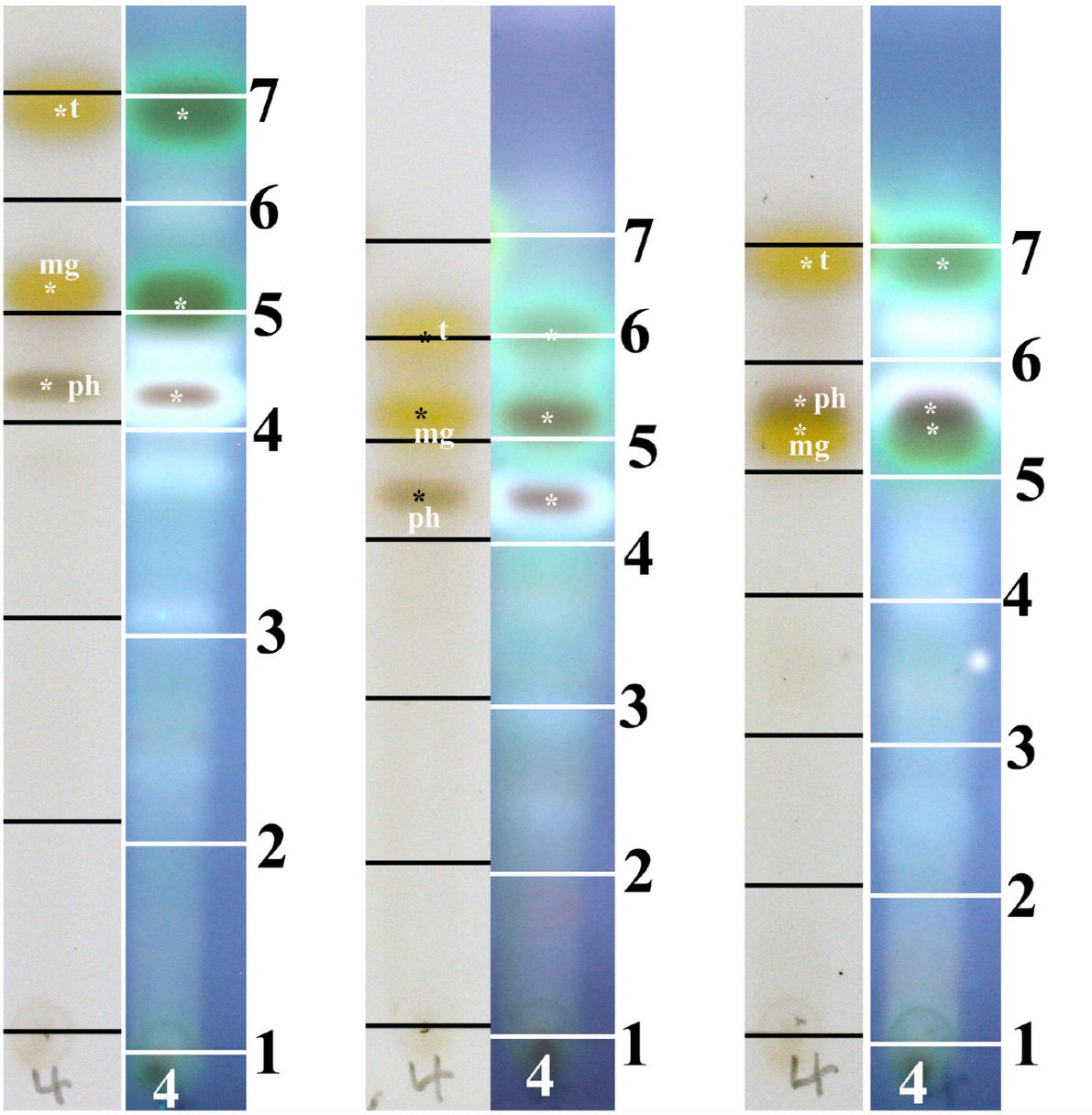
[12666], ÖSTERREICH: Gauertal, Lindauer Hütte, ca. 1900 m, Krummholz. Leg. H. Muhle. 09.2005, det. H. Muhle. *Own notes*: TLC (p280/4): Tenuiorin, Methylgyrophorat, Phlebic acid B - EX HERBARIO F. SCHUMM NR.12666.

Thallus foliose, heteromerous and dorsiventral, broad-lobed, loosely attached, forming 15(-24) cm wide rosettes. Lobes elongate, concave, contiguous, 1.5-3(-5) cm broad, up to 12 cm long, usually obtuse to boat-shaped, with ascending, entire to crenate margins. Upper surface grey to greenish-grey when dry, bright green when wet, smooth, with up to 2 mm wide, numerous, scattered, dark grey, flattened to warty cephalodia containing *Nostoc*. Lower surface tomentose, whitish in marginal parts, abruptly blackening in central parts, with a few, indistinct, broad veins, or without veins, and with a few dark, simple to fasciculate, often confluent rhizines. Upper cortex pseudoparenchymatous; medulla white; lower cortex absent. Apothecia rare, saddle-shaped, terminal, brown, with a continuous, smooth to warty cortex. Paraphyses simple, distinctly thickened in upper part. Asci 8-spored, fissitunicate, the thickened apex with a K/I+ blue ring, Peltigera-type. Ascospores 3-7-septate, hyaline to pale brown at maturity, acicular, thin-walled, (47-)53-67(-75) x 4-5 µm. Photobiont chlorococcoid (*Coccomyxa*), cephalodia with *Nostoc*. Spot tests: K-, C-, KC-, P-, UV-; or medulla faintly and fleeting C+ and KC+ pink. Chemistry: five chemotypes with different combinations of tenuiorin, methylgyrophorate, gyrophoric acid and triterpenoids.

Peltigera aphthosa

Peltigera aphthosa

Peltigera aphthosa



[12666], p280/4

Peltigera aphthosa

Peltigera canina (L.) Willd., Fl. berol. prodr.: 347 (1787)
= *Lichen caninus* L. 1753

[OH638], Japan. Hokkaido. Prov. Kitami: Koshimizu Campsite, Koshimizu-cho, Shari-gun (43°42'33" N, 144°21'02" E). On soil, 650 m. Leg. Y. Ohmura (no. 11196), 21.6.2016, det. Y. Ohmura. EX Y. OHMURA LIXHENES MINUS COGNITI EXSICCATI NR. 638.

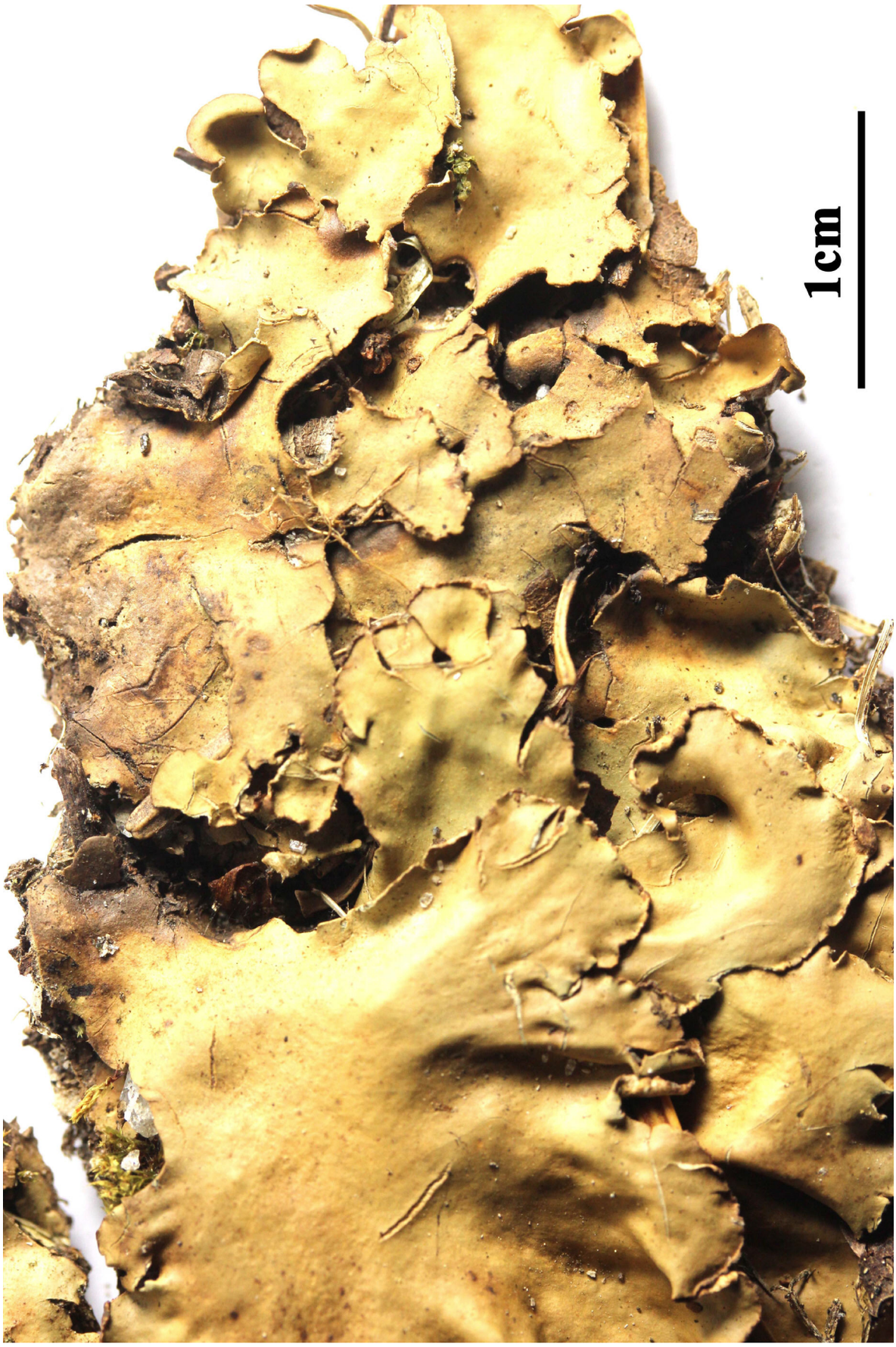
Thallus foliose, broad-lobed, heteromerous and dorsiventral, brownish grey to grey when dry, blackish green when wet, loosely attached, forming up to 20 cm wide rosettes. Lobes elongate, flattened, contiguous, with rounded ends, (1-)1.5-3 cm broad, up to 10 cm long, the upper surface arachnoid-tomentose especially along margins, which are often down-turned and entire. Lower surface whitish, with whitish (at the margin) to brownish (in the centre), raised veins and richly penicillated (brush-like), up to 4 mm long rhizines which are white at the margins, dark in central parts. Upper cortex pseudoparenchymatous; medulla white; lower cortex absent. Apothecia frequent, saddle-shaped, terminal, dark brown to black, 4-10 mm vide. Paraphyses simple, distinctly thickened above. Asci 8-spored, Peltigera-type, fissitunicate, the thickened apex with a K/I+ blue ring. Ascospores 3-5-septate, hyaline to very pale brown at maturity, acicular, thin-walled, (36-)42-53(-65) x 2.5-5.2 µm. Photobiont cyanobacterial (Nostoc, the cells in clusters). Spot tests: cortex and medulla K-, C-, KC-, P-, UV-. Chemistry: without lichen substances. - Note: a widespread holarctic species found on terricolous mosses and soil in open forests and heaths, sometimes on bark in the basal parts of old trees; certainly rarer than *P. praetextata*, with which it was often confused in the past, but widespread and locally common, with a wide altitudinal range.

Peltigera canina

Peltigera canina (L.) Willd., Fl. berol. prodr.: 347 (1787)
= *Lichen caninus* L. 1753

[OH618], Japan. Hokkaido. Prov. Kitami: Koshimizu Campsite, Koshimizu-cho, Shari-gun (43°42'33" N, 144°21'02" E). On soil, 650 m. Leg. Y. Ohmura (no. 11195), 21.6.2016. det. Y. Ohmura. EX Y. OHMURA LICHENES MINUS COGNITI EXSICCATI NR. 618.

Thallus foliose, broad-lobed, heteromerous and dorsiventral, brownish grey to grey when dry, blackish green when wet, loosely attached, forming up to 20 cm wide rosettes. Lobes elongate, flattened, contiguous, with rounded ends, (1-)1.5-3 cm broad, up to 10 cm long, the upper surface arachnoid-tomentose especially along margins, which are often down-turned and entire. Lower surface whitish, with whitish (at the margin) to brownish (in the centre), raised veins and richly penicillated (brush-like), up to 4 mm long rhizines which are white at the margins, dark in central parts. Upper cortex pseudoparenchymatous; medulla white; lower cortex absent. Apothecia frequent, saddle-shaped, terminal, dark brown to black, 4-10 mm vide. Paraphyses simple, distinctly thickened above. Asci 8-spored, Peltigera-type, fissitunicate, the thickened apex with a K/I+ blue ring. Ascospores 3-5-septate, hyaline to very pale brown at maturity, acicular, thin-walled, (36-)42-53(-65) x 2.5-5.2 µm. Photobiont cyanobacterial (Nostoc, the cells in clusters). Spot tests: cortex and medulla K-, C-, KC-, P-, UV-. Chemistry: without lichen substances. - Note: a widespread holarctic species found on terricolous mosses and soil in open forests and heaths, sometimes on bark in the basal parts of old trees; certainly rarer than *P. praetextata*, with which it was often confused in the past, but widespread and locally common, with a wide altitudinal range.



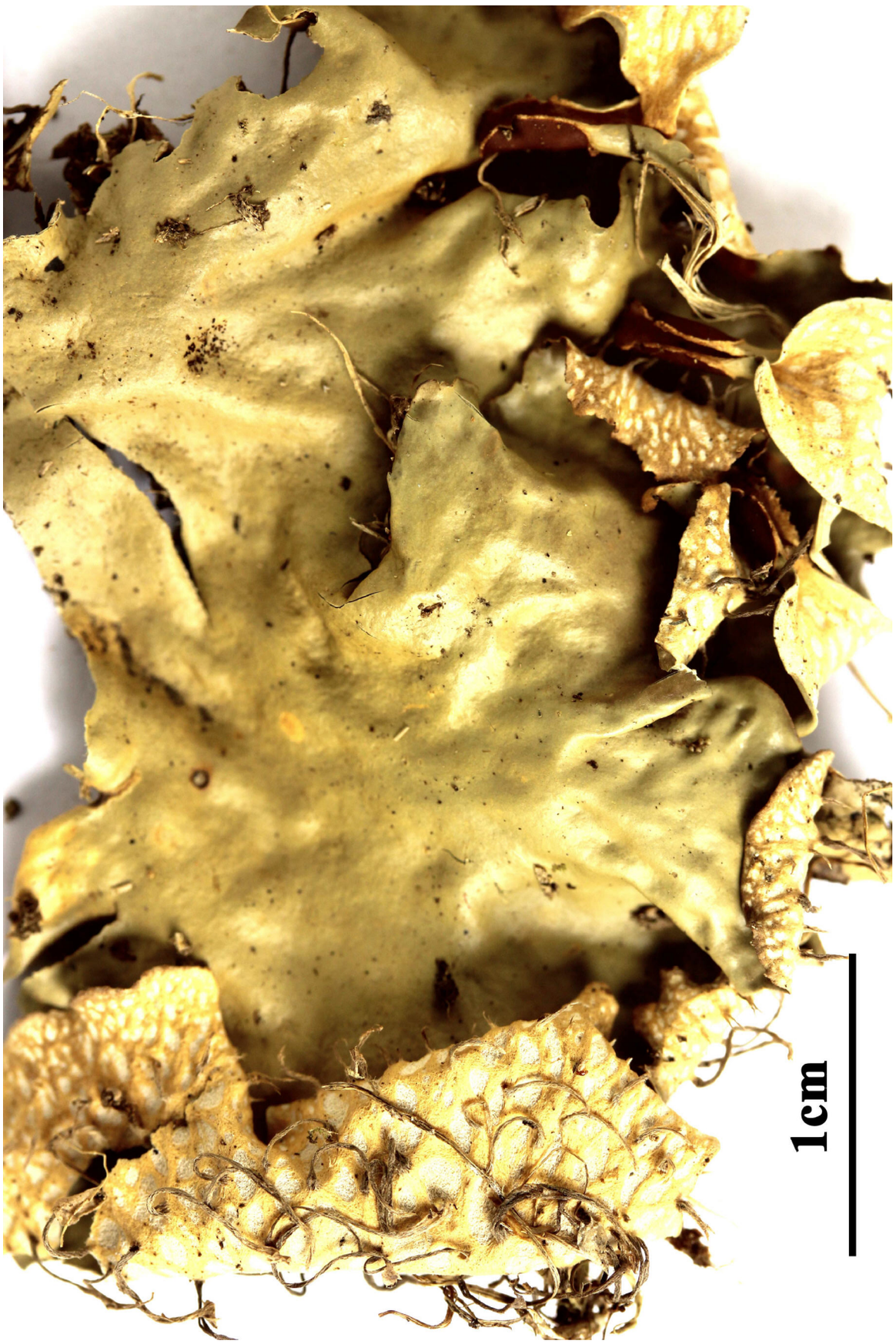
Peltigera canina

Peltigera canina

Peltigera degenii Gyeln., Magy. Bot. Lapok 25: 253 (1927) [1926]

[OH467], Taiwan, Yilan Co.: along Jiancing Historic Trail, Mt. Taiping. Nan-ao Township (34°30' N, 121°31' E). On trunk of dead *Chamaecyparis formosensis*, 1900 m. Leg. Y Ohmura (no. 8658), 1.10.2011, det. Y. Ohmura. EX Y. OHMURA LICHENES MINUS CIGNITI EXSICCATI NR. 467.

Thallus foliose, broad-lobed, heteromerous and dorsiventral, bluish grey when dry, blackish when wet, loosely attached, forming up to 12(-20) cm wide rosettes. Lobes elongate, flattened, contiguous, rounded at tips, 0.5-1(-1.5) cm broad, 2-5 cm long, with a bluish grey, glabrous, glossy, shiny, smooth to weakly wrinkled upper surface, the margins often up-turned, sometimes phyllidiate. Lower surface whitish near margins, pale brown in central parts, with whitish, raised veins becoming pale brown in central parts, and pale, mostly simple, up to 5-7 mm long rhizines. Upper cortex pseudoparenchymatous; medulla white; lower cortex absent. Apothecia frequent on up-turned short lobes, saddle-shaped, pale brown, 4-9 mm across. Paraphyses simple, distinctly thickened above. Asci 8-spored, fissitunicate, the thickened apex with a K/I+ blue ring, Peltigera-type. Ascospores 3-5-septate, hyaline turning pale brown at maturity, acicular, thin-walled, (40-)45-60(-68) x 2.5-5 µm. Photobiont cyanobacterial (Nostoc, the cells not in long chains). Spot tests: cortex and medulla K-, C-, KC-, P-, UV-. Chemistry: without lichen substances. - Note: a temperate to southern boreal species found on terricolous bryophytes, on soil rich in humus and on mossy rocks in forests, sometimes on bark in the basal parts of trunks, with optimum in the montane belt.



Peltigera degenii

Peltigera degenii

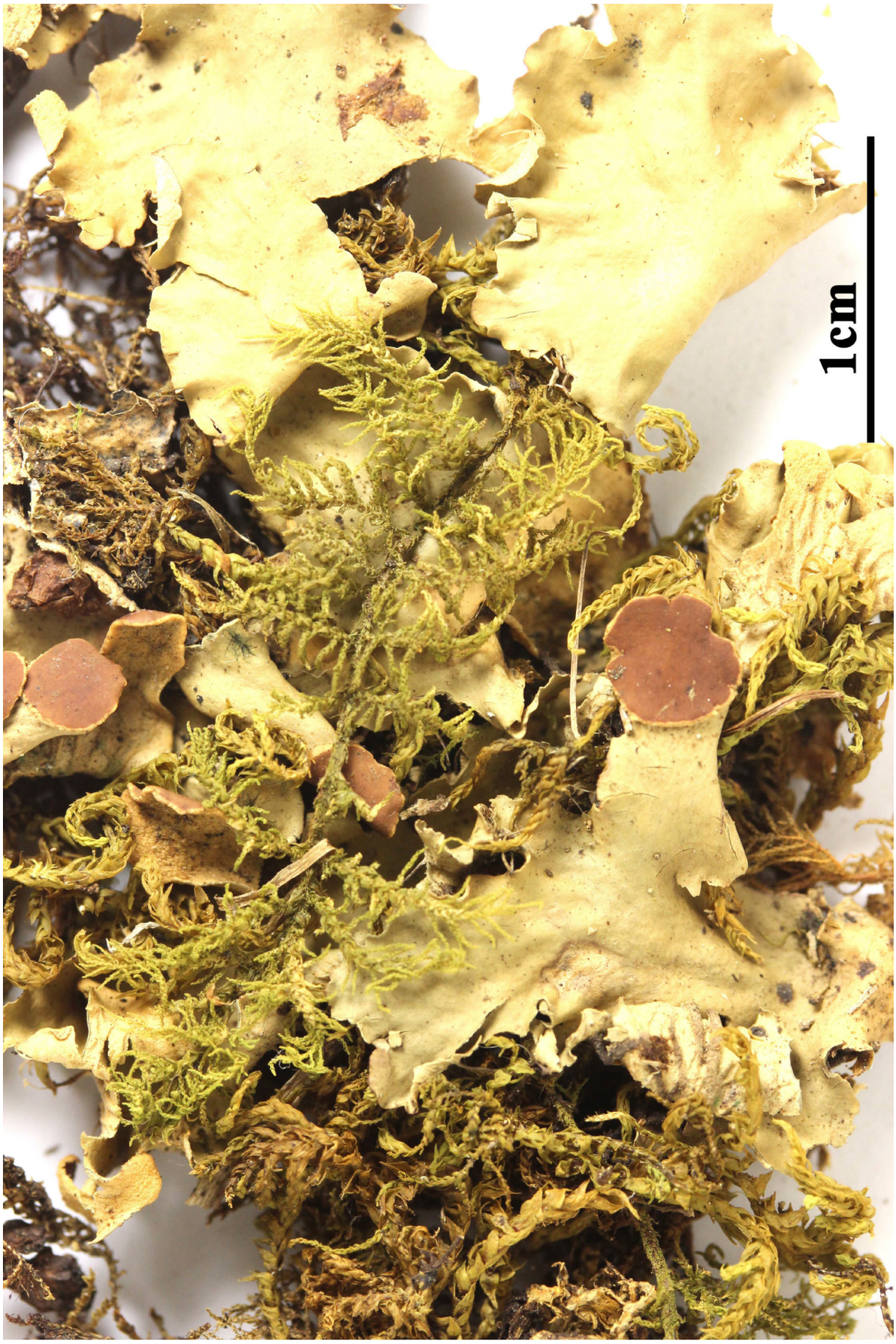
Peltigera degenii Gyeln., Magy. Bot. Lapok 25: 253 (1927) [1926]
= *Peltigera canina* f. *nitens* Anders, Hedwigia 65: 79 (1924)
= *Peltigera degenii* f. *nitens* (Anders) Oxner, Flora Lischaĭnikiv Ukraïni (Kiev) 1: 439 (1956)
= *Peltigera degenii* var. *nitens* (Anders) Trass, Trans. Tartu St. Univ. 211(Pap. bot. 8): 103 (1968)
= *Peltigera nitens* (Anders) Gyeln., Bot. Közl. 24: 133 (1927)
= *Peltigera praetextata* var. *nitens* (Anders) Szatala, Folia Cryptog., Szeged 2(no. 5): 284 (1942)

[OH416], Japan. Honshu. Prov. Inaba (Pref. Tottori): Himeji Park, Yazu-cho, Yazu-gun. On trunk of broad-leaf deciduous tree, 500 m. Leg. Y. Ohmura (no. 7235), T. Arikawa & M. Uzawa, 24.08.2010, det. Y. Ohmura. Ex Y. OHMURA: LICHENES MINUS COGNITI EXSICCATI NR. 416.

