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NEW AND NOTEWORTHY LICHENS AND LICHENICOLOUS FUNGI

NEW AND NOTEWORTHY LICHEN-FORMING AND LICHENICOLOUS FUNGI*

[FOOTNOTE: Dedicated to the 10th anniversary of the foundation of the Korean Lichen Research Institute (KoLRI)]

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Seventeen taxa new for science, i.e. *Absconditella baegasanensis*, *Caloplaca hallasanensis*, *C. subconcilians*, *Fellhanera chejuensis*, *F. maritima*, *Lecania coreana*, *L. rinodinoidea*, *Lichenostigma heterodermae*, *Micarea coreana*, *Phoma heterodermae*, *Protoparmeliopsis chejuensis*, *Roselliniopsis phaeophysciae*, *Topelia jasonhurii* (all from South Korea); *Caloplaca dzhankoiensis* (from Ukraine); *Protoparmeliopsis pseudogyrophoricum* (from China); *P. taranii* (from Russia); and *Seiropora blumii* (from several Central Asian countries) are described, compared with closely related taxa, and illustrated.

Five new combinations are proposed: *Caloplaca subscopularis*, *Protoparmeliopsis crustaceum*, *P. gyrophoricum*, *P. mazatzalensis*, and *P. pinguis*.

A total of 65 lichen-forming and lichenicolous fungi are reported here as new for South Korea (i.e. *Abrothallus microspermus*, *Amandinea melaxanthella*, *Arthonia epiphyscia*, *Arthothelium ruanum*, *Aspicilia contorta* subsp. *hoffmanniana*, *Biatora globulosa*, *Brigantiaea purpurata*, *Caloplaca micromera*, *C. oxneri*, *C. squamosa*, *C. subscopularis*, *C. trassii*, *Candelariella reflexa*, *Dirina massiliensis*, *Endococcus* cf. *verrucosus*, *Hyperphyscia adglutinata*, *Hypogymnia austerodes*, *H. occidentalis*, *Ionaspis lacustris*, *Lecanora barkmaniana*, *Lecanora* cf. *marginata*, *L. symmicta*, *L. varia*, *Lichenochora obscuroides*, *Lichenodiplis lecanorae*, *Lopadium coralloideum*, *Melaspilea bagliettoana*, *Menegazzia subsimilis*, *Micarea denigrata*, *M. peliocarpa*, *Myriospora heppii*, *Myriotrema masonhalei*, *Ochrolechia frigida*, *Opegrapha calcarea*, *O. phaeophysciae*, *Parmelia subdivaricata*, *Pertusaria* aff. *alpinoides*, *P. commutans*, *P. ophthalmiza*, *P. sphaerophora*, *P. subcomposita*, *Phlyctis* aff. *argena*, *Physconia hokkaidensis*, *Porina farinosa*, *Punctelia subrudecta*, *Pyrenula balia*, *P. castanea*, *P. laevigata*, *P. neojaponica*, *P. pseudobufonia*, *Rhizocarpon badioatrum*, *Rinodina fimbriata*, *R. oleae*, *R. polyspora*, *R. pyrina*, *R. sophodes*, *R. teichophila*, *Scoliosporum chlorococcum*, *Sphinctrina tubaeformis*, *Stigmidium fuscatae*, *Taeniolella phaeophysciae*, *Thelotrema nipponicum*, *Toninia aromatica*, *Topeliopsis* aff. *azorica*, and *Trypethelium indutum*); and two new for China (i.e. *Caloplaca bassiae*, *Lecania rabenhorstii*). Detailed locality data and annotations are given for further 20 noteworthy species, which are rare in South Korea (i.e. *Agonimia opuntella*, *Agonimiella pacifica*, *Amandinea punctata*, *Biatora longispora*, *Brigantiaea ferruginea*, *Chrysothrix candelaris*, *Coenogonium luteum*, *Diploschistes actinostomus*, *Hyperphyscia crocata*, *Leucodecton desquamescens*, *Menegazzia nipponica*, *Pertusaria commutata*, *P. multipuncta*, *P. quartans*, *P. submultipuncta*, *P.* aff. *subobductans*, *P. velata*, *Phaeophyscia orbicularis*, *Porina leptalea*, and *Trapelia coarctata*); and for two species rare in China (i.e. *Buellia badia*, *Letrouitella transgressa*).

Key words: China, Korea, new for science, rare, Russia

INTRODUCTION

A number of species new for science, as well as new records for the Korean lichen flora were published after the latest edition of the checklist of Korean lichens (Hur *et al.* 2005). However, there is still a number of taxa status of which should be clarified. Here, descriptions of further seventeen new species are added from the genera *Absconditella*, *Caloplaca*, *Fellhanera*, *Lecania*, *Lichenostigma*, *Micarea*, *Phoma*, *Protoparmeliopsis*, *Roselliniopsis*, *Seiophora* and *Topelia* recently found in a number of herbaria.

Furthermore lists of localities, as well as some notes on new and noteworthy taxa of lichens and lichenioclous fungi are provided, too.

MATERIAL AND METHODS

A total of 1,500 specimens were sampled during the current collections mostly in 2012 and 2013, and these are deposited in the Korean Lichen Research Institute, Sunchon National University, South Korea (hereafter KoLRI), as well as some duplicates in the Hungarian Natural History Museum (hereafter BP) and the Lichen Herbarium of M. H. Kholodny Institute of Botany of National Academy of Sciences of Ukraine (hereafter KW-L).

The specimens were examined using standard microscopical techniques and the hand-sectioned preparations under a dissecting microscope (Nikon SMZ 645; Nikon, Tokyo, Japan). Anatomical descriptions were based on observations of these preparations under a microscope (Nikon Eclipse E200; Nikon, Tokyo, Japan, and Zeiss Scope. A1; Carl Zeiss, Oberkochen, Deutschland, Germany) with digital camera AxioCam ERc 5s. Sections of apothecia were tested with water and with K and IKI (10% aqueous potassium iodide) for identification.

RESULTS AND DISCUSSION

New taxa

Absconditella baegasanensis L. Lökös, S. Y. Kondr. et J.-S. Hur, *spec. nova*

(Figs 1–2)

Mycobank no.: MB 805118.

It is similar to Absconditella sphagnum but differs in having smaller apothecia, narrower ascospores and different substrate.

Type: Republic of Korea: Mt Baegasan (Chollanam-do (province), Hwasun-gun (county), Buk-myeon), on bark of *Chamaecyparis pisifera*. Lat.: 35° 10' 32.4" N; Long.: 127° 08' 23.1" E; Alt.: 320 m a.s.l. Coll.: Lökös, L., 08.10.2005. Holotype: KoLRI-003571 (050667); isotype: BP.

Thallus 1–3 cm diam., very thin, crustose, dull greenish, more or less reflects surface of the substrate. Photobiont most probably a species of Chlorococcaceae, with green, spherical cells, 7–12 (–17) µm diam.

Apothecia very small, 0.15–0.2(–0.25) mm diam., biatorine, marginated, dispersed and rounded, dull whitish or creamy-white, with own margin to 0.04–0.05 mm wide highly rising above disc level; in section biatorine, very thin, to 0.15 mm thick; true exciple to 8–10 µm thick in the basal portion and widened towards the uppermost lateral portion to 20–40(–45) µm thick; hymenium to 80–85 µm high; subhymenium 15–20 µm thick; asci 8-spored; ascospores 1-septate, hyaline, straight, somewhat attenuated at the septum, (7.5–)8–10(–13) × 2.2–3 µm.

Conidiomata and conidia unknown.

Chemistry: Thallus and apothecia (epihyemium and hymenium) K–, C–.

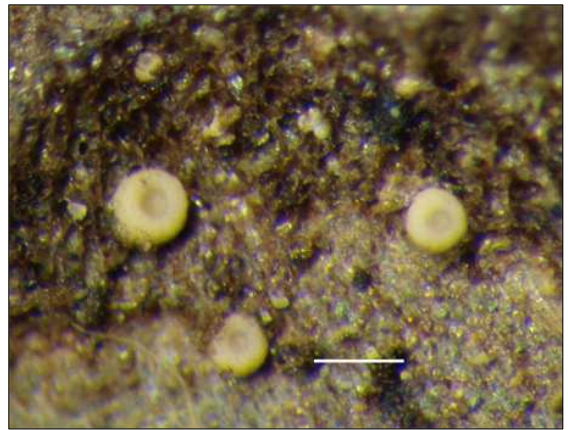
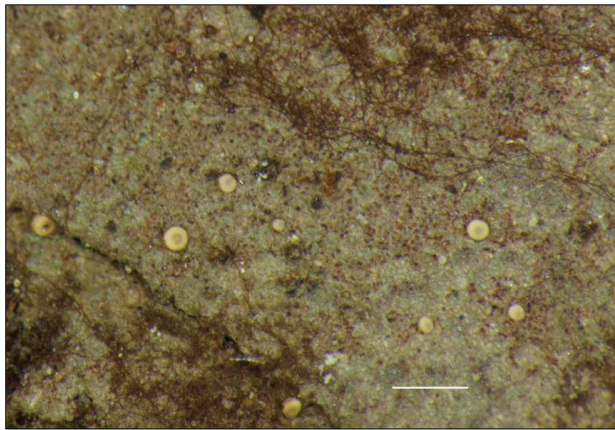
Distribution: It is so far known only from several localities in Korea.

Etymology: Species epithet refers to the type collection of this taxon, i.e. Mt Baega, Chollanam province, Korea.

Taxonomic notes: *Absconditella baegasanensis* is similar to European and North American species *A. sphagnum* Vězda et Poelt, but differs in having smaller apothecia (0.15–0.2 vs. 0.2–0.4 mm diam.), in having narrower ascospores ($8\text{--}10\text{--}(13) \times 2.2\text{--}3 \mu\text{m}$ vs. $9.5\text{--}14.3 \times 2.5\text{--}4\text{--}(5) \mu\text{m}$), as well as in the different substrate (bark of coniferous trees vs. *Sphagnum* spp. thalli in bogs and mountain rock ledges, etc.) (Coppins 2009).

After small apothecia *Absconditella baegasanensis* is similar to *A. delutula* (Nyl.) Coppins et H. Kiliyas, growing on shaded stones, compacted soil and turf, in ephemeral pools, in the Northern Hemisphere and Australia, but differs in having shorter ascospores ($8\text{--}10\text{--}(13) \times 2.2\text{--}3 \mu\text{m}$ vs. $10\text{--}15\text{--}(17) \times 3\text{--}5\text{--}(6.5) \mu\text{m}$), as well as in the different substrate.

Additional specimens examined: Republic of Korea: Mt Baegasan (Chollanam-do, Hwasun-gun, Buk-myeon), on bark of *Styrax japonica*. Lat.: $35^{\circ} 10' 32.4''$ N; Long.: $127^{\circ} 08' 23.1''$ E; Alt.: 320 m a.s.l. Coll.: Lökös, L., 08.10.2005 [KoLRI-003562 (050658), BP]. Mt Chongwansan (Chollanam-do, Jangheung-gun, Gwansan-eup), on bark of *Pinus densiflora*. Lat.: $34^{\circ} 32' 56.1''$ N; Long.: $126^{\circ} 56' 11.1''$ E; Alt.: 110 m a.s.l. Coll.: Lökös, L., 07.10.2005 [KoLRI-003535 (050631), BP].



Figs 1–2. *Absconditella baegasanensis*, holotype: 1 = general habit. 2 = enlarged apothecia Scale 500 μm (1) and 200 μm (2) (photo: E. Farkas)

Caloplaca dzhankoiensis S. Y. Kondr., *spec. nova*

(Figs 3–4)

Mycobank no.: MB 805119.

Similar to Caloplaca safavidiorum, but differs in having longer and subconvex epruinose lobes, in having larger and much higher lifted apothecia, in having distinctly narrower ascospores and in having wider ascospore septum.

Type: Ukraine: Crimean Autonomous Republic, Dzhankoy district, Kalyniv shooting range, northern vicinity, salted areas and steppe slopes at the Syvash, on twigs of small shrubs. Lat.: $45^{\circ} 48' 53.14''$ N; Long.: $34^{\circ} 44' 28.68''$ E; Alt.: 16 m a.s.l. Coll.: Nadeina, O. V., 21.04.2011. Holotype: KW-L 68298.

Thallus to 1 cm across, distinctly lobate in peripheral zone, yellow to deep yellow or orange-yellow in peripheral zone and uplifted portions in exposed places and greyish yellow or whitish greyish in shaded portions; lobes to (2.5–)4–5 mm long., very narrow, 0.5–0.6 mm wide, sometimes forming widened portions to 1–1.5 mm wide in peripheral zone, more or less subconvex, distinctly medullar with hollow. In section cortical layer very thin, a. 10(–20) μm

thick, of palisade paraplectenchyma, with vertically elongated cells with lumina (3–)5–8 μm across; algal zone very massive to 80(–100) μm thick, often algal clusters divided by paraplectenchymatous cords.

Apothecia small, (0.4–)0.6–1.1 mm diam., (in section to 0.2 mm thick), very numerous, often uplifted on long stipa to 1–1.5 mm long (and the same diam. as apothecia a. 0.7–0.8 mm diam.), lecanorine, discs dull brown-orange to reddish orange; in section thalline exciple very thick, 70–150 μm wide, and especially thick in the lower portion of apothecium, cortical layer to 20–25 μm thick, paraplectenchymatous, cell vertically elongated, cell lumina to 5–8 μm across; algal zone 50(–100) μm thick, entire below apothecium; true exciple to 30 μm thick in the upper lateral portion and to 10–15 μm thick in lower lateral and basal portions, *Blastenia*-type, separate cells 8–9 \times 3–4 μm seen; hymenium 80–90 μm high; paraphyses to 2 μm diam. in lower portion and distinctly widened to 6–7 μm diam. towards the tips; subhymenium to 50–60 μm thick; asci 8-spored; ascospores elongated with attenuated ends, (11–)12–14(–17) \times (4–)4.8–6 μm in water and (12–)13–16(–18) \times 5–6(–7) μm in K, septum (2–)2.5–3(–4) μm wide in water and (2–)3–4(–5) μm wide in K.

Ecology: On twigs of various shrubs in steppes.

Distribution: It is known so far from type locality, where it was collected in two localities.

Etymology: It is named after Dzhankoy, a town in the north of Crimea, Ukraine (which means “new village” (*cañköy* or *cañi köy*) in the northern dialect of Crimean tatar).

Taxonomic notes: *Caloplaca dzhankoiensis* is similar to recently described epiphytic species from Central Asian countries *C. safavidiorum* (Kondratyuk *et al.* 2012b), but differs in having longer (4–5 mm vs. 0.3–0.7 mm long) and subconvex epruinose lobes (vs. very convex), in having larger (0.6–1.1 mm vs. 0.5–0.7 mm diam.) and much higher lifted apothecia, in having distinctly narrower ascospores (4.8–6 μm vs. 7–8 μm wide) and in having wider ascospore septum (2.5–3 μm vs. 1.5–2 μm wide).

From lobate epiphytic species *C. persica* (J. Steiner) M. Steiner et Poelt, *C. polycarpoides* (J. Steiner) M. Steiner et Poelt and *C. lobulata* (Flörke) Hellb., rather widely distributed in Mediterranean region or in South Europe and having long narrow ascospores with rather narrow ascospore septum, *Caloplaca dzhankoiensis* differs in having much larger well developed thallus, in having much longer thalline lobes, as well as in a number of other characters. Furthermore *C. persica* has 12–16 spored asci while *C. lobata* is characterised by much wider ascospores septum (i.e. 5–7 μm wide).

After very narrow thalline lobes this species should be compared with coastal epilithic species *C. etesiae* (Nyl.) Du Rietz and Mediterranean lichen *C. australis* (Arnold) Zahlbr. However, *C. etesiae* has much shorter and narrower (12–14 \times 5–6 μm vs. 10–13 \times 4–5 μm) ascospores, while *C. australis* has much longer (12–14 \times 5–6 μm vs. 18–22 \times 5–6 μm) ascospores and much narrower ascospore septum (2.5–3 μm vs. 0.5–1 μm wide).

Caloplaca dzhankoiensis is similar to *Xanthoria tenax* Lindblom, known from arid regions of North America, but differs in having distinctly distant, separate, much narrower and subconvex lobes, and a number of other characters of apothecia and spores as well as in the lack of rosette-like closely attached to the substrate thallus.

After elongated ascospores with rather narrow ascospore septum *Caloplaca dzhankoiensis* is similar to the members of the *C. crenulatella* group and Australian species *C. jerramungupensis* S. Y. Kondr., Kärnefelt et Elix, but these taxa do not have lobate thallus, and they are characterised by complex of other characters of the thalli and apothecia (Kondratyuk *et al.* 2007, 2009, 2012b).

Additional specimen examined: Ukraine: Crimean Autonomous Republic, Dzhankoy district, eastern vicinities of Urozhajne village, steppe slopes at the Syvash, growing on twigs of shrubs together with *Xanthoria* cf. *parietina*. Lat.: 45° 20' 31.09" N; Long.: 35° 11' 14.03" E; Alt.: 2 m a.s.l. Coll.: Nadeina, O. V., 20.04.2011 [KW-L 68296].

Caloplaca hallasanensis S. Y. Kondr., S.-O. Oh et J.-S. Hur, *spec. nova*
(Figs 5–6)

Mycobank no.: MB 805120.

Similar to Caloplaca lutea, but differs in having well developed areole-like formations in places, in having granular pseudoleprose slightly greenish yellow peripheral portion and rather thick seem to be completely soredious/blastidious bright yellow to yellow-orange central portion, in having smaller blastidia as well as in having well developed white hypothallus.

Type: Republic of Korea: Cheju-do Island, Seogwipo-si, Mt Hallasan, Hallasan National Park, Gwaneumsa Temple trail, along the tourist path, on rock, growing together with *Lepraria* sp. Lat.: 33° 23' 37.5" N; Long.: 126° 32' 16.7" E; Alt.: 1,081 m a.s.l. Coll.: Kondratyuk, S. Y. (212776), Oh, S.-O., Kusama, Y., 08.08.2012. Holotype: KoLRI-017066 (121612); isotype: BP.

Thallus to 3–4 cm across, granular or pseudoleprose, consisting of very scattered and distant ecorticate, blastidia-like ascending granules/areoles in peripheral portion with well seen whitish hypothallus (peripheral zone up to 1–2 mm wide), and soon forming mosaic of more aggregated, sometimes almost corticated crustose portions, irregular or more or less rounded, a. 1–2 mm diam./across and much thicker portions of ascending areoles or coralloid formations, bulky soredious/blastidious-like thallus in the centre; greenish yellow or whitish-greenish-yellow with distinct whitish edge in the peripheral portion and very bright yellow or yellow-orange in the centre.

Areoles in peripheral zone dull greenish yellow, very small, *ca* 60–100 µm wide, with tendency to be ascending, attached by one side; in the centre thick, areole-like aggregations (0.4–)0.7–1(–2) mm across, usually broken in places and bearing scarce soredia/blastidia to almost continuous in places; with large magnification seen that in centre convex microareoles/granules consisting of aggregated microgranules/blastidias 0.1–0.2 mm diam./across and to 0.1–0.15 mm high/thick to pustule-like formations as scarce and distant to aggregated and forming entire mass, bearing soredious/blastidious mass, or exfoliating into smaller “squamules”, *ca* 0.3–0.4 mm across with uneven surface, warts/granules 0.08–150 µm across. Blastidia small, to 20 µm diam., rather rarely seen, while somewhat isidioid conblastidia to 0.1–0.2(–0.3) mm across often present in the centre of thallus.

Hypothallus well developed to 0.5 mm wide, very thin, white (especially well seen in younger thalli and contrasting with greenish yellow microareolated thallus).

Apothecia and pycnidia not known.

Chemistry: Thallus K⁺ purple.

Habitat: It is known from volcanic rocks at high altitude of northern slope of Mt Hallasan of Cheju-do Island, where this species is growing together and often overgrown by *Lepraria* sp. This locality is situated in oak forest belt, where a number of rare epiphytic lichens are also reported (*Brigantiaea ferruginea*, *Caloplaca oxnerii*, *Micarea peliocarpa*, *Porina farinosa*, *Pertusaria velata*, *Topeliopsis azorica*, *Taeniolella phaeophysciae* and others).

Distribution. So far known only from type collection. However, it is highly likely that the same material was recorded from the Mt Soraksan from South Korea and from Japan as *Caloplaca citrina* (Moon 1999) and *Caloplaca citrina* var. *volcanica* Räsänen (Räsänen 1940). However, we were not able to investigate material mentioned in those papers within this study.

Etymology: Species epithet reflects the position of the type collection on Mt. Halla (in Korean “Hallasan”), South Korea.

Remarks: Species is characterised by unique combination of conblastidioid thallus with different peripheral and central zone.

Species differs in having two rather different portions of thallus, greenish yellow or whitish greenish yellow peripheral portion with well developed white hypothallus and scattered distant

minute areolae and bright yellow or yellow-orange, mosaic of rather thick, conblastidioid/blastidioid tufts and entire corticated portions.

Caloplaca hallasanensis is similar to Australasian species *Caloplaca lutea* (J. R. Laundon ex D. J. Galloway) D. J. Galloway especially by its central portion which formed by densely aggregated protuberances forming bright yellow or yellowish orange blastidious/soredious mass. However, *Caloplaca hallasanensis* differs from *C. lutea* in having well developed distinct areole-like formations in peripheral portion, in having granular pseudoleprose slightly greenish yellow peripheral portion and rather thick seem to be completely soredious/blastidious bright yellow to yellow-orange central portion, in having smaller blastidia as well as in having well developed white hypothallus.

In contrast to *Caloplaca citrina* (Hoffm.) Th. Fr., *C. flavocitrina* (Nyl.) H. Olivier, *C. chejuensis* S. Y. Kondr. et J.-S. Hur (see Kondratyuk *et al.* 2004, 2012b) and other soredious taxa having well developed thalline areoles with well developed cortical layer, *Caloplaca hallasanensis* does not have any well developed, corticated lobes or areoles.

Caloplaca hallasanensis may resemble *Caloplaca limonia* Nimis et Poelt another sub-Mediterranean species of Europe (see Kondratyuk *et al.* 2004), after having large irregular conblastidia, but *C. limonia* has smaller conblastidia, and latter borning on the upper surface of well developed, thick thalline areoles.

There is slight variation from specimen to specimen in development of entire corticated portions of thallus (especially a number of such fragments are present in BP-isotype specimen, as well as it is almost lack in the KoLRI holotype specimen).

Additional specimen examined: Republic of Korea: Cheju-do Island, Mt Hallasan, Temple Gwan-Um coarse, on rock. Lat.: 33° 23' 41.6" N; Long.: 126° 32' 17.0" E; Alt.: 942 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Park, J. S. and Hur, J.-S., 01.06.2012 [KoLRI-016089 (121057)].

Caloplaca subconcilians* S. Y. Kondr., L. Lökös et J.-S. Hur, *spec. nova
(Figs 7–8)

Mycobank no.: MB 805167.

Similar to Caloplaca concilians, but differs in having grey or whitish grey thallus, in having apothecia not becoming convex, in having black disc of apothecia not being rusty-red (when wet), and in having smaller and narrower ascospores, as well as in the lack of positive reaction of epihymenium with K.

Type: Republic of Korea: Cheju Island, Cheju-si, Hangeong-myeon, Sinchang-ri, around Singaemul Park nearby coast, on rock, growing together with *Caloplaca multicolor*. Lat.: 33° 20' 31.91" N; Long.: 126° 10' 13.00" E; Alt.: 2 m a.s.l. Coll.: Kondratyuk, S. Y. (212663), Lökös, L., Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Hur, J.-S., 05.07.2012. Holotype: KoLRI-016627 (121581); isotypes: KoLRI-016628 (121582), KoLRI-016629 (121583), KoLRI-016635 (121589).

Thallus 5–10 mm diam., but often in larger aggregations to several cm across, dull grey or dark grey to brownish or lead-grey, areolate, areoles (0.3–0.4–0.7(–1.5) mm across, often peripheral areoles at overmature exfoliate and thallus seem to be microlobate. Hypothallus sometimes present, black, to 0.1 mm wide, often indistinct, in places of contact with other crustose lichens a black line to 0.1(–0.2) mm wide is present.

Apothecia 0.3–0.8(–1) mm diam. (in section to 0.25–0.3 mm thick), lecanorine; immersed at first then uplifted, to 0.3(–0.5) mm high above areole level, not being constricted at the basis, up to 3(–4) per areole, regularly rounded; thalline margin rather thick, to 0.2–0.3 mm wide, concolorous with thallus to whitish grey; disc plane, black (both if dry or if wet), very rarely seen (at magnification more of 50×) as zeorine, with very narrow, 0.04–0.06 mm wide black true exciple, somewhat uplifted above disc level; in section thalline exciple to 70–100 µm thick, in the uppermost lateral portion brownish-blackish, cortex of thalline exciple to 25–40 µm thick, or

thicker on underside, mesodermatous paraplectenchymatous, cell lumina 4–5 μm diam.; algal layer well developed, to 50–60 μm thick; true exciple to 30–50 μm thick in the uppermost lateral portion, often with crystals (better seen in K), and to 10–20(–30) μm thick in basal, paraplectenchymatous, cell lumina 3–5 μm diam.; hymenium 60–70(–90) μm high; epihymenium 20–30 μm thick, greenish brown to brown; paraphyses towards tips slightly swollen to 2.5–3(–4) μm wide, abundantly branched, upper portion to 25–30 μm long brownish, sometimes bent horizontally or even downwards; subhymenium (30–)50–120(–200) μm thick, hyaline or yellow-brownish in the upper portion and yellow-brownish in the lower portion, with numerous oil droplets to 3–4(–5) μm diam.; asci (4–6–)8-spored, but abortive single ascospores very common and well seen; ascospores mainly elongate ellipsoid, cylindrical-ellipsoid, to fusiform, where ends more or less attenuated, 10–14(–16) \times (4.5–)5–6(–7) μm in water and (10–)11–16(–20) \times (5–)6–7(–10) μm in K; septum (2.5–)4–6(–7) μm wide in water and 4–8(–10) μm wide in K.

Chemistry: Thallus K–, apothecium K–, epihymenium K–, becoming slightly lighter.

Ecology: It grown on siliceous rocks in coastal areas where are very often associated with *Caloplaca multicolor* and the different species of the genera *Ramalina*, *Pyxine* and *Lecanora*.

Distribution: It is known from several localities in South Korea and eastern coastal part of China.

Etymology: Species epithet reflects similarity of this species with *Caloplaca concilians*.

Taxonomic notes: *Caloplaca subconcilians* is similar to *C. concilians* (Nyl.) H. Olivier, very rare lichen from base rich schistose upland and coastal rocks of Europe and New Zealand, but differs in having grey or whitish grey (vs. dark to black) thallus, in having apothecia not becoming convex (vs. convex apothecia are the key character of *C. concilians*), in having black disc of apothecia not being rusty-red (when wet), and in having smaller and narrower ascospores (10–14 \times 5–6 μm vs. 12–17 \times 6–9 μm), as well as in the lack of positive reaction of epihymenium with K (vs. epihymenium K+ purple) (Fletcher and Laundon 2009, Galloway 2007).

After Wetmore (1994) *Caloplaca subconcilians* is the closest to *Caloplaca atroalba* (Tuck.) Zahlbr., but the latter species differs in having longer and wider ascospores (10–14 \times 5–6 μm vs. 14–17 \times 7–8.5 μm) and in having much narrower septum (4–6 μm vs. 1.5–3 μm wide).

From the first look it resembles a small *Rinodina*, *Lecanora* or *Lobothallia* (especially when peripheral areoles exfoliating), and its taxonomic status can be identified only after microscopical study.

Additional specimens examined: Republic of Korea: Cheju-do Island, Seogwipo-si, Daejeong eup, along the seashore at Sangmo-ri, on rock growing together with *Caloplaca diffluens*. Lat.: 33° 12' 34.88" N; Long.: 126° 17' 30.81" E; Alt.: 5 m a.s.l. Coll.: Kondratyuk, S. Y. (212654), Lökös, L., Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Hur, J. S., 05.07.2012 [KoLRI-016834 (121855)]; Cheju-do Island, Cheju-si, Hallim-eup, along seashore at Gwideok-ri, on rock, growing together with *Caloplaca multicolor* and *Buellia* sp. Lat.: 33° 26' 33.22" N; Long.: 126° 16' 59.97" E; Alt.: 3 m a.s.l. Coll.: Kondratyuk, S. Y. (212651), Lökös, L., Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Hur, J. S., 05.07.2012 [KoLRI-016781 (121984)]. Heuksan-do Island (Chollanam-do, Sinan-gun), on rock, growing together with *Lecanora* sp. damaged by *Lichenodiplis* cf. *lecanorae*. Lat.: 34° 39' 45.54" N; Long.: 125° 23' 45.24" E; Alt.: 2 m a.s.l. Coll.: Wang, X. Y., Ryu, J. A., 22.06.2011 [KoLRI-013621 (110587), KoLRI-013622 (110588)]. Yokji-do Island (Gyeongsangnam-do, Tongyeong-si, Yokji-myeong), Seosan-ri, Duckdong beach, on rock, growing together with *Caloplaca multicolor* and *Pyxine endochrysin*. Lat.: 34° 38' 03.08" N; Long.: 128° 14' 15.06" E; Alt.: 1 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Park, J. S., Ryu, J. A., 11.05.2012 [KoLRI-015773 (120778)]. Geumoh-do Island (Chollanam-do, Yeosu-si, Nam-myeon), Yusong-ri, Mando beach, on rock, growing together with *Caloplaca bogilana*, *Buellia* sp. and *Rinodina* sp. Lat.: 34° 38' 55.00" N; Long.: 127° 48' 12.05" E; Alt.: 18 m a.s.l. Coll.: Jayalal, U., Park, J. S., Ryu, J. A., 27.04.2012 [KoLRI-015556 (120564)].

Fellhanera chejuensis L. Lökös, S. Y. Kondr. et J.-S. Hur, *spec. nova*
(Fig. 9)

Mycobank no.: MB 805121.

Similar to *Fellhanera parvula*, but differs in having larger apothecia, in having wider ascospores, and in having gyrophoric acid.