Thallus foliose, broad-lobed, heteromerous and dorsiventral, bluish grey when dry, blackish when wet, loosely attached, forming up to 12(-20) cm wide rosettes. Lobes elongate, flattened, contiguous, rounded at tips, 0.5-1 cm broad, 2-5 cm long, with a bluish grey, glossy, shiny, smooth upper surface, the margins often up-turned, sometimes phyllidiate. Lower surface whitish near margins, pale brown in central parts, with whitish, raised veins becoming pale brown towards centre, and pale, simple, up to 5-7 mm long rhizines. Upper cortex pseudoparenchymatous; medulla white; lower cortex absent. Apothecia frequent on up-turned short lobes, saddle-shaped, pale brown. Paraphyses simple, distinctly thickened above. Asci 8-spored, fissitunicate, the thickened apex with a K/I+ blue ring, Peltigera-type, Ascospores 3-5-septate, hyaline turning pale brown at maturity, acicular, thin-walled, (40-)45-60(-68) x 2.5-5 µm. Photobiont cyanobacterial (*Nostoc*, the cells not in long chains). Spot tests: cortex and medulla K-, C-, KC-, P-, UV-. Chemistry: without lichen substances.

Peltigera degenii

Peltigera degenii



Peltigera degenii

Peltigera degenii

Peltigera degenii

Peltigera didactyla (With.) J.R. Laundon, Lichenologist 16(3): 217 (1984)
= *Lichen didactylus* With. 1776

[OH488], Japan. Honshu. Prov. Shinano (Pref. Nagano): Azusayama, Kawakami-mura, Minamisaku-gun (35°58' N, 183°40' E). On soil on concrete, 1310 m. Leg. Y. Ohmura (no. 9676), K. Yoshida & A. Frisch, 27.5.2013, det. Y. Ohmura. EX Y. OHMURA LICHENES MINUS COGINTI EXSICCATI NR. 488.

Thallus foliose, broad-lobed, heteromerous, dorsiventral, greenish grey to brownish when dry, blackish green when wet, forming 1-3(-5) cm wide rosettes or consisting of a few scattered lobes only. Lobes 5-10 mm broad, 1-2 cm long, rounded, concave, ear-shaped and sorediate when young, later ascending, esorediate and bearing vertically arranged apothecia. Soralia maculiform, laminar, flat, tending to disappear in fertile specimens (leaving discoloured patches), at first orbicular and 1-3(-4) mm across, then becoming confluent, with grey to grey-brown soredia. Upper surface finely tomentose, at least in marginal parts and in young lobes; lower surface whitish, with narrow (0.4-0.7 mm broad) whitish to brownish veins and dense, up to 4 mm long rhizines becoming tufted and darkening. Upper cortex pseudoparenchymatous; medulla white, with loosely interwoven hyphae; lower cortex absent. Apothecia rare in sorediate specimens, common in esorediate ones, saddle-shaped, brown, located at the tip of short, vertically arranged lobes, with a minutely denticulate margin, 3-4(-6) mm wide. Paraphyses simple, distinctly thickened above. Asci fissitunicate, the thickened apex with a K/I+ blue ring, Peltigera-type. Ascospores 3-5(-7)-septate, hyaline to pale brown at maturity, fusiform, (36-)45-65(-80) x 3-5 µm. Pycnidia rare, dark, immersed. Conidia fusiform, 6-8 x 3-4 µm. Photobiont cyanobacterial (Nostoc, the cells not in long chains). Spot tests: cortex and medulla K-, C-, KC-, P- (soralia very rarely faintly C+ and KC+ pink). Chemistry: without lichen substances, or occasionally with low amounts of gyrophoric acid and methyl gyrophorate in the soralia. Note: a cool-temperate to boreal-montane, ephemeral lichen of disturbed mineral soil, most common in the Alps near and above treeline.

Peltigera didactyla

Peltigera dilacerata (Gyeln.) Gyeln., Rev. Bryol. Lichénol. 5: 70 (1932)
= *Peltigera pellucida f. dilacerata* Gyeln. 1928

[OH586], Japan. Honshu. Prov. Ugo (Pref. Akita): upstream area of Kasuge River, Shirakami Mts. (49°25' N, 140°08' E). On humus, 540 m. Leg. M. Inoue (no.22909), 1-3.7.1985, det. Y. Ohmura. EX Y. OHMURA LICHENES MINUS COGNITI EXSICCATI NR. 586.

Thallus orbicular to broadly spreading, 2-10(-15) cm diam. Lobes linear-elongate to subirregular, 1-3(-5) cm long, 4-10(-12) mm wide. Margins entire to occasionally shallowly notched or crenulate, sometimes phyllidiate, apices sometimes ±downturned, not noticeably thickened below, sometimes suffused red-brown, here and there thinly tomentose. Upper surface dark slatey blue-black when wet, pale bluish grey when dry, smooth to shallowly wrinkled, dimpled or undulate, matt or glossy, thinly tomentose at or near margins and apices and close to apothecial discs; tomentum, ragged, whitish or pale-buff, not thickly developed as in *P. canina*. Lower surface white in a broad marginal zone, darkening slightly to pale-buff towards centre, or white from margins to centre. Veins narrow, 0.2-0.5 mm diam., pale-buft or yellowish, to brown-black or black centrally, raised, anastomosing, surface smooth; interstices broadly polygonal or lenticular, white, fibrous or roughened, often rather thin and appearing somewhat greyish through exposure of cyanobacterial layer. Rhizines discrete, pale, concolorous with veins, darkening to brownish or brown-black at centre, slender, simple, smooth-surfaced, 3-8(-10) mm long. Apothecia erect, on short to elongated marginal stalks; discs flat to inrolled and saddle-shaped, 3-6 mm diam., matt, epruinose, pale to dark red-brown; margins pale-buft, corrugate—scabrid, soon excluded by disc, buff-tomentose and ridged below. Ascospores colourless, acicular, 3-7-septate, (38-)45-60(-70) x 2-3.5 µm. Chemistry: TLC-, all reactions negative.

Peltigera dilacerata

Peltigera dilacerata

Peltigera dilacerata (Gyeln.) Gyeln., Rev. Bryol. Lichénol. 5: 70 (1932)
= *Peltigera pellucida f. dilacerata* Gyeln. 1928

[OH585], Japan.´Honshu. Prov. Ugo (Pref. Akita): upstream area of Kasuge River, Shirakami Mts. (40°25' N, 240°08' E). On humus, 420 m. Leg. M. Inoue (no. 22908), 1-3.7.1983, det. Y. Ohmura. EX Y. OHMURA LICHENES MINUS COGNITI EXSICCATI NR. 585.

Thallus orbicular to broadly spreading, 2-10(-15) cm diam. Lobes linear-elongate to subirregular, 1-3(-5) cm long, 4-10(-12) mm wide. Margins entire to occasionally shallowly notched or crenulate, sometimes phyllidiate, apices sometimes ±downturned, not noticeably thickened below, sometimes suffused red-brown, here and there thinly tomentose. Upper surface dark slatey blue-black when wet, pale bluish grey when dry, smooth to shallowly wrinkled, dimpled or undulate, matt or glossy, thinly tomentose at or near margins and apices and close to apothecial discs; tomentum, ragged, whitish or pale-buff, not thickly developed as in *P. canina*. Lower surface white in a broad marginal zone, darkening slightly to pale-buff towards centre, or white from margins to centre. Veins narrow, 0.2-0.5 mm diam., pale-buft or yellowish, to brown-black or black centrally, raised, anastomosing, surface smooth; interstices broadly polygonal or lenticular, white, fibrous or roughened, often rather thin and appearing somewhat greyish through exposure of cyanobacterial layer. Rhizines discrete, pale, concolorous with veins, darkening to brownish or brown-black at centre, slender, simple, smooth-surfaced, 3-8(-10) mm long. Apothecia erect, on short to elongated marginal stalks; discs flat to inrolled and saddle-shaped, 3-6 mm diam., matt, epruinose, pale to dark red-brown; margins pale-buft, corrugate—scabrid, soon excluded by disc, buff-tomentose and ridged below. Ascospores colourless, acicular, 3-7-septate, (38-)45-60(-70) x 2-3.5 µm. Chemistry: TLC-, all reactions negative.

Peltigera dilacerata

Peltigera dilacerata

Peltigera dolichorhiza (Nyl.) Nyl., Lich. Nov. Zeland. (Paris): 43 (1888)
= *Peltigera polydactylon* var. *dolichorhiza* Nyl. 1860

[OH489], Japan. Honshu. Prov. Iwashiro (Pref. Fukushima): Lakeside of Hibara-ko, Yama-gun. Over mosses, 800 m. Leg. Y Asahina, 2.10.1954, det. A. Asahina. EX Y. OHMURA LICHENES MINUS COGNITI EXSICCAT NR. 489.

Thallus large c. 5-7 cm across (rarely to 10 cm), sometimes rather elongate, with lobes more or less separated from each other, extremities usually rounded and 0.8-1.2 cm wide, with flat or slightly revolute margins; thalli rather fragile and easily broken apart when dry. Upper surface glabrous, beige, orange to dark brown, or bluish grey, smooth and usually rather shiny, without tomentum or pruina, usually distinctly undulating with uneven but distinct depressions. Lower surface pale orange to brownish near the margins, becoming dark brown to blackish, with a network of slightly raised, blackish veins, with large, numerous, usually elliptical, whitish to pale orange interstices, forming an attractive design, with a thin, araneous, orange to blackish layer of hyphae covering them, especially near the margins. Rhizines abundant, usually quite long (to 0.8-1 cm long), simple or penicillate, exceptionally fasciculate, sometimes quite thick (c. 0.3 mm in diam.). Apothecia absent or rare, on rather narrow, +/- raised, digitate and strongly revolute lobes, to 0.4-0.7 cm long (incl. the apothecial disc); disc dark reddish brown, usually saddle-shaped; margins incised. Ascospores (3-)7-septate, 68-102 × 4.5-5 µm. Pycnidia not seen. Notes: P. dolichorhiza is an epithet usually applied to tropical populations with a thin and rather fragile thallus, smooth upper surface usually uneven and with distinct depressions, raised and digitate apothecia, pale orange lower surface near the margins, distinct network of white elliptical interstices over a dark background towards the center of the thallus, simple and long rhizines and production of several terpenoids. Chemistry: ±Tenuiorin, methyl gyrophorate, peltidactylin, dolichorrhizin, zeorin, hopane-7p, 22-diol.

Peltigera dolichorhiza is characterised by: the terricolous/muscicolous habit; a glabrous, glossy upper surface, often wrinkled or dimpled; linear-elongate to rather irregular lobes, with crisped, ascending margins without phyllidia; pale to dark, narrow to broad, slightly raised veins below, with scattered, long, slender, simple to fasciculate, pale-

buff to dark-brown or black rhizines. It has a complex chemistry dominated by hopane triterpenoids. It is distinguished from *P. polydactylon* by the longer, more slender rhizines and the absence of marginal phyllidia or lobules; and from *P. nana* by its thicker, more glossy, coriaceous thallus, narrower lobes, and narrower, raised veins and longer rhizines.

Peltigera dolichorhiza

Peltigera dolichorhiza

Peltigera dolichorhiza

Peltigera dolichorhiza (Nyl.) Nyl., Lich. Nov. Zeland. (Paris): 43 (1888)
= *Peltigera polydactylon var. dolichorhiza* Nyl. 1860

[5013], Indonesien, Java, Dieng-Plateau nordwestlich von Yogyakarta, an einem der Kraterseen, ca. 2000 m. Leg. D. & F. Schumm, 29.12.1988, det. O. Vitikainen, 01.10.1998. *Own notes*: Gehört in die Gruppe *P. polydactyla*. TLC: (p280/8): Tenuiorin, Dolichorrhizin, Methylgyrophorat. - EX HERBARIO F. SCHUMM NR.5013.

Thallus orbicular to loosely and irregularly spreading, 2–10 (–20) cm wide. Lobes 3–8 cm long, 5–15 mm wide, ±discrete at apices, ±thin and brittle; margins undulate and often ascending, sometimes ±inrolled, slightly thickened below, entire to irregularly notched or torn, with or without small tomentose brownish apothecial initials or small regenerating lobules. Upper surface dark lead-grey to blue-black when wet, pale blue-grey to somewhat red-brownish or olive-brown when dry, glabrous, dull to glossy, smooth to undulate, or dimpled to ±bullate in parts. Lower surface pale or whitish at margins, whitish to buff or dark brown centrally. Veins slightly raised, smooth, 0.2–1.0 (–1.5) mm wide, pale buff to brown at margins, brown-black to black centrally, confluent to ±continuous at the margins, soon anastomosing; interstices oval to rounded or somewhat irregularly elongate, occasionally ±fibrous, pale or whitish. Rhizines simple to fasciculate, 5–10 (–15) mm long, slender and tapering towards the margins, often becoming thick, twisted and rope-like centrally, pale buff at the margins, soon becoming dark brown or blackened, scattered to crowded and eventually somewhat tangled. Apothecia erect, rounded to saddle-shaped, 2–5 mm diam., on ±involute marginal stalks; disc pale to dark red-brown, matt; margin thin, corrugate-scabrid, pale pinkish buff. Ascospores acicular, (3–) 5–7-septate, 50–80 × 3–4 µm, pale brown. Pycnidia not seen. Chemistry: Tenuiorin, methylgyrophorate, dolichorrhizin (major or minor), zeorin (major or minor), ±peltidactylin (major or minor), ±traces of hopane-6α,7β,22–triol, hopane-7β,22–diol, hopane-15α,22–diol. - This species has a pantropical to oceanic distribution; it has been reported from Central and South America, Africa, Java, New Zealand and the Hawaiian Islands.

Peltigera dolichorhiza

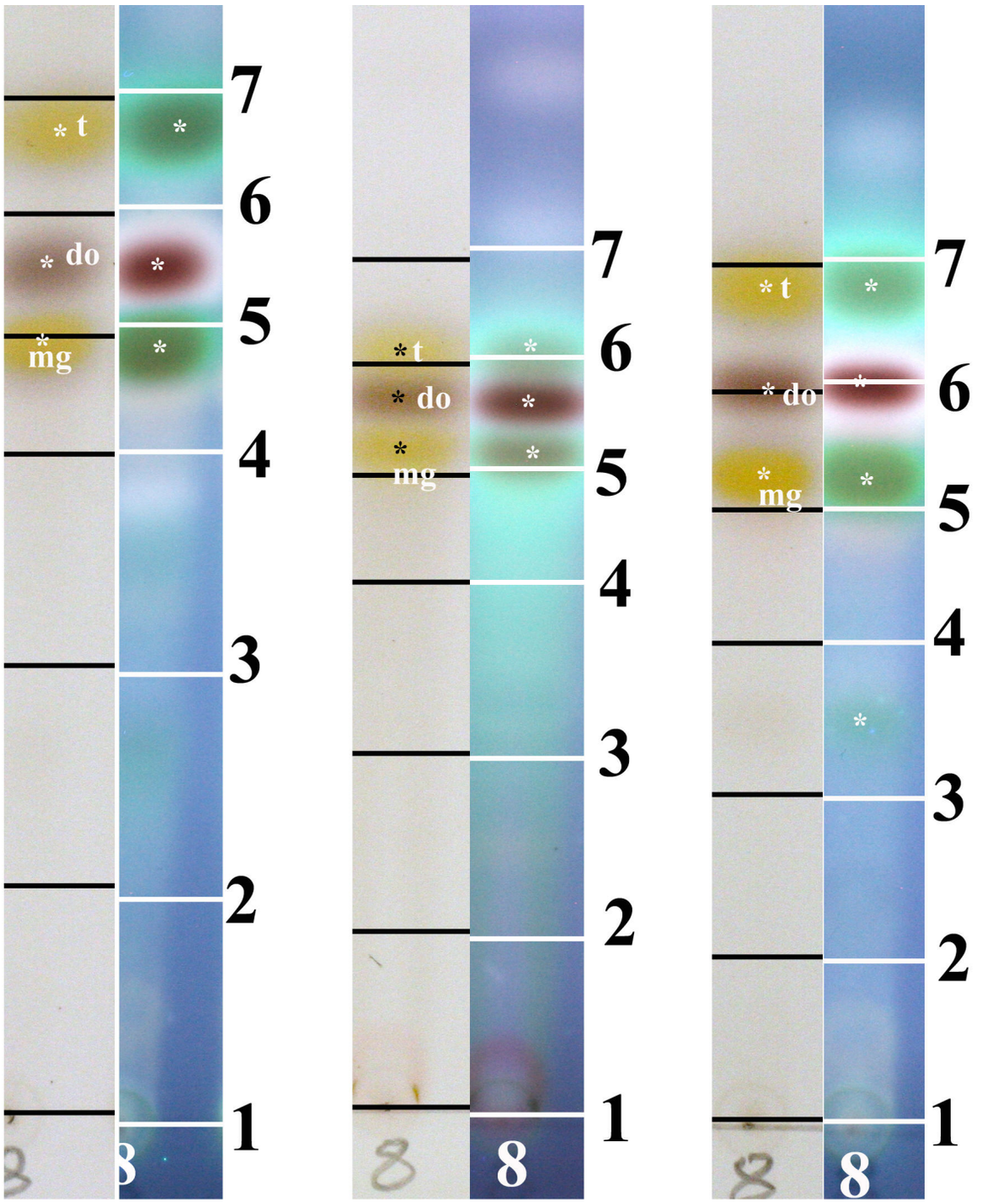
Peltigera dolichorhiza

Peltigera dolichorhiza

Peltigera dolichorhiza

Peltigera dolichorhiza

Peltigera dolichorhiza



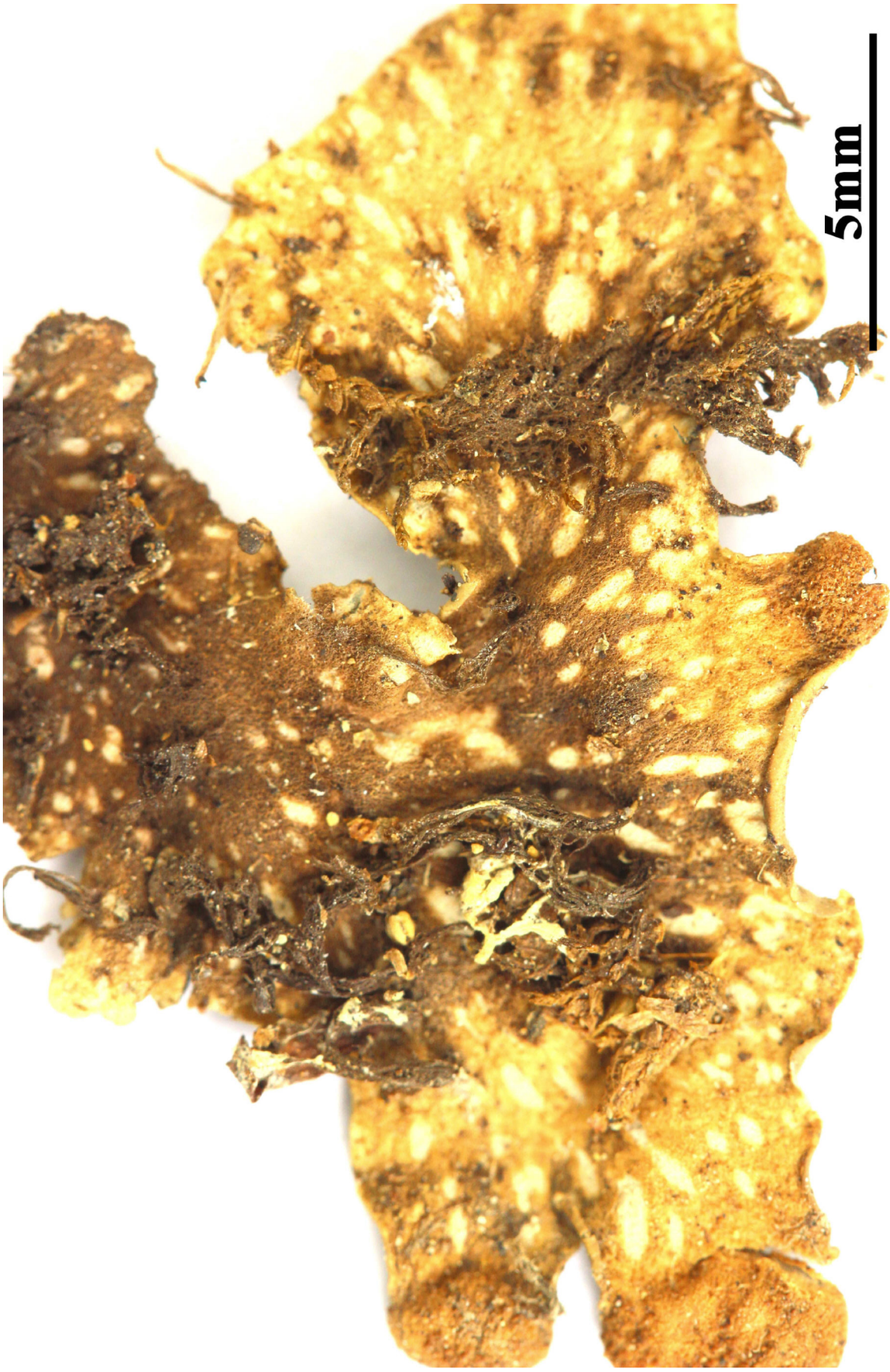
Peltigera dolichorhiza

Peltigera horizontalis (Huds.) Baumg., Fl. Lips.: 562 (1790)
= *Lichen horizontalis* Huds. 1762

[OH667], Japan. Honshu. Shinano Prov. (Nagano Pref.): Azusagawa, Mt. Kokushi, Minamisaku-gun. Leg. M. Nuno, 12.8.1964, det. M. Nuno. EX Y. OHMURA LICHENES MINUS COGNITI EXSICCAT. NR.667.

Thallus foliose, broad-lobed, heteromerous and dorsiventral, forming 10-30(-50) cm wide rosettes, bluish- to brownish grey when dry, blackish green when wet, loosely attached. Lobes 1-3 cm wide, up to 5 cm long, flattened, contiguous, with ascending margins, the upper surface glabrous, shiny, smooth. Lower surface pale towards margins, darker in central parts, with a very distinct pattern of rounded to oval, white patches in the spaces between the network of flat, dark brown-black, broad, reticulated veins, with fasciculate-squarrose, 2-3 mm long rhizines arranged in concentrical lines. Upper cortex pseudoparenchymatous; medulla white; lower cortex absent. Apothecia frequent, terminal on short ascending lobes, to 7(-8) mm across, with a brown (rarely finally blackening), horizontal, flat disc. Paraphyses simple, distinctly thickened above. Asci 8-spored, fissitunicate, Peltigera-type, the thickened apex with a K/I+ blue ring. Ascospores 3(-5)-septate, hyaline, acicular, thin-walled, (25-)33-41(-47) x 3-7 µm. Pycnidia dark, immersed. Conidia fusiform. Photobiont cyanobacterial (Nostoc, the cells not in long chains). Spot tests: cortex and medulla K-, C-, KC-, P-, or medulla sometimes faintly and fleeting C+ and KC+ pale pink. Chemistry: two chemotypes, with different combinations of tenuiorin, methyl gyrophorate, gyrophoric acid, hopanes, and unidentified terpenoids. - Note: on mosses (also epiphytic and epilithic) and humus-rich soil in the openings of humid forests, with a wide altitudinal range but with optimum in the montane belt.

Peltigera horizontalis



Peltigera horizontalis

Peltigera horizontalis

Peltigera horizontalis (Huds.) Baumg., Fl. Lips.: 562 (1790)
= *Antilyssa horizontalis* (Huds.) M. Choisy, Atlas Lichénol.: no. 6237 (1927)
= *Lichen horizontalis* Huds., Fl. Angl.: 453 (1762)
= *Peltidea horizontalis* (Huds.) Ach., Methodus, Sectio post. (Stockholmiæ): 288 (1803)
= *Peltigera canina* var. *horizontalis* (Huds.) L. Marchand, in Hall, Vrolik & Mulder, Bijdr. Natuurk. Wetensch. 5: 198 (1830)
= *Peltigera horizontalis* f. *muscorum* (Schaer.) Zahlbr., Cat. Lich. Univers. 3: 471 (1925)
= *Peltigera horizontalis* var. *muscorum* Schaer., Lich. helv. spicil. 6: 265 (1833)
= *Peltigera rufescens* var. *horizontalis* (Huds.) Spreng., Fl. halensis, Edn 2: 543 (1832)

[12539], GERMANY: Baden-Württemberg, Kreis Göppingen, Albrand, Bad Überkingen, auf dem Pfad zum Kahlenstein, 48°35.892' N, 9°48.493' E, 590 m, schattige Böschung. Leg. F. Schumm, 02.07.2006, det. F. Schumm, 02.07.2006. *Own notes*: TLC (p280/9): Tenuiorin, Zeorin, weiteres Triterpenoid, hellgelber Fleck in LS oberhalb 7. - Ex Herbario F. Schumm Nr. 12539.

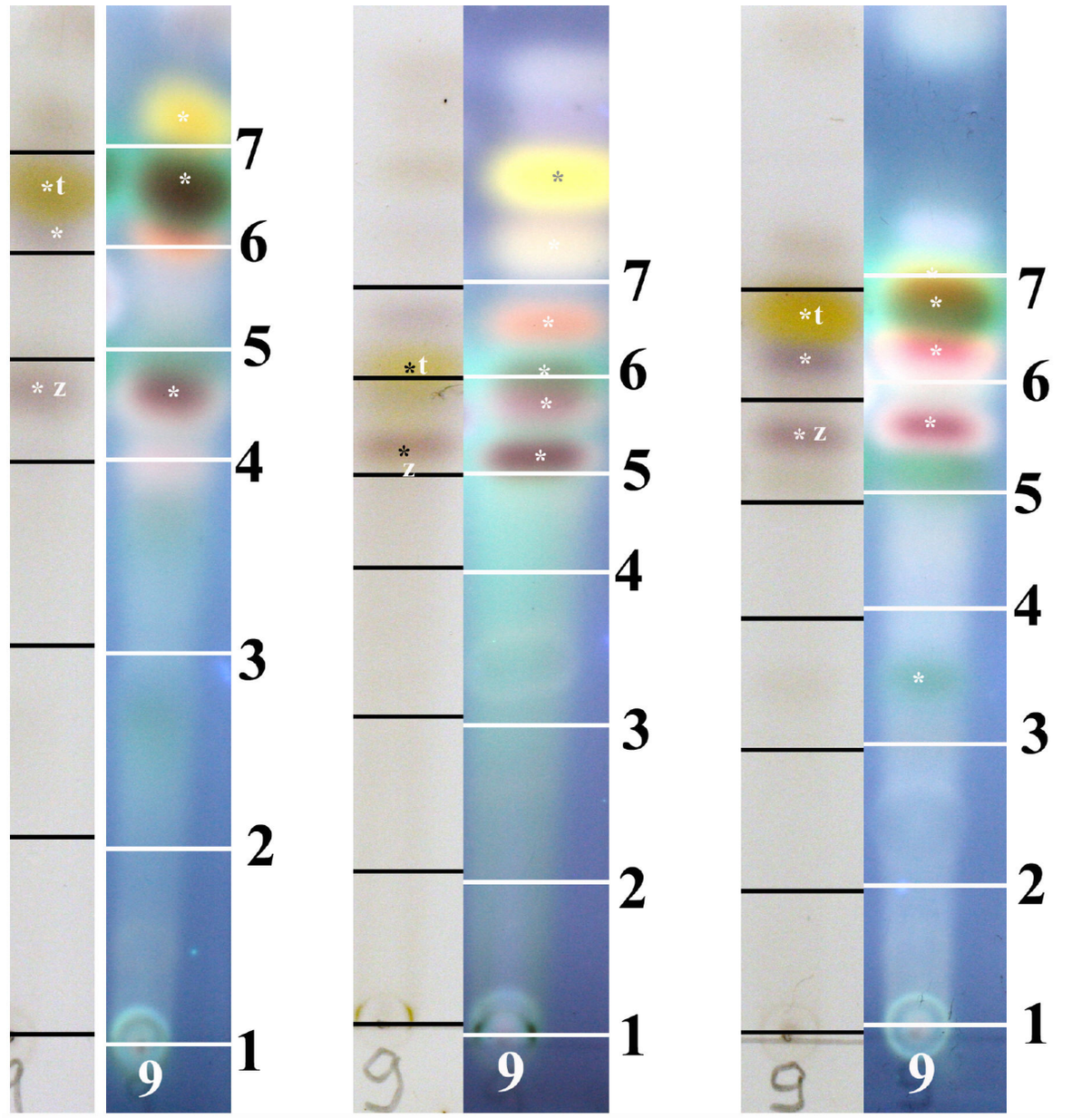
Thallus foliose, broad-lobed, heteromerous and dorsiventral, forming 10-30(-50) cm wide rosettes, bluish- to brownish grey when dry, blackish green when wet, loosely attached. Lobes 1-3 cm wide, up to 5 cm long, flattened, contiguous, with ascending margins, the upper surface glabrous, shiny, smooth. Lower surface pale towards margins, darker in central parts, with a very distinct pattern of rounded to oval, white patches in the spaces between the network of flat, dark brown-black, broad, reticulated veins, with fasciculate-squarrose, 2-3 mm long rhizines arranged in concentric lines. Upper cortex pseudoparenchymatous; medulla white; lower cortex absent. Apothecia frequent, terminal on short ascending lobes, with a brown, horizontal, flat disc. Paraphyses simple, distinctly thickened above. Asci 8-spored, fissitunicate, Peltigera-type, the thickened apex with a K/I+ blue ring. Ascospores 3(-5)-septate, hyaline, acicular, thin-walled, (25-)33-41(-47) x 3-7 µm. Pycnidia dark, immersed. Conidia fusiform. Photobiont cyanobacterial (*Nostoc*, the cells not in long chains). Spot tests: cortex and medulla K-, C-, KC-, P-, or medulla sometimes faintly and fleeting C+ and KC+ pale pink. Chemistry: two chemotypes, with different combinations of tenuiorin, methylgyrophorate, gyrophoric acid, hopanes, and unidentified terpenoids.

Peltigera horizontalis

Peltigera horizontalis

Peltigera horizontalis

Peltigera horizontalis



Peltigera horizontalis

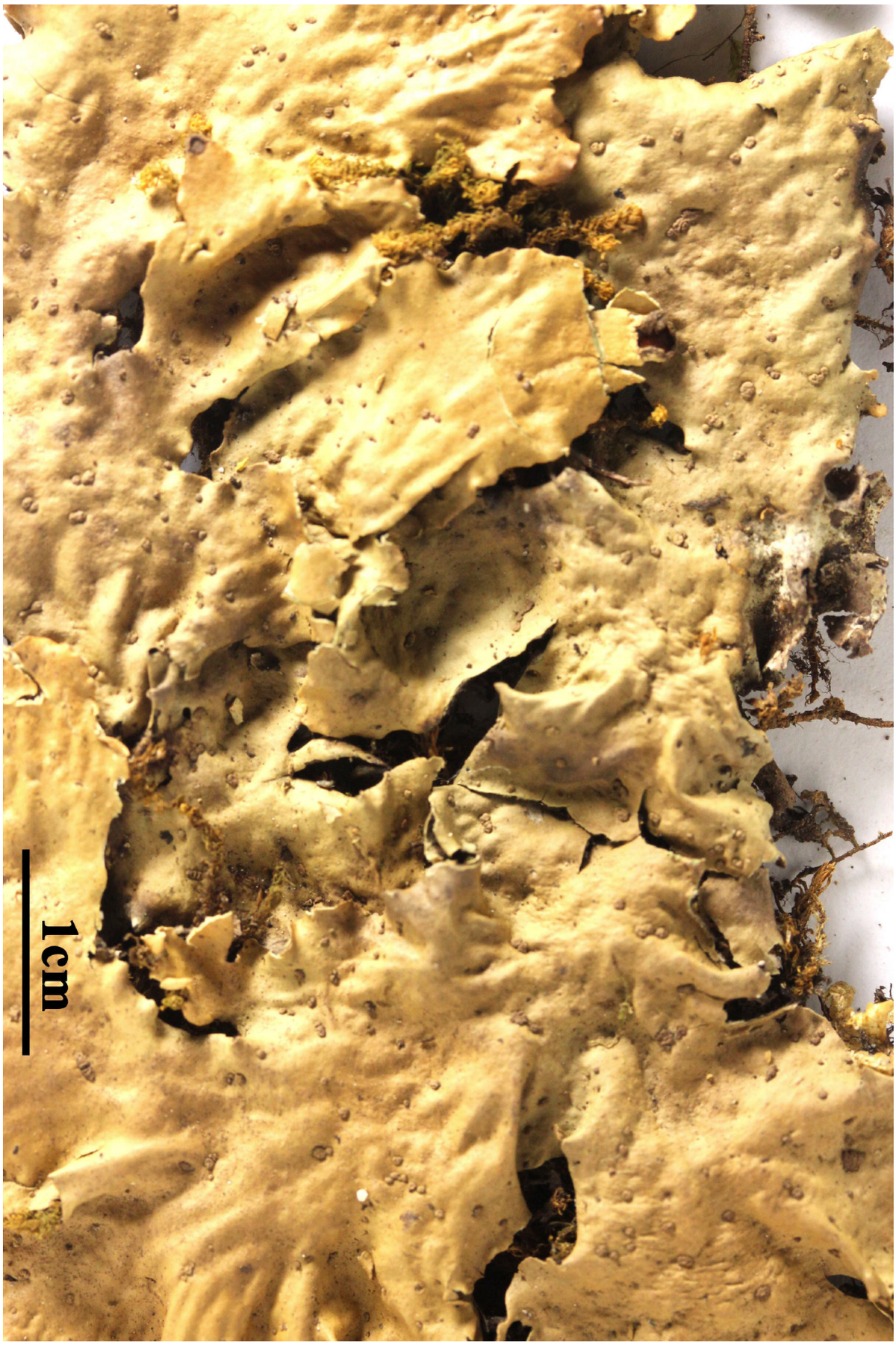
Peltigera leucophlebia (Nyl.) Gyeln., Magy. Bot. Lapok 24: 79 (1926) [1925]
= *Peltigera aphthosa* var. *leucophlebia* Nyl. 1860

[OH490], Japan. Honshu. Prov. Shinano (Pref. Nagano): en route from Moukidaira to Jumonji Pass, Kawakami-mura, Minamisaku-gun (35°57' N, 138°43' E). On rock with mosses, 1500 m. Leg. Y. Ohmura (no. 9674), K. Yoshida & A. Frisch, det. Y. Ohzmura. EX Y. OHMURA LICHENES MINUS COGNITI EXSICCATI NR. 480.

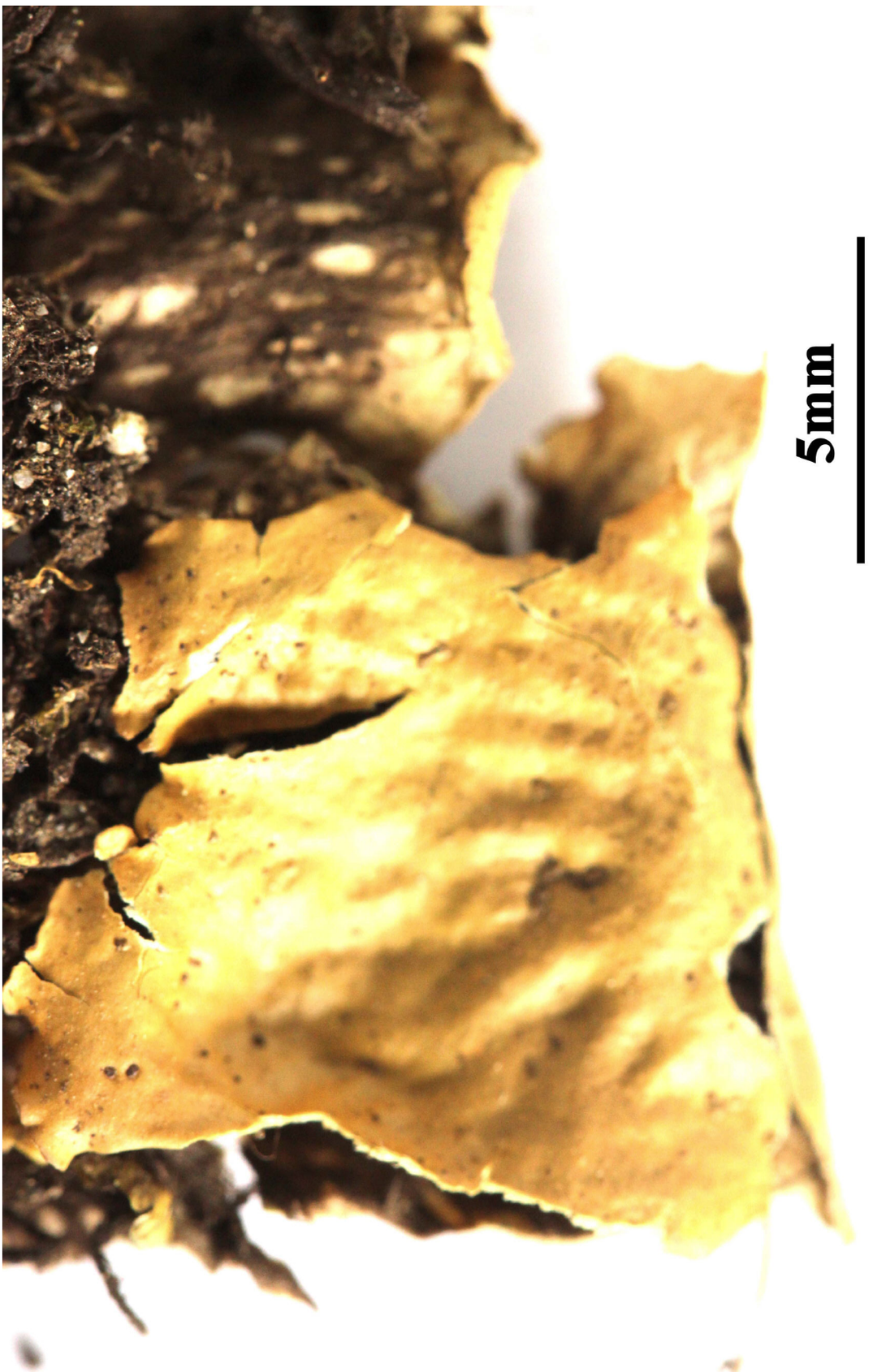
Thallus foliose, heteromerous and dorsiventral, broad-lobed, loosely attached, forming 5-25(-30) cm wide rosettes. Lobes elongate, concave, contiguous, 1.5-3(-5) cm broad, up to 10(-15) cm long, usually obtuse to boat-shaped, with ascending, entire to crenate margins. Upper surface grey to greenish-grey when dry, bright green when wet, smooth or weakly wrinkled, with c. 1-1.3 mm wide, numerous, scattered, dark grey, warted cephalodia containing Nostoc, the marginal parts minutely erect-tomentose. Lower surface tomentose, whitish in marginal parts, dark brown to blackish in central parts, with well-distinct, reticulate, dark brown to black veins and pale to dark, separate, simple to tufted, up to 5 mm long rhizines. Upper cortex pseudoparenchymatous; medulla white, with loosely interwoven hyphae; lower cortex absent. Apothecia rare, saddle-shaped, terminal, brown, the cortex on the lower side disrupted into small green patches, 4-7(-15) mm. Paraphyses simple, distinctly thickened in upper part. Asci 8-spored, fissitunicate, the thickened apex with a K/I+ blue ring, Peltigera-type. Ascospores 3-5(-7)-septate, hyaline to pale brown at maturity, acicular, thin-walled, (45-)50-70(-80) x 4-6 µm. Photobiont chlorococcoid (Coccomyxa), cephalodia with Nostoc. Spot tests: K-, C-, KC-, P-, UV-, or medulla rarely faintly C+ and KC+ pink. Chemistry: tenuiorin, methyl gyrophorate and triterpenoids, sometimes with low amounts of gyrophoric acid in the medulla. - Note: this is the vicariant of *P. aphthosa* on more or less calcareous substrata in upland areas, most common in the beech belt of the Alps.

Peltigera leucophlebia

Peltigera leucophlebia



Peltigera leucophlebia



Peltigera leucophlebia

Peltigera leucophlebia (Nyl.) Gyeln., Magy. Bot. Lapok 24: 79 (1926) [1925]
= *Chloropeltigera variolosa* (A. Massal.) Gyeln., Annls Mus. natn. Hung., Pars bot. 28: 279 (1934)
= *Chloropeltigera variolosa* var. *leucophlebia* (Nyl.) Gyeln., Annls Mus. natn. Hung., Pars bot. 28: 279 (1934)
= *Peltidea aphthosa* f. *leucophlebia* (Nyl.) Cromb., Grevillea 15(no. 75): 77 (1887)
= *Peltidea aphthosa* f. *variolosa* (A. Massal.) Arnold, Flora, Regensburg 67(13): 232 (1884)
= *Peltidea aphthosa* var. *leucophlebia* (Nyl.) Nyl., Not. Sällsk. Fauna et Fl. Fenn. Förh., Ny Ser. 8: 117 (1866)
= *Peltidea leucophlebia* (Nyl.) Räsänen, Ann. bot. Soc. Zool.-Bot. fenn. Vanamo 18(no. 1): 52 (1943)
= *Peltidea variolosa* (A. Massal.) M. Choisy, in Tronchet, Bull. mens. Soc. linn. Soc. Bot. Lyon 5(2): 20 (1936)
= *Peltigera aphthosa* var. *leucophlebia* Nyl., Syn. meth. lich. (Parisiis) 1(2): 323 (1860)
= *Peltigera aphthosa* var. *variolosa* A. Massal., Sched. Crit. Lich. Exsicc. (Veronae) 3: 64 (1856)
= *Peltigera canina* f. *variolosa* (A. Massal.) Lederer, Annls mycol. 3(3): 267 (1905)
= *Peltigera variolosa* (A. Massal.) Gyeln., Magy. Bot. Lapok 28: 61 (1929)
= *Peltigera variolosa* var. *leucophlebia* (Nyl.) Gyeln., Annls mycol. 30(5/6): 453 (1932)

[4692], Österreich, Brandenberg ca. 45 km östlich von Innsbruck nördlich von Rattenberg, in der Kaiserklamm nördlich vom Kaiserhaus (Brandenberger Ache), ca. 730 m, an Baumstümpfen. TK 8437. Leg. F. Schumm (BLAM-Exkursion), 03.08.1996, det. F. Schumm 1996. Ex Herbarioa F. Schumm Nr. 4692.

Thallus foliose, heteromerous and dorsiventral, broad-lobed, loosely attached, forming 5-25(-30) cm wide rosettes. Lobes elongate, concave, contiguous1.5-3(-5) cm broad, up to 10 cm long, usually obtuse to boat-shaped, with ascending, entire to crenate margins. Upper surface grey to greenish-grey when dry, bright green when wet, smooth, with c. 1 mm wide, numerous, scattered, dark grey, warted cephalodia containing *Nostoc*, the marginal parts minutely erect-tomentose. Lower surface tomentose, whitish in marginal parts, dark brown to blackish in central parts, with well-distinct, reticulate, brown to black veins and pale to dark, separate, simple to tufted, up to 5 mm long rhizines. Upper cortex pseudoparenchymatous; medulla white; lower cortex absent.

Apothecia rare, saddle-shaped, terminal, brown, the cortex on the lower side disrupted into small green patches. Paraphyses simple, distinctly thickened in upper part. Asci 8-spored, fissitunicate, the thickened apex with a K/I+ blue ring, Peltigera-type. Ascospores 3-7-septate, hyaline to pale brown at maturity, acicular, thin-walled, 50-70(-80) x 4-6 µm. Photobiont chlorococcoid (*Coccomyxa*), cephalodia with *Nostoc*. Spot tests: K-, C-, KC-, P-, UV-, or medulla rarely faintly C+ and KC+ pink. Chemistry: tenuiorin, methylgyrophorate and triterpenoids, sometimes with low amounts of gyrophoric acid in the medulla. -Note: this is the vicariant of *P. aphthosa* on more or less calcareous substrata in upland areas, most common in the beech belt of the Alps.