Type: Republic of Korea: Cheju-do Island, Cheju-si, at Gwanumsa temple, roadside alee, on bark of *Cryptomeria japonica* (L.f.) D. Don. Lat.: 33° 25' 21.5" N; Long.: 126° 33' 34.8" E; Alt.: 615 m a.s.l. Coll.: Lökös, L., Kondratyuk, S. Y. (212663), 07.07.2012. Holotype: KoLRI; isotypes: BP, KW-L).

Thallus form very small (0.5–)5–7 mm diam. to large aggregations to several cm across, greenish, often with numerous epiphytic algae. Photobiont most probably a species of Chlorococcaceae, with green, spherical cells, 7–12(–17) µm diam.

Apothecia very small, 0.15–0.3(–0.4) mm diam., biatorine, emarginated, usually dispersed and rounded, seldom aggregated to somewhat irregular, often with scarce whitish pruina, dull light brown or creamy; in section biatorine, very thin, to 0.1 mm thick; true exciple to 30 µm thick; hymenium to 30–35 µm high; epihymenium to 5–7 µm thick, brownish; paraphyses richly anastomosing, somewhat widened towards the tips, to 2.5–3 µm diam.; subhymenium 20–30 µm thick, paraplectenchymatous, cell lumina 3–4 µm diam.; asci 8-spored; ascospores (0–)1(–2)-septate, hyaline, straight, seldom curved, somewhat attenuated at the septum, sometimes one cell larger of the other, (6–)8–10(–11) × 2.5–3.2(–3.5) µm.

Conidiomata and conidia unknown.

Chemistry: Thallus and apothecia (epihymenium and hymenium) K+ greenish yellow, C+ orange, but soon becoming discolouring. Typically reacting C+ red, because of the production of gyrophoric acid (checked by HPTLC, incl. the type).

Distribution: It is so far known only from type collection in Korea.

Etymology: Species epithet refers to the type collection of this species, i.e. Cheju-do Island, Korea.

Taxonomic notes: *Fellhanera chejuensis* is similar to *F. parvula* (Vězda) Vězda, a Southern Hemisphere foliicolous lichen, but it differs from the latter in having larger apothecia (0.15–0.3(–0.4) mm vs. 0.08–0.2 mm diam.), not being white or yellow (vs. apothecia whitish to pale yellow in *F. parvula*), in having wider ascospores (8–10(–11) × 2.5–3.2 µm vs. 6–11 × 2.5 µm) and in having gyrophoric acid.

Fellhanera chejuensis differs from *F. vandenberghenii* (Sérus.) Vězda, an African foliicolous lichen, in having apothecia lacking prominent margin, in having shorter and narrower ascospores (8–10(–11) × 2.5–3.2 µm vs. 9–12 × 4–5 µm) and in having gyrophoric acid, as well as in the lack of pycnidia with a long beak (Sérusiaux 1996).

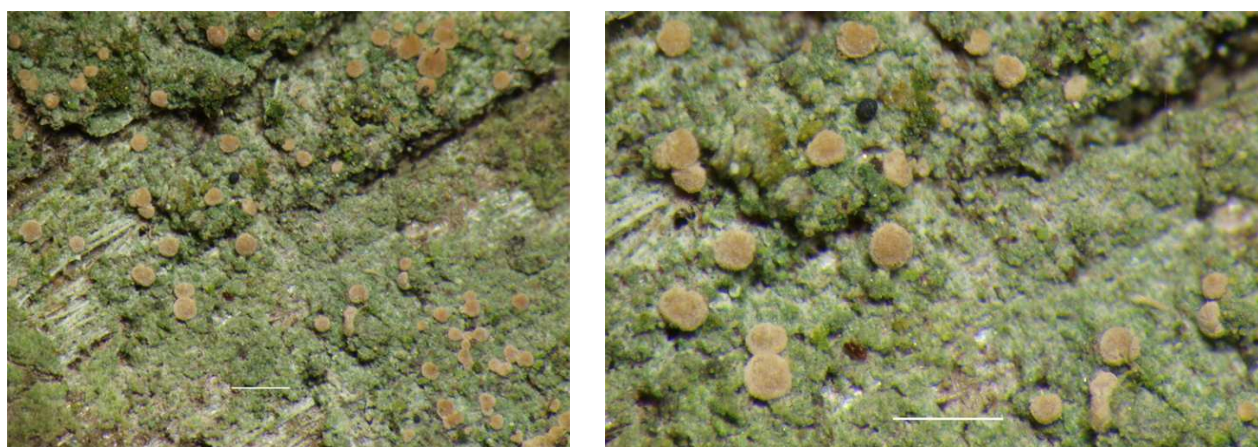


Fig. 9. *Fellhanera chejuensis*, general habit (isotype, BP). Scale 0.5 mm (photo: E. Farkas)

Fellhanera chejuensis differs from *F. encephalarti* (Vězda) Vězda, an African foliicolous lichen, in having light brown (not being black or brownish black) apothecia, in having narrower ascospores ($8-10(-11) \times 2.5-3.2 \mu\text{m}$ vs. $10-12 \times 3.5-4.5 \mu\text{m}$) and in having gyrophoric acid, as well as in the lack of dark granules in the epihymenium (Sérusiaux 1996).

1. ábra

Fellhanera chejuensis differs from *F. congesta* (Vězda) Vězda, an African foliicolous lichen species, in having hyaline (not dark brown) subhymenium, in having much wider ascospores ($8-10(-11) \times 2.5-3.2 \mu\text{m}$ vs. $6-10 \times 1.5-2 \mu\text{m}$) and in having gyrophoric acid, as well as in the lack of a pale yellowish brown margin of apothecium (Sérusiaux 1996).

Fellhanera chejuensis differs from *F. gyrophorica* Sérus., Coppins, Diederich et Scheidegger, a European epiphytic lichen, in having much thinner and indistinct thallus, as well as in the lack of pale yellowish or slight bluish tinge of the thallus, as well as in the lack of the pinkish to pale orange-brown aggregated in clusters pycnidia (Sérusiaux *et al.* 2001).

2. ábra

Fellhanera maritima S. Y. Kondr., L. Lökös et J.-S. Hur, *spec. nova*
(Figs 10–11)

Mycobank no.: MB 805122.

Similar to Fellhanera fallax, but differs in having whitish grey thallus, in having hyaline to pale straw-yellowish apothecia, in having colourless epihymenium, in having 1-septate, smaller ascospores, in having hyaline and smaller conidiomata, and in having smaller conidia.

Type: Republic of Korea: Sinui-do Island (Chollanam-do, Sinan-gun, Sinui-myeon), on rock. Lat.: $34^{\circ} 22' 25.04''$ N; Long.: $126^{\circ} 02' 07.09''$ E; Alt.: 30 m a.s.l. Coll.: Oh, S.-O., Park, J. S., Woo, J. J., 28.06.2013. Holotype: KoLRI-018978 (130633).

Thallus whitish or whitish grey, very thin, consisting of very small areoles, *ca* 0.3–0.5 mm across, scattered or often aggregated in much larger patches to continuous, on siliceous rock. In section thallus corticated, cortical layer to 20 μm thick with epinecral layer to 7 μm thick.

Apothecia to 0.15–0.3(–0.5) mm diam., hyaline to pale straw-yellowish or to pale brown,* [Footnote: *Pale brown, convex apothecia up to 0.5(–0.6) mm diam., sometimes aggregated and irregular, are also seen in the type collection completely filled out by brown, often very interwoven, hyphae (1.5–)2–2.5 μm , sometimes thickened to 3–3.5 μm , of hyphomycete having very long conidiophores and 2–3-septate long conidia. May be presence of the hyphomycete mentioned causes this pale brownish colour of overmature apothecia (darkish of usually hyaline or pale straw-yellowish younger apothecia), which was not observed in young apothecia.] rounded and plane with distinct whitish own margin, then becoming semiconvex or convex; in section biatorine, to 50–100 μm thick, true exciple to 5–15(–20) μm thick in uppermost and lower lateral portions, with distinct epinecral layer to 10 μm thick, and to (10–)15–30 μm thick in basal portion, paraplectenchymatous, cell lumina 5–7 μm diam., colourless; hymenium 35–40 μm high, colourless; paraphyses very thin, moderately branched, to 1 μm diam.; subhymenium (15–)50–60 μm thick, colourless or to slightly straw-yellowish at overmature, somewhat paraplectenchymatous; subhymenium and exciple not reacting with K and N. Asci 8-spored, clavate, Pilocarpaceae type. Ascospores 1-septate, hyaline, fusiform to cylindrical often with eccentric septum or one end slightly or distinctly wider of the other, (8–)9–11(–13) \times (3–)3.5–4(–4.8) μm , without obvious halo. Conidiomata white, to 0.1 mm diam., commonly gaping and becoming cupulate and irregularly shaped. Conidia bacilliform to clavate, one end is much wider

of the other, $3-4 \times 1-1.5(-1.8) \mu\text{m}$.

Chemistry: Spot tests: K-, C-, KC-, P-, UV-.

Ecology: On siliceous rocks in coastal areas.

Distribution: It is so far known only from type locality in western coastal region of South Korea.

Etymology: It is named after occurrence of this species in coastal area.

Taxonomic notes: *Fellhanera maritima* is similar to *Fellhanera fallax* R. C. Harris et Lendemer, known from non-calcareous rock and very rarely from tree bases or roots of central part of Appalachian Mts, Illinois, U.S.A. (Harris and Lendemer 2009), but differs in having whitish grey (not being grey-green, olive-green, greenish brown or tan, occasionally browned or blackened) thallus, in having hyaline to pale straw-yellowish (not dark brown and not black) apothecia, in having colourless epihymenium, in having 1-septate (vs. 3(-4)-septate), and smaller ((8-9-11(-13) \times (3-)3.5-4(-4.8) vs. (12.3-)14.6(-16.8) \times ((3.7-)4.5(-5.2) μm) ascospores, in having hyaline (vs. black) and smaller (to 0.1 mm vs. 0.1-0.2(-0.3) mm diam.) conidiomata, and in having smaller conidia ($3-4 \times 1-1.5(-1.8)$ vs. (3.9-)4.5(-5.1) \times (1.6-)2.0(-2.3) μm).

Fellhanera maritima is similar to *Fellhanera silicis* R. C. Harris et Ladd, a widely distributed species on acidic rocks of dry and mesic wooded habitats of eastern North America (Harris and Lendemer 2009), but differs in having whitish grey (not being grey-green, olive-green, greenish brown or tan, occasionally browned or blackened) much thinner, never becoming very thick thallus, in having hyaline to pale straw-yellowish (not dark brown and not black) apothecia, in having colourless epihymenium (never dark green), in having K- and N-, colourless subhymenium and exciple, in having 1-septate (vs. 3-septate), and smaller ((8-9-11(-13) \times (3-)3.5-4(-4.8) vs. (11.6-)14.4(-16.9) \times ((3.8-)4.2(-4.6) μm) ascospores, in having hyaline (vs. black) and smaller (to 0.1 mm vs. 0.1-0.2(-0.3) mm diam.) conidiomata, and in having smaller conidia ($3-4 \times 1-1.5(-1.8)$ vs. (4.9-)5.8(-6.8) \times (1.5-)1.8(-2.1) μm).

Lecania coreana S. Y. Kondr., L. Lökös et J.-S. Hur, *spec. nova*
(Fig. 12)

Mycobank no.: MB 805123.

Similar to Lecania olivacella, but differs in having dark grey to brownish green thallus, in having smaller apothecia with concave dark brown or black brown disc and in having much thicker thalline exciple, and much longer and narrower ascospores, as well as in the lack of scaly-areolate to squamulose thallus.

Type: Republic of Korea: Aphae-do Island (Chollanam-do, Sinan-gun), seaside, on rock. Lat.: 34° 49' 10.2" N; Long.: 126° 21' 38.7" E; Alt.: 1 m a.s.l. Coll.: Oh, S.-O., Park, J. S., Woo, J. J., 07.06.2013. Holotype: KoLRI-018644 (130299); isotype: KoLRI-018646 (130301).

Thallus to several cm across, dark grey, brownish grey or greenish grey, to brownish green (if apothecia very numerous), consisting of small granules/areoles 0.1-0.2(-0.3) mm across, scattered and distant to forming lax network in peripheral portion to more or less continuous in the centre, with cracks (especially in the places of substrate undulations), but not areolated indeed, with very small and usually very numerous, seem to be lecanorine apothecia. Hypothallus absent.

Apothecia 0.2-0.4 mm diam. (in section to 0.12-0.13 mm thick), very numerous, from scattered to very densely aggregated, from rounded to irregular, plane or slightly concave, not becoming convex; zeorine, thalline margin from very thick at the beginning to better developed below of own margin or disappearing later, concolorous with thallus, dark grey to brownish or greenish grey; own margin very thin, *ca* 0.02-0.04 mm wide, permanently evident (at high magnification especially) and arising level of disc, concolorous with latter, dark brown; disc concave to plane, never being convex, brown to blackish brown or black; algal zone below

apothecium as rather thick entire layer, to 40–50 μm thick; thalline exciple in section below of true exciple level; true exciple 30–40 μm thick in uppermost and lower lateral portions, brownish to dark brown in the outermost parts (especially uppermost part) and hyaline in inner parts, 15–20 μm thick in basal portion, scleroplectenchymatous with matrix, cell lumina to 1.5 μm diam.; hymenium (40–)50–60 μm high; paraphyses to 4 μm diam. towards the tips, uppermost portions to 6–10(–12) μm long becoming brownish or greenish blackish or with blackish brown cups; subhymenium 10–30 μm thick, hyaline; asci 8-spore; ascospores 1-septate, hyaline, elongated ellipsoid to cylindrical or somewhat clavate, where one cell is wider of other, straight or rarely curved, (13–)14–17(–18) \times (3–)3.5–4.2(–6) μm .

Ecology: It grows on siliceous rocks in coastal areas growing together with various species of the genera *Verrucaria* and *Caloplaca*.

Etymology: It is named after country, i.e. Korea, where the type collection was done.

Distribution: So far it is known from several localities in the western coastal part of Korea.

Taxonomic notes: *Lecania coreana* is similar to *L. olivacella* (Nyl.) Zahlbr., growing on siliceous rocks and scattered throughout Europe and North Africa, but differs in having dark grey to brownish green (vs. white to yellow-brown) thallus, in having smaller (0.1–0.3(–0.4) mm vs. to 0.6 mm diam.) apothecia with concave brown or black brown disc (vs. orange-red apothecia with moderately convex disc), and in having much thicker thalline exciple, and much longer and narrower ascospores ((13–)14–17(–18) \times (3–)3.5–4.2(–6) μm vs. 11.5–14 \times 4.5–6 μm), as well as in the lack of scaly-areolate to squamulose thallus.

Lecania coreana is also similar to *L. hutchinsiae* (Nyl.) A. L. Sm., common on siliceous rocks especially on the coast, locally frequent in Scandinavia, northern Europe and Spain, but differs in having thicker and larger (several cm vs. 0.3–0.5 mm wide) thallus, in having smaller (0.1–0.3(–0.4) mm vs. 0.3–0.6 mm diam.) apothecia with concave disc (vs. apothecia with convex disc), and in having well developed and rich on photobiont cells thalline exciple (vs. thalline exciple becoming excluded), in having well developed permanent brown to dark brown own margin (vs. almost colourless), and in having longer ascospores ((13–)14–17(–18) \times (3–)3.5–4.2(–6) μm vs. (9–)10–15 \times 3–4.5 μm), as well as in the lack of white edges of thallus.

At first look *Lecania coreana* may resemble some members of the genus *Verrucaria* with greenish grey thallus as far apothecia are very small. Sometimes it is very difficult to recognise this material among *Verrucarias* in the field conditions. However, microscopical study will very easily clarify its position.

Additional specimens examined: Republic of Korea: Mt Palyongsan (Chollanam-do, Goheung-gun, Chonnam-myeon), on rock. Lat.: 34° 38' 23.9" N; Long.: 127° 25' 19.5" E; Alt.: ca 85 m a.s.l. Coll.: Joshi, Y., Jeon, H. S., Han, G. S., 19.02.2010. [KoLRI-011779 (100268)]. Sinui-do Island (Chollanam-do, Sinan-gun, Sinui-myeon), Hatae-gil seaside, on rock. Lat.: 34° 32' 27.02" N; Long.: 126° 02' 11.01" E; Alt.: 11 m a.s.l. Coll.: Oh, S.-O., Park, J. S., Woo, J. J., 28.06.2013 [KoLRI-018890 (130545)]; same locality, growing together with *Caloplaca* aff. *diffluens* [KoLRI-018893 (130548)]; same locality, growing together with *Verrucaria* spp. [KoLRI-018899 (130554), KoLRI-018923 (130578)].

Lecania rinodinoidea S. Y. Kondr., L. Lökös et J.-S. Hur, *spec. nova*

(Fig. 13)

Mycobank no.: MB 805124.

Similar to Lecania atrynoides, but differs in having dark brownish grey-green thallus, in having smaller apothecia, in having brown or straw orange subhymenium, and in having longer ascospores.

Type: Republic of Korea: Anjwa-do Island (Chollanam-do, Sinan-gun), on rock. Lat.: 34° 47' 47.40" N; Long.: 126° 10' 10.38" E; Alt.: ca 0 m a.s.l. Coll.: Wang, X. Y., Ryu, J. A., 02.06.2011. Holotype: KoLRI 12952 (110409).

Thallus more of 10 cm across, dark brownish or greenish grey to brownish green, continuous

to rather thick, with very small and usually very numerous, lecanorine apothecia. Hypothallus absent.

Apothecia 0.2–0.5 mm diam., (in section to 0.2 mm thick), very numerous, from scattered to rather densely aggregated, mainly regularly rounded, usually concave, not becoming convex; lecanorine, thalline margin from very thick, concolorous with thallus, dark brownish or greenish grey; disc mainly concave to deeply concave, never being convex, blackish brown to black; thalline exciple in section to 50–80 μm thick; true exciple 30–35 μm thick in uppermost and lower lateral portions, 10–20 μm thick in lower lateral and basal portions, paraplectenchymatous with well-developed matrix; algal zone below apothecium as rather thick entire layer, to 70 μm thick; hymenium 60–70 μm high; paraphyses to 3.5–4 μm diam. towards the tips, uppermost portions to 15 μm long becoming brownish; subhymenium 30–40 μm thick, brownish or straw, brownish orange; asci 8-spore; ascospores (0–)1-septate, hyaline, elongated ellipsoid to somewhat clavate, where one cell is wider of other, (11–)13–18(–19) \times (4.5–)5–6(–7) μm .

Ecology: On siliceous rocks in coastal areas.

Distribution: So far it is known only from type locality in the eastern coastal part of Korea.

Etymology: It is named after its similarity to species of the genus *Rinodina*.

Taxonomic notes: *Lecania rinodinoides* is similar to *L. atrynoides* M. Knowles, but differs in having dark brownish grey-green thallus (vs. dirty white to pale brown), in having smaller apothecia (0.2–0.5 mm vs. 0.3–1 mm diam.) and in having much longer ascospores ((11–)13–18(–19) \times (4.5–)5–6(–7) μm vs. 10–14 \times 4.5–6 μm), as well as in the lack or reddish tinge of apothecium disc.

Lecania rinodinoides is similar to *L. coreana* described above, but differs in having much thicker, continuous thallus, in having lecanorine (vs. zeorine) apothecia, in having paraplectenchymatous true exciple being observed only in section (vs. very distinct as permanent own margin, scleroplectenchymatous), and lacking brownish-blackish pigmentation in the outermost portions, in having paraphyses not becoming greenish-blackish towards the tips, in having subhymenium brownish or straw, brownish orange (vs. hyaline), in having very often as simple as 1-septate ascospores being much wider (13–18 \times 5–6 μm vs. 14–17 \times (3–)5–4.2 μm).

Lecania rinodinoides is similar to *L. olivacella* (Nyl.) Zahlbr., but differs in having dark grey to brownish green (vs. white to yellow-brown) thallus, in having brown or black brown apothecia with concave disc (vs. orange-red apothecia with moderately convex disc), and in having much thicker thalline exciple, and in having much longer ascospores (13–18 \times 5–6 μm vs. 11.5–14 \times 4.5–6 μm), as well as in the lack of scaly-areolate to squamulose thallus.

Lecania rinodinoides is also similar to *L. hutchinsiae* (Nyl.) A. L. Sm., but differs in having thicker and larger (several cm vs. 0.3–0.5 mm wide) thallus, in having apothecia with concave disc (vs. apothecia with convex disc) and, and in having well developed and rich on photobiont cells thalline exciple (vs. thalline exciple becoming excluded), and in having longer and wider ascospores (13–18 \times 5–6 μm vs. 10–15 \times 3–4.5 μm), as well as in the lack of white edges of thallus.

At first look *Lecania rinodinoides* may resemble members of the genus *Rinodina* or the genus *Verrucaria* with greenish grey thallus as far apothecia are very small. However, microscopically these taxa are very different and can be easily identified.

Lichenostigma heterodermae S. Y. Kondr., L. Lökös et J.-S. Hur, *spec. nova*
(Figs 14–15)

Mycobank no.: MB 805125.

Similar to Lichenostigma semiimmersa, but differs in having mainly simple hyphae with a few ramifications growing on the host thallus superficially or semi-immersed into the epinecral layer of host cortical layer, in having somewhat

larger ascomata, in having only hyaline ascospores, in having longer and narrower ascospores.

Type: Republic of Korea: Mt Deogyusan, on bark, on thalli of *Heterodermia microphylla*. Lat.: 35° 51' 10.0" N; Long.: 127° 44' 56.9" E; Alt.: 1,568 m a.s.l. Coll.: Hur, J.-S., 10.08.2006. Holotype: KoLRI-004865 (060494).

Vegetative hyphae dark brown, superficial and very scarce at first, but soon becoming more numerous and mostly semi-immersed in epinecral layer to 10–12 µm thick above the cortical layer of the host thallus, causing formation of dark brown to black spots on host lobes especially in the centre of thallus. Hyphae usually simple, with a few ramifications, very long, 60–100 µm and more long, about 3.5–5(–6) µm wide (separate cells about 8–12 × 3.5–5 µm), usually not constricted at the septum. Additional vegetative hyphae penetrating into the host thallus, hyaline and indistinct. Ascomata black or brownish black, superficial, applanate, rounded, intercalary in hyphae, 40–70(–100) µm in diam. Interascal filaments lacking interascal space filled with spherical to polygonal cells. Centrum I–. Asci 1 or 2 per ascoma, fissitunicate, subglobose to broadly clavate, *ca* (23–)25–28(–34) × 11–13(–15) µm, 8-spored. Ascospores 1-septate, narrowly obovate, with rounded apices, somewhat constricted at the septum, lower cell slightly narrower, hyaline, usually without a visible halo in LM (only sometimes seem to be halonate (?)), 8–9.5–11(–11.5) × 3–3.5–4 µm. Anamorph: unknown.

Life form: commensalistic or weakly parasitic on *Heterodermia* species of the *Heterodermia speciosa* group, growing on rocks and various tree trunks.

Comments and affinities: Data on 1-septate brownish ascospores at overmature observed in rather old ascomata on large blackish spots of host thallus infected by *Lichenostigma* are in need of the further verification.

Lichenostigma heterodermiae is similar to *Lichenostigma semiimmersa* Hafellner, the species which is known from terricolous lichens *Buellia elegans* from winter cold steppes and *B. zoharyi* from semideserts, from a number of localities in Europe (Austria, Spain), Asia (Afghanistan, Pakistan) and North America (Canada, U.S.A., Greenland), but differs in having mainly simple hyphae with a few ramifications growing on the host thallus superficially at first and later becoming semi-immersed into the epinecral layer of host cortical layer (vs. hyphae mostly semi-immersed into small fissures of the upper surface of thallus lobes), in having somewhat larger ascomata (40–70 µm vs. 30–50 µm diam.), in having only hyaline ascospores (not becoming brownish at overmature), in having longer and wider ascospores (8–9.5–11(–11.5) × 3–3.5–4 µm vs. 7–8.3–9(–10) × 4–4.3–5 µm), as well as in the lack of strands of vegetative hyphae, and in the lack of slightly reddish reaction of ascomata centrum with I.

Lichenostigma heterodermiae is similar to *L. cosmopolites* Hafellner et Calatayud, lichenicolous fungus on the thallus and occasionally on the apothecia of *Xanthoparmelia* spp., widespread in extra-tropical regions of both hemispheres (Europe, Asia, Africa, North America, South America, Australia) of which it can be easily distinguished by the roughly sculptured vegetative hyphae, the larger ascomata, the size of the ascospores and the host selection.

Additional specimens examined: Republic of Korea: Mt Baegunsan, on *Quercus* bark, on thalli of *Heterodermia microphylla*. Lat.: 35° 36' 31.3" N; Long.: 127° 38' 25.6" E; Alt.: 1,140 m a.s.l. Coll.: Hur, J.-S., 17.08.2006 [KoLRI-004977 (060605)]; Mt. Baegunsan, on rock, on thalli of *H. microphylla*. Lat.: 35° 36' 28.9" N; Long.: 127° 38' 27.6" E; Alt.: 1,082 m a.s.l. Coll.: Hur, J.-S., 17.08.2006 [KoLRI-004970 (060598)]. Mt Baeksokbong (Gangwon-do, Chongson-gun, Bukpyong-myeon), on rock, on thalli of *Heterodermia diademata*. Lat.: 37° 28' 44.34" N; Long.: 128° 39' 45.60" E; Alt.: 494 m a.s.l. Coll.: Hur, J.-S., 16.05.2009 [KoLRI-010196 (090496)]. Chiri Mts, Pia-gol, Jangteo-mok, on *Quercus* bark, on thalli of *Heterodermia* sp. Lat.: 35° 18' 03.5" N; Long.: 127° 33' 51.0" E; Alt.: 1,391 (1,290) m a.s.l. Coll.: Hur, J.-S., 27.09.2006 [KoLRI-005171 (060792)]; same locality, on rock, on thalli of *Heterodermia japonica*. Lat.: 35° 19' 13.0" N; Long.: 127° 36' 31.7" E; Alt.: 1,470 (1,370) m a.s.l. Coll.: Hur, J.-S., 28.09.2006 [KoLRI-005236 (060854), KoLRI-005237 (060854-1)]. Mt Gariwangsan, on rock, on thalli of *Heterodermia dissecta*. Lat.: 37° 24' 05.0" N; Long.: 128° 32' 39.5" E; Alt.: 937 m a.s.l. Coll.: Hur, J.-S., 10.05.2008 [KoLRI-008284 (080041), KoLRI-008292(080049)]. Sobaek Mts, on *Quercus* bark, on thalli of *Heterodermia hypoleuca*. Lat.: 36° 57' 47.4" N; Long.: 128° 30' 31.5" E; Alt.: 1,155 m a.s.l. Coll.: Hur, J.-S., 11.06.2007 [KoLRI-007343 (070492)]. Taebaek Mts, on rock and mosses, on thalli of *Heterodermia* sp. Alt.: 1,617 m a.s.l. Coll.: Hur, J.-

S., 12.09.2004 [KoLRI-001925 (041136)].

Micarea coreana L. Lökös, S. Y. Kondr. et J.-S. Hur, *spec. nova*
(Fig. 16)

Mycobank no.: MB 805126.

Similar to Micarea farinosa, but differs in having dark brown and not farinose thallus, in having slightly larger, black apothecia not being convex to subglobose, in having better developed and dark blue or blackish blue true exciple, in having higher hymenium.

Type: Republic of Korea: Haei-do Island (Chollanam-do, Sinan-gun, Haei-myeon), Hugwang-ri seaside, on rock. Lat.: 34° 37' 55.05" N; Long.: 126° 00' 44.03" E; Alt.: 6 m a.s.l. Coll.: Oh, S.-O., Park, J. S., Woo, J. J., 28.06.2013. Holotype: KoLRI-019049 (130704).

Thallus (0.5–)1–3 mm across, very small, or aggregated in larger spots to 5–7 mm across, continuous to divided into several areoles to 0.3–0.4 mm across, dark grey (at larger magnification rosette-like owing to slightly thicker blackish or blackish-lead peripheral portion and lighter, greyish- or whitish-lead or whitish grey in the centre or at the apothecia). Thallus corticated, cortex to 10 µm thick, algal zone to 40–50 µm thick, algal cells to 10–12 µm diam. Hypothallus as scarce separate hyphae concolorous with thallus to 6 mm long sometimes seen. Black hypothallus present in some cases probably belongs to associated *Rhizocarpon* aff. *sublavatum*.

Apothecia 0.15–0.4(–0.5) mm diam. (in section to 0.11–0.15 mm thick), black, lecideine, at central position of small thalline portion/areole or scattered on larger portions; in section true exciple to 50–100 µm thick in the uppermost and lower lateral portions, dull blue-blackish in the outermost layer and black inside, to 35–50 µm thick in basal portion, bluish black, to dark bluish, palisade plectenchymatous, hyphae to 5 µm diam., cell lumina to 2(–3.5) µm diam.; hymenium (30–)40–50 µm high; epihymenium bluish to dull greenish, blackish or greenish brown; paraphyses 1.5 µm diam. in lower portion, and to 2–2.2 µm diam. towards the tips; subhymenium (25–)30–50(–75) µm thick, brownish in lower portion to black brown; asci 8-spored, 25 × 8–10 µm, of *Helocarpon*- (or *Porpidia*-)type, ascospores very small, (4.5–)5–7(–9) × (2–)2.5–3(–3.5) µm.

Ecology: On siliceous rocks growing together with *Rhizocarpon* aff. *sublavatum* and brown *Acarospora* sp.

Distribution: So far it is known only from the type locality in South Korea.

Etymology: It is named after Korea, where the type collection was done.

Taxonomic notes: *Micarea coreana* is similar to *M. farinosa* Coppins, rare and overlooked in Western Europe (England, Wales and Scotland) lichen, but differs in having dark, not farinose thallus (vs. light green, farinose), in having larger photobiont cells (10–12 µm vs. 4–7 µm), in having slightly larger (0.15–0.4 mm vs. 0.15–0.25(–0.3) mm diam.), black (vs. orange to orange-brown) apothecia not being convex to subglobose, in having better developed and dark blue or blackish blue (vs. badly developed and colourless) true exciple, in having higher hymenium (40–50 µm vs. 24–30 µm high), while ascospores are almost the same (5–7 × 2.5–3 µm vs. 5–7.5 × 2–3.4 µm), and in the lack of goniocysts 12–18 µm diam.

Micarea coreana is similar to *M. lithinella* (Nyl.) Hedl., a pioneer coloniser of shaded stones, widespread lichen in Europe, North America and Eastern Asia, but differs in having distinct thallus (vs. indistinct, sometimes with whitish convex areoles), in having larger photobiont cells (10–12 µm vs. 4–7 µm), in having black (vs. pale, dull yellow-orange to reddish brown), apothecia not being convex, in having better developed (vs. poorly developed and reflexed or absent) true exciple, in having bluish epihymenium (vs. hymenium colourless), in having dark brown subhymenium (vs. yellow straw to pale orange-brown), in having smaller ascospores (5–7 × 2.5–3 µm vs. 6.5–9.5 × 2.5–4 µm).

Micarea coreana is characterised in having *Helocarpon*-type of asci. However, ascospores are not halonate that is distinguishing character of the genus *Helocarpon*.

Phoma heterodermiae S. Y. Kondr., L. Lőkös et J.-S. Hur, *spec. nova*

Mycobank no.: MB 805127.

Similar to Phoma physciicola, but differs in having spherical to widely ovoid conidia, being slightly shorter and much wider.

Type: Republic of Korea: Mt Kongduck, on bark, on thalli of *Heterodermia hypoleuca*, growing together with *Normandina pulchella*. Lat.: 36° 45' 00.3" N; Long.: 128° 15' 53.0" E; Alt.: 643 m a.s.l. Coll.: Hur, J.-S., 20.06.2007. Holotype: KoLRI-007638 (070798).

Conidiomata to 90–120 µm diam., black, subglobose, ostiolate usually completely immersed into host thallus, causing somewhat bleaching host thallus; wall: black-brown, 7–10 µm thick, slightly thicker at the ostiole, composed of 2–3 layers of cells 6–11 × 5–7.5 µm; conidiophores absent, conidiogenous cells 4–5 µm diam., hyaline, subglobose, smooth; conidia simple, hyaline, spherical to broadly ovoid, smooth 3.5–5 × 3–4(–4.5) µm.

Hosts: On thalli of *Heterodermia hypoleuca*, causing somewhat bleaching host thallus.

Distribution: So far known only from the type collection.

Etymology: It is named after the genus of the lichen host.

Taxonomic notes: Similar to *Phoma physciicola* Keissl., a rarely recorded and obviously rare lichenicolous fungus from apothecia of *Physcia* and *Physconia* species, not or only slightly damaging the host, recorded from Europe and North America, but differs in having spherical to widely ovoid, and in having slightly smaller and wider conidia (3.5–5 × 3–4(–4.5) µm vs. 4–5.5(–6) × 2.5–3.5(–4) µm.

Protoparmeliopsis chejuensis S. Y. Kondr. et J.-S. Hur, *spec. nova*

(Fig. 17)

Mycobank no.: MB 805128.

Similar to Protoparmeliopsis acharianum, but differs in having much smaller thallus and apothecia, in having whitish grey thallus and apothecium discs, in having smaller and narrower marginal lobes, in having scarce white pruina as well as in having shorter and wider ascospores.

Type: Republic of Korea: Cheju-do Island, Gwideok-ri (Cheju-si, Hangyeong-myeon, Hallim-eub), along seashore, on rock growing together with *Caloplaca squamosa*. Lat.: 33° 26' 33.22" N; Long.: 126° 16' 59.97" E; Alt.: 3 m a.s.l. Coll.: Kondratyuk, S. Y. (212651), Hur, J.-S., Oh., S.-O., Lőkös, L., Jayalal, U., Joshi, S., Park, J. S., 05.07.2012. Holotype: KoLRI-016788 (121991); isotypes: KoLRI-016797 (121998, sub *Caloplaca diffluens*), KoLRI-016798 (121999, sub *Caloplaca diffluens*), KoLRI-016799 (122000, sub *Caloplaca diffluens*).

Thallus very small, (1–)2–3 mm diam./across, usually indistinct or seen when aggregated into aggregations to 1 cm across or more; rosette-like if with several radially orientated lobes and/or of distant and disperse areoles (0.3–)0.4–0.8 mm across in the centre; whitish or whitish grey. Lobes 0.7–0.8(–1) mm long and 0.3–0.7 mm wide, very wide and widened towards the tips, often forming rosettes and/or rather indistinct, somewhat semiconvex or convex, but thinning towards the ends. Soredia and isidia absent. Hypothallus absent.

Apothecia rather large 0.4–0.7 (–0.9) mm diam., (to 0.35 mm thick in section), usually 1–3(–5) in the centre of rosette-like thalli; disc whitish grey (concolorous with thallus) to dull flesh-coloured, dull greyish-brownish with scarce whitish pruina, only slightly darker of thallus; thalline margin permanent and varying in the width, a. 0.1 mm wide; in section lecanorine, thalline exciple 80 µm wide in the uppermost lateral portion and 120–150 µm wide in lower lateral portion; true

exciple 20–25 μm thick in lateral and basal portions; hymenium very low, 30–40 μm high; epihymenium brownish, in K becoming colourless; subhymenium 70–100(–120) μm thick, hyaline while with numerous oil droplets to 4 μm diam.; paraphyses to 3 μm diam., slightly widened towards the tips, to 3–4(–5) μm diam.; asci of *Lecanora*-type, 30–35 \times 15–18 μm ; ascospores widely ellipsoid to widely ovoid, usually with 2 oil droplets, 7–11 \times (5–)6–7 μm .

Chemistry: Thallus K⁺ weakly yellowish, KC[–] or somewhat becoming bluish(?), C[–], P[–]. Epihymenium in K becoming colourless.

Ecology: On volcanic rocks in supralittoral zone.

Distribution: So far known from several scattered localities in coastal zone of South Korea.

Etymology: Species epithet refers to the type locality, Cheju-do Island, South Korea.

Taxonomic notes: The genus *Protoparmeliopsis* includes hitherto about 40 species (Kondratyuk 2010, Kondratyuk *et al.* 2012a, Santesson 2004). Two more Asian species (*P. esfahanensis* S. Y. Kondr. et B. Zarei-Darki and *P. zarei* S. Y. Kondr., both from Iran), were recently described from Asia (Kondratyuk *et al.* 2012a).

The legal descriptions for the next three new for science Asian species, i.e. *Protoparmeliopsis chejuensis* S. Y. Kondr. et J.-S. Hur (from Korea), *P. pseudogyrophorica* S. Y. Kondr., S.-O. Oh et J.-S. Hur (from China) and *P. taranii* S. Y. Kondr. et Tschabanenko (from Russia) are provided in this paper.

Protoparmeliopsis chejuensis is similar to *P. acharianum*, but differs in having much smaller thallus and apothecia (0.4–0.7 mm vs. 1–2 mm diam.), in having whitish grey (vs. pale yellow to yellow-green) thallus, in having whitish grey apothecium discs (vs. brown or rose-brown in *P. acharianum*), in having smaller and narrower marginal lobes (0.3–0.7 mm wide vs. 0.8–1.5(–2) mm wide), in having central areoles not being ascending, in having scarce white pruina (vs. not being pruinose) as well as in having shorter and wider ascospores (7–11 \times 6–7 μm vs. 10–15(–16) \times 4–6 μm) and in supralittoral habitat (vs. upland siliceous rocks) (Kondratyuk 2010).

Material of *Protoparmeliopsis chejuensis* can be keyed to *Lecanora albocaesiella* B. D. Ryan et T. H. Nash, but differs from it in having smaller thallus and apothecia, in having *Lecanora*-type asci (vs. *Bacidia* or *Eiglera*-type asci), and in having wider ascospores (7–11 \times (5–)6–7 μm vs. 8–13 \times 3–5 μm) (Ryan *et al.* 2004).

From *Lecanora brattiae* B. D. Ryan et T. H. Nash *Protoparmeliopsis chejuensis* differs in having smaller and whitish grey (vs. yellowish brown) thallus, in having whitish grey (vs. reddish brown to dark brown) discs of apothecia, and in having *Lecanora*-type ascus (vs. *Bacidia*-type of ascus), as well as in having simple (not 1-septate) and wider ascospores (7–11 \times 6–7 μm vs. 8–10 \times 2–4 μm) (Ryan *et al.* 2004).

Protoparmeliopsis pseudogyrophoricum* S. Y. Kondr., S.-O. Oh et J.-S. Hur, *spec. nova
(Fig. 18)

Mycobank no.: MB 805129.

Similar to Protoparmeliopsis gyrophoricum, but differs in having gyrophoric acid in medullar layer, in having much darker brown (not waxy yellow) discs of apothecia, and in having much longer and wider ascospores as well as in the lack of yellowish colour of thallus and in the lack of pruina on thallus.

Type: China: Songmudao village, Wafangdian city, Dalian county, Liaoning province, on rock. Lat.: 39° 23' 51.4" N; Long.: 121° 48' 28.4" E; Alt.: 55 m a.s.l. Coll.: Oh, S.-O., Hur, J.-S., 26.07.2012. Holotype: KoLRI-016651 (CH-120041).

Thallus to 3–5 cm across while often in larger aggregations, distinctly lobate in peripheral zone and areolate/squamulose in the centre. Lobes 1–1.5 mm long and 0.5–1.2(–1.7) mm wide, somewhat widened towards the tips, plane, flat (not convex), with somewhat rough upper surface,

epruinose, often with bluish or bluish-greenish-blackish line at the tips. Areoles in the centre 0.5–0.7 (–1.2) mm across. Upper surface greenish grey.

Apothecia 0.4–1.2(–1.5) mm diam., (in section to 0.35 mm thick), lecanorine, immersed at first then sessile; disc from dull brown or greenish brown to dark brown or chestnut-brown, epruinose; in section thalline exciple 150–200 µm wide, with cortical layer only in lower lateral portion; algal zone to 50–80 µm thick; true exciple 10–20 µm thick in the uppermost and lower lateral portions, 20–30 µm thick in basal portion, paraplectenchymatous with matrix; hymenium 50–60 µm high; epihymenium light brown to orange-brown; tips of paraphyses with numerous minute granules of brown pigment; paraphyses 2–2.5 µm diam. in lower portion and distinctly widened towards the tips to 4–5 µm diam.; subhymenium 40–50 µm diam., hyaline; ascospores elongated ellipsoid, often somewhat curved, or more or less bean-like, with more or less attenuated ends, (13–)17–21(–23) × 5.5–6.5(–7) µm.

Chemistry: Spot tests: cortex K+ yellowish, KC–, C–, P–, UV–; medullar K–, C+ pink, KC+ yellow, P–, UV–. Usnic acid (cortex), gyrophoric acid (medulla).

Ecology: Growing on coastal granitic rocks together with *Dimelaena* cf. *oreina*, partly damaged by lichenicolous fungus.

Distribution: Species is so far known only from type locality, coastal Pacific region of China.

Etymology: The species epithet reflects similarity of new species to *Protoparmeliopsis gyrophorica*.

Taxonomic notes: *Protoparmeliopsis pseudogyrophoricum* is similar to *P. gyrophoricum* (Lendemer) S. Y. Kondr., a lichen species known from sandstone in two localities of North America (USA: Minnesota and Iowa), but differs in having gyrophoric acid in medullar layer (not in cortical layer, i.e. in having positive reaction of medullar with C vs. positive reaction of cortical layer with C in *P. gyrophoricum*), in having much darker brown (not waxy yellow) discs of apothecia, and in having much longer and wider ascospores ((16–)17–21(–23) × 5.5–6.5(–7) µm vs. (11–)13.5(–16) × (5–)5.5(–6.5) µm) as well as in the lack of yellowish colour of thallus and in the lack of pruina on thallus (Knudsen and Lendemer 2009).

Protoparmeliopsis pseudogyrophoricum differs from *P. pinguis* (Tuck.) S. Y. Kondr., a coastal epilithic species of California region of North America in having much thinner greenish grey thallus (vs. very thick with thick convex folded verrucae, pale yellowish green, often with an extremely rough pruinose or scabrose surface), in having well developed lobes (vs. slightly lobed at the margin), as well as in the lack of irregular patches of granules or granular soredia, in the lack of KC+ red-orange and C+ orange reactions of cortex, and in the lack of K+ yellow, KC+ orange and C+ deep yellow reactions of medulla as well as in the lack of xanthonic and thiophanic acid (Brodo *et al.* 2001).

A number of *Lecanora* species containing gyrophoric acid have been recently described and discussed in a number of publications. However, they belong to different species groups (i.e. *Lecanora saligna* H. Magn. and *L. congesta* Clauzade et Vězda from the *Lecanora dispersa*-group, *L. epibryon* subsp. *broccha* (Nyl.) Lumbsch – from the *L. subfusca*-group, *L. munzii* K. Knudsen et Lendemer and *Lecanora peninsularis* Knudsen, Lendemer et Elix – from the *L. saligna*-group, *L. microloba* Śliwa et Flakus – from the *L. polytropa*-group (Knudsen *et al.* 2011, Śliwa and Flakus 2011) and they are not included into comparison here. The discovery of the new species of *Protoparmeliopsis* described here indicates that gyrophoric acid is a more common lichen product in the lecanoroid lichens than previously thought.

Protoparmeliopsis taranii S. Y. Kondr. et Tchaban., *spec. nova*
(Figs 19–21)

Mycobank no.: MB 805130.

Similar to *Protoparmeliopsis dispersoareolata*, but differs in having well developed small regularly rounded, (0.1–)0.2–0.5 mm diam., bright yellowish soralia, in having much smaller and not being pruinose thallus, in having much smaller and lacking black edge thalline areoles not being differentiated in central and peripheral portions, and in its maritime habit.

Type: Russia: Iturup Island, “Kasatka” Bay, “Chertovy Skaly” rocks, in the vicinities of Burevestnik settlement, on rock. Coll.: Tschabanenko, S. I., 16.08.2011. Holotype: KW-L.

Thallus small 3–15 mm across, or in larger aggregations, consisting of rosettes of more or less rounded areoles, with very small but distinct characteristically rounded yellowish soralia and often with very large apothecia; areoles very small, (0.2–)0.3–0.7(–1) mm across, plane at first, but often semiconvex to rather convex, greyish green; soralia regularly rounded, crater-like, (0.1–)0.2–0.3(–0.5) mm diam./across with plane or concave rarely to somewhat subconvex yellowish green soredious mass. Soredia farinose, 10–15 µm diam, regularly rounded.

Apothecia very large, 1–2.5 mm diam., (in section to 0.3 mm thick), lecanorine, often with undulating surface and thalline margin, discs dull brownish to brownish green or brownish-yellowish green, thalline margin to 0.1(–0.2) mm wide, sometimes disappearing, yellowish green, distinctly contrasting discs and thallus; in section thalline exciple to 100–150 µm thick, with cortical layer to 20–30 µm thick, paraplectenchymatous, outermost layer brownish greenish owing to numerous crystals; true exciple almost indistinct in lateral portion, to 30 µm wide in the uppermost and to 10 µm wide in lower lateral portion, 15–40 µm thick in basal portion, with oil inclusions; hymenium 70–80 µm high, with oil droplets, epihymenium dull greenish yellow to dull greenish yellow or dirty greenish orange, in K becoming colourless; subhymenium 40–70(–100) µm thick, yellowish or yellow-brownish in the upper part (to 20 µm thick) and hyaline in lower portion, with numerous oil cells and irregular oil aggregations to 4–7 µm across; asci 8-spored; ascospores from widely ellipsoid to almost spherical, 7–10(–10.5) × (5–)6–7(–8) µm.

Ecology: On siliceous rocks, growing together with *Protoparmeliopsis muralis*, *Rhizocarpon reductum* and species of the genera *Acarospora*, *Buellia*, *Lecanora* in the littoral zone of Sakhalin Island.

Etymology: It is named after known Russian botanist and geobotanist, collector of vascular plants and lichens, Dr Alexander Alekseyevich Taran (Yuzhno-Sakhalinsk, Russia), and who has kindly helped during field work and to provide type collection.

Distribution: So far known from type locality in the Sakhalin Island.

Taxonomic notes: *Protoparmeliopsis taranii* is similar to *P. dispersoareolata* (Körb.) S. Y. Kondr., growing on calcium containing shale, on sandstone pure on calcium and totally absent on pure limestone of alpine belt of European and Central Asian mountains, in having apothecia much larger of thalline areoles (apothecia 2–4 mm diam.), but *P. taranii* differs from the latter in having in having well developed small regularly rounded, 0.2–0.5 mm diam., bright yellowish soralia, in having much smaller and not being pruinose thallus (vs. thallus to 4 cm across, sometimes being with dense pruina), in having much smaller and lacking black edge thalline areoles, and not being differentiated in central and peripheral portions (vs. peripheral lobes to 1–2 mm long and 1–1.5 mm wide), in having much shorter ascospores (7–10(–10.5) × (5–)6–7(–8) µm vs. 12–18 × 3.5–7 µm) and in its maritime habit.

Protoparmeliopsis taranii is similar to *P. crustacea* (Savicz) S. Y. Kondr., growing on siliceous rocks, often in nitrophilous conditions in Asia (Arctic – Taimyr; Kamchatka), but differs in having well developed soralia, in having much thinner thallus (vs. 3–6 mm thick), in having apothecia not being convex, in having wider ascospores (7–10(–10.5) × (5–)6–7(–8) µm vs. 8–11 × 5.5–6.5 µm) as well as in the lack of squamulose central portion and lobate peripheral portion, and in the lack of brownish or brown-black hypothallus, in the lack of reddish–brown discs.

Protoparmeliopsis taranii is similar described above *P. chejuensis* S. Y. Kondr. et J.-S. Hur

from South Korea in having very small thalline areoles, but differs in having well developed rounded soralia, as well as in having greenish grey (not whitish) thallus, and in having much larger apothecia.

After small thalline areoles not being lobate in peripheral zone *Protoparmeliopsis taranii* is similar to *P. bolcana* (Zahlbr.) S. Y. Kondr., but differs in having much smaller and mainly convex areoles, and in having distinctly lecanorine apothecia with dull brownish to brown-greenish discs.

Sometimes sterile thalline areoles of *Protoparmeliopsis taranii* can be accepted as thallus of soredious species of the genus *Rhizocarpon*, but fertile material easily differs in having distinctly lecanorine apothecia from the first stages of their development.

There is only one soredious species of the former genus *Placolecanora* Räs., i.e. *P. demissa* (Flot.) Kopacz., mentioned in the "Handbook of the lichens of the USSR" (Kopachevskaya *et al.* 1971). However, this species as recently shown to be species of the genus *Caloplaca* (Arup and Grube 1999).

Thus *P. taranii* is the first soredious member of this genus in Russian Far East.

Protoparmeliopsis taranii can be compared with some species of the genus *Lecanora* (i.e. *L. brodoana*, *L. umbrosa*, *L. impudens* and *L. epanora*) too. However, from all these *Lecanora* species *Protoparmeliopsis taranii* differs in having greyish green (not yellowish white to yellowish grey or greenish white) thallus, consisting of more or less distant convex corticated areoles, in having larger apothecia, in the lack of red-brown discs, and in having yellowish green (not concolorous with thallus white to whitish grey or pale yellow) thalline margin of apothecium, and in the lack of continuous areolated thallus.

Furthermore from *Lecanora brodoana* Lumsch et T. H. Nash, having punctiform soralia and large amphithecial crystals in apothecia as well as containing usnic acid in addition to atranorin and growing in shaded conditions on siliceous rocks in montane areas of SW North America (Ryan *et al.* 2004), *Protoparmeliopsis taranii* differs in having much smaller (10–15 μm vs. (30–)40–45(–50) μm diam., and not being granulose) soredia, and in having smaller (0.2–0.5 mm vs. 0.2–1(–1.4) mm diam./across, being confluent) soralia, and in having smaller ascospores (7–10(–10.5) \times (5–)6–7(–8) μm vs. 10.5–15 \times 7.5–10.5 μm), as well as in the lack of large crystals insoluble in K.

Additionally to characters mentioned above *Protoparmeliopsis taranii* differs from *Lecanora umbrosa* Degel., (having soralia in rounded patches, and in having small amphithecial crystals in apothecia, and lacking usnic acid, containing terpenoids and /or fatty acids in addition to atranorin and growing on vertical non-calcareous rock faces, often protected and shaded in Europe and North America), in having smaller soredia (not being granulose, 10–15 μm , vs. 25–50 μm in diam.), in having smaller and yellowish grey (not white or yellowish white) soralia (0.2–0.5 mm vs. 0.3–0.7(–1.2) mm diam./across), in having thalline margin not being soredious (vs. often sorediate in *L. umbrosa*), in having smaller ascospores (7–10(–10.5) \times (5–)6–7(–8) μm vs. 11–15 \times 6–8.5 μm) in the lack of thin, white, fibrous prothallus, in the lack of small crystals partly soluble in K in amphithecium as well as in the lack of K+ yellow reaction of thallus.

Furthermore, *Protoparmeliopsis taranii* differs from *Lecanora impudens* Degel., epiphyte sorediate species growing on bark of deciduous trees in Europe and North America as well as from sorediate morphotype of *L. allophana* in having smaller not being granular soredia (10–15 μm vs. 40–60 μm diam.), and in having much smaller soralia (0.2–0.5 mm vs. 0.3–1 mm diam.), and in having smaller ascospores (7–10(–10.5) \times (5–)6–7(–8) μm vs. 12–14 \times 8–9.5 μm), as well as in the lack of small numerous crystals in amphithecium dissolving in K, and in the lack of K+ yellow and P+ pale yellow reactions of thallus.

From sorediate forms of *Lecanora campestris* (mentioned by Ryan *et al.* 2004) growing on siliceous and calciferous rocks in Mediterranean areas of Northern Hemisphere, as well as from *L.*

brodoana *Protoparmeliopsis taranii* differs in having smaller ascospores ($7-10(-10.5) \times (5-)6-7(-8) \mu\text{m}$ vs. $14.5-16.5 \times 5.5-7 \mu\text{m}$), as well as in the lack of small numerous crystals dissolving in K and in the lack of K+ yellow and P+ pale yellow reactions of thallus.

Protoparmeliopsis taranii differs from *Lecanora panticapensis* Khodosovtsev, Naumovich, Elix et S. Y. Kondr. from *Lecanora frustulosa* group recently described from southeastern Europe (Khodosovtsev *et al.* 2009) in having distinctly rosette-like thallus, in having smaller and especially thinner thalline areoles, in having smaller soralia ($0.2-0.5 \text{ mm}$ vs. $1.2-2.5(-3.5) \text{ mm}$ diam./across), in having smaller soredia (nor being in consoredia, $10-15 \mu\text{m}$ vs. $50-60(-70) \mu\text{m}$ diam.) and in having smaller ascospores ($7-10(-10.5) \times (5-)6-7(-8) \mu\text{m}$ vs. $10.5-14 \times 5-7 \mu\text{m}$), and in the lack of P+ yellow reaction of soredious mass.

From Easter Asian epiphyte species *Lecanora pachycheila* Hue, growing on smooth bark of deciduous trees in plains and low elevations in mountains of East Asia (Russia: Amurskaya oblast, Khabarovskiy and Prymorskiy krays), Korea, Japan), *Protoparmeliopsis taranii* differs in having thallus of convex dispersed and scattered/distant areoles (not being continuous and wrinkled, not being leprose), not being fibrose in peripheral zone, in having well developed smaller soralia, and in having much smaller soredia, in having dull brown (not being red-brown or brown-red and pruinose) apothecium disc, in having distinctly yellowish green thalline margin (not concolorous with thallus, not being leprose), and in having smaller ascospores ($7-10(-10.5) \times (5-)6-7(-8) \mu\text{m}$ vs. $15-24 \times 7-12 \mu\text{m}$), as well as in the lack of K+ rusty-yellow reaction of thallus.

Protoparmeliopsis taranii is similar to widely distributed under shaded overhangs and in dry crevices of iron-rich rocks and walls in Europe, and North America soredious species *Lecanora epanora* (Ach.) Ach., but it differs in having smaller punctiform soralia ($0.2-0.3 \text{ mm}$ vs. $0.2-0.5 \text{ mm}$ diam.) and not coalescing to form almost continuous sorediate crust, in having very large apothecia, and in having wider ascospores ($7-10(-10.5) \times (5-)6-7(-8) \mu\text{m}$ vs. $8-12 \times 5-6.5 \mu\text{m}$), as well as in the lack of blue hypothallus, and in the lack of UV+ bright orange reaction of thallus. Unfortunately it should be mentioned that data on *Lecanora epanora* in the “Handbook of the lichens of the USSR” (Kopachevskaya 1971) are not full enough as far it is not mentioned that this species is soredious, and data on soredia and soralia are missing completely.

Protoparmeliopsis taranii is similar to another soredious species *Lecanora subaurea* Zahlbr., but it differs in having smaller punctiform soralia and not coalescing to form an almost continuous sorediate crust, as well as in the lack of soredia arising only on the margins of areoles, in the lack of P+ orange or red reaction of thallus and soralia, and in the lack of UV+ bright orange reaction of thallus.

Protoparmeliopsis taranii is preliminary placed into the genus *Protoparmeliopsis*. It differs from all *Lecanora* species mentioned above in having convex corticated areoles which are distant and scattered, often resembling thalline areoles of *Rhizocarpon* or yellow *Acarospora* species.

Future collections and inclusion of material of taxa described above into molecular phylogenetical analysis together with other Eastern Asian species of the genus *Protoparmeliopsis* will clarify their status within this genus, as well as will allow to study relation study of the genus *Protoparmeliopsis* with other genera of the Lecanoraceae.

New combinations

Protoparmeliopsis crustaceum (Savicz) S. Y. Kondr., *comb. nova* [Mycobank MB 805132]. – Basionym: *Squamarina crustacea* Savicz, Bull. Jard. Bot. Imp. Pierre le Grand, 14: 123 (1914).

Protoparmeliopsis gyrophoricum (Lendemer) S. Y. Kondr., *comb. nova* [Mycobank MB 805133]. – Basionym: *Lecanora gyrophorica* Lendemer, Opuscula Philolichenum, 7: 22 (2009).

Protoparmeliopsis mazatzalensis (B. D. Ryan et T. H. Nash) S. Y. Kondr., *comb. nova* [Mycobank MB 805134]. – Basionym: *Lecanora mazatzalensis* B. D. Ryan et T. H. Nash, Crypt. Bot. 3: 268 (1993).

Protoparmeliopsis pinguis (Tuck.) S. Y. Kondr., *comb. nova* [Mycobank MB 805135]. – Basionym: *Lecanora pinguis* Tuck., Proc., Amer. Acad. Arts and Sci. 6: 268 (1864).

Roselliniopsis phaeophysciae S. Y. Kondr., L. Lökös et J.-S. Hur, *spec. nova*
(Figs 22–23)

Mycobank no.: MB 805136.

Similar to Roselliniopsis tartaricola, but differs in having smaller ascomata, in having only simple and much longer and narrower ascospores and in having different host.

Type: Republic of Korea: Mt Soraksan (Gangwon-do, Yangyang-gun), Heulrimgol valley, on *Carpinus* bark, on *Phaeophyscia adiastrala* thalli. Lat.: 38° 05' 02.16" N; Long.: 128° 25' 10.56" E; Alt.: ca 884 m a.s.l. Coll.: Joshi, Y., Wang, X. Y., Ryu, J. A., 25.05.2009. Holotype: KoLRI-010602 (090930).

Mycelium visible as small dark brown to black patches, normally inconspicuous around the ascomata, often seen as radiating hyphae in the section; subicular hyphae brown, 5–6 µm thick. Ascomata black, subspherical to ovate, 300–400(–500) µm diam., scattered and distant or aggregated to 3–5 ascomata in groups; ascomatal wall 20–35 µm thick, with isodiametric to slightly vertically elongated cells; hymenium composed of numerous paraphyses and asci, ca 100 µm high; hamathecium present as paraphyses and periphyses; paraphyses with very delicate walls, 1.5–3(–4) µm thick; periphyses forming a crown, with delicate walls, dissolving with age; asci cylindrical, 80–100 × 11–14 µm, 8-spored; ascospores single, hyaline and more or less fusiform at first, then becoming pale brown and dark brown, more or less broadly ellipsoid or elongated ellipsoid with rounded ends, 16–22(–24) × (6–)7–8(–8.5) µm.

Host: on thalli of *Phaeophyscia* spp. (*P. adiastrala* (Essl.) Essl., *P. exornatula* (Zahlbr.) Kashiw., and *P. limbata* (Poelt) Kashiw.), probably commensalistic as far no visible damage of host thalli observed.

Distribution: So far known from several localities of South Korea (e.g. Mt Soraksan and Sobaek Mts), and Eastern Asia.

Etymology: It is named after lichen host (i.e. the genus *Phaeophyscia*) from which this taxon is so far known.

Taxonomic notes: Seven species of the genus *Roselliniopsis* are hitherto known in the world, of which three species, i.e. *Roselliniopsis gelidaria* (Mudd) Matzer, *R. palicei* Etayo and *R. ventosa* (Rostrup) Alstrup inhabit predominantly species of the genus *Placopsis* (Nyl.) Linds. (of them *Roselliniopsis ventosa* is recorded from *Buellia chionea*, too); *Roselliniopsis tartaricola* (Nyl.) Matzer inhabits predominantly species of *Ochrolechia* and *Pertusaria*, *R. groedensis* (Zopf) Matzer et Hafellner known from *Pertusaria* spp., *R. tropica* Matzer et R. Sant. on *Pertusaria* spp. and *R. indica* S. J. Kaur et Gehlot.

Roselliniopsis phaeophysciae is similar to *R. tartaricola*, but differs in having smaller ascomata (300–400 µm vs. 400–700 µm diam.), in having only simple and much longer and narrower ascospores (16–22 × 7–8 µm vs. 9–14(–16) × 8–10 µm) and in its host selection.

From *Roselliniopsis palicei* *R. phaeophysciae* differs in having larger ascomata, in having wider asci and in having fusiform or elongated ellipsoid, much larger ascospores.