Peltigera leucophlebia

Peltigera leucophlebia

Peltigera malacea (Ach.) Funck, Cryptog. Gewächse (Leipzig) 33: 5 (1827)
= *Peltidea malacea* Ach. 1814

[OH687], Japan. Honshu. Echigo Prov. (Niigata Pref.) Suginosawa-mura, Naka-Kubiki-gun. Leg. M. Togashi, 6.11.1957, det. Y. Ohmura. EX X.OHMURA LICHENES MINUS COGNITI EXSICCATI NR. 687.

Thallus foliose, broad-lobed, heteromerous, dorsiventral, medium-sized to large, to 15(-20) cm in diam., up to 1.5 mm thick, bluish to greenish grey (often with a brownish hue) when dry, dark bluish green to dark olive-green when wet, loosely attached. Lobes elongate, concave, contiguous, with rounded ends, up to 3 cm broad, to 10 cm long, often imbricate, with plane to ascending, often inrolled, erect-tomentose margins. Lower surface veinless, pale brown near margins, black in central parts, with sparse, fasciculate, up to 3 mm long, dark rhizines. Upper cortex paraplectenchymatous; medulla white, with loosely intewoven hyphae; lower cortex absent. Apothecia extremely rare (not seen in Italian material), terminal on short ascending lobes, brown-black, the disc usually flat, 4-8 mm. Paraphyses simple, distinctly thickened above. Asci 8-spored, fissitunicate, the thickened apex with a K/I+ blue ring, Peltigera-type. Ascospores 3-5-septate, hyaline, acicular, thin-walled, (45-)52-70(-90) x (2.6-)4-6.5 μm. Photobiont cyanobacterial (Nostoc the cells not in long chains). Spot tests: all negative or medulla weakly C+ red. Chemistry: five chemotypes with different combinations of tenuiorin, methyl gyrophorate, gyrophoric acid, 3-5-hopane triterpenoids, zeorin, and dolichorrhizin. - Note: a circumpolar, arctic-alpine lichen found in grasslands and scrublands near and above tree-line, often amongst mosses, on siliceous substrata.

Peltigera malacea

Peltigera malacea

Peltigera praetextata (Flörke ex Sommerf.) Zopf, Ann. Chemie 364: 299 (1909)
= *Peltidea ulorrhiza* var. *praetextata* Flörke ex Sommerf., Suppl. Fl. lapp. (Oslo): 123 (1826)
= *Peltigera canina* f. *innovans* (Flot. ex Körb.) J.W. Thomson, Trans. Wis. Acad. Sci. Arts Lett. 38: 265 (1947) [1946]
= *Peltigera canina* subsp. *praetextata* (Flörke ex Sommerf.) Lambinon ex Ozenda & Clauzade, Les Lichens (Paris): 775 (1970)
= *Peltigera canina* var. *praetextata* (Flörke ex Sommerf.) Vain., Term. Füz. 22: 306 (1899)
= *Peltigera rufescens* *** *innovans* Flot. ex Körb., Syst. lich. germ. (Breslau): 60 (1855)
= *Peltigera rufescens* f. *innovans* Flot. ex Körb., Syst. lich. germ. (Breslau): 60 (1855)
= *Peltigera rufescens* f. *praetextata* (Flörke ex Sommerf.) Oxner, Flora Lischaĭnikiv Ukraïni (Kiev) 1: 438 (1956)
= *Peltigera rufescens* var. *praetextata* (Flörke ex Sommerf.) Nyl., Syn. meth. lich. (Parisiis) 1(2): 324 (1860)

[19629], Germany, Baden-Württemberg, Kreis Göppingen, Zell bei Börtlingen, im Marbachtal, an Stammbasis am Blockhausweg, 48.7572° N, 9.6447° E, 365 m. Leg. F. Schumm, 26.03.2017, det. F. Schumm. *Own notes*: Thallus oberseits filzig, marginal mit ziemlich spärlichen Isidien-Phyllidien.

Thallus large, up to 20(-30) cm in diameter, lobes 10-15(-20) mm broad, 5-7 cm long, margins plane or upright. Upper surface tomentose, becoming glabrose towards the centre and often with a brownish tint. Phyllidia common, marginal and laminal, squamulose or coralloid. Lower surface with 0.6-1 mm broad veins which are dark brown in the centre. Rhizines 4-6 mm, dark in central parts but pale and simple close to margins. Apothecia common, 4-7(-10) mm wide. Spores (29-)38-58(-65) x 2.6-5.2 µm. Chemistry: No lichen substances by TLC. - The presence of isidia (or phyllidia) on cracks or along margins of the thallus is often considered as the only reliable diagnostic characteristic of *P. praetextata* against *P. canina*. Solely on this basis does not, however, result in a natural grouping and, besides the phyllidia, there are other useful characteristrics to distinguish between these species: the structure of rhizines and veins in particular, and the spore size to a certain degree. The upper surface of P. praetextata often is distinctly brownish in colour and has no tomentum in its central parts. Helping to distinguish the species from *P. canina* and *P. membranacea* are the

flattened, smooth and brown veins and the slender, almost simple or only slightly ramified rhizines, which are not fused together with their bases. - On shaded, mossy outcrops or boulders of usually basic or calciferous rocks, often in or bordered by rich-forest vegetation, and also on decaying, fallen logs or mossy bases and trunks of deciduous trees.

Peltigera praetextata

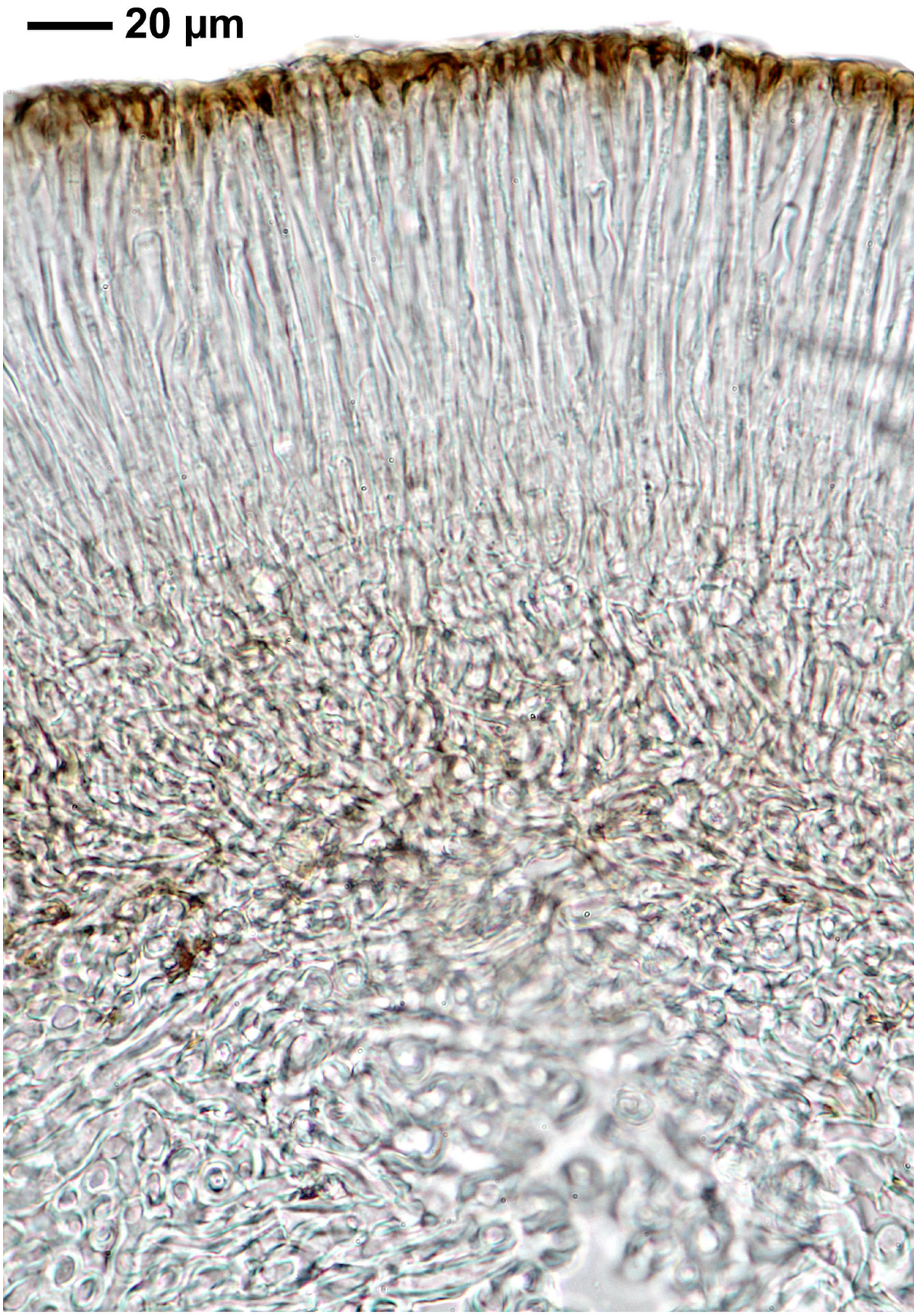
Peltigera praetextata

Peltigera praetextata

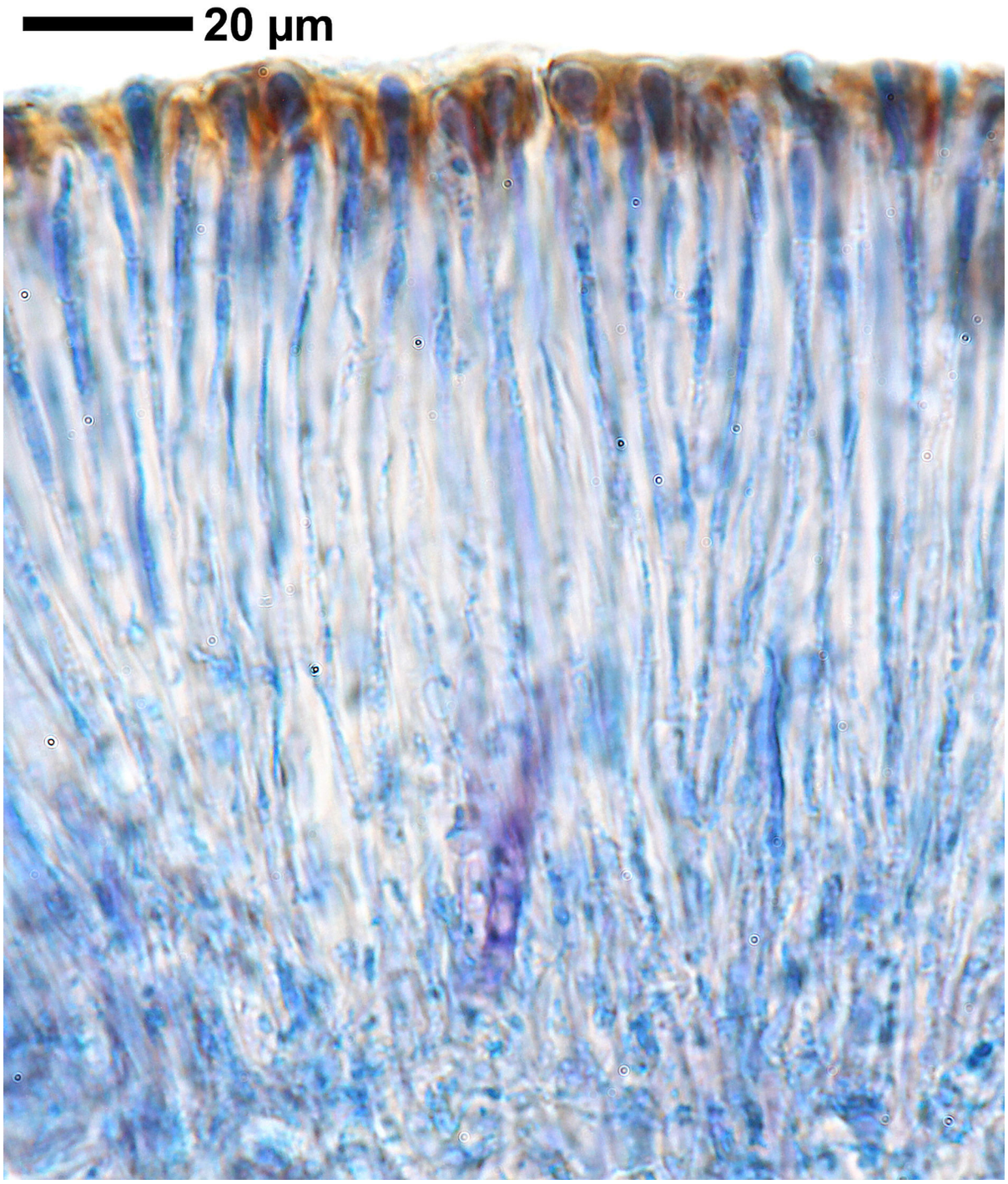
Peltigera praetextata

Peltigera praetextata

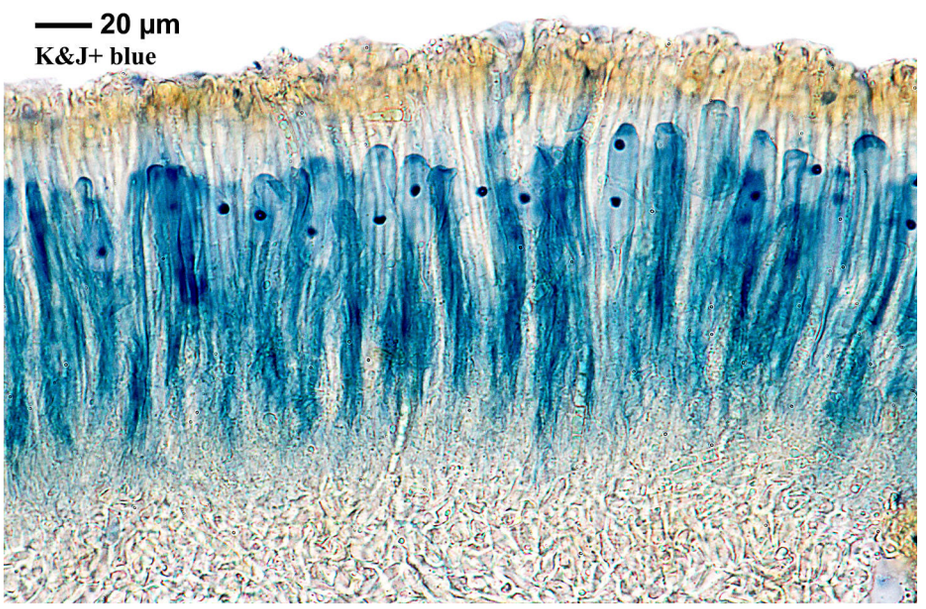
Peltigera praetextata



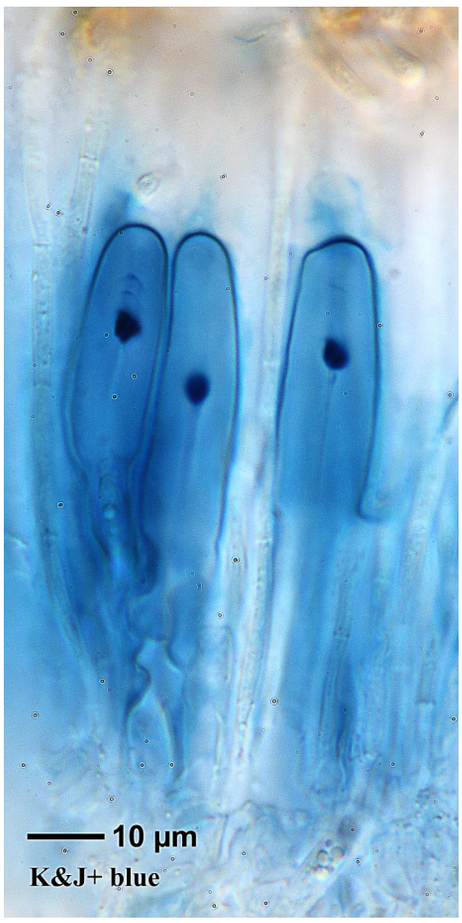
Peltigera praetextata

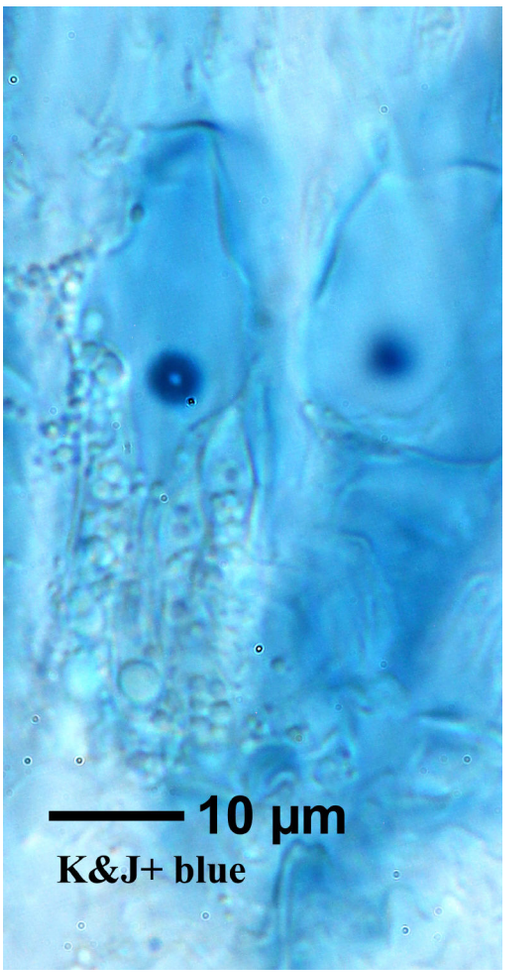


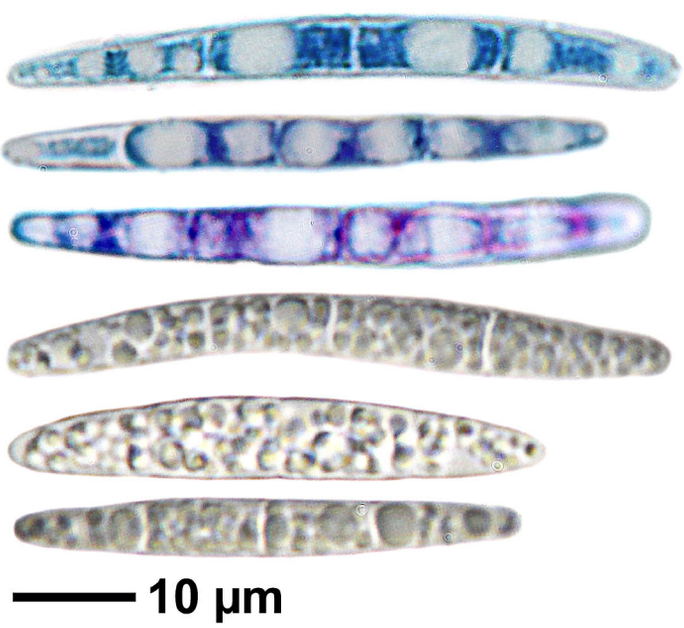
Peltigera praetextata



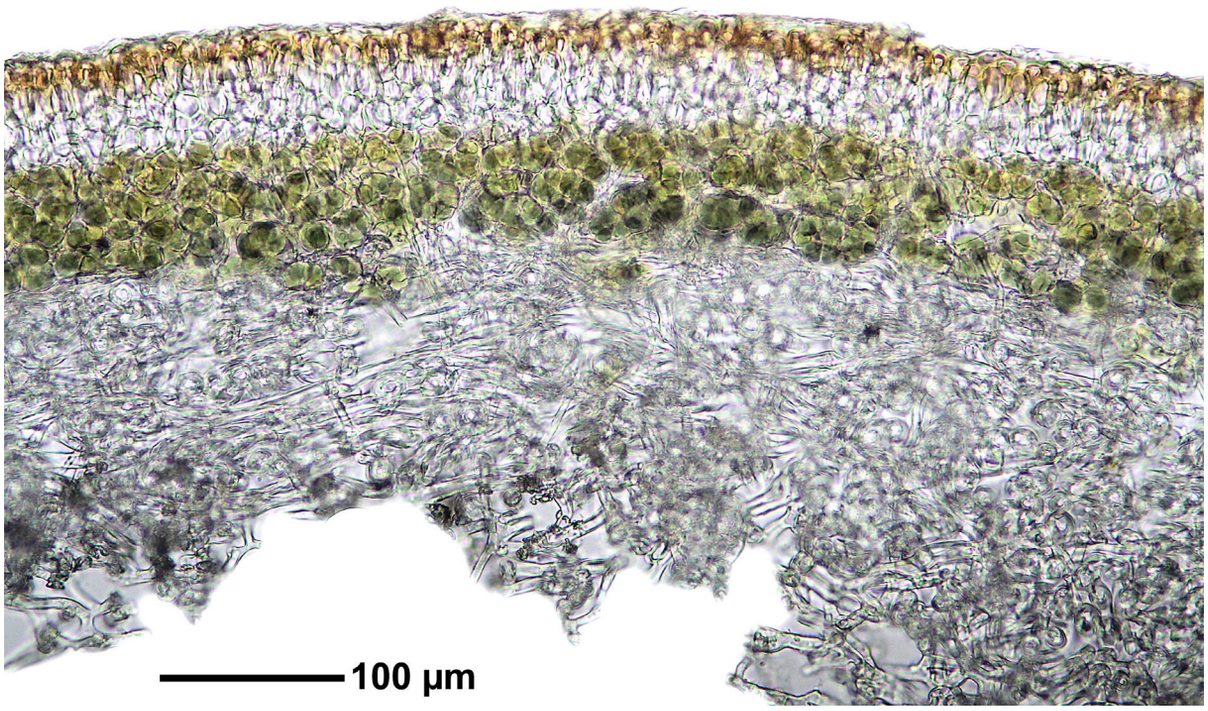
Peltigera praetextata

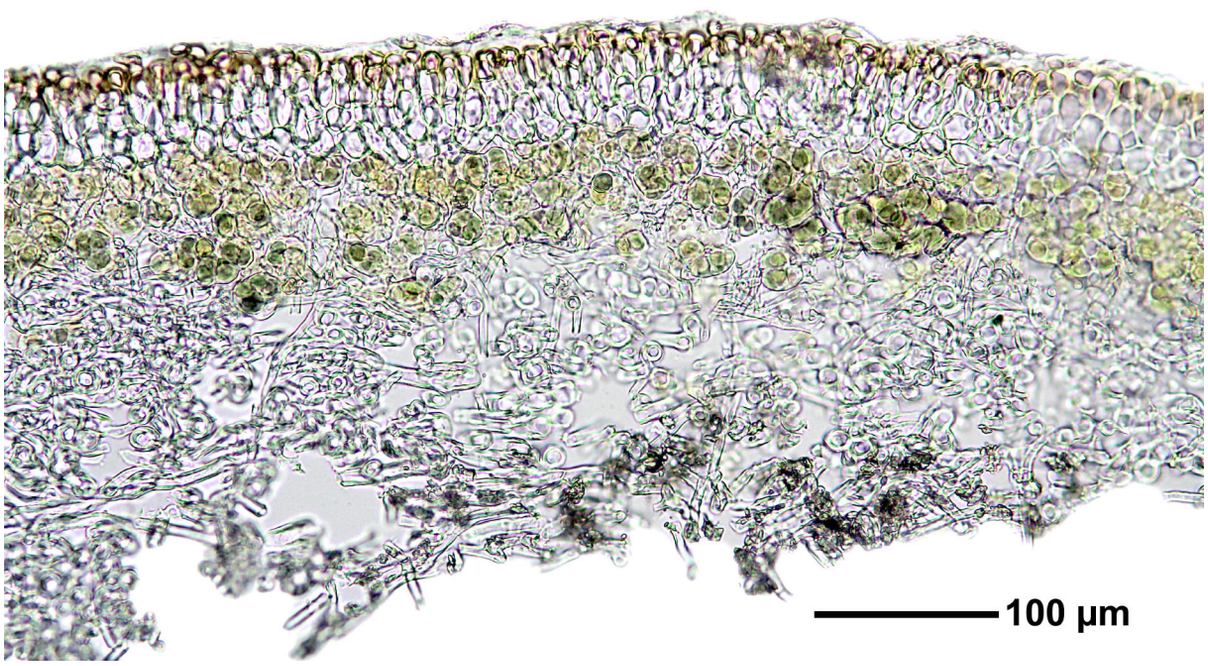




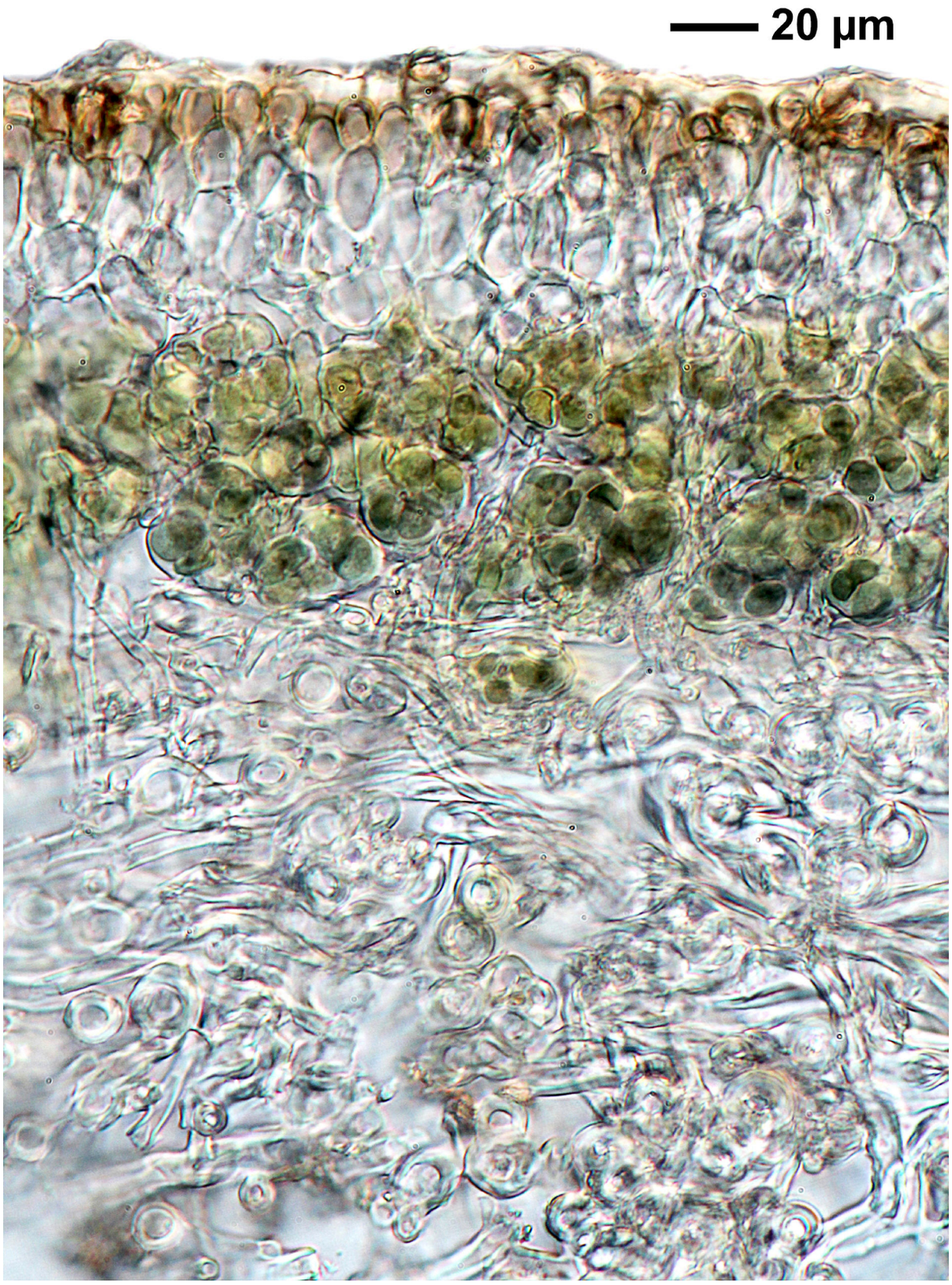


Peltigera praetextata





Peltigera praetextata



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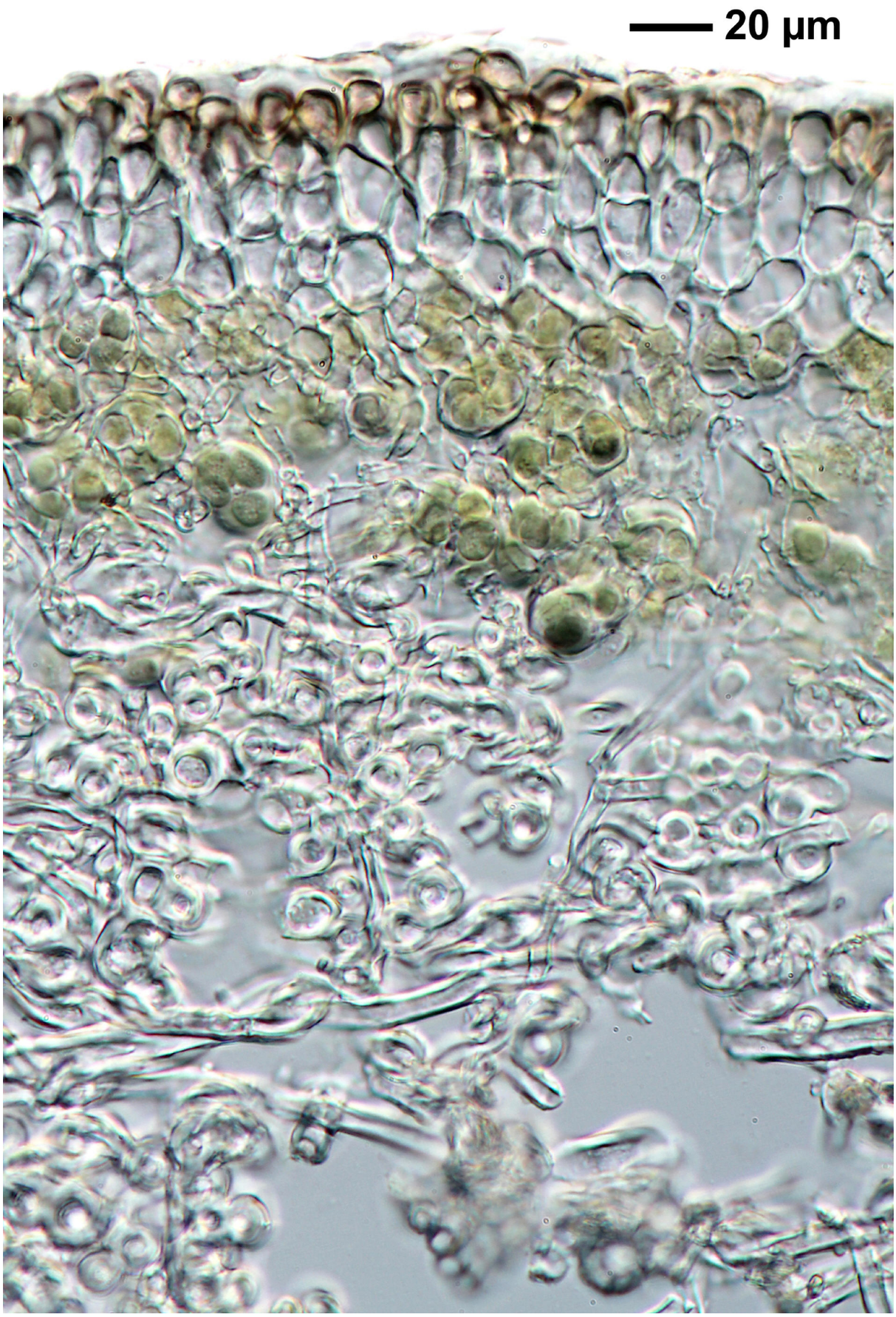

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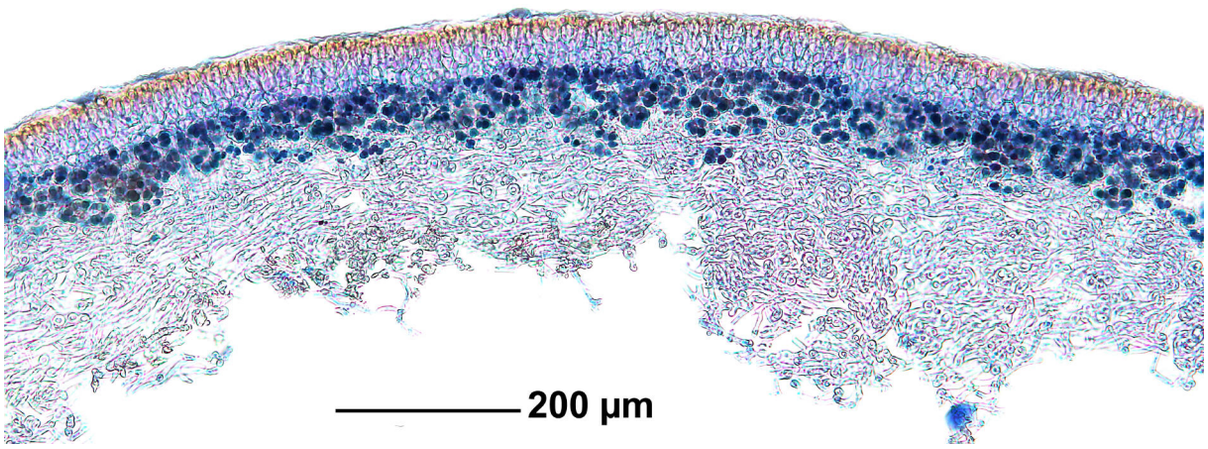
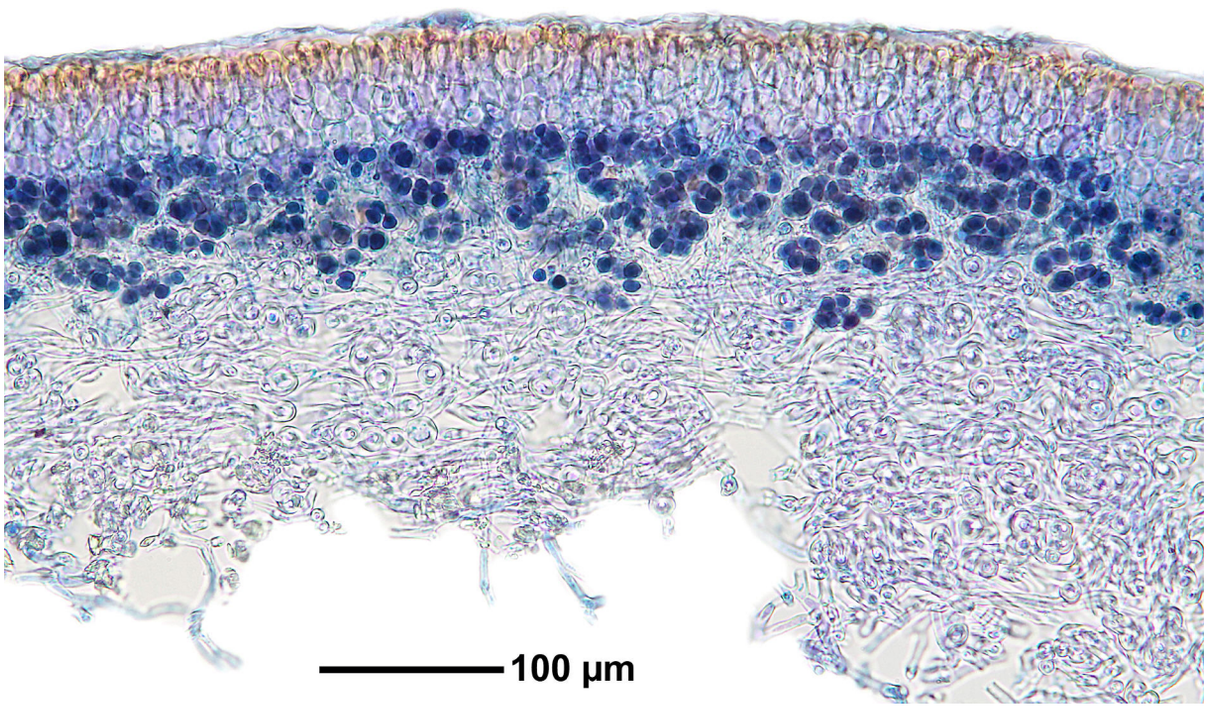
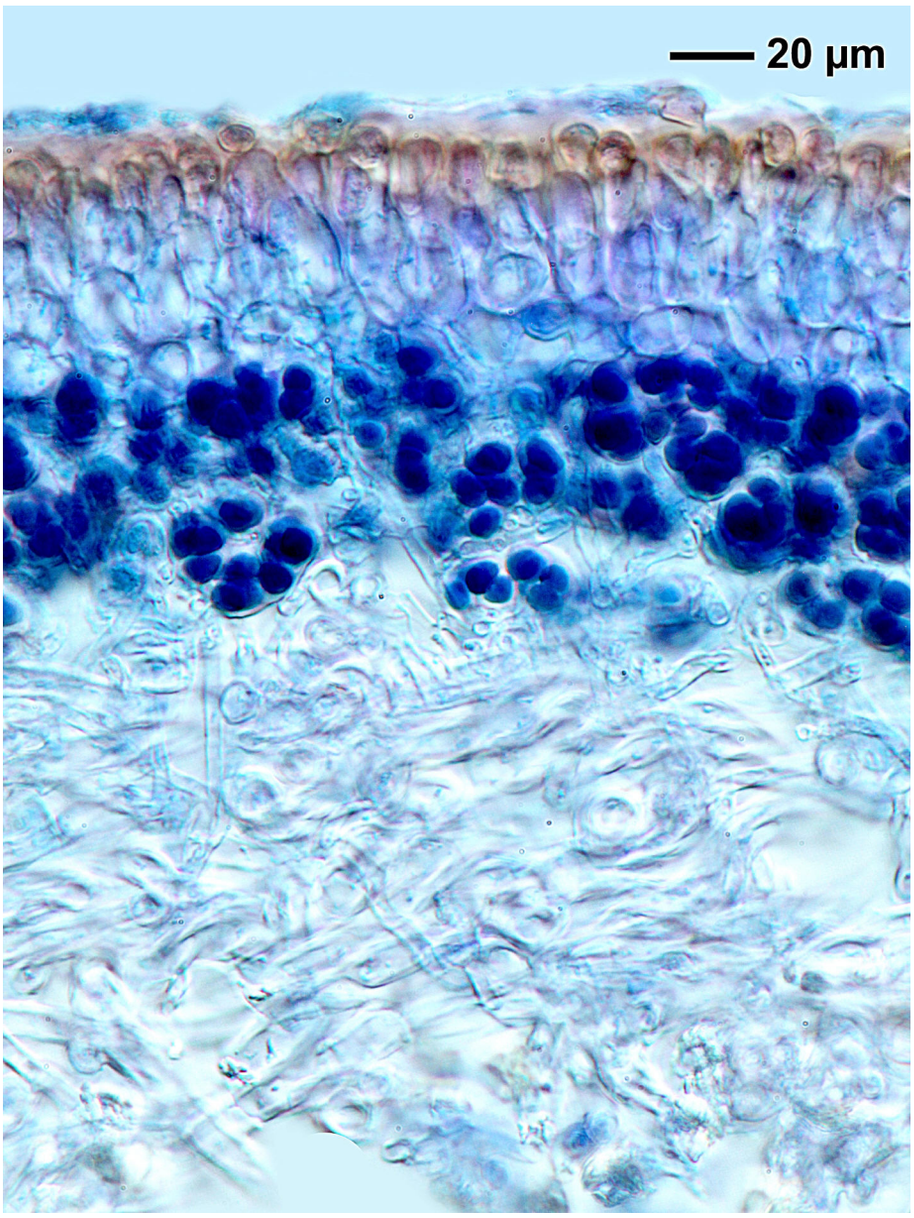
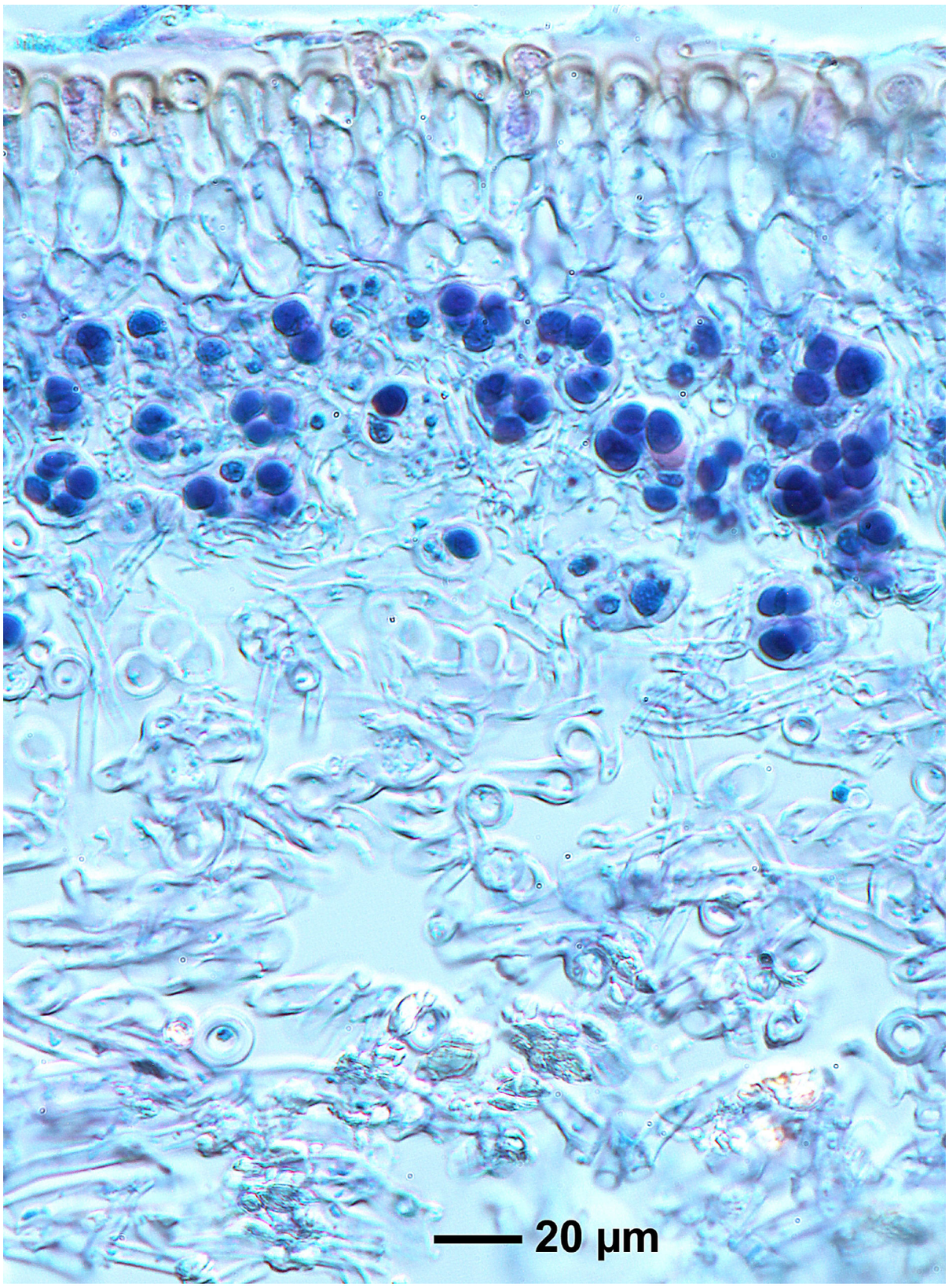