It should be mentioned that taxonomic position of two mentioned above taxa *Roselliniopsis ventosa* and *R. palicei* is in urgent need of clarifying. However, it can be separate object of special study.

Additional specimens examined: Republic of Korea: Mt Soraksan (Gangwon-do, Shokcho-si, Sorak-dong), on rock and mosses, on *Phaeophyscia* cf. *exornatula* thalli. Lat.: 38° 10' 32.2" N; Long.: 128° 18' 17.6" E; Alt.: 355 m a.s.l. Coll.: Hur, J.-S., 16.06.2005 [KoLRI-003136 (050232)]. Sobaek Mts, on bark, on *Phaeophyscia* cf. *limbata* thalli. Lat.: 36° 57' 44.0" N; Long.: 128° 30' 31.1" E; Alt.: 1,116 m a.s.l. Coll.: Hur, J.-S., 11.06.2007 [KoLRI-007337 (070485)].

Seiophora blumii S. Y. Kondr. et M. Haji Moniri, *spec. nova*

(Figs 24–27)

Mycobank no.: MB 805137.

Similar to Seirophora lacunosa, but differs in having much shorter lobes clearly differentiated on three portions (wide “main lobes”, narrow and long “secondary lobules”, and “terminal portions”), in having terminal macroblastidia, in having microblastidia on underside and 4-spored asci at the maturity.

Type: Turkmenistan: Mountains of Western Kopet-Dagh, Kara-Kalin district, in the vicinity of Aj-dyry settlement. Coll.: Blum, O. B., 17.11.1966. Holotype: KW-L 65277; isotype: KW-L 65278.

Thallus to 8–10 cm across, foliose to subfruticose, greyish to orange-greyish or orange-brown in places, thin and friable, richly blastidious in terminal portions and on underside. Lobes well developed, horizontally orientated (not erect), 10–20 mm long, clearly differentiated on three portions, i.e.: “main lobes” *ca* 8–15 mm long and (1–)2–5(–6) mm wide, very wide from the basis, and somewhat wider to 4–6 mm wide in places of ramification, with distinctly folded downwards margins; abundant thin, tubular (or inversely trough-type) “secondary lobules” to 4–5(–7) mm long, and *ca* 0.2–0.5 mm wide forming “the second zone” (*ca* 5–7 mm wide); and the “terminal portion” consists of abundantly ramified, and very thin sublobules (0.7–)0.15–0.2 mm wide and 1–1.5 mm long. Upper surface grey to orange-greyish, orange-brownish in places, almost without tomentum. Lower surface often with distinct numerous thick veins, abundantly blastidious between veins. Macroblastidia on terminal portions of secondary sublobules sometimes present and well developed, 120–150 μm diam., with visible thorns or with visible pimples. Microblastidia often forming abundant blastidious green zone on underside, (24–)30–43(–48) μm diam., without pimples and thorns, often forming conblastidia 55–65(–82) μm diam. Thallus in section (72–)90–100 μm thick in places with algal zone developed; and to 100–130(–166) μm thick in places with vens. Upper cortex scleroplectenchymatous to 36(–48) μm thick, with pimples or single hyphae; algal layer to 24–36(–48) μm thick. Lower cortex and true medulla absent.

Apothecia very rare but sometimes numerous, *ca* 1 mm diam with distinct tomentum, especially young with distinct single or grouped hyphae to pimple-like formations, which darker *ca* 20–50 μm diam. at the basis and hyaline 12–30 μm diam. at the tips to 36 μm long; disc deeply concave, orange to orange-brownish. Cortex of thalline margin scleroplectenchymatous to 50 μm thick. Hymenium 50–60 μm high. Subhymenium 65–80 μm thick. Paraphyses without distinctly swollen the uppermost cells. Asci 8-spored at the beginning, while only 4(–6) adult bipolar spores present at the maturity, 45–47(57) \times 13–18 μm . Ascospores narrowly ellipsoid (11.5–)14.5–16 \times 5–6(–6.5) μm . Septum 2–3.2 μm thick.

Ecology: On bark and dead twigs of *Picea* and *Juniperus* trees, as well as on branches of *Acer monspessulanum*.

Etymology: It is named after an eminent Ukrainian lichenologist Dr Oleg B. Blum (Kiev, Ukraine) who has kindly allowed us to work with his collection from the Middle Asia and provided the type collection of taxon described in recognition of his contribution to lichenology.

Taxonomic notes: According to wide “main lobes” *S. blumii* is somewhat similar to rather widely distributed in arid regions of Holarctics species *S. lacunosa* (Rupr.) Frödén. However, differs *S. blumii* in having much shorter lobes clearly differentiated on three portions (wide “main lobes”, narrow and long “secondary lobules”, and “terminal portions”), in having terminal macroblastidia, in having microblastidia on underside and 4(–6)-spored asci at the maturity.

In fact *Seirophora blumii* has combination of characters from several taxa, i.e. *S. lacunosa*, *S. villosa* (Ach.) Frödén and *S. contortuplicata* (Ach.) Frödén.

According to presence of macro- and microblastidia it is similar to *S. contortuplicata*. It is why material of *S. blumii* was previously included to *S. contortuplicata* (and description of latter in Kondratyuk (2004) included some characters of *S. blumii*). Unfortunately data on small size of

blastidia developing on underside of *S. contortuplicata* (incorrectly given us up to 20 µm diam.) were included on the basis of cited here specimens of *S. blumii*. These data should be excluded from diagnosis of *S. contortuplicata*.

However, *S. contortuplicata* differs from *S. blumii* much smaller lobes, lack of differentiation of lobes into three groups (main lobes, secondary lobes and terminal fragments as in *X. blumii*) and smaller macroblastidia (of *Massjukiella candelaria* type) (after Kondratyuk 2004: 292 incorrectly given as they *ca* 20–50 µm diam.); smaller into conblastidia of smaller size as well as by 4-spored asci and longer ascospores.

In contrast to *S. blumii* where conblastidia are rather rare, *S. contortuplicata*, which is characterised by presence of blastidia on underside as well, has microblastidia to 30 µm diam., which usually aggregated in much larger conblastidia (28–)40–48(–55) diam. on underside.

In contrast of *S. blumii*, *S. contortuplicata* has very narrow marginal zone (to 0.4–0.5(–0.6) mm wide) dissected on numerous terminal fragments 400–500 × (150–)200–300 µm, which then forming/dissecting on macroblastidia (58–)69–84 µm diam.

Sometimes whole upper surface of *S. contortuplicata* thalli covered by macroblastidia, that may in some respect to be similar to North European taxon *Massjukiella ucrainica* subsp. *marginata* (Räs.) S. Y. Kondr., Fedorenko, S. Stenroos, Kärnefelt, Elix, J.-S. Hur et A. Thell.

According to characters of lobes *S. blumii* is similar to *S. villosa*. However, *S. blumii* differs from *S. villosa* in having microblastidia (and rare conblastidia) on underside and 4(–6)-spored asci at the maturity. In contrast to *S. villosa* “main lobes” of *S. blumii* are much wider, as well as the third group, i.e. “terminal fragments” of secondary lobules are not so well developed in *S. blumii* as in *S. villosa*. Furthermore lobes of *S. blumii* are horizontally orientated (in contrast erect lobes of *S. villosa*); terminal fragments of lobes of *S. blumii* slightly narrower than in *S. villosa*.

According to differentiation of lobe on distinct portions: namely wide main lobes, secondary thin lobules it is somewhat similar to Arctic species *S. aurantiaca* (R. Br.) Frödén (see details in Kondratyuk 2004).

According to grey horizontally orientated lobes with rich network of secondary lobules *S. blumii* may resemble *Pseudevernia furfuracea*. However, lack of lower cortex, details of apothecia as well as characteristic blastidious mass on underside allow to distinguish this taxon.

Macroblastidia of *S. blumii* may resemble type of blastidia known for *Massjukiella candelaria*. However, in case of *S. blumii* they may be called as insidious soredia having numerous pimples or single or grouped hyphae.

To clarify situation with details on ascospores and other details of apothecia we need further rich fertile material of *S. blumii* as well as *S. villosa*.

Additional specimens examined: Turkmenistan: Kjurin-Dagh Mts, in the vicinities of Danaty settlement, along valley towards spring. Coll.: Blum, O. B., 31.10.1966 (KW-L 65275, KW-L 65276). – Kirghizstan: Central Tjanj-Shanj: locality Jon-Kulon, left bank of Kaundy River, *Picea* forest, 3,050 m alt., on bark of tree. Coll.: Kotov, M., 03.09.1933 (KW-L 2706). Central Tjanj-Shanj: above geographic station in basin of Chon-Kzyl-Su [River], on dead branches of rotten branches of *Picea* trees in forest. Coll.: Sobolev, L., 12.07.1947 (KW-L 2704). – Iran: Razavi Khorasan Province, close to Dargaz city, Tandoureh national park, NE part of the park, Chelmir, on bark of *Acer monspessulanum* twigs. Lat.: *ca* 37° 22' N; Long.: 58° 53' E; Alt.: 1,300 m a.s.l. Coll.: Haji Moniri, M., 30.03.2012 (TARI, KW-L).

Topelia jasonhurii L. Lökös, E. Farkas et S. Y. Kondr., *spec. nova*
(Figs 28–30)

Mycobank no.: MB 805138.

Similar to Topelia nimisiana, but differs in having smaller ascospores.

Type: Republic of Korea: Cheju-do Island, Nabeup-ri (Cheju-si, Hangyeong-myeon, Aewol-eup), Keumsna Park, warm temperate forest, on bark of *Machilus thunbergii*. Lat.: 33° 26' 06.50" N; Long.: 126° 19' 48.50" E; Alt.: 90 m

a.s.l. Coll.: Lökös, L., 05.07.2012. Holotype: BP; isotypes: KoLRI, KW-L.

Thallus corticolous, crustose, with a smooth or uneven surface, greenish, partly immersed but mostly epiphyloedic, ecorticate. Photobiont coccoid, up to 5–10 μm diam., belonging to *Trentepohlia*.

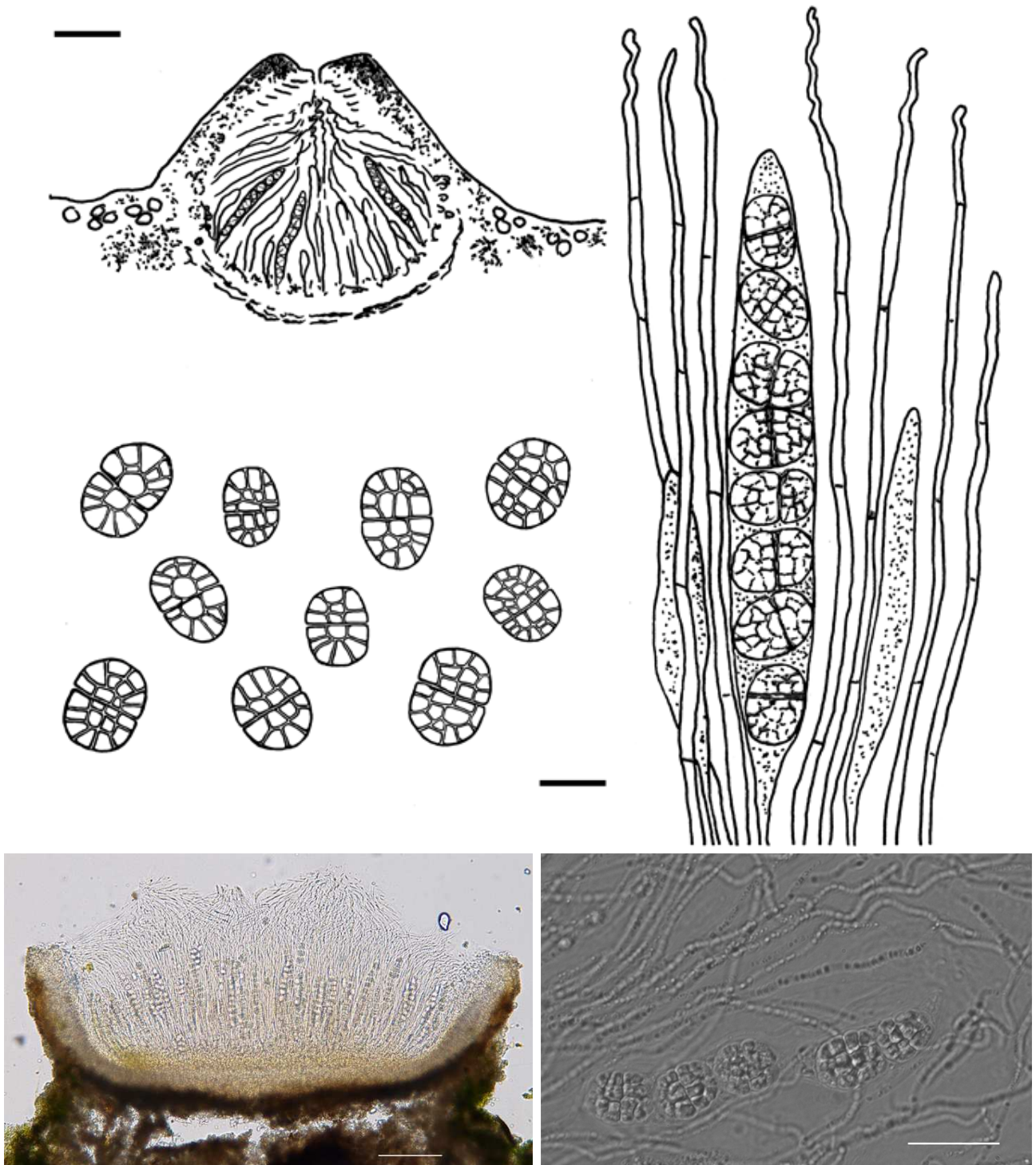


Fig. 28. *Topelia jasonhurii*, general habit (holotype). Scale 100 μm (A) and 10 μm (B) (drawn by E. Farkas)

Fig. 29. *Topelia jasonhurii*, section of ascocata (holotype). Scale 200 μm (photo: E. Farkas)

Fig. 30. *Topelia jasonhurii*, enlarged ascospores and paraphyses (holotype). Scale 20 μm (photo: E. Farkas)

Ascomata closed, perithecioid, spherical to somewhat wider than high, to 0.5–0.6 mm wide and 0.4 mm high, immersed in the thallus and developing more or less singly. Externally mainly punctiform ostiolum is visible. Excipulum hyaline, 40–55(–60) μm wide, colourless, or with outer layer (to 25 μm thick) light yellow brownish or light brownish in the upper portion and slightly darker to pale brown in lower portion, inner layer to 30 μm thick hyaline, paraplectenchymatous, cells lumina to (1–)2–3 μm diam./wide; the excipulum not covered by thallus. Periphyses near the ostiole short, to 20–35 μm long and 2–2.5 μm diam., straight, colourless. Hypothecium yellowish, without oil droplets. Paraphyses 1.5–2(–3) μm diam., septate, straight (or somewhat wavy toward the tip), not branched and not widened towards the tips. Asci cylindrical, 95–125 \times 12 μm , with conical tips, and very thin membranes, without apical thickening, as typical for the genus, 8-spored. Ascospores uniseriate, ellipsoid to somewhat quadric or spherical, richly muriform, not halonate, (11–)12–15(–17) \times 9–11 μm . Pycnidia not seen.

Ecology: On bark of an old *Machilus thunbergii*.

Distribution: So far known only from type locality in Cheju-do Island in Korea.

Etymology: It is named after the known Korean lichenologist Prof. Jae-Seoun Hur (Suncheon, Korea) and our good friend in recognition of his efforts to study lichen diversity of Korea, as well as for providing us possibility to visit type locality of this species.

Taxonomic notes: *Topelia jasonhurii* is similar to *T. nimisiana* Tretiach et Vězda known from bark of various deciduous trees (*Quercus* spp.) in the Mediterranean Europe and the Asian Near East (Italy and Israel) (Kondratyuk *et al.* 2005, Tretiach and Vězda 1992), but differs in having smaller ascospores ((11–)12–15(–17) \times 9–11 μm vs. 20–30 \times 8–12 μm), as well as in having excipulum not covered by thallus and in having hypothecium not interspersed by numerous oil droplets.

Topelia jasonhurii especially after having pale or bright yellow-brown peripherally exciple is also similar to *T. gyalectodes* (Nyl.) B. D. Ryan et H. T. Lumbsch (Ryan and Lumbsch 2007) growing on calcareous rock in North America but differs in having pale orange to rose red ascomata and pale orange to pale red apothecial pore, in having wider exciple (40–55(–60) μm vs. 70–80 μm wide), and larger ascospores ((11–)12–15(–17) \times 9–11 μm vs. 20–26(–28) \times 11–14 μm).

3. ábra

Rare or noteworthy species

**Abrothallus microspermus* Tul. – Republic of Korea: Cheju-do Island, Cheju-si, Jeju National University (Jejudaehakno), on *Prunus* bark on *Parmotrema reticulatum* thalli. Lat.: 33° 27' 24.6" N; Long.: 126° 33' 10.2" E; Alt.: 278 m a.s.l. Coll.: Oh, S.-O., Kim, K. E., 17.12.2012 [KoLRI-017283 (122034)]. – New to Korea.

Agonimia opuntiella (Buschardt et Poelt) Vězda – Republic of Korea: Ucheon-ri, Yongam village (Chollanam-do, Goheung-gun, Yeongnam-myeon), Yongbawi seaside, on rock, growing together with *Candelaria concolor* and *Phaeophyscia orbicularis*. Lat.: 34° 35' 76.5" N; Long.: 127° 30' 37.5" E; Alt.: 10 m a.s.l. Coll.: Joshi, Y., Jeon, H. S., Han, G. S., 19.02.2010 [KoLRI-011860 (100351)]. – It was published in Korea for the first time by Moon and Aptroot (2009).

Agonimiella pacifica (H. Harada) Diederich. – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Arail-dong, around Gwaneumsa Temple. Lat.: 33° 25' 21.50" N; Long.: 126° 33' 34.80" E; Alt.: 615 m a.s.l. Coll.: Kondratyuk, S. Y. (212663), Lökös, L., 06.07.2012 [KoLRI-016942 (121914)]; same locality, growing together with *Phaeophyscia* sp. [KoLRI-016949 (121921)]; same locality [KoLRI-016950 (121922)]; same locality [KW-L, BP];

Cheju-do Island (Cheju-si), Mt Hallasan, Hallasan National Park, Arail-dong, along Gwaneumsa Temple trail, along the tourist path, on bark of *Acer* and *Quercus* (*Quercus* sp.1 and *Quercus* sp.2) trees, growing together with *Brigantiaea ferruginea*. Lat.: 33° 23' 32.2" N; Long.: 126° 32' 16.0" E; Alt.: 1,128 m a.s.l. Coll.: Kondratyuk, S. Y. (212779), Oh, S.-O., Kusama, Y., 08.08.2012. [KW-L]; Cheju-do Island (Cheju-si), Mt Hallasan, Hallasan National Park, Seongpanak Trail, on bark (*Quercus*). Lat.: 33° 23' 05.03" N; Long.: 126° 36' 07.07" E; Alt.: 1,100 m a.s.l. Coll.: Kondratyuk, S. Y., Lökös, L., Oh, S.-O., Joshi, S. 06.07.2012 [KoLRI-016545 (121459)]; Chiri Mts, along the pathway from Nogodan to Dwaengi ryeong, *Quercus mongolica* forest close to Nogodan, on bark of *Acer mono*, and other trees. Lat.: 35° 10.356' N; Long.: 127° 19.151' E; Alt.: 1,406 m a.s.l. Coll.: Kondratyuk, S. (21160), Wang, X. Y., Ryu, Y. A., 11.10.2011 [KoLRI-014116 (111041)]. – It seems to be common, but rarely reported from Korea (e.g. Moon 1999, Moon and Aptroot 2009).

**Amandinea melaxanthella* (Nyl.) Marbach (Fig. 31) – Republic of Korea: Suncheon National University (Chollanam-do, Suncheon-si, Maegok-dong), at the humanitarian faculty, on bark of *Pinus densiflora*. Lat.: 34° 58' 10.8" N; Long.: 127° 28' 36.7" E; Alt.: 65 m a.s.l. Coll.: Kondratyuk, S. Y. (21147), 04.10.2011 [KoLRI-014069 (110994), KW-L]. Suncheon National University (Chollanam-do, Suncheon-si), Maegok-dong, on bark of *Alnus* sp. Lat.: 34° 58' 00.4" N; Long.: 127° 28' 32.9" E; Alt.: ca 115 m a.s.l. Coll.: Lökös, L., 08.10.2005. [KoLRI-003576 (050672)]; same locality, on *Pinus densiflora* bark. Lat.: 34° 57' 59.3" N; Long.: 127° 28' 44.8" E; Alt.: 70 m a.s.l. Coll.: Lökös, L., 05.10.2005 [KoLRI-003529 (050625)]. Mt Chongwansan (Chollanam-do, Jangheung-gun, Gwansan-eup), on bark of *Alnus* sp., Lat.: 34° 32' 56.1" N; Long.: 126° 56' 11.1" E; Alt.: ca 120 m a.s.l. Coll.: Lökös, L., 07.10.2005. [KoLRI-003536 (050632)].

It is similar to *Buellia polyspora* (Willey) Vain., but differs in having continuous more or less smooth (never becoming subsquamulose) thallus, in having white prothallus, in having *dispersa*-type (non *aethalea*-type) of true exciple, in having (12–)16-spored (not (8–)16(–32)-spored) asci, in having (0–)1-septate (vs. only 1-septate in *B. polyspora*) ascospores, and in having much longer and especially much wider ascospores (10–14 × 4–5 µm vs. 8.5–10 × 3–4 µm), as well as in the lack of yellowish colour of subhymenium (data on *B. polyspora* after Bungartz *et al.* 2007).

Thallus colour of thalli of *Amandinea melaxanthella* may vary from specimen to specimen, as on bark of *Alnus* (from dull greyish-brownish to dull whitish grey) as on *Pinus densiflora* (from yellowish grey to yellowish-greenish-grey). – New to Korea. Previous records of *Buellia polyspora* (Willey) Vain. from South Korea (Joshi *et al.* 2010a: 66) belong to this species.

Amandinea punctata (Hoffm.) Coppins et Scheid. – Republic of Korea: Suncheon National University (Suncheon-si), at the humanitarian faculty, on bark of *Pinus koreana* trees, and on bark of *Metasequoia glyptostroboides*, *Acer buergerianum*, *Zelkova serrata*. Lat.: 34° 58' 10.8" N; Long.: 127° 28' 36.7" E; Alt.: 65 m a.s.l. Coll.: Kondratyuk, S. (21147), 04.10.2011 [KoLRI-014066 (110991), KoLRI-014070 (110995)]. Between Najin and Imok-ri (Chollanam-do, Hwayang-myeon, Yeosu-si), along the road, on bark of *Cerasus*. Lat.: 34° 40' 49.53" N; Long.: 127° 34' 35.59" E; Alt.: 75 m a.s.l. Coll.: Kondratyuk, S. K., Lökös, L. and Park, C.-H., 28.07.2013. [KoLRI, KW-L, BP]. – *Amandinea punctata* was published for the first time from Korea by Park (1982), then by Joshi *et al.* (2010a).

**Arthonia epiphyscia* Nyl. – Republic of Korea: Cheju-do Island, Nabeup-ri, (Cheju-si, Hangeong-myeon, Aewol-eup), Keumsna Park, warm temperate forest, on rock, on *Phaeophyscia orbicularis*, growing together with *Pertusaria* sp.1, *Lecidella* sp., and *Hyperphyscia* sp. damaged by *Taeniolella phaeophysciae*. Lat.: 33° 26' 06.50" N; Long.: 126° 19' 48.50" E; Alt.: 90 m a.s.l. Coll.: Kondratyuk, S. Y. (212650), Hur, J.-S., Oh, S.-O., Lökös, L., Jayalal, U., Joshi, S., Park, J. S., 05.07.2012, [KoLRI-016765 (121828)]; same locality, on *Phaeophyscia orbicularis*, growing on rock together with *Pertusaria* sp.1. [KoLRI-016768 (121831)]. – New

lichenicolous fungus to Korea.

**Arthothelium ruanum* (A. Massal.) Körb. – Republic of Korea: Cheju-do Island: Mt Hallasan, Yeongsil trail, on bark. Lat.: 33° 21' 57.0" N; Long.: 126° 30' 9.16" E; Alt.: 1,670 m a.s.l. Coll.: Kondratyuk, S. Y., Lökös, L., Oh., S.-O., Joshi, S., Hur, J.-S., 04.07.2012 [KoLRI-016394 (121487)]. – New to Korea.

**Aspicilia contorta* subsp. *hoffmanniana* S. Ekman et Fröberg ex R. Sant. – Republic of Korea: Cheju-do Island, Sinchang-ri (Cheju-si, Hangyeong-myeon), around Singaemul Park nearby coast, on rock. Lat.: 33° 30' 31.3" N; Long.: 126° 10' 13.1" E; Alt.: 19 m a.s.l. Coll.: Kondratyuk, S. Y., Lökös, L., Oh., S.-O., Jayalal, U., Joshi, S., Park, J. S., Hur, J.-S., 05.07.2012, [KoLRI-016469 (121411)]. – New to Korea, but it is known from Japan (cf. Harada *et al.* 2004).

**Biatora globulosa* (Flörke) Fr. (Fig. 32) – Republic of Korea: Suncheon National University (Suncheon-ri), at the humanitarian faculty, on bark of *Pinus koreana* trees, and on bark of *Metasequoia glyptostroboides*, *Acer buergerianum*, *Zelkova serrata*, growing together with *Lecanora* sp. Lat.: 34° 58' 10.8" N; Long.: 127° 28' 36.7" E; Alt.: 65 m a.s.l. Coll.: Kondratyuk, S. (21147), 04.10.2011 [KoLRI-014065 (110990)]. Aphae-do Island (Chollanam-do, Sinan-gun), seaside, on twigs. Lat.: 34° 54' 27.4" N; Long.: 126° 18' 58.7" E; Alt.: 8 m a.s.l. Coll.: Oh, S.-O., Park, J. S., Woo, J. J., 07.06.2013 [KoLRI-018688 (130343)]. Baengnyeong-do Island, Jinchon-ri, (Incheon, Ongjin-gun, Baengnyeong-myeon), Simcheanggak, on bark. Lat.: 37° 58' 42.4" N; Long.: 124° 42' 51.2" E; Alt.: 97 m a.s.l. Coll.: Oh, S.-O., Park, J. S., 12.06.2013 [KoLRI-018725 (130380)]. – New to Korea.

Biatora longispora (Degel.) Lendemer et Printzen (Figs 33–35) – Republic of Korea: Cheju-do Island, Seogwipo-si, Mt Hallasan, Hallasan National Park, Gwaneumsa Temple trail, along the tourist path, on bark of *Prunus*. Lat.: 33° 23' 0.66" N; Long.: 126° 32' 03.60" E; Alt.: 1,326 m a.s.l. Coll.: Kondratyuk, S. Y. (212778), Oh, S.-O., Kusama, Y., 08.08.2012 [KoLRI-017104 (121738), BP, KW-L]; same locality, and below, on bark of *Prunus*. Lat.: 33° 22' 42.9" N; Long.: 126° 31' 52.4" E; Alt.: 1,452 m a.s.l. Coll.: Kondratyuk, S. Y. (212777), Oh, S.-O., Kusama, Y., 08.08.2012 [KoLRI-017145 (121779), KoLRI-017146 (121780), KoLRI-017147 (121781)]; same locality, growing together with *Scoliciosporum chlorococcum* [BP, KW-L]; Cheju-do Island, Seogwipo-si, Mt Hallasan, Hallasan National Park, Seongpanak trail, on bark of *Prunus*, growing together with *Bacidia* sp. Lat.: 33° 22' 48.44" N; Long.: 126° 35' 26.70" E; Alt.: 1,025 m a.s.l. Coll.: Kondratyuk, S. Y. (212659), Lökös, L., Oh., S.-O., Joshi, S., 06.07.2012 [KoLRI-016846 (121867, sub *Bacidia*)]; same locality, on bark of deciduous trees, growing together with *Pertusaria*, *Thelotrema* and *Porina*. Lat.: 33° 22' 23.28" N; Long.: 126° 34' 09.84" E; Alt.: 1,181 m a.s.l. Coll.: Kondratyuk, S. Y. (212670), Hur, J.-S., Oh, S.-O., Kusama, Y., 07.08.2012 [KoLRI-016963 (121648)]; Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Seongpanak trail, along the tourist path, on bark of deciduous trees, growing together with *Lecanora*. Lat.: 33° 22' 20.46" N; Long.: 126° 34' 07.32" E; Alt.: 1,209 m a.s.l. Coll.: Kondratyuk, S. Y. (212671), Hur, J.-S., Oh, S.-O., Kusama, Y., 07.08.2012. [KW-L]; same locality, together with *Graphis* [KW-L]; same locality, growing together with *Amandinea* [KW-L]; same locality, on bark of deciduous trees. Lat.: 33° 22' N; Long.: 126° 34' E; Alt.: ca 1210–1250 m a.s.l. Coll.: Kondratyuk, S. Y. (212672), Hur, J.-S., Oh, S.-O., Kusama, Y., 07.08.2012 [KoLRI-017010 (121695)]; Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Yeongsil trail, along the tourist path, on twigs of shrubs. Lat.: 33° 21' 30.91" N; Long.: 126° 30' 13.94" E; Alt.: 1,615 m a.s.l. Coll.: Kondratyuk, S. Y. (212646), 04.07.2012 [KoLRI]; Cheju-si, Cheju special self-governing province, Mt Hallasan, on bark (of *Prunus*), growing together with *Scoliciosporum chlorococcum* and *Parmelia adaugescens*. Lat.: 33° 21' 18.8" N; Long.: 126° 30' 00.4" E; Alt.: 1,492 m a.s.l. Coll.: Hur, J.-S., 10.08.2008 [KoLRI-009739 (080798, sub *Parmelia adaugescens*)]; same locality, growing together with *Parmelia adaugescens*. Coll.: Hur, J.-S., 10.08.2008 [KoLRI-009737 (080796, sub *Parmelia adaugescens*)]. Mt Deogyusan, on bark,

growing together with *Cetrelia japonica*. Lat.: 35° 51' 30.2" N; Long.: 127° 46' 02.4" E; Alt.: 1,045 m a. s. l. Coll.: Hur, J.-S., 02.04.2005 [KoLRI-002975 (050072, sub *Cetrelia japonica*)]; Mt Deogyusan, on bark of *Quercus*, growing together with *Nipponoparmelia* cf. *laevior*. Lat.: 35° 51' 15.8" N; Long.: 127° 44' 55.2" E; Alt.: 1,601 m a.s.l. Coll.: Hur, J.-S., 02.04.2005 [KoLRI-002975 (050072, sub *Nipponoparmelia* cf. *laevior*)]. Mt Chongtaesan (Gangwon-do, Hoengseong-gun, Dunnae-myeon), on bark. Lat.: 37° 30' 54.04" N; Long.: 128° 17' 45.02" E; Alt.: 990 m a.s.l. Coll.: Oh, S.-O., Park, J. S., 15.06.2013 [KoLRI-018868 (130523)].