Peltigera praetextata


20 µm



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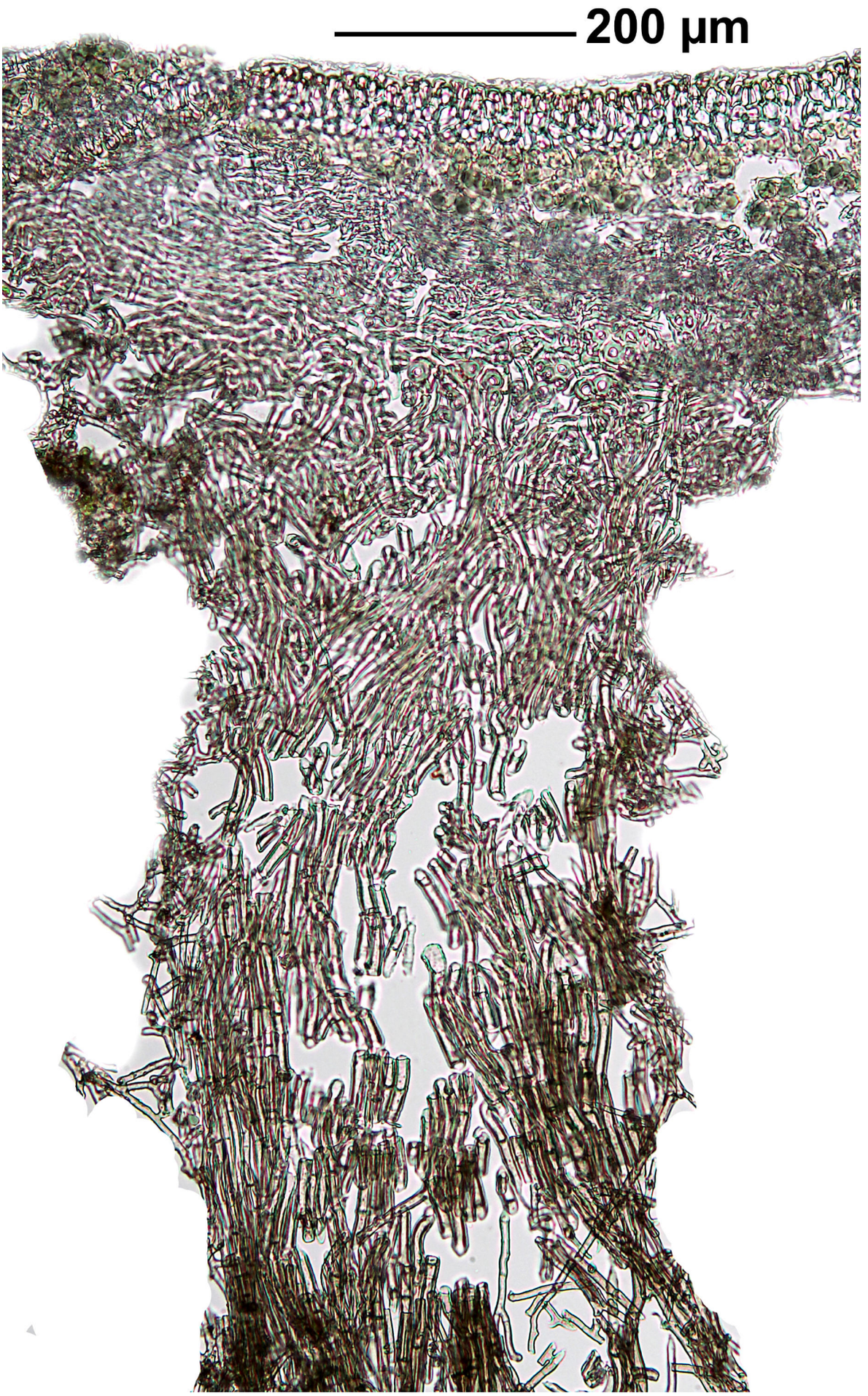
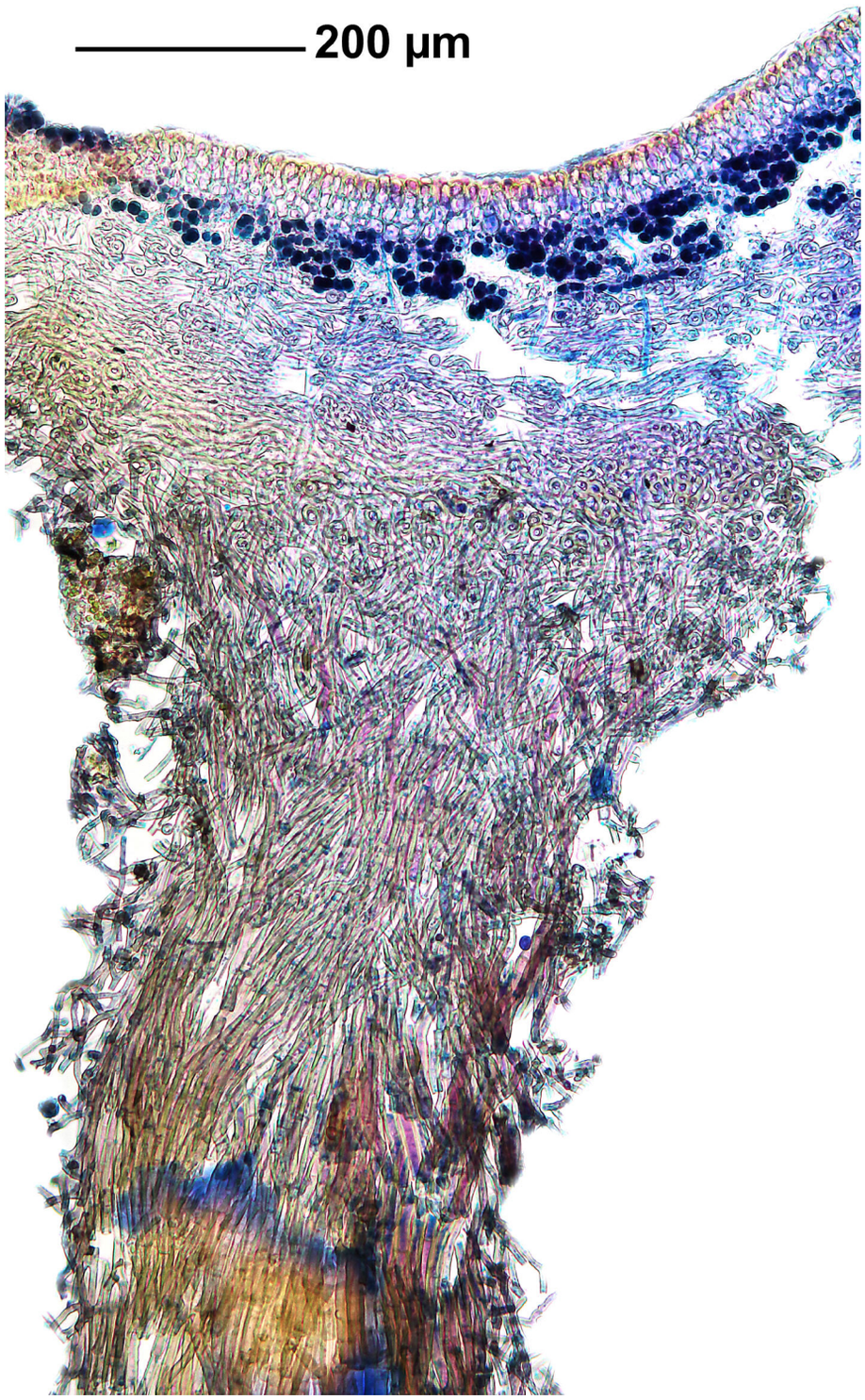
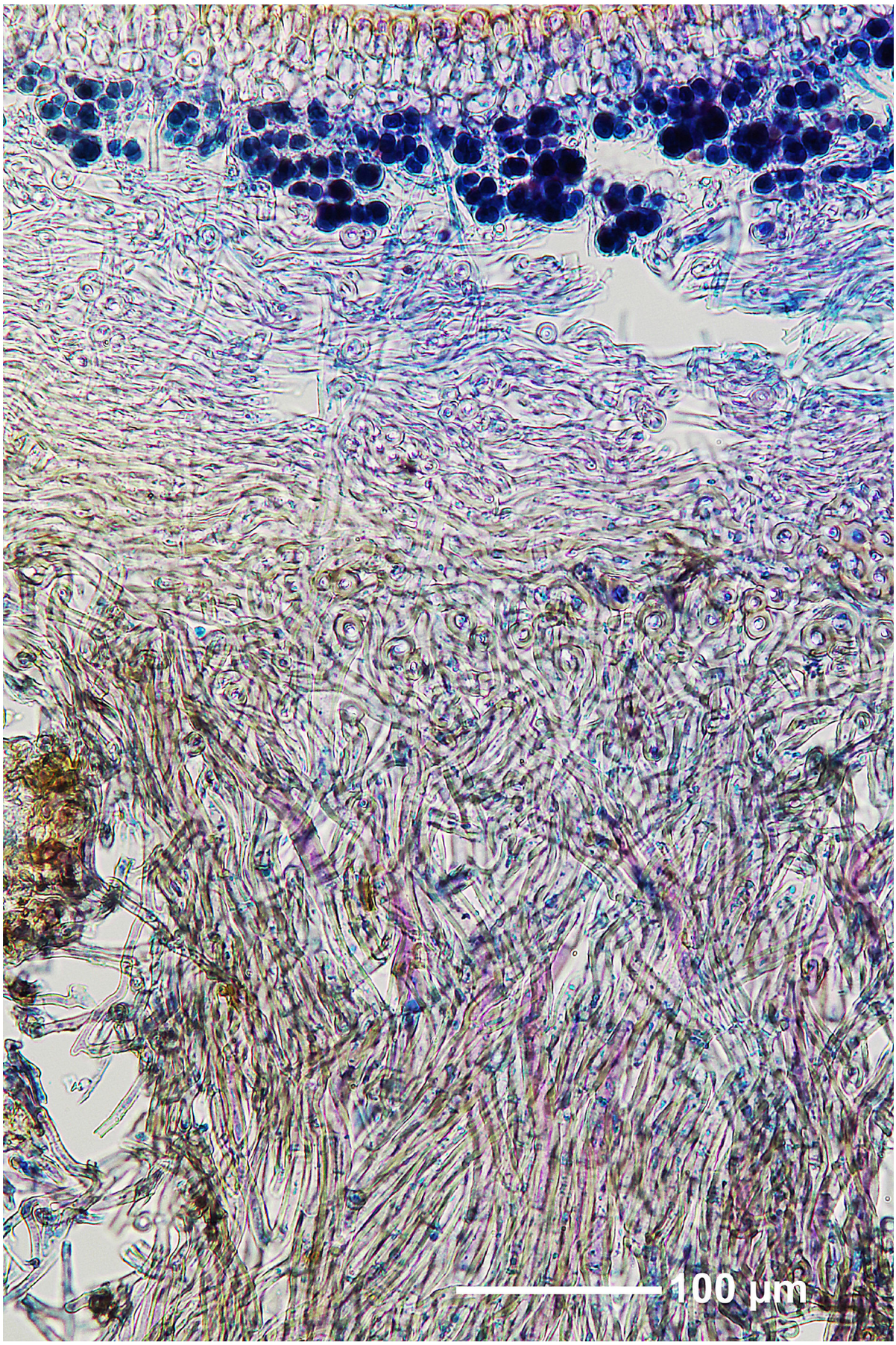
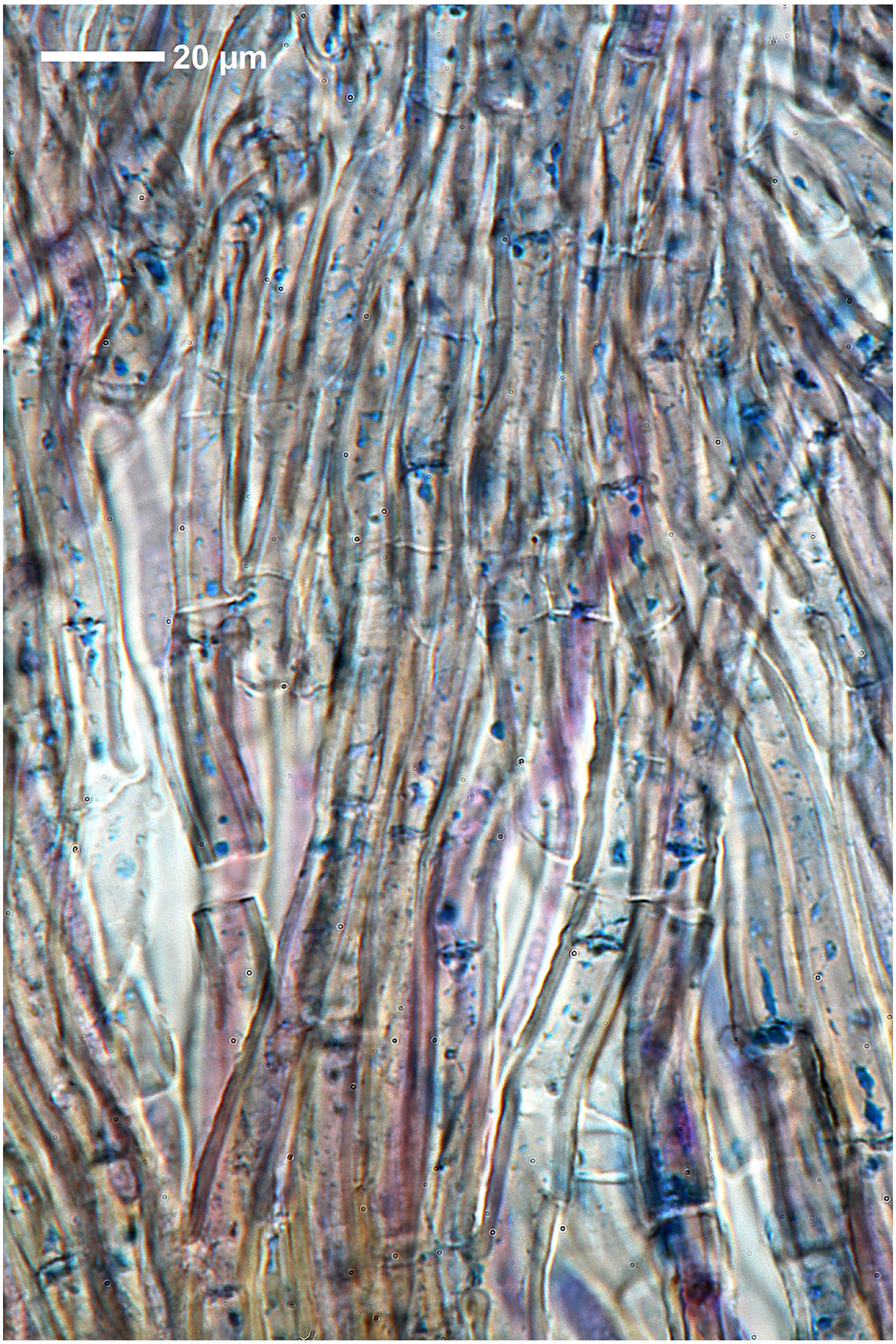


Peltigera praetextata


200 µm



Peltigera praetextata

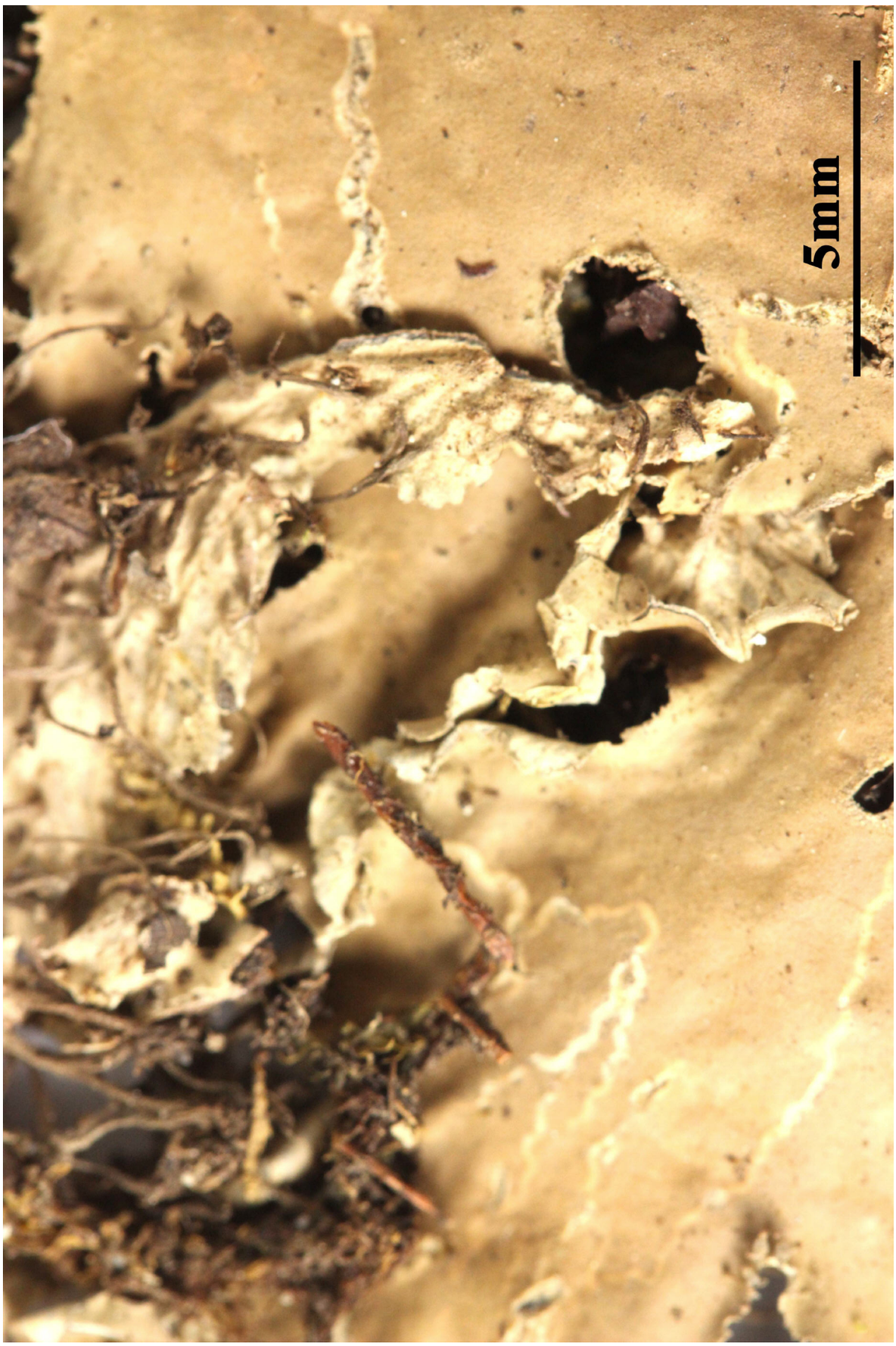


Peltigera praetextata

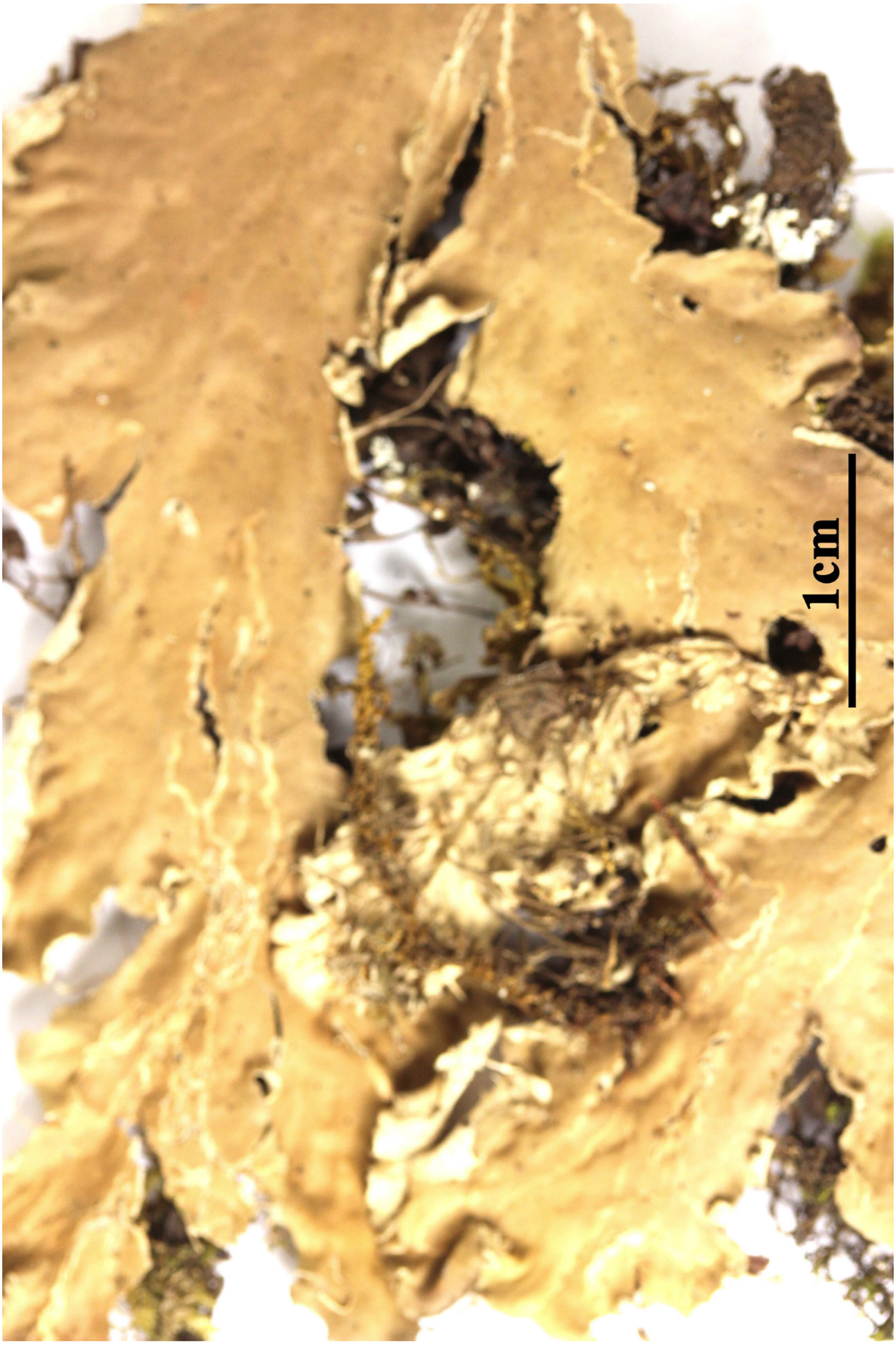
Peltigera praetextata (Flörke ex Sommerf.) Zopf, Ann. Chemie 364: 299 (1909)
= *Peltidea ulorrhiza* var. *praetextata* Flörke ex Sommerf. 1826

[OH491], Japan. Honshu. Prov. Shinano (Pref. Nagano): en route from Mouki-daira to Jumonji Pass. Kawakami-mura. Minamisaku-gun (35°57' E, 138°43' E). On rock with mosses, 1500 m. Leg. Y. Ohmura (m9 9675), K. Yoshida & A. Frisch, det. Y. Ohmura. EX Y. OHMURA LICHENES MINUS COGNITI EXSICCATI, NR. 491.

Thallus foliose, broad-lobed, heteromerous and dorsiventral, brownish grey to brown when dry, blackish when wet, loosely attached, forming more or less circular, up to 30 cm wide rosettes. Lobes elongate, flattened, contiguous, with rounded ends, up to 3(-4) cm wide and to 10 cm long, arachnoid-tomentose at margin, becoming glabrous in central parts, with flattened to slightly up-turned margins, often with flattened, simple to lobulate phyllidia located mostly along cracks of the upper cortex. Lower surface whitish, with pale, flattened to slightly raised, 0.5-1 mm wide veins which become darker towards centre, and 4-6 mm long, pale, simple, not confluent rhizines. Upper cortex pseudoparenchymatous; medulla white; lower cortex absent. Apothecia rare, brown, saddle-shaped, terminal on short ascending lobes, up to 7(-8) mm long. Paraphyses simple, distinctly thickened above. Asci 8-spored, fissitunicate, the thickened apex with a K/I+ blue ring, Peltigera-type. Ascospores 3-5-septate, hyaline to pale brown at maturity, acicular, thin-walled, 30-65 x (2.5-)3-5(-6) µm. Photobiont cyanobacterial (Nostoc, the cells not in long chains). Spot tests: cortex and medulla K-, C-, KC-, P-, UV-. Chemistry: without lichen substances. - Note: a holarctic, ecologically wide-ranging species found both in open woodlands and in grasslands (but only in humid areas), on mosses, mineral or organic soil, lignum (on stumps) and bark (on basal parts of old trees); one of the most common species of the genus.