Thallus very small, 1–1.5 mm across, but usually in much large aggregations to several cm across; from indistinct or endophloed, inconspicuous or absent to very thin of small areoles 0.1–0.3 mm across, from immersed distant and dispersed to usually aggregated and forming thallus with uneven, often warted or waved surface, without cracks, dull grey-green to dark greyish green or greenish grey, sometimes with much brighter greenish or green-yellowish soralia. Soralia few to numerous, at first discrete, punctiform, 0.1–0.2 mm diam., rounded, then to large irregular aggregations 0.4–1 mm across with more or less subconvex bright green-yellowish soredious mass. Soredia 20–30 µm diam. mainly regularly rounded, but usually soon aggregated in irregular consoredia 40–60 µm diam./across, green with bright yellowish tint. Hypothallus whitish.

Apothecia (0.2–)0.3–0.6(–1) mm diam., rounded and distant, or aggregated and irregular, from plane at the beginning with own margin very thin while sometimes well seen, to 0.04–0.06 mm wide as whitish or brownish white edge, to subconvex disc, then very convex and emarginated; rounded and distant to very densely aggregated in groups of 3–5; white or hyaline to dull brownish or pale yellowish brown or greyish brown, dark brown or brownish black, becoming more yellowish in wet condition, rarely black to brownish black; in section to 0.15–0.2(–0.35) mm thick, biatorine, own margin to 40–60(–80) µm thick in uppermost lateral portion, hyaline or sometimes yellow to straw-yellow rarely to very dark brown to blackish brown in places, 70–80(–100) µm thick in lower lateral portion, straw-yellow in inner layers and hyaline in outer layer, rarely with blackish outer layer, of radially orientated hyphae in matrix, lumina 1–2.5(–3) µm diam.; true exciple to 30–50(–80) µm thick, scleroplectenchymatous, cell lumina 1–2.5(–3.5) µm, in basal portion; algae in cluster below subhymenium level present, cells 8–12 µm diam./across; hymenium 40–50(–90) µm high, hyaline; epihymenium hyaline rarely to somewhat greenish, paraphyses slightly swollen towards the tips, to 4–5 µm diam., in K to 3–4 µm diam.; subhymenium 20–40(–50) µm thick, hyaline or sometimes straw-yellow in places rarely to greyish; asci 8-spored, 40–45 × 10–12 µm; ascospores hyaline, simple rarely 1-septate (better seen in K), (septum often eccentric), straight or slightly curved, cylindrically-ellipsoid, ends rounded, (13–)16–20(–23) × (3–)3.5–4(–4.5) µm in water and (14–)16–20(–24) × 3–4(–4.5) µm in K.

Thallus cortex K– or rarely K+ yellowish, C–, KC– or rarely KC+ yellowish then brownish, P–. Hymenium if it was coloured in K violetish black.

It rows on bark of *Prunus* in Pineta and Querceta forests at rather high elevations (between 1,300 and 1,400 m a.s.l.), growing often together with *Scoliciosporum chlorococcum*, as well as with some species of *Pertusaria*, *Lecanora*, *Lecidella* and other genera, one collection was done from bark of shrubs in subalpine belt in wind-swept areas, where it was growing together with *Caloplaca flavorubescens* aggr., *Ochrolechia tartarea*, *Rinodina* sp., *Pertusaria* sp., and *Candelariella reflexa*.

In Korea it was so far known from a single locality, only from Mt Hallasan, Cheju-do Island. It is recorded here from a number of localities from Mt Hallasan, Cheju-do Island and Mt Deogyusan from mainland of South Korea.

Remarks: *Biatora longispora* was included in the key to European and Macaronesian species of *Biatora* (Printzen and Otte 2005), however, its description is hitherto not available in recent publications. It is why we provide a full description of this species here.

Biatora longispora is similar to *Scoliciosporum chlorococcum*, but differs in having greyish

green (not dark green) thallus, in having hyaline or pale yellowish brown larger apothecia (0.3–0.6 mm vs. 0.2–0.3 mm diam.), in having much shorter asci, in having hyaline (not bluish-greenish in *S. chlorococcum*) tips of paraphyses, in having simple (rarely 1-septate vs. 6–7-septated ascospores in *S. chlorococcum*), widely ellipsoid, shorter and narrower ascospores ($16\text{--}19 \times 3.5\text{--}4.2 \mu\text{m}$ vs. $20\text{--}40 \times 4\text{--}5 \mu\text{m}$), straight not spirally arranged in ascus, as well as in the lack of black true exciple and bluish green epihymenium, as well as in the lack of one end of ascospores is wider of other (in *S. chlorococcum* ascospores 6–7-septate, $20\text{--}40 \times 2.5\text{--}3.5 \mu\text{m}$).

Presence of punctiform crater-like soralia to 0.2 mm diam, often coalescing, with greenish soredia 15–20 μm diam. is not permanent character of *Biatora longispora*, while it in urgent need of the further study on more extent collections. From our observation the same thallus may be soredious from one side, while it is without any soredia from another side. May be soredia/soralia formation is connected with light conditions of each locality.

Biatora longispora is similar to *Scoliciosporum sarothamni* (Vain.) Vězda, growing on more or less nutrient-rich or nutrient-enriched bark or twigs of a wide range of trees of lowland Europe and North America, in having grey green thallus with brighter greenish or greenish-yellowish soredious mass. However, *Biatora longispora* differs from last taxon in having larger apothecia (0.3–0.6 mm vs. 0.1–0.3 mm diam.), in having mainly 0–1)-septate, straight not spirally arranged in ascus and much shorter and wider ($(14\text{--})16\text{--}19 \times 3.5\text{--}4.2 \mu\text{m}$ vs. $20\text{--}40 \times 2\text{--}3 \mu\text{m}$) ascospores, and in growing in montane habitats as well as in the lack of positive reaction of soralia with C.

From all *Micarea* species it differs in having larger algal cells (i.e. 7–11 μm diam.), as well as in having larger (especially longer) ascospores. After monograph on *Micarea* (Coppins 1983) this material can be compared only with *Micarea stipitata* Coppins et P. James, more oceanic than *Micarea pycnidiophora* Coppins et P. James, which has 3–7-septate ascospores $21\text{--}34 \times 2\text{--}2.5 \mu\text{m}$ and paraphyses 1–1.5 μm diam., not swollen towards the tips, as well as poorly developed true exciple (ca 10 μm wide). Furthermore, pycnidia of *Micarea stipitata* always present, numerous and conspicuous, borne on distinct whitish stalks (pycnidiophores), conidia narrowly ellipsoid $6\text{--}8 \times 1\text{--}1.8 \mu\text{m}$.

Specimens Kondratyuk 212646 [KoLRI] and Hur [KoLRI-002975 (050072)] differ in having 0–1(–3)-septate and slightly longer ascospores. It is why Korean specimens were compared with the *Scoliciosporum* species first.

Brigantiaea ferruginea (Müll. Arg.) Kashiw. et Kurok. (as “*ferrugineum*”) – Republic of Korea: Cheju-do Island, on bark. Lat.: 33° 23' 18.1" N; Long.: 126° 29' 45.1" E; Alt.: 1,000 m a.s.l. Coll.: Hur, J.-S., 27.08.2004 [KoLRI-001506 (040722)]; Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Gwaneumsa trail, on bark. Lat.: 33° 23' 37.04" N; Long.: 126° 32' 16.01" E; Alt.: 1,072 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Park, J. S., Hur, J.-S. 01.06.2012 [KoLRI-016094 (121061)]; Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Seongpanak trail. Lat.: 33° 22' 48.44" N; Long.: 126° 35' 26.70" E; Alt.: 1,025 m a.s.l. Coll.: Kondratyuk, S. Y. (212659), Lökös, L., Oh., S.-O., Joshi, S., 06.07.2012 [KoLRI-016855 (121876)]; same locality, Seongpanak trail, growing together with *Pertusaria quartans* and *Leptogium menziesii*. Lat.: 33° 22' 49.53" N; Long.: 126° 34' 51.02" E; Alt.: 1,100 m a.s.l. Coll.: Kondratyuk, S. Y. (212661), Lökös, L., Oh., S.-O., Joshi, S. 06.07.2012 [KoLRI-016870 (121891)]; same locality, growing together with *Pertusaria* sp. and *Lobaria discolor*. [KoLRI-016890 (121935), KoLRI-016891 (121936)]; same locality, growing together with *Lobaria discolor*, *Leptogium menziesii* and *Pertusaria* sp. [KoLRI-016892 (121937)]; same locality, Seongpanak trail. Lat.: 33° 22' 45.46" N; Long.: 126° 34' 35.59" E; Alt.: 1,145 m a.s.l. Coll.: Kondratyuk, S. Y. (212662), Lökös, L., Oh., S.-O., Joshi, S., 06.07.2012 [KoLRI-016922 (121967), KoLRI-016923 (121968), KoLRI-016924 (121969), KoLRI-016925 (121970), KoLRI-016926 (121971)]; same locality, growing together with *Bacidia* sp. Coll.: Kondratyuk, S. Y. (212662) [KW-L]; same locality, growing together with *Lepraria* sp., Kondratyuk, S. Y. (212662)

[KW-L]; same locality, Seongpanak trail, along the tourist path, on bark of deciduous trees. Lat.: 33° 23.28" N; Long.: 126° 34' 09.84" E; Alt.: 1,181 m a.s.l. Coll.: Kondratyuk, S. Y. (212670), Hur, J.-S., Oh, S.-O., Kusama, Y., 07.08.2012 [KoLRI-016965 (121650), KoLRI-016983 (121668)]; same locality, Seongpanak trail, along the tourist path, on bark of deciduous trees. Lat.: 33° 22' 20.46" N; Long.: 126° 34' 07.32" E; Alt.: 1,209 m a.s.l. Coll.: Kondratyuk, S. Y. (212671), Hur, J.-S., Oh, S.-O., Kusama, Y., 07.08.2012 [KoLRI-017009 (121694)]; Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Arail-dong, along Gwaneumsa Temple trail, along the tourist path, on bark of *Acer* and *Quercus* (*Quercus* sp.1 and *Quercus* sp.2) trees. Lat.: 33° 23' 32.2" N; Long.: 126° 32' 16.0" E; Alt.: 1,128 m a.s.l. Coll.: Kondratyuk, S. Y. (212779), Oh, S.-O., Kusama, Y., 08.08.2012 [KoLRI-017073 (121629), KoLRI-017092 (121638), KoLRI-017095 (121641)]; same locality, growing together with *Agonimiella pacifica*. Coll.: Kondratyuk, S. Y. (212779), [KW-L]. Galjeongokbong (Gangwon-do, Yangyang-gun, Seo-Myeon), on bark. Lat.: 37° 52' 52.80" N; Long.: 128° 26' 50.88" E; Alt.: 1,101 m a.s.l. Coll.: Joshi, Y. *et al.*, 22.05.2009 [KoLRI-010283 (090610)]. Chiri Mts, Jungsan-ri, on bark. Lat.: 35° 20' 04.6" N; Long.: 127° 42' 50.6" E; Alt.: 1,547 m a.s.l. Coll.: Hur, J.-S., 16.09.2006 [KoLRI-005112 (060733)]; Chiri Mts, Pia-gol, Jangteo-mok, on bark (*Quercus*). Lat.: 35° 17' 49.9" N; Long.: 127° 33' 33.3" E; Alt.: 1,324 (1,215) m a.s.l. Coll.: Hur, J.-S., 27.09.2006 [KoLRI-005165 (060786)]; Chiri Mts, Pia-gol, Jangteo-mok, on bark (*Quercus*). Lat.: 35° 18' 28.9" N; Long.: 127° 35' 30.6" E; Alt.: 1,408 (1,295) m a.s.l. Coll.: Hur, J.-S., 28.09.2006 [KoLRI-005201 (060819)]; Chiri Mts (Chonnam Prov., Gurae Co.), from Nogodan to Dwaengi ryeong, on bark. Lat.: 35° 10.356' N; Long.: 127° 19.151' E; Alt.: 1,406 m a.s.l. Coll.: Kondratyuk, S., Wang, X. Y., Ryu, J. A., 11.10.2011 [KoLRI-014102 (111027), KoLRI-014117 (111042), KoLRI-014118 (111043)]. Mt Jombongsan, on bark. Lat.: 38° 03' 17.2" N; Long.: 128° 26' 33.1" E; Alt.: 970 m a.s.l. Coll.: Hur, J.-S., 09.10.2004 [KoLRI-002169 (041378), KoLRI-002170 (041379)]. Mt Odaesan, on bark. Lat.: 37° 46' 46.3" N; Long.: 128° 36' 14.5" E; Alt.: 1,404 m a.s.l. Coll.: Hur, J.-S., 15.07.2008 [KoLRI-008834 (080633)]. Mt Soraksan (Gangwon-do, Sokcho-si), on bark. Lat.: 38° 06' 40.1" N; Long.: 128° 24' 33.9" E; Alt.: 1,325 m a.s.l. Coll.: Hur, J.-S., 10.10.2004 [KoLRI-002227 (041435)]. Taebaek Mts (Gangwon-do, Taebaek-si, Mungoksodo-dong), on bark. Lat.: 37° 05' 31.0" N; Long.: 128° 56' 42.5" E; Alt.: 1,504 m a.s.l. Coll.: Joshi, Y. *et al.*, 12.09.2004 [KoLRI-001893 (041104)]; same locality. Coll.: s.n., 12.09.2004 [KoLRI-001903 (041114)]; same locality, on bark (*Quercus*). Coll.: s.n., 18.06.2007 [KoLRI-007435 (070599)]. – It seems to be common in the mountain range; however, it was published from Korea only once (Moon 1999).

**Brigantiaea purpurata* (Zahlbr.) Hafellner et Bellem. – Republic of Korea: Mt Hwangbyeong-san, on bark. Lat.: 37° 44' 47.0" N; Long.: 128° 37' 30.8" E; Alt.: 765 m a.s.l. Coll.: Hur, J.-S., 14.07.2008 [KoLRI-008648 (080396)]. Chiri Mts, Yeonhaceon-Byeoksoryeong (Gyeongsangnam-do, Hadong-gun, Hwagae-myeon), on bark of *Acer*; Lat.: 35° 18' 21.30" N; Long.: 127° 35' 12.84" E; Alt.: 1,473 m a.s.l. Coll.: Joshi, Y. *et al.*, 14.10.2009 [KoLRI-011194 (091179)]; Chiri Mts, on bark of *Betula*. Lat.: 35° 17' 33.1" N; Long.: 127° 32' 18.7" E; Alt.: 1,390 m a.s.l. Coll.: Hur, J.-S., 17.06.2006 [KoLRI-004597 (060220)]. Taebaek Mts (Gangwon-do, Taebaek-si, Mungoksodo-dong), bark of *Acer*. Lat.: 37° 05' 31.2" N; Long.: 128° 56' 35.5" E; Alt.: 1,518 m a.s.l. Coll.: Hur, J.-S., 18.06.2007 [KoLRI-007443 (070608)]. – Widely distributed species in the temperate regions. New to Korea.

Buellia badia (Fr.) A. Massal. – China: Liaoning province, Dalian county, Jinzhou city, Yujiawopeng village, on rock, growing together with *Dimelaena* aff. *oreina*. Lat.: 39° 08' 14.6" N; Long.: 122° 05' 53.9" E; Alt.: 63 m a.s.l. Coll.: Oh, S.-O., Hur, J.-S., 28.07.2012 [KoLRI-016708 (CH-120098), KoLRI-016711 (CH-120101)]. – *Buellia badia* was rarely recorded from China.

**Caloplaca bassiae* (Ach.) Zahlbr. – China: GeJiu County, Man Hao town, on bark. Lat.: 22°

55° 36.2' N; Long.: 103° 36' 21.0' E; Alt.: 598 m a.s.l. Coll.: Hur, J.-S., 25.12.2006 [KoLRI-006299 (CH-060449)]. – New to China.

**Caloplaca micromera* (Hue) Zahlbr. – Republic of Korea: Gyeonggi-do, Ansan-si, Danwon-gu, Daebudong-dong, Daebu Island, on rock, growing together with *Caloplaca galbina*. Lat.: 37° 14' 51.90" N; Long.: 126° 28' 56.46" E; Alt.: 5 m a.s.l. Coll.: Wang, X. Y. *et al.*, 01.10.2010 [KoLRI-012659 (101280)]. – It was described from Japan (Hue 1915). It is for the first time recorded from Korea.

**Caloplaca oxneri* S. Y. Kondr. et Søchting (Fig. 36) – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Seongpanak trail, on bark. Lat.: 33° 22' 48.44" N; Long.: 126° 35' 26.70" E; Alt.: 1,025 m a.s.l. Coll.: Kondratyuk, S. Y. (212659), Lökös, L., Oh., S.-O., Joshi, S., 06.07.2012 [KoLRI-016854 (121875), KoLRI-016859 (121880)]; same locality, growing together with *Parmeliella inciza* and *Collema* sp. [KW-L]; same locality, Seongpanak trail. Lat.: 33° 22' 45.46" N; Long.: 126° 34' 35.59" E; Alt.: 1,145 m a.s.l. Coll.: Kondratyuk, S. Y. (212662), Lökös, L., Oh., S.-O., Joshi, S., 06.07.2012 [KoLRI-016907 (1219520), KoLRI-016909 (121954), KoLRI-016915 (121960), KoLRI-016916 (121961), KoLRI-016917 (121962)]; same locality, growing together with *Lecanora barkmaniana* [KoLRI-016918 (121963), KoLRI-016931 (121976)]; same locality, growing together with *Gyalecta* sp. and *Rinodina* sp. [KoLRI-016934 (121979)]; same locality [BP, KW-L]; same locality, growing together with *Taeniolella phaeophyscia* on *Phaeophyscia* sp. [KW-L]; same locality, growing together with *Pertusaria quartans*, *Pertusaria* sp. and *Taeniolella phaeophyscia* on *Phaeophyscia* sp. [KW-L]; same locality, growing together with *Pertusaria quartans* [KW-L]; same locality, growing together with *Unguiculariopsis* sp. [KW-L]; same locality, Seongpanak trail, on bark. Lat.: 33° 22' 38.8" N; Long.: 126° 34' 16.4" E; Alt.: 1181 m a.s.l. Coll.: Kondratyuk, S. Y. (212670), Oh, S.-O., Kusama, Y., Hur, J. S., 07.08.2012 [KoLRI-016980 (121665)]; Cheju-do Island, Seogwipo-si, Hallasan National Park, Mt Hallasan, along Gwaneumsa Temple trail, along the tourist path, on bark of *Quercus* and *Acer* trees. Lat.: 33° 23' 37.5" N; Long.: 126° 32' 16.6" E; Alt.: 1,081 m a.s.l. Coll.: Kondratyuk, S. Y. (212776), Oh, S.-O., Kusama, Y., 08.08.2012 [KW-L]; same locality, growing together with *Leptogium* sp. [BP]; same locality, on bark of *Acer* and *Quercus* (*Quercus* sp.1 and *Quercus* sp.2) trees. Lat.: 33° 23' 32.2" N; Long.: 126° 32' 16.0" E; Alt.: 1,128 m a.s.l. Coll.: Kondratyuk, S. Y. (212779), Oh, S.-O., Kusama, Y., 08.08.2012 [KW-L]; same locality, on bark of *Prunus*. Lat.: 33° 23' 00.66" N; Long.: 126° 32' 03.60" E; Alt.: 1,326 m a.s.l. Coll.: Kondratyuk, S. Y. (212778), Oh, S.-O., Kusama, Y., 08.08.2012 [KoLRI, BP, KW-L]; Chiri Mts (Chollanam-do, Gurae-gun), from Nogodan to Dwaeeji ryeong, on bark. Lat.: 35° 10.356' N; Long.: 127° 19.151' E; Alt.: 1,406 m a.s.l. Coll.: Kondratyuk, S. (21160), Wang, X. Y., Ryu, Y. A., 11.10.2011 [KoLRI-014115 (111040), KoLRI-014119 (111044), KoLRI-014120 (111045)].

It belongs to the *Caloplaca flavorubescens* group, but differs in having areolated thallus with often ascending areoles shown to be somewhat insidious and shizidioid. Thallus and isidia when yellow K+ purple, apothecia K+ purple. – This species was rather recently described from Russian Far East, and now it is known from Russia and Japan (Kondratyuk *et al.* 1996, Harada *et al.* 2004). Here it is for the first time recorded for Korea. It was collected from bark of various deciduous trees.

**Caloplaca squamosa* (B. de Lesd.) Zahlbr. – Republic of Korea: Cheju-do Island, seaside, on rock. Lat.: 33° 34' 00.1" N; Long.: 126° 45' 44.4" E; Alt.: 10 m a.s.l. Coll.: Hur, J.-S. *et al.*, 19.04.2009 [KoLRI-009786-1 (090022-1)]; Cheju-do Island, Cheju-si, Hangyeong-myeon, Hallim-eub, along seashore at Gwideok-ri, on rock growing together with *Lecanora aff. achariana*. Lat.: 33° 26' 33.22" N; Long.: 126° 16' 59.97" E; Alt.: 3 m a.s.l. Coll.: Kondratyuk, S. Y. (212651), Hur, J.-S., Oh., S.-O., Lökös, L., Jayalal, U., Joshi, S., Park, J. S., 05.07.2012 [KoLRI-016788 (121991)]. – New to Korea.

**Caloplaca subscopularis* (Arup et Frisch) S. Y. Kondr., *comb. nova* [MycoBank no.: MB

805160] (Basionym: *Orientophila subscopularis* Arup et Frisch, in Arup et al., Nordic J. Bot. 31: 47). – Republic of Korea: Cheju-do Island, Cheju-si, Hangyeong-myeon, along the seashore at Yongsu-ri, on rock. Lat.: 33° 19' 13.56" N; Long.: 126° 10' 01.96" E; Alt.: 3 m a.s.l. Coll.: Kondratyuk, S. Y. (212653), Lökös, L., Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Hur, J. S., 05.07.2012 [KoLRI-016810 (122011), KoLRI-016811 (122012), KoLRI-016813 (122014), KoLRI-016814 (122015), KoLRI-016820 (122021)]. Cheju-do Island, Seogwipo-si, Andeok-myeon, Sangye-ri, at Sanbanguksa Temple, on rock. Lat.: 33° 14' 14.27" N; Long.: 126° 18' 47.95" E; Alt.: 3 m a.s.l. Coll.: Lökös, L., Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., 05.06.2012 [KoLRI-016836 (121857)]. Cheju-do Island, Seogwipo-si, Daejeong eup, along the seashore at Sangmo-ri, on rock. Lat.: 33° 12' 34.88" N; Long.: 126° 17' 30.81" E; Alt.: 5 m a.s.l. Coll.: Kondratyuk, S. Y. (212654), Lökös, L., Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Hur, J.-S., 05.07.2012 [KoLRI-016824 (121845), KoLRI-016826 (121847), KoLRI-016832 (121853), KoLRI-016833 (121854), KoLRI-016835 (121856)]. Cheju-do Island, Seogwipo-si, Daejeong eup, Sangmo-ri, around Mt Songaksan nearby coast, on rock. Lat.: 33° 12' 35.1" N; Long.: 126° 17' 30.0" E; Alt.: 16 m a.s.l. Coll.: Kondratyuk, S. Y., Lökös, L., Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Hur, J.-S., 05.06.2012 [KoLRI-016496 (121426)]. Cheju-do Island, Cheju-si, Hallim eup, Gwideok-ri, coast near the Chorok village, on rock. Lat.: 33° 26' 33.3" N; Long.: 126° 17' 00.1" E; Alt.: 18 m a.s.l. Coll.: Kondratyuk, S. Y., Lökös, L., Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Hur, J.-S., 05.07.2012 [KoLRI-016435 (121378)]. Saengil-do Island (Chollanam-do, Wando-gun, Saengil-myeon), Geumgok-ri coast, on rock. Lat.: 34° 20' 02.02" N; Long.: 126° 57' 51.02" E; Alt.: 7 m a.s.l. Coll.: Jayalal, U., Park, J. S., Ryu, J. A., 18.04.2012 [KoLRI-014767 (120173)]. Yokji-do Island (Gyeongsangnam-do, Tongyeong-si, Yokji-myeon), Seosan-ri, on rock. Lat.: 34° 38' 39.04" N; Long.: 128° 14' 04.05" E; Alt.: 18 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Park, J. S., Ryu, J. A., 10.05.2012 [KoLRI-015753 (120758)]; same locality, Seosan-ri, Duckdong beach, on rock. Lat.: 34° 38' 03.08" N; Long.: 128° 14' 15.06" E; Alt.: 1 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Park, J. S., Ryu, J. A., 11.05.2012 [KoLRI-015831 (120834)]. – New to Korea. Recently described and hitherto known only from Japan (Arup *et al.* 2013).

**Caloplaca trassii* I. Galanina et S. Y. Kondr. – Republic of Korea: Jeop-do Island (Chonnam Prov., Jindo-gun, Uisin-myeon), on bark. Lat.: 34° 23' 05.46" N; Long.: 126° 18' 15.00" E; Alt.: ca 2 m a.s.l. Coll.: Wang, X. Y., Ryu, J. A., 03.06.2011 [KoLRI-013562 (110518)]. Geumoh-do Island (Chollanam-do, Yeosu-si, Nam-myeon), Dumo-ri, Jickpo coast, on bark. Lat.: 34° 30' 45.00" N; Long.: 127° 44' 14.08" E; Alt.: 6 m a.s.l. Coll.: Jayalal, U., Park, J. S., Ryu, J. A., 26.04.2012 [KoLRI-015394 (120405), KoLRI-015395 (120406), KoLRI-015396 (120407), KoLRI-015398 (120409)].

This species was rather recently described from Russian Far East (Kondratyuk *et al.* 2011). Morphologically similar to *Lecanoras* and *Rinodinas* and can be distinguished only after checking ascospores. Thallus grey, becoming thicker in the centre; apothecia to 1 mm diam., with lightly brown discs and thick (to 0.2 mm wide) thalline margin.

The specimen from Geumoh-do island (KoLRI-015394) differs from Russian specimens in having slightly larger apothecia and slightly wider ascospore septum (especially, in K: (4–)5–6 vs. 4–5(–8) and in water (3–)4–6 vs. 2–5(–7) µm wide); and another specimen (KoLRI-015395) differs from Russian specimens in having wider ascospore septum (in K: (5–)6–8 vs. 4–5 µm and in water: 5–6 vs. 2–5 µm wide). – Here it is reported for the first time for Korea. It was collected from bark of various deciduous trees

**Candelariella reflexa* (Nyl.) Lettau (Fig. 37) – Republic of Korea: Cheju-do Island, Seogwipo-si, Mt Hallasan, Hallasan National Park, Yeongsil trail, along the tourist path, on bark. Lat.: 33° 21' 30.91" N; Long.: 126° 30' 13.94" E; Alt.: 1,615 m a.s.l. Coll.: Kondratyuk, S. Y. (212646), Lökös, L., Oh, S.-O., Joshi, S., 04.07.2012 [KoLRI-016733 (121797)]. – New to Korea.

Chrysothrix candelaris (L.) J. R. Laundon – Republic of Korea: Suncheon National University

(Suncheon-si), in front of the library, on bark of roadside cherry trees (and on bark of *Juniperus*), growing together with *Lepraria* sp. Lat.: 34° 58' 7.2" N; Long.: 127° 29' 2.3" E; Alt.: 40 m a.s.l. Coll.: Kondratyuk, S. (21145), 24.09.2011, 01.10.2011, 04.10.2011 [KoLRI-014057 (110982)]; Cheju: Cheju-do Island, Seogwipo-si, Andeok-myeon, Sagye-ri, Mt Sanbang, at the temple, on bark (*Cerasus*). Lat.: 33° 14' 14.2" N; Long.: 126° 18' 47.7" E; Alt.: 101 m a.s.l. Coll.: Lökös, L., Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Hur, J. S., 05.07.2012 [KoLRI-016505 (121435)]. – *Chrysothrix candelaris* was reported from Korea (Cheju) only once (Joshi *et al.* 2009).

Coenogonium luteum (Dicks.) Kalb et Lücking (Fig. 38) – Republic of Korea: Chiri Mts (Chollanam-do, Gurae-gun), at the top of Nogodan ridge, on bark, growing together with *Normandina pulchella*. Lat.: 35° 10' 43.4" N; Long.: 127° 19' 07.8" E; Alt.: 1,452 m a.s.l. Coll.: Kondratyuk, S. (21155), Wang, X. Y., Ryu, Y. A., 11.10.2011 [KoLRI-014091 (111016)]. – It was published from South Korea for the first time by Moon (1999).

Diploschistes actinostomus (Ach.) Zahlbr. – Republic of Korea: Aphae-do Island (Chollanam-do, Sinan-gun), seaside, on rock. Lat.: 34° 49' 10.2" N; Long.: 126° 21' 38.7" E; Alt.: 30 m a.s.l. Coll.: Oh, S.-O., Park, J.-S., Woo, J. J., 07.06.2013 [KoLRI-018626 (130281), KoLRI-018630 (130285)]. Gagum-do Island (Chollanam-do, Goheung-gun), Sinpyeong-ri coast, on rock. Lat.: 34° 28' 30.4" N; Long.: 127° 14' 03.6" E; Alt.: 1 m a.s.l. Coll.: Jayalal, U., Park, J. S., Ryu, J. A., 17.04.2012 [KoLRI-014677 (120084)]. Geumoh-do Island (Chollanam-do, Yeosu-si, Nam-myeon), Dumo-ri, Jickpo coast, on rock. Lat.: 34° 30' 46.08" N; Long.: 127° 44' 16.04" E; Alt.: 30 m a.s.l. Coll.: Jayalal, U., Park, J. S., Ryu, J. A., 26.04.2012 [KoLRI-015413 (120424)]. Saengil-do Island (Chollanam-do, Wando-gun, Saengil-myeon), Geumgok beach coast, on rock. Lat.: 34° 18' 40.02" N; Long.: 126° 57' 54.03" E; Alt.: 4 m a.s.l. Coll.: Jayalal, U., Park, J. S., Ryu, J. A., 18.04.2012 [KoLRI-014827 (120232)]. Sinsi-do Island (Chollabuk-do, Gunsan-si), on rock, together with *Lecanora oreinodes*. Lat.: 35° 49' 08.8" N; Long.: 126° 27' 55.8" E; Alt.: 19 m a.s.l. Coll.: s.n., 22.08.2011 [KoLRI-013817 (110808)]. – Although the first records of this species were published recently from Mt Cheongwansan (Chollanam-do) (Joshi *et al.* 2011), it seems to be widely distributed in the coastal areas.

Dirina massiliensis Durieu et Mont. – Republic of Korea: Imja-do Island (Chollanam-do, Sinan-gun, Bigeum-myeon), nearby wharf Jinri, on rock. Lat.: 35° 05' 21.1" N; Long.: 126° 07' 17.6" E; Alt.: 4 m a.s.l. Coll.: Oh, S.-O., Park, J. S., Woo, J. J., 06.06.2013 [KoLRI-018585 (130240)]; Imja-do Island (Chollanam-do, Sinan-gun, Bigeum-myeon), wharf Hawoori, on rock. Lat.: 35° 05' 42.6" N; Long.: 126° 03' 21.0" E; Alt.: 4 m a.s.l. Coll.: Oh, S.-O., Park, J. S., Woo, J. J., 06.06.2013 [KoLRI-018609 (130264)]. – New genus and new species to Korea.

Endococcus cf. verrucosus Hafellner – Republic of Korea: Sinui-do Island (Chollanam-do, Sinan-gun, Sinui-myeon), Hatae-gil seaside, on rock, on grey thallus probably *Aspicilia*. Lat.: 34° 32' 27.02" N; Long.: 126° 02' 11.01" E; Alt.: 11 m a.s.l. Coll.: Oh, S.-O., Park, J. S., Woo, J. J., 28.06.2013 [KoLRI-018918 (130573)]. – New to Korea. The Korean specimen is perhaps rather young, because it differs in having slightly smaller ascospores.

Hyperphyscia adglutinata (Flörke) H. Mayrhofer et Poelt (Fig. 39) – Republic of Korea: Suncheon National University (Suncheon-si), in front of the library, on bark of roadside cherry trees (and on bark of *Juniperus*), growing together with *Physcia* sp. Lat.: 34° 58' 7.2" N; Long.: 127° 29' 2.3" E; Alt.: 40 m a.s.l. Coll.: Kondratyuk, S. (21145), 24.09.2011, 01.10.2011 and 04.10.2011 [KoLRI-014059 (110984)]; same locality, growing together with *Dirinaria applanata* [KoLRI-014056 (110981), KoLRI-014060 (110985)]; Suncheon National University (Suncheon-si), at the humanitarian faculty, on bark of *Pinus koreana* trees, and on bark of *Metasequoia glyptostroboides*, *Acer buergerianum*, *Zelkova serrata*. Lat.: 34° 58' 10.8" N; Long.: 127° 28' 36.7" E; Alt.: 65 m a.s.l. Coll.: Kondratyuk, S. (21147), 04.10.2011 [KoLRI-014067 (110992)]. Suncheon, along the right bank of River Dongcheon, on bark of roadside cherry trees, growing together with *Candelaria concolor*. Lat.: 34° 57' 46.2"–58.0" N; Long.: 127° 29' 17.8"–21.6" E;

Alt.: 17 m a.s.l. Coll.: Kondratyuk, S. (21144), 02.10.2011 [KoLRI-014054 (110979), [KoLRI-014055 (110980)]. – New to Korea.

Hyperphyscia crocata Kashiw. – Republic of Korea: Cheju-do Island, Cheju-si, Hangeong-myeon, Aewol-eup, Nabeup-ri, Keumsna Park, warm temperate forest, on bark of *Melia azedarach*, growing together with *Pyxine subcinerea*, *Candelaria concolor*, and *Dirinaria* sp. Lat.: 33° 26' 06.50" N; Long.: 126° 19' 48.50" E; Alt.: 90 m a.s.l. Coll.: Kondratyuk, S. Y. (212650), Hur, J.-S., Oh, S.-O., Lökös, L., Jayalal, U., Joshi, S., Park, J. S., 05.07.2012. [KoLRI-016767 (121830)]. Yangsu-ri (Chollanam-do, Hwayang-myeon, Yeosu-si), along the road at seacoast, on bark (*Celtis*). Lat.: 34° 39' 05.33" N; Long.: 127° 34' 45.67" E; Alt.: 8 m a.s.l. Coll.: Kondratyuk, S. K., Lökös, L. and Park, C.-H., 28.07.2013 [KoLRI, KW-L, BP]. – *Hyperphyscia crocata* was reported from Korea (Cheju) only once (Kashiwadani *et al.* 2002).

****Hypogymnia austerodes*** (Nyl.) Räsänen – Republic of Korea: Chiri Mts, on bark of *Abies koreana*. Lat.: 35° 18' 39.4" N; Long.: 127° 35' 54.3" E; Alt.: 1,620 (1,532) m a.s.l. Coll.: Hur, J.-S., 22.04.2004 [KoLRI-001069 (040295)]. Mt Soraksan, on bark of pine. Lat.: 38° 06' 45.6" N; Long.: 128° 27' 04.5" E; Alt.: 1,550 m a.s.l. Coll.: Hur, J.-S., 12.10.2004 [KoLRI-002391 (041597)]. Taebaek Mts, on bark of *Abies koreana*. Alt.: 1,610 m a.s.l. Coll.: Hur, J.-S., 12.09.2004 [KoLRI-001933 (041144)]. – New to Korea.

****Hypogymnia occidentalis*** L. H. Pike – Republic of Korea: Cheju-do Island, on bark of *Abies koreana*. Lat.: 33° 21' 42.4" N; Long.: 126° 32' 56.9" E; Alt.: 1,670 m a.s.l. Coll.: Hur, J.-S., 28.08.2004 [KoLRI-001597 (040815)]. Chiri Mts, on bark of *Abies* Lat.: 35° 18' 39.7" N; Long.: 127° 34' 24.0" E; Alt.: 1,620 m a.s.l. Coll.: Hur, J.-S., 17.06.2006 [KoLRI-004690 (060319)]. Mt Soraksan, on bark of *Abies*. Lat.: 38° 06' 40.4" N; Long.: 128° 24' 26.8" E; Alt.: 1,335 m a.s.l. Coll.: Hur, J.-S., 10.10.2004 [KoLRI-002255 (041461)]. – New to Korea.

****Ionaspis lacustris*** (With.) Lutzoni – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Gwaneumsa trail, on rock. Lat.: 33° 21' 49.00" N; Long.: 126° 32' 04.05" E; Alt.: 1,888 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Tian, F. H., Hur, J.-S., 19.06.2012 [KoLRI-016223 (121187)]. Cheju-do Island, Seogwipo-si, Mt Hallasan, Hallasan National Park, Donnaeko trail, on rock. Lat.: 33° 20' 49.06" N; Long.: 126° 32' 47.01" E; Alt.: 1,404 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Tian, F. H., Hur, J.-S., 20.06.2012 [KoLRI-016329 (121279)]. Cheju-do Island, Seogwipo-si, Mt Hallasan, Hallasan National Park, Yeongsil trail, along the tourist path, on rock. Lat.: 33° 21' 57.0" N; Long.: 126° 30' 09.16" E; Alt.: 1,694 m a.s.l. Coll.: Kondratyuk, S. Y., Lökös, L., Oh, S.-O., Joshi, S., Hur, J.-S., 04.07.2012 [KoLRI-016400 (121493)]. – New to Korea.

****Lecania rabenhorstii*** (Hepp) Arnold – China: Liaoning province, Dalian county, Lüshun city, Xiaoheishi village, on rock. Lat.: 38° 58' 06.9" N; Long.: 120° 16' 32.3" E; Alt.: 46 m a.s.l. Coll.: Oh, S.-O., Hur, J.-S., 27.07.2012 [KoLRI-016705 (CH-120095)]. – New to Asia.

****Lecanora barkmaniana*** Aptroot et Herk (as "*barkmaneana*") – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Seongpanak trail, on bark of *Quercus*, growing together with *Caloplaca oxneri*. Lat.: 33° 22' 45.46" N; Long.: 126° 34' 35.59" E; Alt.: 1,145 m a.s.l. Coll.: Kondratyuk, S. Y. (212662), Lökös, L., Oh, S.-O., Joshi, S., 06.07.2012 [KoLRI-016888 (121933), KoLRI-016918 (121963)]; same locality, growing together with *Caloplaca oxneri* [KoLRI-016932 (121977)]. – New to Korea.

****Lecanora cf. marginata*** (Schaer.) Hertel et Rambold – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Gwaneumsa trail, on rock. Lat.: 33° 22' 12.05" N; Long.: 126° 31' 58.05" E; Alt.: 1,677 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Tian, F. H., Hur, J.-S., 19.06.2012 [KoLRI-016156 (121120)]. Yokji-do Island (Gyeongsangnam-do, Tongyeong-si, Yokji-myeon), Seosan-ri, Udong beach, on rock. Lat.: 34° 37' 05.07" N; Long.: 128° 14' 38.00" E; Alt.: 8 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Park, J. S., Ryu, J. A., 11.05.2012 [KoLRI-015856 (120859)]. – New to Korea.

**Lecanora symmicta* (Ach.) Ach. – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Seongpanak trail, along the tourist path, at the lake in the crater of volcano, on twigs and on bark of deciduous trees, Lat.: 33° 22' 34.1" N; Long.: 126° 34' 12.2" E; Alt.: 1,250 m a.s.l. Coll.: Kondratyuk, S. Y. (212673), Hur, J.-S., Oh, S.-O., Kusama, Y., 07.08.2012 [KoLRI-017038 (121723), KoLRI-017047 (121732), KoLRI-017048 (121733), KoLRI-017049 (121734), KoLRI-017050 (121735)]; same locality, growing together with *Biatora* sp., 07.08.2012 [KoLRI-017033 (121718), KoLRI-017044 (121729)]; same locality, growing together with *Graphis* sp., 07.08.2012 [KoLRI-017039 (121724)]; same locality, growing together with *Lecanora* sp., 07.08.2012 [KoLRI-017034 (121719)]; same locality, growing together with *Lecanora* and *Porina* sp., 07.08.2012 [KoLRI-017032 (121717)]; same locality, growing together with *Lecidella* sp., 07.08.2012 [KoLRI-017042 (121727)]; same locality, growing together with *Porina* sp., 07.08.2012 [KoLRI-017025 (121710), KoLRI-017026 (121711)]; same locality, growing together with *Rinodina* sp., 07.08.2012 [KoLRI-017031 (121716), KoLRI-017036 (121721), KoLRI-017043 (121728)]; growing together with *Rinodina* and *Biatora* sp., 07.08.2012 [KoLRI-017030 (121715)]; growing together with *Rinodina* and *Porina* sp., 07.08.2012 [KoLRI-017045 (121730)]. – New to Korea.

**Lecanora varia* (Hoffm.) Ach. – Republic of Korea: Cheju-do Island, Nabeup-ri (Cheju-si, Hangeong-myeon, Aewol-eup), Keumsna Park, warm temperate forest, on bark. Lat.: 33° 26' 05.60" N; Long.: 126° 19' 49.02" E; Alt.: 106 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Hur, J.-S., 05.07.2012 [KoLRI-016420 (121495)]. Saengil-do Island (Chollanam-do, Wando-gun, Saengil-myeon), Geumgok beach coast, on bark. Lat.: 34° 18' 40.02" N; Long.: 126° 57' 54.03" E; Alt.: 4 m a.s.l. Coll.: Jayalal, U., Park, J. S., Ryu, J. A., 18.04.2012 [KoLRI-014818 (120223)]. Geumil-do Island (Chollanam-do, Wando-gun), Chungdong-ri, Geumil-eup, on bark. Lat.: 34° 20' 43.04" N; Long.: 127° 03' 56.01" E; Alt.: 4 m a.s.l. Coll.: Jayalal, U., Park, J. S., Ryu, J. A., 19.04.2012 [KoLRI-014902 (120307), KoLRI-014918 (120323)]. Geumoh-do Island (Chollanam-do, Yeosu-si, Nam-myeon), Dumo-ri, Jickpo coast, on bark. Lat.: 34° 30' 46.08" N; Long.: 127° 44' 16.04" E; Alt.: 30 m a.s.l. Coll.: Jayalal, U., Park, J. S., Ryu, J. A., 26.04.2012 [KoLRI-015424 (120434)]. – New to Korea.

Letrouitia transgressa (Malme) Hafellner et Bellem. – [China]: Plant Garden of Xi Shuang Ban Na, on bark of *Ficus*. Lat.: 21° 55' 25.1" N; Long.: 101° 15' 17.3" E; Alt.: 541 m a.s.l. Coll.: Hur, J.-S., 27.12.2006 [KoLRI-006468 (CH-060696)]. – *Letrouitia transgressa* is already known from China (Yunnan).

Leucodecton desquamescens (Vain.) Lücking – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Seongpanak trail, on bark. Lat.: 33° 22' 45.46" N; Long.: 126° 34' 35.59" E; Alt.: 1,145 m a.s.l. Coll.: Kondratyuk, S. Y. (212662), Lökös, L., Oh, S.-O., Joshi, S., 06.07.2012 [KoLRI-016927 (121972)]. – It was published from Korea only once (Joshi *et al.* 2010b).

**Lichenochora obscuroides* (Linds.) Triebel et Rambold – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, on bark. Lat.: 33° 22' 17.7" N; Long.: 126° 34' 15.2" E; Alt.: 1,100 m a.s.l. Coll.: Hur, J.-S., 09.08.2008 [KoLRI-009676 (080735)]; Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Arail-dong, along Gwaneumsa Temple trail, along the tourist path, on *Quercus* and *Acer* bark, on *Phaeophyscia adiastrata* thalli. Lat.: 33° 23' 37.5" N; Long.: 126° 32' 16.6" E; Alt.: 1,081 m a.s.l. Coll.: Kondratyuk, S. Y. (212776), Oh, S.-O., Kusama, Y., 08.08.2012 [KoLRI-017064 (121610)]. Chiri Mts, Jongju, on bark, on *Phaeophyscia exornatula* thalli. Lat.: 35° 17' 57.3" N; Long.: 127° 33' 35.8" E; Alt.: 1,410 (1,320) m a.s.l. Coll.: Hur, J.-S., 22.04.2004 [KoLRI-001053 (040279)]; Chiri Mts, Pia-gol, Jangteo-mok, on *Abies* bark, on *Phaeophyscia exornatula*. Lat.: 35° 18' 41.6" N; Long.: 125° 35' 58.8" E; Alt.: 1,485 (1,355) m a.s.l. Coll.: Hur, J.-S., 29.09.2006 [KoLRI-005213 (060837)]. Geomun-do Island, Yeosu-si, on rock, on *Phaeophyscia* sp. thalli. Lat.: 34° 00' 21.5" N; Long.: 127° 19' 24.6" E; Alt.: 80 m a.s.l.

Coll.: Hur, J.-S., 23.03.2007 [KoLRI-007058 (070071)]. Mt Hwangbyeongsan, on bark, on *Phaeophyscia adiastrata* thalli damaged also *Taeniolella phaeophysciae*. Lat.: 37° 44' 44.3" N; Long.: 128° 37' 30.4" E; Alt.: 779 m a.s.l. Coll.: Hur, J.-S., 14.07.2008 [KoLRI-008639 (080386)]; same locality. Lat.: 37° 44' 53.0" N; Long.: 128° 37' 31.9" E; Alt.: 776 m a.s.l. Coll.: Hur, J.-S., 14.07.2008 [KoLRI-008708 (080469)]. Mt Odaesan, on bark, on *Phaeophyscia hispidula* thalli. Lat.: 37° 46' 22.4" N; Long.: 128° 36' 05.8" E; Alt.: 1,418 m a.s.l. Coll.: Hur, J.-S., 15.07.2008 [KoLRI-008815 (080604)]. Mt Soraksan (Gangwon-do, Sokcho-si), on *Quercus* bark, on *Phaeophyscia adiastrata* thalli. Lat.: 38° 09' 58.86" N; Long.: 128° 27' 16.02" E; Alt.: 463 m a.s.l. Coll.: Joshi, Y., Wang, X. Y., Ryu, J. A., 24.05.2009 [KoLRI-010457 (090785)]. Taebaek Mts, on bark, on thalli of *Pheophyscia exornatula*. Alt.: 1,215 m a.s.l. Coll.: Hur, J.-S., 12.09.2004. [KoLRI-001830 (041041)]. – It grows on the thallus of *Phaeophyscia hispidula*, *P. orbicularis*, *P. pusilloides*, *P. rubropulchra* inducing the formation of galls of the host thallus. Known from Europe and North America. New to Asia.

**Lichenodiplis lecanorae* (Vouaux) Duko et D. Hawksw. – Republic of Korea: Heuksan-do Island (Chollanam-do, Sinan-gun), on rock, *Lecanora* sp. damaged by *Lichenodiplis* cf. *lecanorae* growing together with *Caloplaca subconcilians*. Lat.: 34° 39' 45.54" N; Long.: 125° 23' 45.24" E; Alt.: 2 m a.s.l. Coll.: Wang, X. Y., Ryu, J. A., 22.06.2011 [KoLRI-013622 (110588, sub *Lecanora*)]. – New to Korea. The Korean specimen differs in having slightly longer ascospores (5–9(–11) × 2–3(–3.5) µm vs. 4–7.5 × 2–3 µm; after Hawksworth (1983)).

**Lopadium coralloideum* (Nyl.) Lyngé (Figs 40–41) – Republic of Korea: Chiri Mts, Pia-gol, Jangteo-mok, on bark of *Malus baccata*, growing together with *Parmelia subdivaricata*. Lat.: 35° 19' 16.5" N; Long.: 127° 42' 33.6" E; Alt.: 1,669 (1,565) m a.s.l. Coll.: Hur, J.-S., 29.06.2006 [KoLRI-005350 (060966, sub *Parmelia subdivaricata*)]. – New to Korea.

**Melaspilea bagliettoana* Zahlbr. – Republic of Korea: Baengnyeong-do Island (Incheon, Ongjin-gun, Baengnyeong-myeon), Gaeul-ri, on *Pinus* bark. Lat.: 37° 58' 22.5" N; Long.: 124° 39' 13.9" E; Alt.: 30 m a.s.l. Coll.: Oh, S.-O., Park, J.-S., 12.06.2013 [KoLRI-018744 (130399, sub *Amandinea punctata*)]. Hui-do Island (Chollanam-do, Sinan-gun, Hui-myeon), Unggok-ri seaside, on *Pinus* bark. Lat.: 34° 36' 07.07" N; Long.: 126° 00' 52.02" E; Alt.: 20 m a.s.l. Coll.: Oh, S.-O., Park, J.-S., Woo, J. J., 28.06.2013 [KoLRI-019027 (130682, sub *Lecanora*)]. Imja-do Island (Chollanam-do, Sinan-gun, Bigeum-myeon), wharf Hawoori, on *Pinus* bark. Lat.: 35° 05' 42.6" N; Long.: 126° 03' 21.0" E; Alt.: 4 m a.s.l. Coll.: Oh, S.-O., Park, J.-S., Woo, J. J., 06.06.2013 [KoLRI-018610 (130265, sub *Myelochroa*); KoLRI-018611 (130266, sub *Parmotrema*); KoLRI-018612 (130267, sub *Pertusaria*)]. – Rare, probably under-recorded species growing on “bare” bark, in oceanic woodlands, in South Korea on *Pinus* bark (growing together with *Myelochroa* sp., *Amandinea punctata* and *Lecanora* sp.). Known from Europe (England, Wales, Scotland), North Africa (Morocco). New to Asia.

**Menegazzia subsimilis* (H. Magn.) R. Sant. (Fig. 42) – Republic of Korea: Cheju-do Island, on bark (*Abies koreana*). Lat.: 33° 21' 30.4" N; Long.: 126° 31' 19.3" E; Alt.: 1,725 m a.s.l. Coll.: Hur, J.-S., 27.08.2004 [KoLRI-001532 (040748)]. Chiri Mts, Jongju, on bark of *Betula*, growing together with *Sulcaria sulcata*. Lat.: 35° 19' 38.5" N; Long.: 127° 42' 59.4" E; Alt.: 1,705 (1,665) m a.s.l. Coll.: Hur, J.-S., 23.04.2004 [KoLRI-001151 (040375, sub *Sulcaria sulcata*)]; Chiri Mts, Nogodan–Baemsagol, on bark (*Abies*). Lat.: 35° 18' 39.7" N; Long.: 127° 34' 24.0" E; Alt.: 1,620 m a.s.l. Coll.: Hur, J.-S., 17.06.2006 [KoLRI-004691 (060320), KoLRI-004692 (060321)]. Mt Deogyusan, on bark (*Quercus*). Lat.: 35° 51' 30.2" N; Long.: 127° 46' 02.4" E; Alt.: 1,040 m a.s.l. Coll.: Hur, J.-S., 02.04.2005 [KoLRI-002974 (050071)]. Mt Geumwonsan (Gyeongsangnam-do, Geochang-gun, Wicheon-myeon), on bark. Lat.: 35° 43' 44.16" N; Long.: 127° 46' 04.68" E; Alt.: 1,205 a.s.l. Coll.: Wang, X. Y. et al., 25.06.2010 [KoLRI-012113 (100514)]. Mt Hambaeksan, on rock. Lat.: 37° 09' 47.1" N; Long.: 128° 55' 05.8" E; Alt.: 1,459 m a.s.l. Coll.: Hur, J.-S., 19.06.2007 [KoLRI-007611 (070764)]. Mt Hwangbyeongsan, on bark.

Lat.: 37° 44' 47.6" N; Long.: 128° 37' 31.5" E; Alt.: 772 m a.s.l. Coll.: Hur, J.-S., 14.07.2008 [KoLRI-008676 (080433)]. Mt Jobong (Gangwon-do, Yangyang-gun, Seo-myeon), Hwangi-ri, on rock. Lat.: 37° 56' 06.42" N; Long.: 128° 33' 44.82" E; Alt.: 980 m a.s.l. Coll.: Joshi, Y. *et al.*, 14.05.2009 [KoLRI-009985 (090223)]. Mt Jombongsan, on bark. Lat.: 38° 04' 00.6" N; Long.: 128° 26' 55.4" E; Alt.: 495 m a.s.l. Coll.: Hur, J.-S., 09.10.2004 [KoLRI-002107 (041317)]. Micheongol valley (Gangwon-do, Yangyang-gun, Seo-myeon), Hwangi-ri, on bark. Lat.: 37° 56' 06.36" N; Long.: 128° 31' 52.62" E; Alt.: 420 m a.s.l. Coll.: Joshi, Y., Wang, X. Y., Ryu, J. A., Hur, J. Y., 14.05.2009 [KoLRI-010067 (090335)]. Mt Odaesan, on bark (*Abies*). Lat.: 37° 43' 42.8" N; Long.: 128° 35' 36.6" E; Alt.: 650 (662) m a.s.l. Coll.: Hur, J.-S., 07.05.2004 [KoLRI-001185 (040408)]. Mt Seokbyeongsan, on bark (*Quercus*). Lat.: 37° 34' 30.8" N; Long.: 128° 51' 49.2" E; Alt.: 834 m a.s.l. Coll.: Hur, J.-S., 24.05.2008 [KoLRI-008455 (080209)]. Mt Soraksan, on bark of *Abies* growing together with *Sulcaria sulcata*. Lat.: 38° 06' 40.4" N; Long.: 128° 24' 26.8" E; Alt.: 1,335 m a.s.l. Coll.: Hur, J.-S., 10.10.2004 [KoLRI-002252 (041459, sub *Sulcaria sulcata*)]. Taebaek Mts, on rock. Alt.: 1,080 m a.s.l. Coll.: Hur, J.-S., 25.06.2003 [KoLRI-000340 (030409)]; same locality, on bark. Lat.: 37° 05' 40.4" N; Long.: 128° 56' 48.5" E; Alt.: 1,394 m a.s.l. Coll.: Hur, J.-S., 02.11.2003 [KoLRI-000671 (030880-1)]; same locality, growing together with *Parmelia adaugescens*. Coll.: Hur, J.-S., 02.11.2003 [KoLRI-000677 (030886, sub *Parmelia adaugescens*)]; same locality, on bark, growing together with *Rinodina*. Lat.: 37° 05' 52.2" N; Long.: 128° 57' 00.9" E; Alt.: 1,280 m a.s.l. Coll.: Hur, J.-S., 12.09.2004 [KoLRI-001843 (041054)]; same locality, on bark (*Acer*). Coll.: Hur, J.-S., 12.09.2004 [KoLRI-001888 (041099)]; same locality, on bark. Lat.: 37° 05' 31.3" N; Long.: 128° 56' 38.0" E; Alt.: 1,507 m a.s.l. Coll.: Hur, J.-S., 18.06.2007 [KoLRI-007438 (070602)]. Mt Takmasan (Chollanam-do, Haenam-gun), Songji-ri, on rock. Alt.: 445 m a.s.l. Hur, J.-S., 26.07.2005 [KoLRI-003252 (050350)]. Mt Woraksan, on bark. Coll.: Hur, J.-S., 19.09.2004 [KoLRI-002013 (041221)]. – China: Changbai Mts, on bark (*Abies*). Lat.: 42° 05' 31.5" N; Long.: 128° 04' 10.9" E; Alt.: 1,531 m a.s.l. Coll.: Hur, J.-S., 24.07.2006 [KoLRI-006123 (CH-060267)].

Thallus of shiny lobes with few to numerous apical or laminal, lacerate, maniciform, labriform to flabellate, dactyliform or flange-like soralia 0.5–2(–5 mm) wide, that at maturity show an open duct to the cavity. Soralia not produced at lobe apices burst out from 0.5 to 1.5 mm tall, ± vertically orientated lobules or protuberances. Perforations are small, ellipsoid or circular, with non-elevated margins. Apothecia rare, on central lobes, clustered, ellipsoid to circular in shape, 0.7–3.0 mm wide, sessile to subpedicellate; exciple white-cracked, becoming richly soresiate; disc concave to flat, pale brown or red-brown. Asci 2-spored at maturity, 68–102 × 24–32 µm. Ascospores ellipsoid, 36–44 × 17–22 µm; wall 3–7 µm thick.

It contains stictic acid (major), constictic acid (major), menegazziaic acid (major to minor), atranorin (major to minor), cryptostictic acid (minor), and chloroatranorin (minor).

An epiphyte of trees and shrubs, often found at high altitudes close to the tree limit. Towards the northern limit, it is also found close to sea level. One specimen from Primorsk (Russia) was collected from rocks. A widespread species in Pacific region, with a southern distribution in Peru, Solomon Islands and Papua New Guinea and a northern distribution in Sakhalin (Russia) and in British Columbia (Canada). It is known from islands in, and continents surrounding the Pacific Ocean, but it is also currently known from the Caribbean, the Atlantic Ocean, and Europe (Bjerke 2003, 2004). New to Korea.

This species is characterised by shiny lobes with few to numerous apical or laminal, lacerate, maniciform, labriform to flabellate, dactyliform or flange-like soralia, that at maturity show an open duct to the cavity, in having soralia burst out from 0.5 to 1.5 mm tall, ± vertically orientated lobules or protuberances, as well as in the lack of soralia at lobe apices.

Menegazzia nipponica K. H. Moon, Kurok. et Kashiw. – Republic of Korea: Cheju-do Island, Mt Hallasan, on bark. Lat.: 33° 21' 18.8" N; Long.: 126° 30' 00.4" E; Alt.: 1,492 m a.s.l. Coll.:

Hur, J.-S., 10.08.2008 [KoLRI-009735 (080794)]; Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Gwaneumsa trail, on rock. Lat.: 33° 22' 03.06" N; Long.: 126° 32' 03.03" E; Alt.: 1,763 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Tian, F. H., Hur, J.-S., 19.06.2012 [KoLRI-016187 (121151)]; Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Gwaneumsa trail, on bark (*Abies*). Lat.: 33° 22' 01.04" N; Long.: 126° 32' 03.08" E; Alt.: 1,778 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Tian, F. H., Hur, J.-S., 19.06.2012 [KoLRI-016193 (121157), KoLRI-016194 (121158), KoLRI-016195 (121159)]. Chiri Mts, Jongju, on bark (*Abies*). Lat.: 35° 19' 00.9" N; Long.: 127° 42' 27.3" E; Alt.: 1,720 (1,618) m a.s.l. Coll.: Hur, J.-S., 23.04.2004 [KoLRI-001133 (040357)]; Chiri Mts, Nogodan-Baemsagol, on bark (*Abies*). Lat.: 35° 18' 33.5" N; Long.: 127° 34' 27.8" E; Alt.: 1,610 m a.s.l. Coll.: Hur, J.-S., 17.06.2006 [KoLRI-004682 (060310)]. Mt Deogyusan, Jeonbuk, on bark. Lat.: 35° 51' 10.0" N; Long.: 127° 44' 56.9" E; Alt.: 1,568 m a.s.l. Coll.: Hur, J.-S., 10.08.2006 [KoLRI-004867 (060496)]. – For the first time it was reported from the Cheju-do Island by Moon (2011).