Peltigera praetextata



Peltigera praetextata

Peltigera rufescens (Weiss) Humb., Fl. Friberg. Spec. (Berlin): 2 (1793)
= *Lichen caninus* var. *rufescens* Weiss 1770

[OH640], Japan. Honshu. Prov. Shinano (Nagano Pref.) Taira, Ohmachi-city (36°35'38" N, 137°51'*51" E). On soil, 1000 m. Leg. M. Nuno & M. Frisch, 22.8.1983, det. Y. Ohmura. EX Y. OHMURA LICHENES MINUS COIGNITI EXSICCATI NR. 640.

Thallus foliose, heteromerous and dorsiventral, dull brownish to whitish-grey-pruinose when dry, blackish green when wet, loosely attached, forming 5-10(-15) cm wide rosettes. Lobes 5-10 mm broad and up to 4 cm long, elongate, concave to flattened, contiguous, the upper surface thickly arachnoid-tomentose especially along margins, which are ascending, crisped, sometimes with adventitious lobules. Lower surface whitish, with raised, dark veins and c. 5 mm long, dark, squarrose-fasciculate rhizines. Upper cortex pseudoparenchymatous; medulla white; lower cortex absent. Apothecia saddle-shaped, on upper surface of the recurved lobe tips, brown, up to 5 mm. Paraphyses simple, distinctly thickened above. Asci 8-spored, Peltigera-type, fissitunicate, the thickened apex with a K/I+ blue ring. Ascospores 3-5(-6) septate, hyaline to very pale brown at maturity, acicular, thin-walled, (36-)50-65(-75) x 2.5-5.2 µm. Pycnidia dark, immersed. Conidia fusiform, 7-10 x 2.5-4.5 µm. Photobiont cyanobacterial (Nostoc, the cells not in long chains). Spot tests: cortex and medulla K-, C-, KC-, P-, UV-. Chemistry: without lichen substances. - Note: a widespread holarctic lichen, most common in dry grasslands, especially in upland areas, but also in the Mediterranean belt, where it is generally rare due to intensive grazing and trampling; one of the most common species of the genus.

Peltigera rufescens

Peltigera rufescens

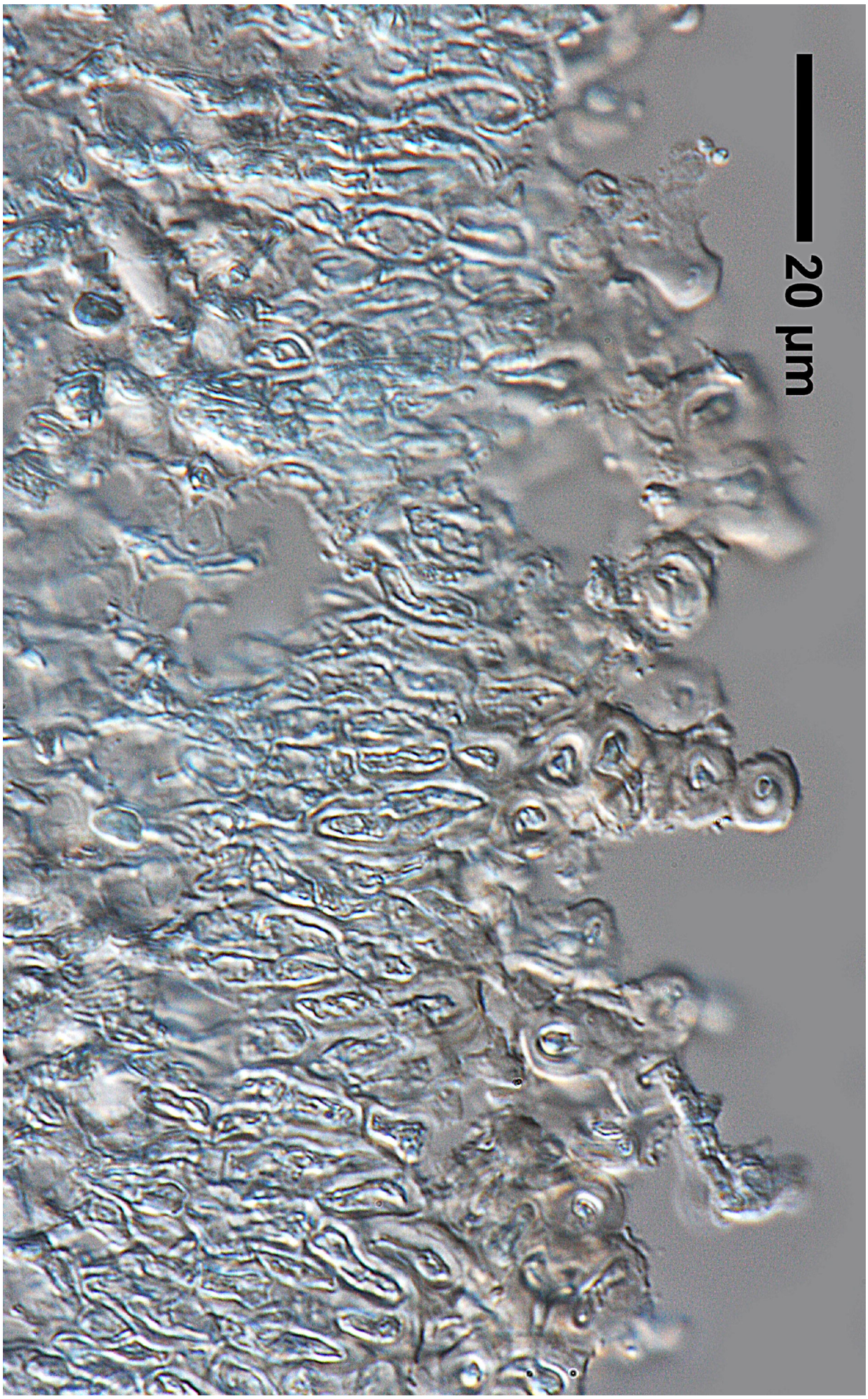
Peltigera rufescens (Weiss) Humb., Fl. Friberg. Spec. (Berlin): 2 (1793)
= *Lichen caninus* var. *rufescens* Weiss, Plant. Cryptog.-Fl. Goettingens: 79 (1770)
= *Lichen rufescens* (Weiss) Neck. [as 'ruffescens'], Method. Muscor. (Manhemii): 79 (1771)
= *Peltidea canina* var. *rufescens* (Weiss) Wahlenb., Fl. Suec. 2: 842 (1826)
= *Peltidea rufescens* (Weiss) Ach., Methodus, Sectio post. (Stockholmiæ): 285 (1803)
= *Peltigera canina* subsp. *rufescens* (Weiss) Lamy, Bull. Soc. bot. Fr. 25(5): 378 (1880) [1878]
=*Peltigera canina* var. *rufescens* (Weiss) Mudd, Man. Brit. Lich.: 82 (1861)

[5537], Germany, Baden-Württemberg, Zollernalbkreis, Lochenstein südlich von Balingen, Weißjura, ca. 964 m alt.; 48°13.048' N, 8°51.075' E; zwischen Moosen über Kalkblöcken in Steppenheide. TK 7719/3. Leg. F. Schumm & U. Schwarz, 25.04.1999, det. F. Schumm, 04.1999, conf. O. Vitikainen, 05.1999. EX HERBARIO F. SCHUMM NR. 5537.

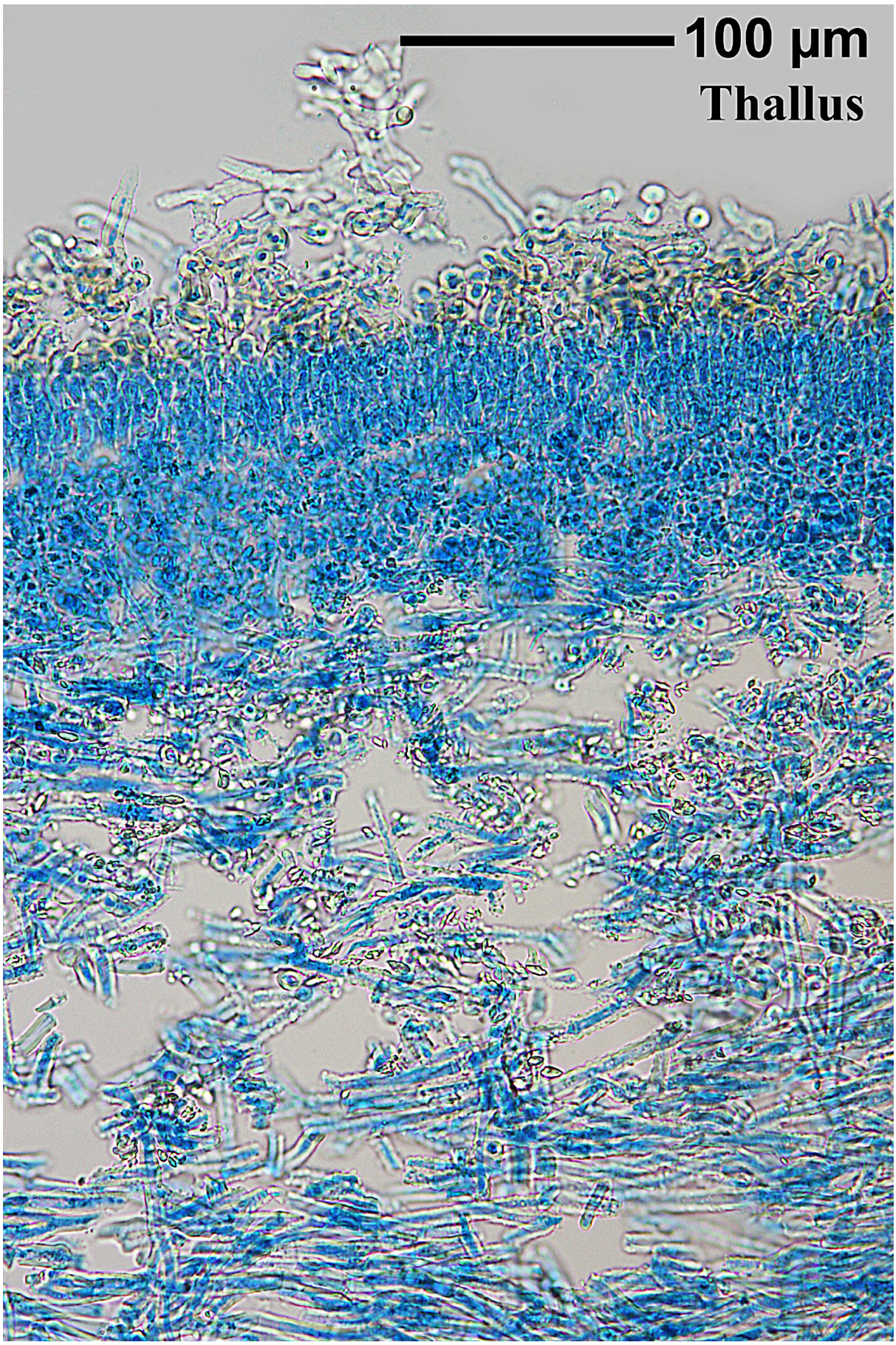
Thallus 6-10 m in diameter, lobes 5-10 mm broad and 40 mm long, margins crisped, elevated, often with adventitious lobules or squamules. Lower surface with elevated and soon darkening veins. Rhizines soon dark brown to blackish, richly branched, often with fused bases in dense rows along veins, ca. 5 mm. Apothecia fairly common, saddle-shaped, with dark discs. Spores (36-)49-63(-78) x 2.6-5.2 µm. Chemistry: No lichen substances by TLC. Usually *P. rufescens* is easily distinguished from *P. canina* by its narrower lobes with upward turned margins, its sooner darkening venation and blackish and dense-lined rhizines. The latter characteristics is especially important in separating *P. rufescens* from young, small specimens of *P. canina*.

Peltigera rufescens

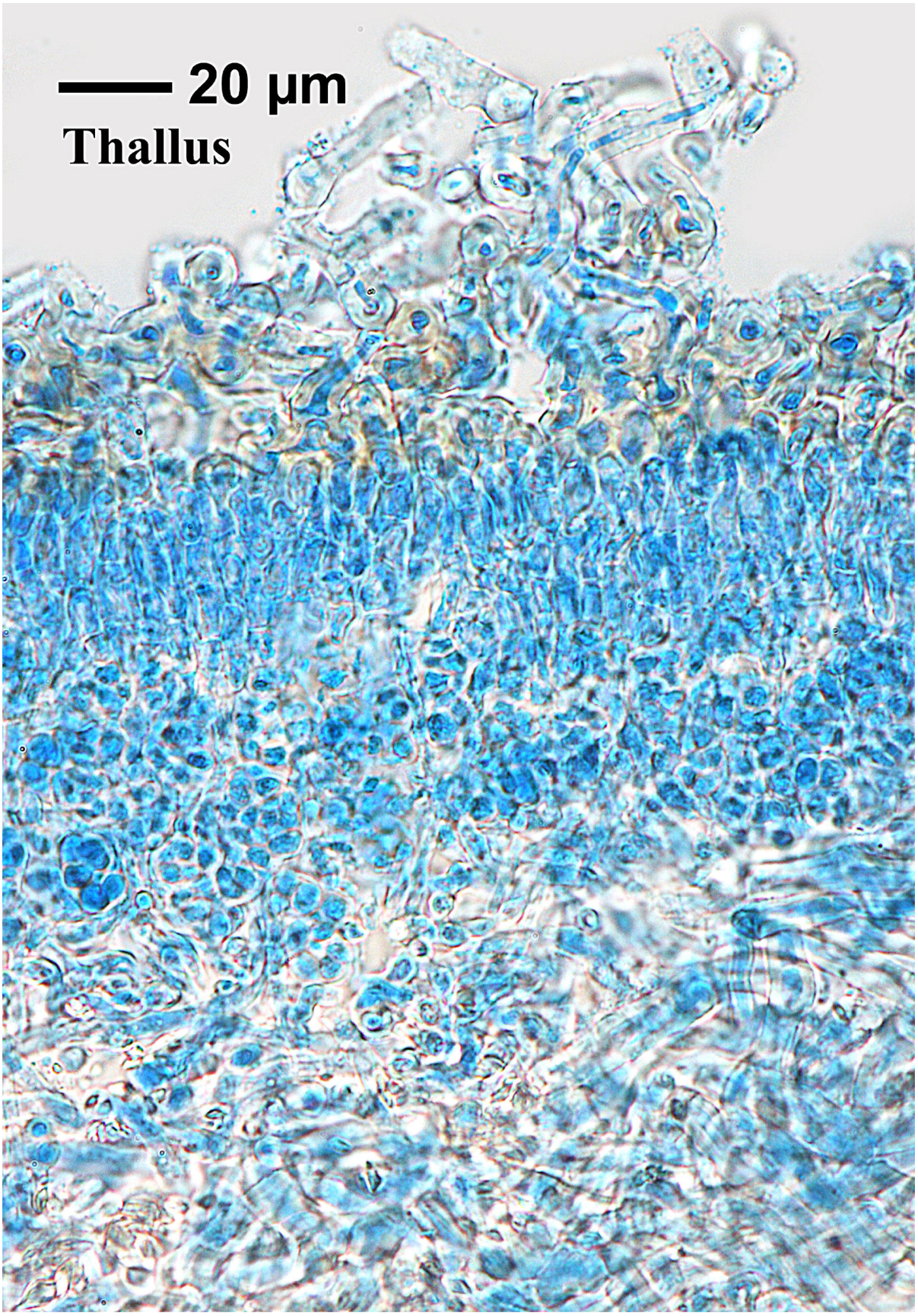
Peltigera rufescens



Peltigera rufescens



Peltigera rufescens



Peltigera rufescens

Pertusaria flavicans Lamy, Bull. Soc. Bot. France 25(5): 427 (1880) [1878]

[OH641], Japan. Honshu. Prov. Bizen (Okayama Pref.): Ohtahara, Wake-cho, Wake-gun (34°48'31" N, 134°98'47" E). On rock, 152 m. Leg.M. Sugimoto (no. 588), 19.3.1019, det. M. Sugimoto & Y. Ohmura. EX Y. OHMRA LICHENES MINUS COGNITIEXSICCATI NR. 641.

Thallus crustose, episubstratic, rather thick, yellowish to greyish green, rimose-areolate, forming large patches, sometimes delimited by a pale prothallus, sorediate, , the areoles flat to convex, 0.5-1.5(-2) mm wide. Soralia 0.4-1.2 mm across, at first orbicular, then often confluent, yellowish green (paler than thallus); soredia coarsely to finely granular, 35-90 µm. Apothecia rare, lecanorine, immersed in thalline warts, with an initially punctiform, later expanded disc. Epithecium K+ violet; hymenium and hypothecium colourless. Asci 8-spored, broadly cylindrical, the apex with a broad ocular chamber, the outer sheath K/I+ blue, otherwise K/I-, with an inner extensible layer, Pertusaria-type. Ascospores 1-celled, hyaline, ellipsoid, 60-75 x 20-30 µm. Photobiont chlorococcoid. Spot tests: thallus and soralia K-, C+ orange, KC+ orange, P-, UV+ orange (soralia UV+ brighter orange), UV+ orange. Chemistry: thiophaninic acid and variable amounts of O-methylmonochlornorlichexanthone. - Note: on base-rich or calciferous siliceous rocks, especiallly calciferous schists, mostly on sheltered, steeply inclined surfaces.

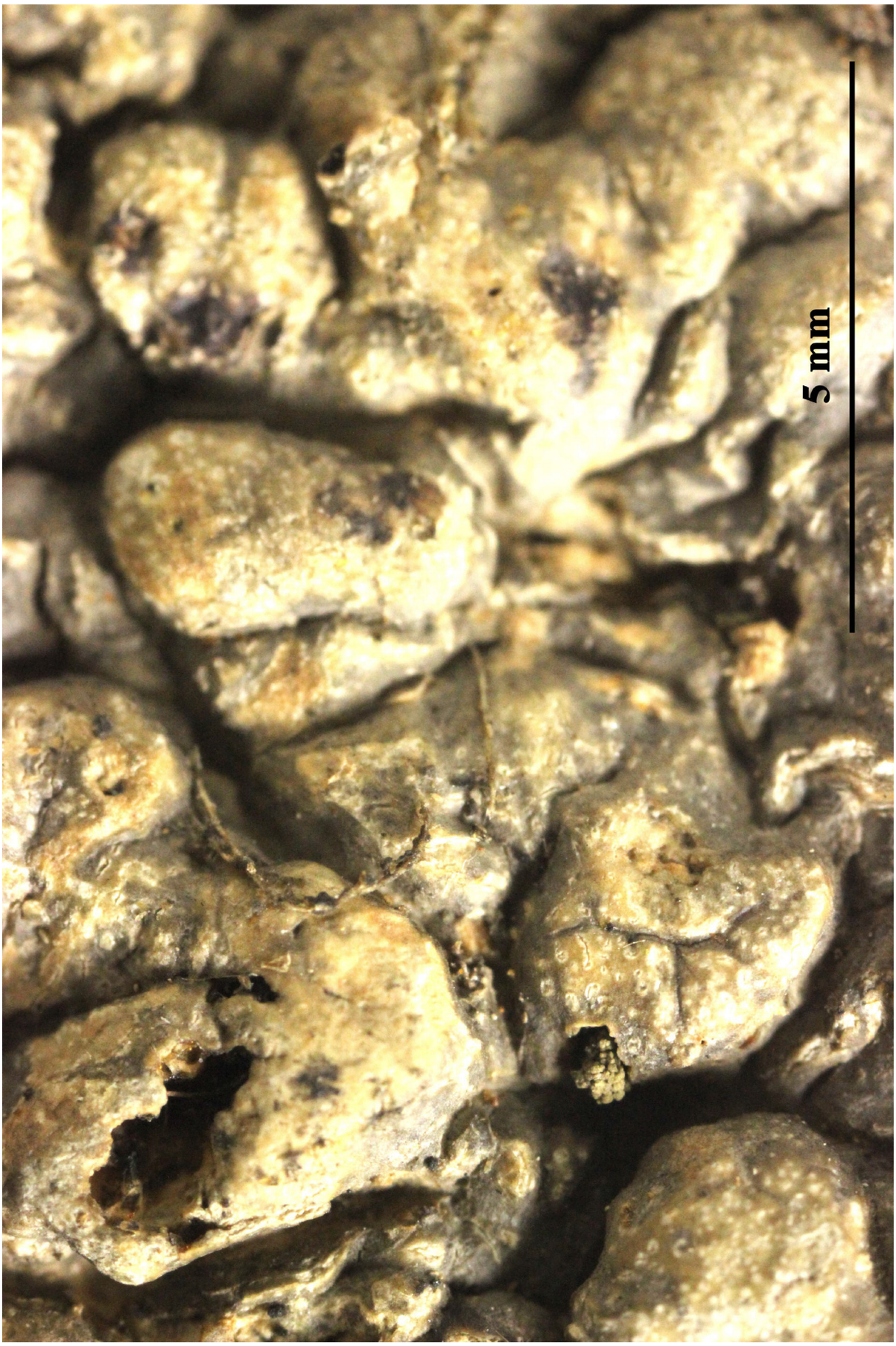
Pertusaria flavicans

Pertusaria flavicans

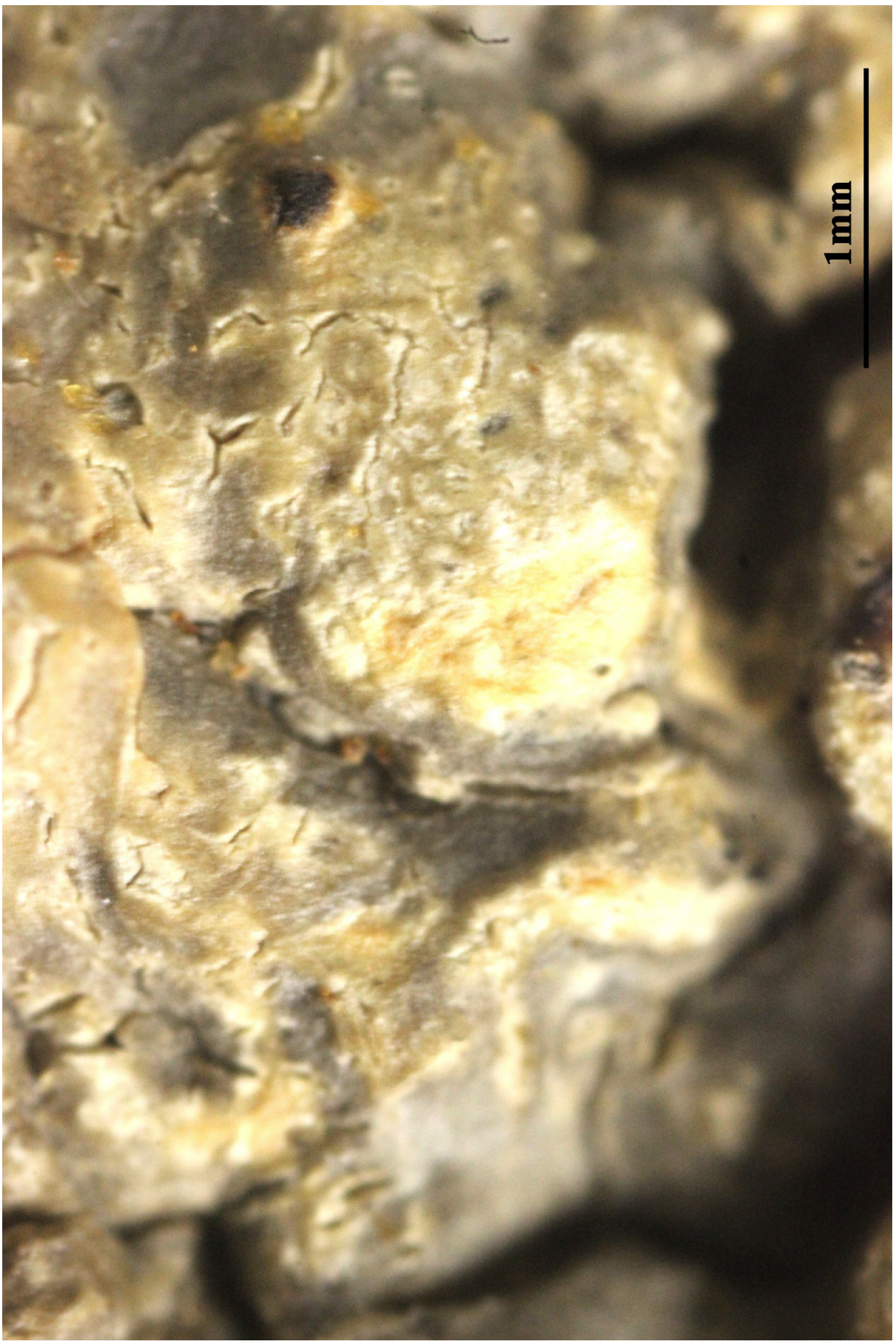
Pertusaria laeviganda Nyl., Lich. Japon.: 53 (1890)

[KA316], Japan. Honshu. Prov. Yamato (Pref. Nara): Mt. Gyojyaga-eshi-dake, Ohmine Mts. Yoshino-gun. On bark of *Fagus crenata*, 1500 m.Leg. H. Shibuichi (no. 5367), 24.7.1977, det. H. Shibuichi. EX H. KASHIWADANI LICHENES MIUNUS CIGNITI EXSICCATI NR. 316.