**Micarea denigrata* (Fr.) Hedl. – Republic of Korea: Cheju-do Island (Cheju-si), Mt Hallasan, Hallasan National Park, Seongpanak Trail, on bark. Lat.: 33° 22' 49.53" N; Long.: 126° 34' 51.02" E; Alt.: 1,100 m a.s.l. Coll.: Kondratyuk, S. Y. (212661), Lökös, L., Oh, S.-O., Joshi, S., 06.07.2012 [KoLRI-016893 (121938), KoLRI-016894 (121939), KoLRI-016895 (121940)]; same locality, on bark. Lat.: 33° 22' 48.44" N; Long.: 126° 35' 26.70" E; Alt.: 1,025 m a.s.l. Coll.: Kondratyuk, S. Y. (212660), Lökös, L., Oh, S.-O., Joshi, S., 06.07.2012 [KoLRI-016876 (121897), KoLRI-016877 (121898), KoLRI-016887 (121908)]; same locality, on bark. Lat.: 33° 22' 45.46" N; Long.: 126° 34' 35.59" E; Alt.: 1,145 m a.s.l. Coll.: Kondratyuk, S. Y. (212660), Lökös, L., Oh, S.-O., Joshi, S., 06.07.2012 [KoLRI-016911 (121956)]. – New to Korea.

**Micarea peliocarpa* (Anzi) Coppins – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Seongpanak trail, along the tourist path, on bark of deciduous trees, growing together with aerophytic algae. Lat.: 33° 22' 34.1" N; Long.: 126° 34' 12.2" E; Alt.: 1,209 m a.s.l. Coll.: Kondratyuk, S. Y. (212671), Oh, S.-O., Kusama, Y., Hur, J.-S., 07.08.2012 [KW-L]; Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Arail-dong, along Gwaneumsa Temple trail, along the tourist path, on bark of *Betula*, *Pinus* and *Prunus* trees. Lat.: 33° 22' 42.9" N; Long.: 126° 31' 52.4" E; Alt.: 1,452 m a.s.l. (and below). Coll.: Kondratyuk, S. Y. (212777), Oh, S.-O., Kusama, Y., 08.08.2012 [KoLRI-017106 (121740), KoLRI-017107 (121741), KoLRI-017108 (121742), KoLRI-017110 (121744), KoLRI-017111 (121745), KoLRI-017112 (121746), KoLRI-017113 (121747), KoLRI-017114 (121748), KoLRI-017115 (121749), KoLRI-017139 (121773), KoLRI-017140 (121774), KoLRI-017141 (121775), KoLRI-017142 (121776), KoLRI-017143 (121777), KoLRI-017150 (121784), KoLRI-017151 (121785)]; same locality, on bark of *Pinus* [BP]; same locality, growing together with *Porina leptalea* [KW-L]. – It grows on wide range of acidic substrates, widespread and frequent, especially in uplands (but in Europe rare above 500 m). So far known from Europe, North and South America, Eastern Asia (Japan), Africa (Madagascar), Australia, New Zealand. New to Korea.

**Myriospora heppii* Nägeli – Republic of Korea: Geumil-do Island (Chollanam-do, Wandogun, Geumil-eup Chungdong-ri, on rock, growing together with *Scoliciosporum umbrinum*. Lat.: 34° 20' 43.04" N; Long.: 127° 03' 56.01" E; Alt.: 4 m a.s.l. Coll.: Jayalal, U., Park, J. S., Ryu, J. A., 19.04.2012 [KoLRI-014904 (120309)]. – New genus and species for Korea! This diminutive species is distinguished by the tiny, dispersed apothecia connected by a thin, thalline network. It resembles a large *Thelocarpon* or a minute *Acarospora* (Fletcher 2009).

**Myriotrema masonhalei* (Patw. et C. R. Kulk.) Hale – Republic of Korea: Cheju-do Island, Seogwipo-si, Mt Hallasan, Hallasan National Park, Donnaeko trail, on bark. Lat.: 33° 19' 16.03" N; Long.: 126° 33' 21.03" E; Alt.: 957 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Tian, F. H., Hur, J.-S., 20.06.2012 [KoLRI-016296 (121259)]; Cheju-do Island, Cheju-si, Mt

Hallasan, Hallasan National Park, Seongpanak trail, on bark. Lat.: 33° 22' 48.44" N; Long.: 126° 35' 26.70" E; Alt.: 1,025 m a.s.l. Coll.: Kondratyuk, S. Y. (212659), Lökös, L., Oh., S.-O., Joshi, S., 06.07.2012 [KoLRI-016514 (121444)]; same locality, on bark (*Acer*). Lat.: 33° 23' 05.03" N; Long.: 126° 36' 07.07" E; Alt.: 1,000 m a.s.l. Coll.: Kondratyuk, S. Y. (212659), Lökös, L., Oh., S.-O., Joshi, S., 06.07.2012 [KoLRI-016535 (121449)]. – New to Korea. It is characterised by the presence of psoromic acid (Pd + yellow), while *M. porinaceum* contains norstictic acid (Pd+ orange).

**Ochrolechia frigida* (Sw.) Lynge – Republic of Korea: Cheju-do Island (Cheju-si), Mt Hallasan, Hallasan National Park, Seongpanak Trail, on bark. Lat.: 33° 22' 82.4" N; Long.: 126° 34' 85.08" E; Alt.: 1,107 m a.s.l. Coll.: Kondratyuk, S. Y., Lökös, L., Oh., S.-O., Joshi, S., 06.07.2012 [KoLRI-016551 (121465)]. – New to Korea.

**Opegrapha calcarea* Turn. ex Sm. – Republic of Korea: Geumoh-do Island (Chollanam-do, Yeosu-si, Nam-myeon), Uhak-ri port, on rock, growing together with *Caloplaca loekoesii* and *Rinodina* sp. Lat.: 34° 30' 30.07" N; Long.: 127° 46' 13.00" E; Alt.: ca 14 m a.s.l. Coll.: Jayalal, U., Park, J. S., Ryu, J. A., 27.04.2012 [KoLRI-015580 (120588)]. Imja-do Island (Chollanam-do, Sinan-gun, Bigeum-myeon), wharf Hawoori, on rock. Lat.: 35° 05' 42.6" N; Long.: 126° 03' 21.0" E; Alt.: 4 m a.s.l. Coll.: Oh, S.-O., Park, J. S., Woo, J. J., 06.06.2012 [KoLRI-018614 (130269)]. Sinui-do Island (Chollanam-do, Sinan-gun, Sinui-myeon), Hatae-gil seaside, on rock. Lat.: 34° 32' 27.02" N; Long.: 126° 02' 10.00" E; Alt.: 1 m a.s.l. Coll.: Oh, S.-O., Park, J. S., Woo, J. J., 28.06.2012 [KoLRI-018971 (130626)]. – One of the commonest *Opegrapha* species near the coast. It is known from Europe, Macaronesia, Asia and Africa. New to Korea.

**Opegrapha phaeophysciae* R. Sant., Diederich, Ertz et Christnach – Republic of Korea: Chiri Mts (Chollanam-do, Gurye-gun, Masan-myeon), Hwaeom valley, on *Magnolia* bark, on *Phaeophyscia* aff. *squarrosa* thalli. Lat.: 35° 16' 54.30" N; Long.: 127° 31' 00.18" E; Alt.: 816 m a.s.l. Coll.: Joshi, Y., Wang, X. Y., Hur J.-Y., 12.10.2009 [KoLRI-010436 (091042)]. Mt Hambaeksan, on bark, on *Phaeophyscia adiastrum* thalli growing together with *Physconia* sp. Lat.: 37° 11' 35.9" N; Long.: 128° 54' 51.3" E; Alt.: 1,439 m a.s.l. Coll.: Hur, J.-S., 19.06.2007 [KoLRI-007541 (070669, sub *Physconia*)]. Mt Jobong (Gangwon-do, Yangyang-gun, Seomyeon), Hwangi-ri, on rock, on *Phaeophyscia exornatula* thalli. Lat.: 37° 56' 06.42" N; Long.: 127° 33' 44.82" E; Alt.: 980 m a.s.l. Coll.: Joshi, Y., Wang, X. Y., Ryu, J. A., Hur, J. Y., 14.05.2009 [KoLRI-009999 (090244)]. – It was described from *Phaeophyscia hispidula* from Russian Far East, and recently recorded from Japan. New to Korea.

**Parmelia subdivaricata* Asah. (Figs 43–44) – Republic of Korea: Cheju-do Island, on bark. Lat.: 33° 25' 21.9" N; Long.: 126° 33' 35.7" E; Alt.: 505 (614) m a.s.l. Coll.: Hur, J.-S. 26.08.2004 [KoLRI-001448 (040665)]; Cheju-do Island, Mt Hallasan, on bark (*Quercus*). Lat.: 33° 25' 17.6" N; Long.: 126° 33' 37.3" E; Alt.: 592 m a.s.l. Coll.: Hur, J.-S., 16.10.2006 [KoLRI-005357 (060973), KoLRI-005359 (060975)]; Cheju-do Island, Gwaneumsa Temple, on bark (*Quercus*). Lat.: 33° 25' 67.8" N; Long.: 126° 32' 93.8" E; Alt.: 565 m a.s.l. Coll.: Hur, J.-S., 19.04.2009 [KoLRI-009819 (090055), KoLRI-009833 (090069)]. Chiri Mts, Pia-gol, Jangteomok, on bark of *Malus baccata*, growing together with *Lopadium coralloideum*. Lat.: 35° 19' 16.5" N; Long.: 127° 42' 33.6" E; Alt.: 1,669 (1,565) m a.s.l. Coll.: Hur, J.-S., 29.09.2006 [KoLRI-005350 (060966)]. Taebaek Mts, on bark. Lat.: 37° 06' 16.4" N; Long.: 128° 56' 31.8" E; Alt.: 1,388 m a.s.l. Coll.: Hur, J.-S., 20.08.2003 [KoLRI-000474 (030672)]; same locality, on rock. Lat.: 37° 06' 13.4" N; Long.: 128° 56' 28.1" E; Alt.: 1,057 m a.s.l. Coll.: Hur, J.-S., 20.08.2003 [KoLRI-000451 (030648)]. – New to Korea.

**Pertusaria* aff. *alpinoides* Oshio – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Gwaneumsa trail, on bark. Lat.: 33° 24' 02.09" N; Long.: 126° 32' 26.00" E; Alt.: 851 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Park, J. S., Hur, J.-S., 01.06.2012 [KoLRI-016051 (121021)]. – New to Korea.

**Pertusaria commutans* Vain. – Republic of Korea: Taebaek Mts, on bark of *Abies koreana*, growing together with *Nipponoparmelia* cf. *laevior*. Alt.: 1,610 m. Coll.: Hur, J.-S., 12.09.2004 [KoLRI-001938 (041148, sub *Nipponoparmelia* cf. *laevior*)]. – New to Korea.

Pertusaria commutata Müll. Arg. – Republic of Korea: Cheju-do Island, Cheju-si, Hallasan National Park, Arail-dong, around Gwaneumsa Temple, on rock. Lat.: 33° 25' 21.50" N; Long.: 126° 33' 34.80" E; Alt.: 615 m a.s.l. Coll.: Kondratyuk, S. Y. (212663), Lökös, L., 07.07.2012 [KoLRI-016959 (121931)]. – It was published from Korea by Kim (1981) (cf. Hur *et al.* 2005).

Pertusaria multipuncta (Turner) Nyl. – Republic of Korea: Cheju-do Island, Cheju-si, Hallasan National Park, Arail-dong, around Gwaneumsa Temple, on rock. Lat.: 33° 25' 21.50" N; Long.: 126° 33' 34.80" E; Alt.: 615 m a.s.l. Coll.: Kondratyuk, S. Y. (212663), Lökös, L., 07.07.2012 [KoLRI-016946 (121918)]. – It was published from Korea by Moon (1999), and Moon *et al.* (2002).

**Pertusaria ophthalmiza* (Nyl.) Nyl. – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Gwaneumsa trail, on bark. Lat.: 33° 25' 18.04" N; Long.: 126° 32' 58.09" E; Alt.: 577 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Park, J. S., Hur, J.-S., 01.06.2012 [KoLRI-015939 (120910), KoLRI-015948 (120918), KoLRI-015961 (120931)]; same locality. Lat.: 33° 25' 04.08" N; Long.: 126° 32' 52.01" E; Alt.: 619 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Park, J. S., Hur, J.-S., 01.06.2012 [KoLRI-015994 (120964)]; same locality. Lat.: 33° 24' 39.08" N; Long.: 126° 32' 47.05" E; Alt.: 739 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Park, J. S., Hur, J.-S., 01.06.2012 [KoLRI-016027, (120997) KoLRI-016036 (121006), KoLRI-016043 (121013)]; same locality, Lat.: 33° 23' 54.09" N; Long.: 126° 32' 21.04" E; Alt.: 942 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Park, J. S., Hur, J.-S., 01.06.2012 [KoLRI-016064 (121034)]; same locality, Lat.: 33° 22' 09.01" N; Long.: 126° 31' 53.03" E; Alt.: 1,570 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Tian, F. H., Hur, J.-S., 01.06.2012 [KoLRI-016152 (121116)]; same locality, Lat.: 33° 27' 07.06" N; Long.: 126° 32' 02.03" E; Alt.: 1,709 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Tian, F. H., Hur, J.-S., 01.06.2012 [KoLRI-016170 (121134)]; Cheju-do Island, Seogwipo-si, Mt Hallasan, Hallasan National Park, Donnaeko trail, on bark. Lat.: 33° 19' 16.03" N; Long.: 126° 33' 36.03" E; Alt.: 738 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Tian, F. H., Hur, J.-S., 20.06.2012 [KoLRI-016288 (121246)]; same locality. Lat.: 33° 20' 08.05" N; Long.: 126° 33' 14.04" E; Alt.: 1,023 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Tian, F. H., Hur, J.-S., 20.06.2012 [KoLRI-016310 (121265)]; Cheju-do Island, Seogwipo-si, Mt Hallasan, Hallasan National Park, Yeongsil trail, along the tourist path, growing together with *Rinodina fimbriata*, *Ochrolechia tartarea*, *Caloplaca flavorubescens* and *Lecanora* sp. Lat.: 33° 21' 30.91" N; Long.: 126° 30' 13.94" E; Alt.: 1,615 m a.s.l. Coll.: Kondratyuk, S. Y. (212646), Lökös, L., Oh, S.-O., Joshi, S., 04.07.2012 [KoLRI-016731 (121795)]. – New to Korea. *P. ophthalmiza* differs from *Pertusaria amara* in having apothecia on regular distance from each other, furthermore in the lack of black line at the edge of thallus as well as in the lack of zonations.

Pertusaria quartans Nyl. – Republic of Korea: Cheju-do Island, Seogwipo-si, Mt Hallasan, Hallasan National Park, Donnaeko trail, on bark. Lat.: 33° 19' 16.03" N; Long.: 126° 33' 21.03" E; Alt.: 957 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Tian, F. H., Hur, J.-S., 20.06.2012 [KoLRI-016296 (121259)]; Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Seongpanak trail, on bark, growing together with *Pertusaria* sp. Lat.: 33° 22' 48.44" N; Long.: 126° 35' 26.70" E; Alt.: 1,025 m a.s.l. Coll.: Kondratyuk, S. Y. (212659), Lökös, L., Oh, S.-O., Joshi, S., 06.07.2012 [KoLRI-016862 (121883), KoLRI-016871 (121892)]; same locality, growing together with *Brigantiaea ferruginea* and *Leptogium menziesii*. Lat.: 33° 22' 49.53" N; Long.: 126° 34' 51.02" E; Alt.: 1,100 m a.s.l. Coll.: Kondratyuk, S. Y. (212661), Lökös, L., Oh, S.-O., Joshi, S., 06.07.2012 [KoLRI-016870 (121891)]; same locality, growing together with *Brigantiaea ferruginea*. Lat.: 33° 22' 45.46" N; Long.: 126° 34' 35.59" E; Alt.: 1,145 m a.s.l.

Coll.: Kondratyuk, S. Y. (212662), Lökös, L., Oh, S.-O., Joshi, S., 06.07.2012 [KoLRI-016863 (121884)]. – Rarely recorded species from Korea, known after Moon (1999) and Moon *et al.* (2002).

**Pertusaria sphaerophora* Oshio – Republic of Korea: Cheju-do Island, Seogwipo-si, Mt Hallasan, Hallasan National Park, Yeongsil trail, along the tourist path, on bark of *Abies*, growing together with *Parmelia adaugescens*. Lat.: 33° 21' 30.91" N; Long.: 126° 30' 13.94" E; Alt.: 1,615 m a.s.l. Coll.: Kondratyuk, S. Y. (212646), Lökös, L., Oh, S.-O., Joshi, S., 04.07.2012 [KoLRI-016727 (121793)]. – New to Korea.

**Pertusaria subcomposita* Oshio – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Gwaneumsa trail, on bark, damaged in parts by *Dactylospora* sp. Lat.: 33° 22' 09.01" N; Long.: 126° 31' 53.03" E; Alt.: 1,570 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Tian, F. H., Hur, J.-S., 01.06.2012 [KoLRI-016151 (121115)]. – New to Korea.

Pertusaria submultipuncta Nyl. – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Gwaneumsa trail, on bark. Lat.: 33° 22' 13.04" N; Long.: 126° 31' 49.07" E; Alt.: 1,530 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Tian, F. H., Hur, J.-S., 19.06.2012 [KoLRI-016133 (121099)]; same locality. Lat.: 33° 27' 07.06" N; Long.: 126° 32' 02.03" E; Alt.: 1,709 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Tian, F. H., Hur, J.-S., 19.06.2012 [KoLRI-016176 (121140)]; same locality. Lat.: 33° 21' 58.06" N; Long.: 126° 32' 03.03" E; Alt.: 1,800 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Tian, F. H., Hur, J.-S., 19.06.2012 [KoLRI-016213 (121177)]. – It was published from Korea by Moon (1999) and Moon *et al.* (2002).

Pertusaria aff. subobductans Nyl. – Republic of Korea: Cheju-do Island, Cheju-si, Hallim-eup, Gwideok-ri, coast near the Chorok village, on rock. Lat.: 33° 26' 33.3" N; Long.: 126° 17' 00.1" E; Alt.: 18 m a.s.l. Coll.: Kondratyuk, S. Y., Lökös, L., Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Hur, J.-S., 05.07.2012 [KoLRI-016429 (121372)]. Joyak-do Island (Chollanam-do, Wando-gun, Yaksan-myeon), Deugam-ri, Udury coast, on rock. Lat.: 34° 21' 36.07" N; Long.: 126° 53' 27.03" E; Alt.: 3 m a.s.l. Coll.: Jayalal, U., Park, J. S., Ryu, J. A., 18.04.2012 [KoLRI-014747 (120153)]. Geumil-do Island (Chollanam-do, Wando-gun, Dojaeng port, on rock. Lat.: 34° 21' 39.06" N; Long.: 126° 59' 20.06" E; Alt.: 7 m a.s.l. Coll.: Jayalal, U., Park, J. S., Ryu, J. A., 19.04.2012 [KoLRI-014921 (120326)]. Saengil-do Island (Chollanam-do, Wando-gun, Saengil-myeon), Geumgok beach coast, on rock. Lat.: 34° 18' 40.02" N; Long.: 126° 57' 54.03" E; Alt.: 4 m a.s.l. Coll.: Jayalal, U., Park, J. S., Ryu, J. A., 18.04.2012 [KoLRI-014824 (120229), KoLRI-014826 (120231)]. – It was published from Korea by Moon (1999) and Moon *et al.* (2002).

Pertusaria velata (Turner) Nyl. – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Arail-dong, along Gwaneumsa Temple trail, along the tourist path, on bark (*Quercus* and *Acer*). Lat.: 33° 23' 32.2" N; Long.: 126° 32' 16.0" E; Alt.: 1,128 m a.s.l. Coll.: Kondratyuk, S. Y., Oh, S.-O., Kusama, Y., 08.08.2012. [KoLRI-017069 (121615), KoLRI-017071 (121617), KoLRI-017072 (121618), KoLRI-017089 (121635)]; Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Seongpanak trail, along the tourist path, at the lake in the crater of volcano, on twigs and on bark of deciduous trees. Lat.: 33° 22' 34.1" N; Long.: 126° 34' 12.2" E; Alt.: 1,250 m a.s.l. Coll.: Kondratyuk, S. Y. (212673), Oh, S.-O., Kusama, Y., Hur, J.-S., 07.08.2012 [KoLRI-017027 (121712)]. – Rarely recorded species from Korea (Moon 1999).

Phaeophyscia orbicularis (Neck.) Moberg – Republic of Korea: Cheju-do Island (Cheju-si, Hangeong-myeon, Aewol-eup), Nabeup-ri, Keumsna Park, warm temperate forest, on rock, damaged by *Arthonia epiphyscia*, growing together with *Pertusaria* sp. 1, *Lecidella* sp., and *Hyperphyscia* sp. damaged by *Taeniolella phaeophysciae*. Lat.: 33° 26' 06.50" N; Long.: 126° 19' 48.50" E; Alt.: 90 m a.s.l. Coll.: Kondratyuk, S. Y. (212650), Hur, J.-S., Oh, S.-O., Lökös, L.,

Jayalal, U., Joshi, S., Park, J. S., 05.07.2012, [KoLRI-016765 (121828)]; same locality, on rock, damaged by *Arthonia epiphyscia*, and growing together with *Pertusaria* sp.1. [KoLRI-016768 (121831)]. – Rarely recorded from Korea species (Park 1990).

**Phlyctis* aff. *argena* (Ach.) Flot. – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Seongpanak trail, along the tourist path, on bark of deciduous trees, growing together with *Pertusaria* sp. Lat.: 33° 22' 38.8" N; Long.: 126° 34' 16.4" E; Alt.: 1,181 m a.s.l. Coll.: Kondratyuk, S. Y. (212670), Oh, S.-O., Kusama, Y., Hur, J.-S., 07.08.2012 [KoLRI-016964 (121649), KoLRI-016981 (121666)]; same locality, on bark of deciduous trees. Lat.: 33° 22' N; Long.: 126° 34' E; Alt.: 1,210–1,250 m a.s.l. [KoLRI-017018 (121703)]. – New to Korea.

**Physconia hokkaidensis* Kashiw. – Republic of Korea: Mt Gariwangsan (Gangwon-do), on rock, growing together with *Heterodermia* sp. Lat.: 37° 24' 05.0" N; Long.: 128° 32' 39.5" E; Alt.: 937 m a.s.l. Coll.: Hur, J.-S., 10.05.2008 [KoLRI-008270 (080028)]. – New to Korea.

**Porina farinosa* C. Knight – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Arail-dong, along Gwaneumsa Temple trail, along the tourist path, on bark of *Acer*. Lat.: 33° 22' 42.9" N; Long.: 126° 31' 52.4" E; Alt.: 1,452 m a.s.l. (and below). Coll.: Kondratyuk, S. Y. (212777), Oh, S.-O., Kusama, Y., 08.08.2012 [KoLRI-017148 (121782)]. – A rather common epiphyte in subtropical and tropical forest in Eastern Queensland and New South Wales of Australia, also in the Caribbean, East Africa, New Guinea, southern Japan, New Caledonia and Polynesia (McCarthy 2001). New to Korea.

Porina leptalea (Durieu et Mont.) A. L. Sm. – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Arail-dong, along Gwaneumsa Temple trail, along the tourist path, on bark of *Pinus* trees. Lat.: 33° 22' 42.9" N; Long.: 126° 31' 52.4" E; Alt.: 1,452 m a.s.l. (and below). Coll.: Kondratyuk, S. Y. (212777), Oh, S.-O., Kusama, Y., 08.08.2012 [KoLRI-017144 (121778)]; same locality [KW-L, BP]. – It was published from South Korea at first by Moon and Aptroot (2009).

**Punctelia subrudecta* (Nyl.) Krog – Republic of Korea: Cheju-do Island, at Wondang temple, on bark. Coll.: Hur, J.-S., 20.06.2003 [KoLRI-000271 (30332)]; Cheju-do Island, Mt Hallasan, on bark (*Cerasus*). Lat.: 33° 22' 17.7" N, Long.: 126° 34' 15.2" E; Alt.: 1300 m a.s.l. Coll.: Hur, J.-S., 09.08.2009 [KoLRI-009687 (80746), KoLRI-009691 (80750), KoLRI-009693 (80752), KoLRI-009705 (80764)]. Namhae Island, Mt. Nogudwissan, on rock. Lat.: 34° 45' 38.6" N, Long.: 128° 02' 54.0" E; Alt.: 262 m a.s.l. Coll.: Hur, J.-S., 11.11.2007 [KoLRI-012814 (070973)]. Sobaek Mts, on bark. Lat.: 36° 56' 11.1" N; Long.: 128° 30' 05.9" E; Alt.: 647 m a.s.l. Coll.: Hur, J.-S., 02.10.2003 [KoLRI-00523 (30727), KoLRI-00531 (30736)]. Mt Soraksan (Gangwon-do, Sokcho-si), on bark. Lat.: 38° 09' 58.86" N, Long.: 128° 27' 16.02" E; Alt.: 463 m a.s.l. Coll.: Hur, J.-S., 24.05.2009 [KoLRI-010465 (90793)]. Mt Seonunsan (Chollabuk-do), on bark, 1,200 m a.s.l. Coll.: Hur, J.-S., 01.06.2003 [KoLRI-00197 (30257)]. Mt Woraksan, on bark (*Ginkgo*). Lat.: 36° 51' 21.96" N; Long.: 128° 05' 16.44" E; Alt.: 245 m a.s.l. Coll.: Hur, J.-S., 18.09.2004 [KoLRI-001962 (041170)]; same locality, on bark (*Quercus*). Alt.: 750 m a.s.l. Coll.: Hur, J.-S., 19.09.2004 [KoLRI-001979 (041187)]. – New to South Korea.

**Pyrenula balia* (Krempelh.) R. C. Harris (Syn.: *Pyrenula* cf. *santensis* (Nyl.) Müll. Arg.) – Republic of Korea: Cheju-do Island, on bark (*Quercus*). Coll.: Hur, J.-S., 08.08.2008 [KoLRI-009622 (080681)]. – New to Korea. It differs from *P. nitidula* in having shorter ascospores (Aptroot 2012).

**Pyrenula castanea* (Kremp.) R. C. Harris – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Arail-dong, around Gwaneumsa Temple. Lat.: 33° 25' 21.50" N; Long.: 126° 33' 34.80" E; Alt.: 615 m a.s.l. Coll.: Kondratyuk, S. Y. (212663), Lökös, L., 06.07.2012 [KoLRI-016953 (121925)]. – New to Korea.

**Pyrenula laevigata* (Pers.) Arnold – Republic of Korea: Mt Baegunsan (Gwangyan-do), on

bark. Lat.: 35° 06' 56.8" N; Long.: 127° 36' 25.9" E; Alt.: 809 m a.s.l. Coll.: Hur, J.-S., 27.06.2006 [KoLRI-004764 (060392)]. Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Gwaneumsa trail, on bark. Lat.: 33° 25' 04.08" N; Long.: 126° 32' 52.01" E; Alt.: 619 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Park, J. S., Hur, J.-S., 01.06.2012 [KoLRI-015989 (120959)]; Cheju-do Island, Seogwipo-si, Mt Hallasan, Hallasan National Park, Donnaeko trail, on bark. Lat.: 33° 19' 16.03" N; Long.: 126° 33' 36.03" E; Alt.: 738 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Tian, F. H., Hur, J.-S., 20.06.2012 [KoLRI-016285 (121243), KoLRI-016286 (121244), KoLRI-016290 (121253)]; same locality, on bark. Alt.: 700–1,000 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Tian, F. H., Hur, J.-S., 20.06.2012 [KoLRI-016308 (121273)]. – New to Korea.

**Pyrenula neojaponica* H. Harada (Syn.: *Anthracotheicum japonicum* Kashiw. et Kurok.) – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Gwaneumsa trail, on bark. Lat.: 33° 25' 18.04" N; Long.: 126° 32' 58.09" E; Alt.: 577 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Park, J. S., Hur, J.-S., 01.06.2012 [KoLRI-015959 (120929), KoLRI-015960 (120930)]; same locality, on bark. Lat.: 33° 25' 04.08" N; Long.: 126° 32' 52.01" E; Alt.: 619 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Park, J. S., Hur, J.-S., 01.06.2012 [KoLRI-015998 (120968)]; same locality, on bark. Lat.: 33° 24' 43.03" N; Long.: 126° 32' 52.04" E; Alt.: 713 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Park, J. S., Hur, J.-S., 01.06.2012 [KoLRI-016008 (120978), KoLRI-016010 (120980)]; same locality, on bark. Lat.: 33° 24' 02.09" N; Long.: 126° 32' 26.00" E; Alt.: 851 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Park, J. S., Hur, J.-S., 01.06.2012 [KoLRI-016052 (121022), KoLRI-016055 (121025)]; same locality, on bark. Lat.: 33° 23' 54.09" N; Long.: 126° 32' 21.04" E; Alt.: 942 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Park, J. S., Hur, J.-S., 01.06.2012 [KoLRI-016059 (121029), KoLRI-016070 (121140)]. – New to Korea.

**Pyrenula pseudobufonia* (Rehm) R. C. Harris – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Gwaneumsa trail, on bark. Lat.: 33° 25' 18.04" N; Long.: 126° 32' 58.09" E; Alt.: 577 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Park, J. S., Hur, J.-S., 01.06.2012 [KoLRI-015943 (120913), KoLRI-015951 (120921)]. – New to Korea.

**Rhizocarpon badioatrum* (Flörke ex Spreng.) Th. Fr. – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Gwaneumsa trail, on rock. Lat.: 33° 21' 49.00" N; Long.: 126° 32' 04.05" E; Alt.: 1,888 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Tian, F. H., Hur, J.-S., 19.06.2012 [KoLRI-016225 (121189)]. – New to Korea.

**Rinodina fimbriata* Körb. – Republic of Korea: Cheju-do Island, Seogwipo-si, Hallasan National Park, Mt Hallasan, Yeongsil trail, along the tourist path, on bark of *Quercus*, growing together with *Pertusaria ophthalmiza*, *Ochrolechia tartarea*, *Caloplaca flavorubescens* and *Lecanora* sp. Lat.: 33° 21' 30.91" N; Long.: 126° 30' 13.94" E; Alt.: 1,615 m a.s.l. Coll.: Kondratyuk, S. Y. (212646), Lökös, L., Oh, S.-O., Joshi, S., 04.07.2012 [KoLRI-016731 (121795)]. – New to Korea. Readily identified by the immersed apothecia lacking a distinctive thalline margin, habitat of periodically inundated rocks and characteristic *Mischoblastia*-type spores. The Korean specimen was collected on the bark of *Quercus*.

**Rinodina oleae* Bagl. – Republic of Korea: Suncheon National University (Suncheon-si), at the humanitarian faculty, on bark of *Pinus koreana* trees, and on bark of *Metasequoia glyptostroboides*, *Acer buergerianum*, *Zelkova serrata*. Lat.: 34° 58' 10.8" N; Long.: 127° 28' 36.7" E; Alt.: 65 m a.s.l. Coll.: Kondratyuk, S. (21147), 04.10.2011 [KoLRI-014063 (110988)]. – New to Korea.

**Rinodina polyspora* Th. Fr. – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Arail-dong, around Gwaneumsa Temple, on bark, growing together with *Phaeophyscia rubropulchra* and *Lecanora* sp. Lat.: 33° 25' 21.50" N; Long.: 126° 33' 34.80" E; Alt.: 615 m a.s.l. Coll.: Kondratyuk, S. Y. (212663), Lökös, L., 06.07.2012 [KoLRI-016952 (121924)]. – New to Korea.

**Rinodina pyrina* (Ach.) Arnold – Republic of Korea: Suncheon National University (Suncheon-si), in front of the library, on bark of roadside cherry trees (and on bark of *Juniperus*). Lat.: 34° 58' 7.2" N; Long.: 127° 29' 2.3" E; Alt.: 40 m a.s.l. Coll.: S. Kondratyuk (21145), 24.09.2011, 01.10.2011 and 04.10.2011 [KoLRI-014058 (110983)]. – New to Korea.

**Rinodina sophodes* (Ach.) A. Massal. – Republic of Korea: Suncheon National University (Suncheon-si), at the humanitarian faculty, on bark of *Pinus koreana* trees, and on bark of *Metasequoia glyptostroboides*, *Acer buergerianum*, *Zelkova serrata*. Lat.: 34° 58' 10.8" N; Long.: 127° 28' 36.7" E; Alt.: 65 m a.s.l. Coll.: Kondratyuk, S. (21147), 04.10.2011 [KoLRI-014062 (110987)]. – New to Korea.

**Rinodina teichophila* (Nyl.) Arnold – Republic of Korea: Cheju-do Island, Seogwipo-si, Mt Hallasan, Hallasan National Park, Yeongsil trail, along the tourist path, growing together with *Caloplaca flavorubescens*. Lat.: 33° 21' 30.91" N; Long.: 126° 30' 13.94" E; Alt.: 1,615 m a.s.l. Coll.: Kondratyuk, S. Y. (212646), Lökös, L., Oh, S.-O., Joshi, S., 04.07.2012 [KoLRI-016732 (121796)]. – New to Korea.

**Scoliciosporum chlorococcum* (Graewe ex Stenh.) Vězda – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Seongpanak trail, along the tourist path, on bark of deciduous trees. Lat.: 33° 22' 34.1" N; Long.: 126° 34' 12.2" E; Alt.: 1,209 m a.s.l. Coll.: Kondratyuk, S. Y. (212671), Hur, J.-S., Oh, S.-O., Kusama, Y., 07.08.2012 [KoLRI-017003 (121688)]; same locality, growing together with *Biatora longispora* [KW-L]; same locality [KW-L]. Suncheon National University (Suncheon-si), at the humanitarian faculty, on bark of *Pinus koreana* trees, and on bark of *Metasequoia glyptostroboides*, *Acer buergerianum*, *Zelkova serrata*. Lat.: 34° 58' 10.8" N; Long.: 127° 28' 36.7" E; Alt.: 65 m a.s.l. Coll.: Kondratyuk, S. (21147), 04.10.2011 [KoLRI-014064 (110989)]. Between Najin and Imok-ri (Chollanam-do, Hwayang-myeon, Yeosu-si), along the road, on bark of *Cerasus*. Lat.: 34° 40' 49.53" N; Long.: 127° 34' 35.59" E; Alt.: 75 m a.s.l. Coll.: Kondratyuk, S. K., Lökös, L. and Park, C.-H., 28.07.2013. [KoLRI, KW-L, BP]. – New to Korea.

**Sphinctrina tubaeformis* A. Massal. – Republic of Korea: Geumoh-do Island (Chollanam-do, Yeosu-si, Nam-myeon), Uhak-ri port, on rock, growing on the thallus of a *Pertusaria* sp. Lat.: 34° 30' 30.07" N; Long.: 127° 46' 13.00" E; Alt.: ca 14 m a.s.l. Coll.: Jayalal, U., Park, J. S., Ryu, J. A., 27.04.2012 [KoLRI-015581 (120589)]. – New to Korea.

**Stigmidium fuscatae* (Arnold) R. Sant. – Republic of Korea: Hui-do Island (Chollanam-do, Sinan-gun, Hui-myeon), Unggok-ri seaside, on rock, on young thalli of *Acarospora* subg. *Phaeothallia*. Lat.: 34° 36' 07.07" N; Long.: 126° 00' 52.02" E; Alt.: 20 m a.s.l. Coll.: Oh, S.-O., Park, J.-S., Woo, J. J., 28.06.2013 [KoLRI-019004 (130659)]. – New to Korea. It was recently recorded from Iran as new to Asia (Sohrabi and Alstrup 2007).

**Taeniolella phaeophysciae* D. Hawksw. – Republic of Korea: Mt Baegunsan (Gyeongsangnam-do, Hamyang-gun, Seosang-myeon), on bark *Quercus*, on *Phaeophyscia adiastrata* thalli, Lat.: 35° 37' 04.50" N; Long.: 127° 39' 24.42" E; Alt.: 1,042 m a.s.l. Coll.: Wang, X. Y., Jeon, H. S., Han, G. S., 24.06.2010 [KoLRI-012067 (100447)]. Mt. Baekseokbong (Gangwon-do, Jeongseon-gun, Bukpyeong-myeon), on rock with moss, on *Phaeophyscia exornatula* thalli. Lat.: 37° 28' 44.34" N; Long.: 128° 39' 45.60" E; Alt.: 494 m a.s.l. Coll.: Joshi, Y., Wang, X. Y., Ryu, J. A., Hur, J. Y., 16.05.2009 [KoLRI-010145 (090439)]. Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Seongpanak trail, on bark, *Taeniolella* on *Phaeophyscia* growing together with *Brigantiaea ferruginea*. Lat.: 33° 22' 45.46" N; Long.: 126° 34' 35.59" E; Alt.: 1,145 m a.s.l. Coll.: Kondratyuk, S. Y. (212662), Lökös, L., Oh, S.-O., Joshi, S., 06.07.2012 [KoLRI-016921 (121966)]; same locality, on *Phaeophyscia* sp., growing together with *Rinodina* sp. [KW-L]; same locality, on *Phaeophyscia* sp., growing together with *Pertusaria quartans*, *Caloplaca oxneri* and *Pertusaria* sp. [KW-L]; same locality, on *Phaeophyscia* sp., growing together with *Caloplaca oxneri* [KW-L]; same locality, on bark of deciduous trees, on

thalli of *Phaeophyscia* sp., growing together with *Lecanora* and *Rinodina*. Lat.: 33° 22' 34.1" N; Long.: 126° 34' 12.2" E; Alt.: 1,209 m a.s.l. Coll.: Kondratyuk, S. Y. (212671), Oh, S.-O., Kusama, Y., Hur, J.-S., 07.08.2012 [KoLRI-016995 (121680)]; same locality, on *Phaeophyscia rubropulchra*, which growing together with *Lecanora* and *Rinodina* [KoLRI-016998 (121683)]; Cheju-do Island, Cheju-si, Hallasan National Park, Arail-dong, around Gwaneumsa Temple, on rock, on *Phaeophyscia orbicularis* growing together with *Graphis* sp. and *Caloplaca flavorubescens*. Lat.: 33° 25' 21.50" N; Long.: 126° 33' 34.80" E; Alt.: 615 m a.s.l. Coll.: Kondratyuk, S. Y. (212663), Lökös, L., 07.07.2012 [KoLRI-016956 (121928)]; Cheju-do Island, Cheju-si, Hangyeong-myeon, Aewol-eup, Nabeup-ri, Keumsna Park, warm temperate forest, on rock, on *Hyperphyscia* sp., growing together with *Pertusaria* sp.1, *Lecidella* sp., and *Phaeophyscia orbicularis* damaged by *Arthonia epiphyscia*. Lat.: 33° 26' 06.50" N; Long.: 126° 19' 48.50" E; Alt.: 90 m a.s.l. Coll.: Kondratyuk, S. Y. (212650), Hur, J.-S., Oh, S.-O., Lökös, L., Jayalal, U., Joshi, S., Park, J. S., 05.07.2012 [KoLRI-016765 (121828)]; same locality, on *Phaeophyscia orbicularis*, growing together with *Physcia caesia*, *Phaeophyscia rubropulchra* [KoLRI-016766 (121829)]; same locality, on rock, on *Phaeophyscia orbicularis* thalli [KoLRI-016766 (121829)]. Chiri Mts, Jongju, on bark, on *Phaeophyscia exornatula* thalli. Lat.: 35° 17' 33.4" N; Long.: 127° 32' 04.7" E; Alt.: 1,460 m a.s.l. Coll.: Hur, J.-S., 21.04.2004 [KoLRI-001034 (040261)]; Chiri Mts, Nogodan–Baemsagol, on *Quercus* bark, on *Phaeophyscia exornatula* thalli. Lat.: 35° 17' 25.7" N; Long.: 127° 31' 59.7" E; Alt.: 1,420 m a.s.l. Coll.: Hur, J.-S., 17.06.2006 [KoLRI-004551 (060174)]; Chiri Mts, along the pathway from Nogodan to Dwaengi ryeong, *Quercus mongolica* forest close to Nogodan, on bark of *Acer mono*, and other trees, forming gall on thalli of *Phaeophyscia* sp. (non *orbicularis*). Lat.: 35° 10.356' N; Long.: 127° 19.151' E; Alt.: 1,406 m a.s.l. Coll.: Kondratyuk, S. (21160), Wang, X. Y., Ryu, Y. A., 11.10.2011 [KoLRI-014101 (111026)]. Mt Deogyusan, on bark (*Quercus*) on *Phaeophyscia adiastrata* thalli. Lat.: 35° 51' 30.2" N; Long.: 127° 46' 02.4" E; Alt.: 1,500 m a.s.l. Coll.: Hur, J.-S., 03.04.2005 [KoLRI-003011 (050108)]. Mt Dutasan (Mt Bakjisan) (Gangwon-do, Pyeongchang-gun, Jinbu-myeon), Suhang-ri, on rock, on *Phaeophyscia adiastrata* thalli. Lat.: 37° 34' 23.40" N; Long.: 128° 36' 13.98" E; Alt.: 989 m a.s.l. Coll.: Wang, X. Y., Jeon, H. S., Lei, Lü, Ryu, J. A., 27.05.2010 [KoLRI-012467 (100768)]. Mt Eungboksan (Gangwon-do, Hongcheon-gun, Nae-myeon), on bark, on *Phaeophyscia exornatula* thalli. Lat.: 37° 51' 46.32" N; Long.: 128° 33' 31.68" E; Alt.: 866 m a.s.l. Coll.: Y. Joshi, Wang, X. Y., Ryu, J. A., 23.05.2009 [KoLRI-010412 (090741)]; same locality, Tongbaram Valley, on rock, on *Phaeophyscia adiastrata* thalli. Lat.: 37° 51' 21.54" N; Long.: 128° 30' 58.44" E; Alt.: 1,192 m a.s.l. Coll.: Joshi, Y., Wang, X. Y., Ryu, J. A., 23.05.2009 [KoLRI-010333 (090667)]; same locality, Tongbaram Valley, on bark of *Quercus*, on thallus of *Phaeophyscia* sp., growing together with *Myelochroa leucotylica*. Lat.: 37° 51' 41.52" N; Long.: 128° 31' 31.32" E; Alt.: ca 706 m a.s.l. [KoLRI-010402 (090731)]. Galjeongokbong (Gangwon-do, Yangyang-gun, Seo-myeon), on bark, on *Phaeophyscia orbicularis* thalli. Lat.: 37° 52' 47.76" N; Long.: 128° 31' 02.40" E; Alt.: 1,020 m a.s.l. Coll.: Joshi, Y., Wang, X. Y., Ryu, J. A., 22.05.2009 [KoLRI-010214 (090518)]; same locality, on bark, on *Phaeophyscia exornatula* thalli. Lat.: 37° 52' 57.12" N; Long.: 128° 30' 09.66" E; Alt.: 1,104 m a.s.l. Coll.: Joshi, Y., Wang, X. Y., Ryu, J. A., 22.05.2009 [KoLRI-010246 (090561)]. Mt Gariwangsan, on bark, on *Phaeophyscia adiastrata* thalli. Lat.: 37° 25' 01.4" N; 128° 32' 46.6" E; Alt.: 500 m a.s.l. Coll.: Hur, J.-S., 10.05.2008 [KoLRI-008244 (080002)]. Geomun-do Island, Yeosu, on rock, on *Phaeophyscia exornatula* thalli. Lat.: 34° 00' 34.0" N; Long.: 127° 19' 11.6" E; Alt.: 54 m a.s.l. Coll.: Hur, J.-S., 24.03.2007 [KoLRI-007135 (070148)]. Mt Geumwonsan (Gyeongsangnam-do, Geochang-gun, Wicheon-myeon), on bark, on *Phaeophyscia adiastrata* thalli. Lat.: 37° 43' 38.64" N; Long.: 127° 45' 49.26" E; Alt.: 351 m a.s.l. Coll.: Wang, X. Y., Jeon, H. S., Han, G. S., 25.06.2010 [KoLRI-012142 (100552)]; same locality, on *Acer* bark, on *Phaeophyscia adiastrata* thalli [KoLRI-012145 (100555)]. Mt Hwangbyeongsan,

on bark, on *Phaeophyscia adiastrata* thalli. Lat.: 37° 44' 28.56" N; Long.: 128° 37' 18.90" E; Alt.: 772 m a.s.l. Coll.: Hur, J.-S., 14.07.2008 [KoLRI-008662 (080415)]; same locality, on bark, on *Phaeophyscia exornatula* thalli. Lat.: 37° 44' 31.80" N; Long.: 128° 37' 19.14" E; Alt.: 776 m a.s.l. Coll.: Hur, J.-S., 14.07.2008 [KoLRI-008703 (080464)]. Mt Joryeongsan (Chungcheongbuk-do), Sinseonbong, on *Quercus* bark, on *Phaeophyscia exornatula* thalli. Lat.: 36° 48' 55.1" N; Long.: 128° 02' 53.5" E; Alt.: 630 (720) m a.s.l. Coll.: Hur, J.-S., 27.10.2006 [KoLRI-05412 (061028)]. Korea National Arboretum (Gyeonggi-do, Pocheon-si, Soheul-eup), on *Juniperus* bark, on *Phaeophyscia adiastrata* thalli. Lat.: 37° 45' 33.00" N; Long.: 127° 10' 15.18" E; Alt.: 114 m a.s.l. Coll.: Wang, X. Y., Joshi, Y., Han, J. H., 25.09.2010 [KoLRI-012584 (100950)]. Mt Maebong (Gangwon-do, Buksan-myeon, Chuncheon-si) Jogyo-ri, on *Quercus* bark, on *Phaeophyscia limbata* thalli. Lat.: 37° 54' 38.28" N; Long.: 127° 58' 54.48" E; Alt.: 610 m a.s.l. Coll.: Wang, X. Y., Jeon, H. S., Lei, Lü, Ryu, J. A., 26.05.2010 [KoLRI-012322 (100566)]; same locality, on *Quercus* bark, on *Phaeophyscia imbricata* thalli. Lat.: 37° 54' 41.88" N; Long.: 127° 58' 59.52" E; Alt.: 617 m a.s.l. [KoLRI-012347 (100598)]. Mt Odaesan, on bark, on *Phaeophyscia limbata* thalli. Lat.: 37° 45' 48.5" N; 128° 36' 407" E; Alt.: 998 m a.s.l. Coll.: Hur, J.-S., 15.07.2008 [KoLRI-008723 (080485)]. Mt Sambong (Gangwon-do, Samcheok-si, Hajang-myeon), on *Quercus* bark, on *Phaeophyscia adiastrata* thalli. Lat.: 37° 18' 18.36" N; Long.: 128° 56' 22.08" E; Alt.: 930 m a.s.l. Coll.: Joshi, Y., Wang, X. Y., Ryu, J. A., Hur, J. Y., 15.05.2009 [KoLRI-010074 (090348)]; same locality, on *Quercus* bark, on *Phaeophyscia adiastrata* thalli [KoLRI-010081 (090359)]. Mt Seokbyeongsan, on bark, on *Phaeophyscia adiastrata* thalli. Lat.: 37° 34' 17.46" N; Long.: 128° 51' 22.32" E; Alt.: 774 m a.s.l. Coll.: Hur, J.-S., 24.05.2008 [KoLRI-008448 (080202)]. Mt Seondalsan (Gyeongsangbuk-do, Bonghwa), on bark, on *Phaeophyscia adiastrata* thalli. Lat.: 37° 01' 11.40" N; Long.: 128° 42' 04.74" E; Alt.: 598 m a.s.l. Coll.: Hur, J.-S., 24.04.2007 [KoLRI-007207 (070226)]. Mt Soraksan (Gangwon-do, Yangyang-gun), Heulringol valley, on *Acer* bark, on *Phaeophyscia adiastrata* thalli. Lat.: 38° 05' 16.20" N; Long.: 128° 25' 7.86" E; Alt.: 798 m a.s.l. Coll.: Joshi, Y., Wang, X. Y., Ryu, J. A., 25.05.2009 [KoLRI-010591 (090919)]; Mt Soraksan (Gangwon-do, Shokcho-si, Sorak-dong), on bark, on *Phaeophyscia exornatula* thalli. Lat.: 38° 09' 21.18" N; Long.: 128° 27' 02.46" E; Alt.: 910 m a.s.l. Coll.: Hur, J.-S., 17.06.2005 [KoLRI-003193 (050289)]. Taebaek Mts, on bark, on *Phaeophyscia* cf. *spinulosa* thalli. Lat.: 36° 44' 42.5" N; Long.: 128° 15' 54.59" E; Alt.: 1,062 m a.s.l. Coll.: Hur, J.-S., 18.06.2007 [KoLRI-007665 (070831)]. Mt Woraksan, on bark, on *Phaeophyscia exornatula* thalli. Lat.: 36° 51' 21.96" N; Long.: 128° 05' 16.44" E; Alt.: 245 m a.s.l. Coll.: Hur, J.-S., 18.09.2004 [KoLRI-001953 (041162)]. – New to Korea.

**Thelotrema nipponicum* Tat. Matsumoto – Republic of Korea: Cheju-do Island, Seogwiposi, Mt Hallasan, Hallasan National Park, Donnaeko trail, on bark. Lat.: 33° 19' 16.03" N; Long.: 126° 33' 36.03" E; Alt.: 738 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Tian, F. H., Hur, J.-S., 20.06.2012 [KoLRI-016282 (121240), KoLRI-016287 (121245), KoLRI-016291 (121254)]; same locality, on bark. Alt.: 1,200 m a.s.l. [KoLRI-016318 (121283), KoLRI-016319 (121284), KoLRI-016320 (121285)]. – New to Korea.

**Toninia aromatica* (Turner) A. Massl. – Republic of Korea: Cheju-do Island, Sinchang-ri (Cheju-si, Hangyeong-myeon), around Singaemul Park nearby coast, on rock, growing together with *Caloplaca pelodella* and *C. diffluens*. Lat.: 33° 20' 31.91" N; Long.: 126° 10' 13.00" E; Alt.: 2 m a.s.l. Coll.: Kondratyuk, S. Y., Lököš, L., Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Hur, J.-S., 06.07.2012 [KoLRI-016605 (121559)]. – New to Korea.

**Topeliopsis* aff. *azorica* (P. James et Purvis) Coppins et Aptroot – Republic of Korea: Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Arail-dong, along Gwaneumsa Temple trail, along the tourist path, on bark of *Acer* trees, growing together with *Brigantiaea ferruginea*. Lat.: 33° 23' 32.2" N; Long.: 126° 32' 16.0" E; Alt.: 1,128 m a.s.l. Coll.: Kondratyuk, S. Y. (212779), Oh, S.-O., Kusama, Y., 08.08.2012 [KoLRI-000000 (000000), KoLRI-000000

(000000)]. – New to Korea.

Description of this species is provided in paper of Mangold *et al.* (2009): 409. In Australia this species found on siliceous rocks, while collection from the Azores are from soft bark and has slightly raised and inconspicuous apothecia that are partly more or less concolorous with the thallus. Our collection similarly to the Azores collection is from soft bark of *Acer* sp. tree. From descriptions and discussion provided for this species in the latest literature (Lumbsch *et al.* 2010, Mangold *et al.* 2009) we may conclude that our collection from Mt Hallasan is rather young specimens while mature muriform, which are hyaline, non-amyloid $100\text{--}160 \times 30\text{--}45\text{--}(50) \mu\text{m}$ present.

It can be keyed to *T. macrocarpa* (C. W. Dodge) Mangold et Lumbsch, after growing over bryophytes and ascospore length (Lumbsch *et al.* 2010). However, our specimens differ from *Topeliopsis macrocarpa* (C. W. Dodge) Mangold et Lumbsch, knowing so far only from the Southern Hemisphere (South America and New Zealand), in lack so well developed thallus (and not being pale grey), and lack of chemical reactions with K and PD (thallus K+ yellow and PD+ orange in *T. macrocarpa*) (or in different chemistry, stictic, cryptostictic and peristictic acids). After ascospores measurements these two species are very similar: $70\text{--}160 \times 15\text{--}45 \mu\text{m}$ in *T. azorica* (after Mangold *et al.* 2009) and $70\text{--}150 \times 26\text{--}45 \mu\text{m}$ in *T. macrocarpa* (after Lumbsch *et al.* 2010).

Trapelia coarctata (Turner ex Sm.) M. Choisy – Republic of Korea: Cheju-do Island, Seogwipo-si, Mt Hallasan, Hallasan National Park, Donnaeko trail, on rock. Lat.: 33° 19' 05.00" N; Long.: 126° 34' 10.06" E; Alt.: 646 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Tian, F. H., Hur, J.-S., 20.06.2012 [KoLRI-016268 (121232)]. – Rarely recorded from Korea species (Joshi *et al.* 2013).

****Trypethelium indutum*** Stirt. – Republic of Korea: Cheju-do Island, Seogwipo-si, Mt Hallasan, Hallasan National Park, Donnaeko trail, on bark. Lat.: 33° 19' 16.03" N; Long.: 126° 33' 36.03" E; Alt.: 738 m a.s.l. Coll.: Oh, S.-O., Jayalal, U., Joshi, S., Park, J. S., Tian, F. H., Hur, J.-S., 20.06.2012 [KoLRI-016292 (121255)]; Cheju-do Island, Cheju-si, Mt Hallasan, Hallasan National Park, Seongpanak trail, on bark. Lat.: 33° 22' 51.64" N; Long.: 126° 35' 46.33" E; Alt.: 950 m a.s.l. Coll.: Kondratyuk, S. Y. (212659), Lőkös, L., Oh., S.-O., Joshi, S., 06.07.2012 [KoLRI-016844 (121865)]. – New genus for Korea.

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Fig. 1. *Absconditella baegasanensis*, general habit (holotype). Scale 500 µm (photo: E. Farkas)

Fig. 2. *Absconditella baegasanensis*, enlarged apothecia (holotype). Scale 200 µm (photo: E. Farkas)

Fig. 3. *Caloplaca dzhankoiensis*, general habit (holotype). Scale 1 mm (photo: S. Kondratyuk)

Fig. 4. *Caloplaca dzhankoiensis*, enlarged peripheral zone of the thallus (holotype). Scale 1 mm (photo: S. Kondratyuk)

Fig. 5. *Caloplaca hallasanensis*, enlarged peripheral zone of the thallus (holotype). Scale 1 mm (photo: S. Kondratyuk)

Fig. 6. *Caloplaca hallasanensis*, enlarged blastidious mass in the centre of thallus (holotype). Scale 1 mm (photo: S. Kondratyuk)

- Fig. 7. *Caloplaca subconcilians*, general habit (holotype). Scale 2 mm (photo: S. Kondratyuk)
- Fig. 8. *Caloplaca subconcilians*, enlarged thalline areoles and apothecia (holotype). Scale 1 mm (photo: S. Kondratyuk)
- Fig. 9. *Fellhanera chejuensis*, general habit (holotype). Scale 0.5 mm (photo: E. Farkas)
- Fig. 10. *Fellhanera maritima*, enlarged portion of thallus with apothecia (holotype). Scale 0.5 mm (photo: S. Kondratyuk)
- Fig. 11. *Fellhanera maritima*, enlarged portion of thallus with conidiomata (holotype). Scale 0.5 mm (photo: S. Kondratyuk)
- Fig. 12. *Lecania coreana*, general habit (holotype). Scale 0.5 mm (photo: S. Kondratyuk)
- Fig. 13. *Lecania rinodinoides*, general habit (holotype). Scale 0.5 mm (photo: S. Kondratyuk)
- Fig. 14. *Lichenostigma heterodermiae*, enlarged portion of host thallus of *Heterodermia diademata* with mycelium of lichenicolous fungus (KoLRI-007633). Scale 1 mm (photo: S. Kondratyuk)
- Fig. 15. *Lichenostigma heterodermiae*, enlarged portion of host thallus of *Heterodermia japonica* with mycelium of lichenicolous fungus (KoLRI-012520). Scale 1 mm (photo: S. Kondratyuk)
- Fig. 16. *Micarea coreana*, general habit (holotype). Scale 0.5 mm (photo: S. Kondratyuk)
- Fig. 17. *Protoparmeliopsis chejuensis*, general habit (holotype). Scale 1 mm (photo: S. Kondratyuk)
- Fig. 18. *Protoparmeliopsis pseudogyrophoricum*, general habit (holotype). Scale 1 mm (photo: S. Kondratyuk)
- Fig. 19. *Protoparmeliopsis taranii*, general habit (holotype). Scale 1 mm (photo: S. Kondratyuk)
- Fig. 20. *Protoparmeliopsis taranii*, enlarged marginal thalline lobes (holotype). Scale 1 mm (photo: S. Kondratyuk)
- Fig. 21. *Protoparmeliopsis taranii*, enlarged apothecia (holotype). Scale 1 mm (photo: S. Kondratyuk)
- Fig. 22. *Roselliniopsis phaeophysciae*, general habit (holotype). Scale 1 mm (photo: S. Kondratyuk)
- Fig. 23. *Roselliniopsis phaeophysciae*, enlarged portion of host thallus with conidiomata of lichenicolous fungus (holotype). Scale 1 mm (photo: S. Kondratyuk)
- Fig. 24. *Seiophora blumii*, secondary thalline lobes and terminal portions from upper surface (M. Haji Moniri s.n., KW-L). Scale 1 mm (photo: S. Kondratyuk)
- Fig. 25. *Seiophora blumii*, secondary thalline lobes and terminal portions from underside (Iran). Scale 1 mm (photo: S. Kondratyuk)
- Fig. 26. *Seiophora blumii*, enlarged terminal portions from upper surface (M. Haji Moniri s.n., KW-L). Scale 1 mm (photo: S. Kondratyuk)
- Fig. 27. *Seiophora blumii*, enlarged terminal portions from underside (M. Haji Moniri s.n., KW-L). Scale 1 mm (photo: S. Kondratyuk)
- Fig. 28. *Topelia jasonhurii*, general habit (holotype). Scale 100 μ m (A) and 10 μ m (B) (drawn by E. Farkas)
- Fig. 29. *Topelia jasonhurii*, section of ascomata (holotype). Scale 200 μ m (photo: E. Farkas)
- Fig. 30. *Topelia jasonhurii*, enlarged ascospores and paraphyses (holotype). Scale 20 μ m (photo: E. Farkas)
- Fig. 31. *Amandinea melanoxanthea*, general habit. Scale 0.5 mm (photo: S. Kondratyuk)
- Fig. 32. *Biatora globulosa*, general habit. Scale 2 mm (photo: S. Kondratyuk)
- Fig. 33. *Biatora longispora*, general habit. Scale 2 mm (photo: S. Kondratyuk)
- Fig. 34. *Biatora longispora*, enlarged portion with apothecia. Scale 1 mm (photo: S. Kondratyuk)
- Fig. 35. *Biatora longispora*, enlarged portion with soralia. Scale 1 mm (photo: S. Kondratyuk)
- Fig. 36. *Caloplaca oxneri*, enlarged portion of thallus with isidia (090069 KoLRI). Scale 1 mm (photo: S. Kondratyuk)
- Fig. 37. *Candelariella reflexa*, general habit. Scale 2 mm (photo: S. Kondratyuk)
- Fig. 38. *Coenogonium luteum*, general habit. Scale 2 mm (photo: S. Kondratyuk)
- Fig. 39. *Hyperphyscia adglutinata*, general habit. Scale 2 mm (photo: S. Kondratyuk)
- Fig. 40. *Lopadium coralloideum*, enlarged portion of thallus with isidia [KoLRI-005350 (060966)]. Scale 1 mm (photo: S. Kondratyuk)
- Fig. 41. *Lopadium coralloideum*, enlarged portion of thallus with apothecia [KoLRI-005350 (060966)]. Scale 1 mm (photo: S. Kondratyuk)
- Fig. 42. *Menegazzia subsimilis*, enlarged portion with soralia (030839 KoLRI). Scale 1 mm (photo: S. Kondratyuk)
- Fig. 43. *Parmelia subdivaricata*, general habit of terminal lobes [KoLRI-009833 (090069)]. Scale 2 mm (photo: S. Kondratyuk)
- Fig. 44. *Parmelia subdivaricata*, enlarged portion with apothecium [KoLRI-009833 (090069)]. Scale 1 mm (photo: S. Kondratyuk)