Thallus albidus, laevis, subnitidiusculus,; apothecia in protuberculis depressis, subconfluentibus: sporae 8/ascus, 13-13µm long.



Pertusaria laeviganda



Pertusaria laeviganda

Pertusaria nakamurae (Yasuda ex Räsänen) Dibben, Publications in Biology and Geology, Milwaukee Public Museum 5: 19 (1980)
= *Pertusaria tuberculifera var. nakamurae* Yasuda ex Räsänen 1940

[OH515], Japan. Honshu. Prov. Yamato (Pref. Nara): Mt. Hinodedake, Ohdaihara Mts. Yoshino-gun. On bark of *Picea* sp., 1650 m. Leg. H. Shibuichi (no. 5422), 25.7.1977, det. Y. Ohmura. EX Y. OHMURA LICHENES MINUS COGNITI EXSICCATI NR. 515.

P. nakamurae is characterized by the presence of a poriform apothecia, scattered with numerous large irregular granules. It is very similar to *P. quartans* in having 4 ascospores in each ascus, but no granule. It has been reported from the Jejudo by Moon et al.

Pertusaria nakamurae

Pertusaria nakamurae

Pertusaria subobductans Nyl., Lich. Japon.: 52 (1890)

[OH564], Japan. Honshu. Prov Musashi: Mt. Ohhira, Chichibu. On bark of *Fagus crenata*, 1500 m. Leg. H. Shibuichi (no. 5574), 29.8.1977, det. Y. Ohmura. EX Y. OHMURA LICHENES MINUS COGNITI EXSICCATI NR. 564.

Pertusaria subobductans

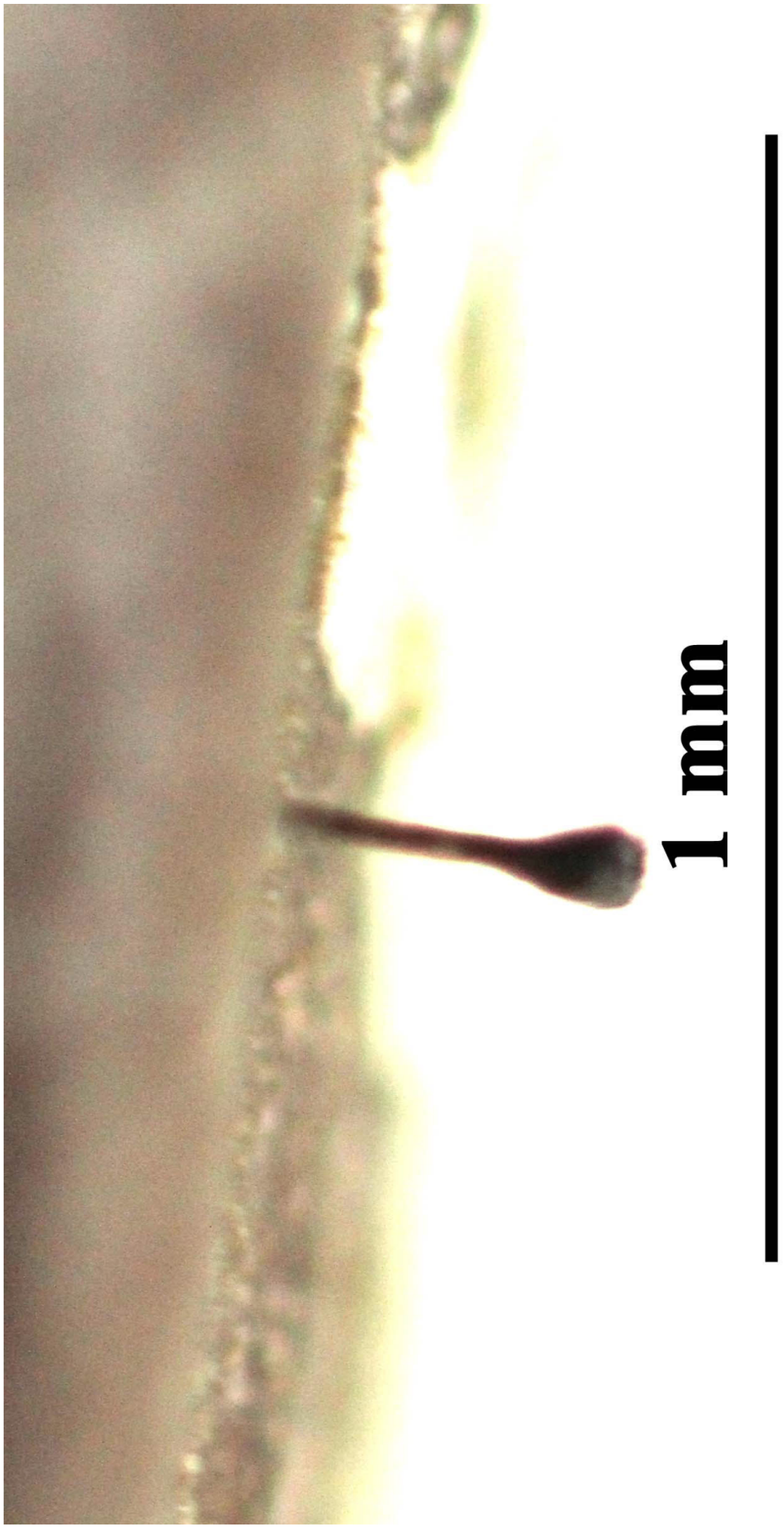
Pertusaria subobductans

Phaeocalicium compressulum (Nyl. ex Vain.) A.F.W. Schmidt, Mitt. Staatsinst. Allg. Bot. Hamburg 13: 130 (1970)
= *Mycocalicium praecedens* var. *compressulum* Nyl. ex Vain. 1927

[OH468], Japan. Honshu. Prov. Kai (Pref. Yamanashi) en route from Kitazawa Pass to Sensui Pass, Minami-Alps-city. On twigs of *Alnus* sp., 2010 m. Leg, Y. Ohmura (no. 8941) & A. Frisch, 28.6.2012, det. Y. Ohmura & A. Frisch. EX Y. OHMURA LICHENES MINUS COGNITI EXSICCATI NR. 468.

Thallus not evident, not lichenized. Apothecia stalked, black, 0.25-0.4(-0.5) mm high, the stalk 0.03-0.5 mm thick, somewhat paler than capitulum, medium browm in central part, consisting of periclinally arranged hyphae, surrounded by an up to 6 µm thick gelatinous layer. Capitulum at first obconical, but soon becoming strongly flattened, 0.08-0.15 wide; mazaedium absent. Exciple well-developed, of periclinally arranged, narrowly cylindrical, brown cells, K-; epithecium thin, dark brown; hypothecium obconical, c. 45 µm high, colourless to medium brown, of more or less isodiametrical cells. Asci 8-spored, cylindrical, with a weakly thickened apex, formed singly from hooked ascogenous hyphae, with uniseriately arranged ascospores, persisting until the ascospores are mature. Ascospores 1-celled, brown, broadly to narrowly ellipsoid, 10-12(-15) x (4.3-)5-6 µm, with a minutely verruculose ornamentation. Photobiont absent. Spot tests: ascomata K-. Chemistry: without lichen substances. - Note: saprobic on *Alnus alnobetula*, certainly widespread throughout the Alps and locally very common, especially in the subalpine belt.

Phaeocalicium compressu-



Phaeocalicium compressu-

Phaeographis laevigata (M. Nakan.) M. Nakan. & Kashiw., in Nakanishi, Kashiwadani & Moon, Bull. natn. Sci. Mus., Tokyo, B 29(2): 88 (2003)
= *Phaeographina laevigata* M. Nakan. 1977

[OH543], Japan. Kyushu. Prov. Satsuma (Pref. Kagoshima): en route from Yakusugiranda to Yodogawagoya-Irikuchi, Yaku-cho, Kumage-gun, Yakushima Island (30°18' N, 130°32' E). On bark of *Cryptomeria japonica*, 1280 m. Leg. H. Kashiwadani (no. 47655), 27.9.2005, det. H. Kashiwadani. EX Y. OHMURA LICHENES MINUS COGNITI EXSICCATI NR. 543.

Phaeographis laevigata

Phaeographis laevigata

Phaeographis planiuscula (Mont. & Bosch) Müll. Arg., Flora, Regensburg 65: 336 (1882)
= *Lecanactis planiuscula* Mont. & Bosch 1856

[OH417], Japan Sulphur Islands. Kita-iwo Island. On bark of *Ficus microcarpa*, 212 m. Leg. Y. Ohmura (no. 6460), 19.6.2009, det. Y. Ohmura. EX Y. OHMURA LICHENES MINUS COGNITI EXSICCATI NR. 417.

Excipulum totum fuligineum, integrum, Discus in margine non crenulatus .Labia excipuli arcuato-erecta.divergentia.

Phaeographis planiuscula

Phaeographis planiuscula

Phaeophyscia hirtuosa (Kremp.) Essl., Mycotaxon 7(2): 304 (1978)
= *Physcia hirtuosa* Kremp. 1873

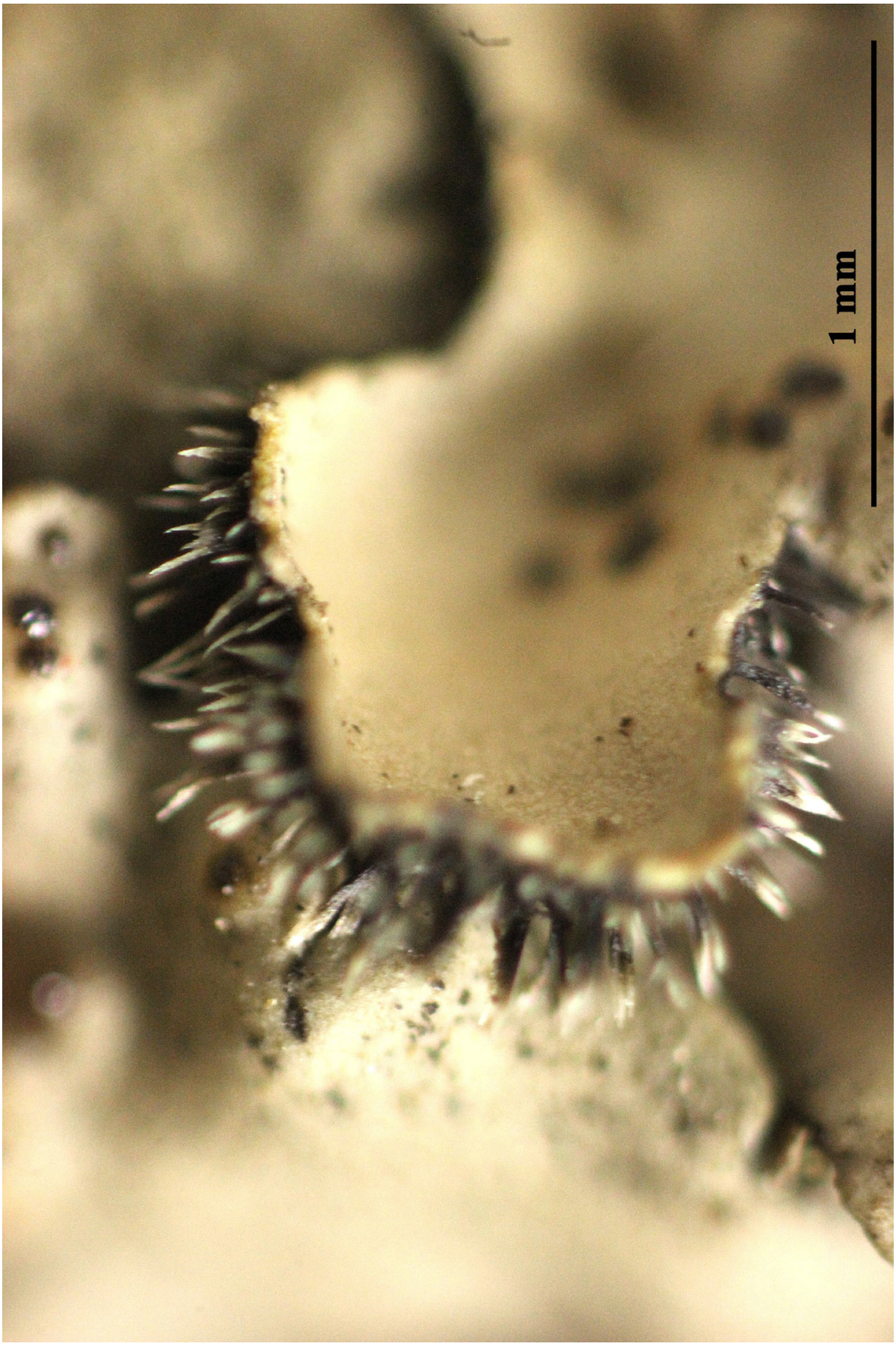
[KU584], Japan. Hokkaido. Prov. Kitami: Oshidomari, Rishiri Island. On trunk of *Abies sacharinensis*, 20 m. Legt. H. Shibuichi (no 7240) & M. Mineta, 1.8.1983, det. H. Kashiwadani. Ex S. Kurokawa and H. Kashiwadani Lichenes Rariores Et Critici Exsiccati Nr. 584.

Lappen unregelmäßig oder fiederig verzweigt, dicht oder überlappend, 0.5-3.5 mm breit. Weder Sorale noch Isidien. Unterseite schwarz mit schwarzen nur an der Spitze weißen, dicht stehenden, langen Rhizinen, die bis zu 5 mm über die Lappenränder hervorstehen. Ober- und Unterrinde paraplectenchymatisch (zellig). Apothecien bis 4 mm, am Rand mit Haaren, Scheibe rötlich braun, unbereift. Sporen braun, 1-septiert, dickwandig, 8/Ascus, 20-25 x 8-12 µm. Chemie: Rinde und Mark K-, C-, KC-, P-, Atranorin, im TLC Spuren von Zeorin, Leucotylin nachweisbar. Erkennbar an den Haaren der Apothecienränder, der schwarzen Unterseite, den langen schwarzen Rhizinen, dem Fehlen von Soralen und Isidien und der chem. Reaktion K-

Phaeophyscia hirtuosa

Phaeophyscia hirtuosa

Phaeophyscia hirtuosa



Phaeophyscia hirtuosa

Phaeophyscia hirtuosa

Phaeophyscia hirtuosa (Kremp.) Essl., Mycotaxon 7(2): 304 (1978)
= *Physcia hirtuosa* Kremp. 1873

[OH469], Japan, Hokkaido. Prov. Abashiri: Ikutahara-Kiyosato, Engaru-cho,Monbetsu-gun. On bark of *Ulmus davidiana* var.*japonica*, 290 m. Leg. Y. Ohmura (no. 89000) & A. Frisch, 29.3.2012, det. Y. Ohmura & H. Kashiwadani. EX Y. OHMURA LICHENES MINUS COGNITI EXSICCATI NR. 469.

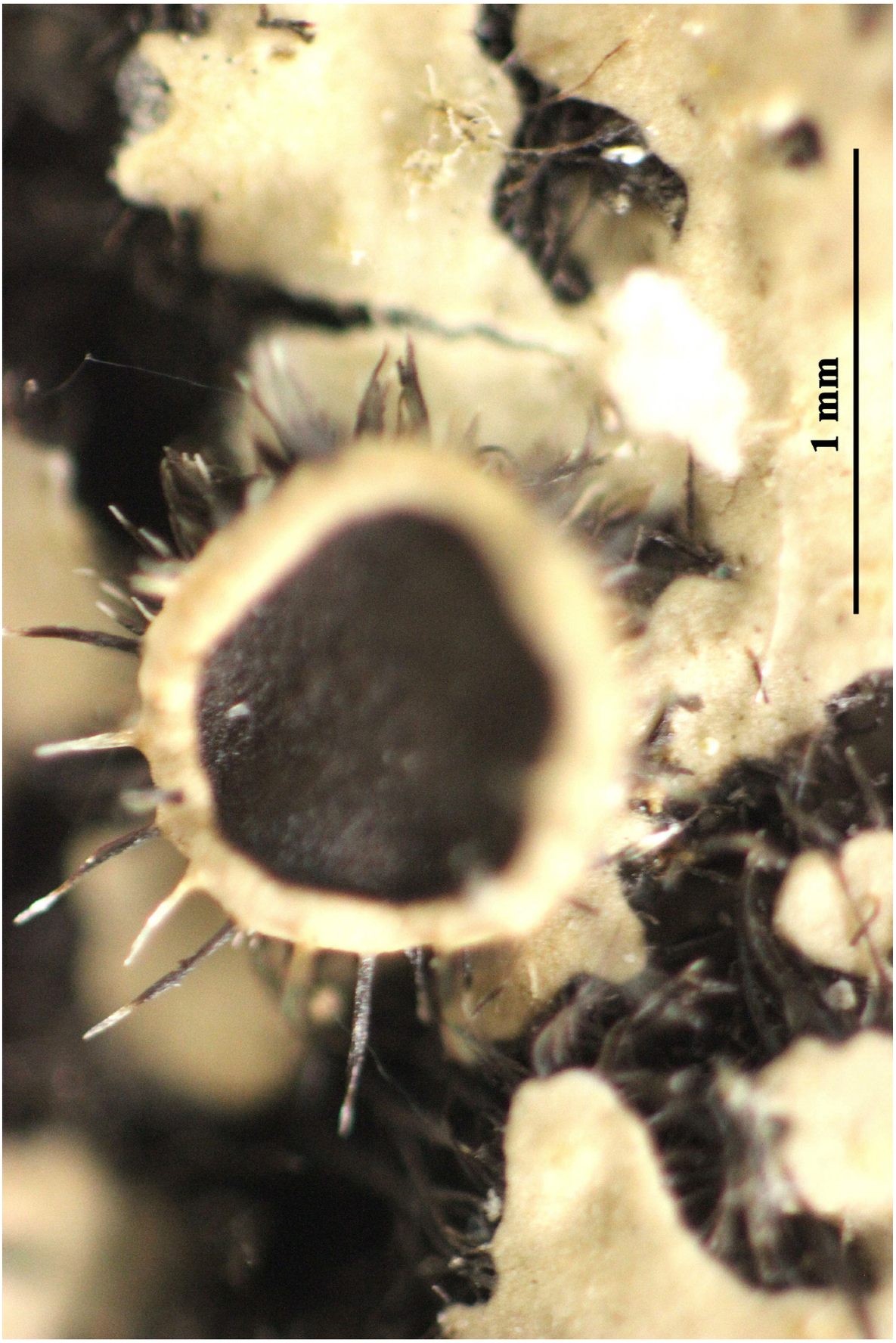
Lappen unregelmäßig oder fiederig verzweigt, dicht oder überlappend, 0.5-3.5 mm breit. Weder Sorale noch Isidien. Unterseite schwarz mit schwarzen nur an der Spitze weißen, dicht stehenden, langen Rhizinen, die bis zu 5 mm über die Lappenränder hervorstehen. Ober- und Unterrinde paraplectenchymatisch (zellig). Apothecien bis 4 mm, am Rand mit Haaren, Scheibe rötlich braun, unbereift. Sporen braun, 1-septiert, dickwandig, 8/Ascus, 20-25 x 8-12 µm. Chemie: Rinde und Mark K-, C-, KC-, P-, Atranorin, im TLC Spuren von Zeorin, Leucotylin nachweisbar. Erkennbar an den Haaren der Apothecienränder, der schwarzen Unterseite, den langen schwarzen Rhizinen, dem Fehlen von Soralen und Isidien und der chem. Reaktion K-

Phaeophyscia hirtuosa

Phaeophyscia hirtuosa

Phaeophyscia hirtuosa

Phaeophyscia hirtuosa



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