

Three New Monotypic Genera of the Caloplacoid Lichens (Teloschistaceae, Lichen-Forming Ascomycetes)

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Abstract Three monophyletic branches are strongly supported in a phylogenetic analysis of the Teloschistaceae based on combined data sets of internal transcribed spacer and large subunit nrDNA and 12S small subunit mtDNA sequences. These are described as new monotypic genera: *Jasonhuria* S. Y. Kondr., L. Lőkös et S. -O. Oh, *Loekoesia* S. Y. Kondr., S. -O. Oh et J. -S. Hur and *Olegblumia* S. Y. Kondr., L. Lőkös et J. -S. Hur. Three new combinations for the type species of these genera are proposed.

Keywords Caloplacoideae, *Gyalolechia*, *Jasonhuria*, *Loekoesia*, *Olegblumia*, *Pyrenodesmia*

The taxonomy of the Teloschistaceae has developed rapidly since 2012. A large number of new genera, based on molecular phylogeny investigations, have been proposed [1-7]. The number of genera in the Teloschistaceae increased from 10 in Kärnefelt [8] to 29 [1] and to presently 67 [5-7, 9, 10]. The family is divided in three, Caloplacoideae, Teloschistoideae, and Xanthorioideae [3, 11] or four subfamilies [12].

Three new, monotypic genera were discovered within this study and are described below: *Jasonhuria* for the Eastern Asian *Caloplaca bogilana*; *Loekoesia* for the South Korean *Caloplaca austrocoreana*; and *Olegblumia* for the European and North American *Caloplaca demissa*.

MATERIALS AND METHODS

Specimens were examined using standard microscopical techniques, i.e., hand-sectioned under a Nikon SMZ-645 dissecting microscope (Nikon Corp., Tokyo, Japan), sections were observed under a Nikon E-200 and Olympus BX-51 microscope (Olympus, Tokyo, Japan). Spot test reactions were performed on thalli. Chemicals were extracted in analytical grade acetone in a 1-mL Eppendorf tube. Thin layer chromatography (TLC) was performed using a glass plate coated with TLC Silica gel 60, in solvent system A (toluene : dioxin : acetic acid = 180 : 45 : 5) [13].

Total DNA was extracted directly from the thalli according to Ekman [14] and was purified with DNeasy Plant Mini Kit (Qiagen, Hilden, Germany). The nuclear ribosomal RNA gene region including the internal transcribed spacers 1 and 2 and the 5.8S subunit (ITS) was amplified using the primers ITS1F [15] and ITS4 [16], the 28S large subunit (LSU) using the primer LR5 [17], and the 12S mtSSU using the primers mtSSU1-mtSSU3R and mtSSU2R [2, 18].

The amplification was done using a Takara JP/TP600 PCR machine (Takara Bio Inc., Tokyo, Japan). One initial cycle of 5 min at 94°C was followed by 30 cycles of the following steps: 30 sec at 94°C, 39 sec at 57°C, and 1 min at 72°C. Amplifications were ended with a final cycle at 72°C for 10 min. PCR products were then sent to the sequencing facilities of the Genotech Co. (Seoul, Korea) for cleaning and sequencing. The sequencing was carried out using the

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Table 1. Specimen vouchers used in the phylogenetic analysis with GenBank numbers

Species name	Voucher details/References	ITS	LSU	mt DNA
<i>Brigantiaea ferruginea</i>	SK779, Kondratyuk <i>et al.</i> (2013) [5]	KF264622	-	KF264684
<i>Brigantiaea ferruginea</i>	SK780, Kondratyuk <i>et al.</i> (2013) [5]	KF264623	-	KF264685
<i>Blastenia crenularia</i>	Gaya <i>et al.</i> (2012) [3]	JQ301711	-	JQ301489
<i>Blastenia ferruginea</i>	-	KC179416	KC179163	KC179493
<i>Blastenia subochracea</i>	Arup <i>et al.</i> (2013) [1]	KC179418	-	-
<i>Bryoplaca jungermanniae</i>	Arup <i>et al.</i> (2013) [1]	KC179420	-	-
<i>Bryoplaca sinapisperma</i>	Arup <i>et al.</i> (2013) [1]	KC179421	-	KC179495
<i>Bryoplaca tetraspora</i>	Arup <i>et al.</i> (2013) [1]	KC179422	-	-
<i>Caloplaca cerina</i>	FNM185, Fedorenko <i>et al.</i> (2009, 2012) [2, 18]	EU681284	-	EU680863
<i>Caloplaca cerina</i>	Gaya <i>et al.</i> (2012) [3]	-	JQ301549	-
<i>Caloplaca pelodella</i>	SK714, Kondratyuk <i>et al.</i> (2013) [5]	KF264629	-	KF264689
' <i>Caloplaca</i> ' <i>furax</i>	-	HQ644341	-	-
' <i>Caloplaca</i> ' <i>furax</i>	Gaya <i>et al.</i> (2012) [3]	JQ301622	-	-
' <i>Caloplaca</i> ' <i>phaeothamnos</i>	-	JN813419	-	-
<i>Caloplaca stillicidiorum</i>	Gaya <i>et al.</i> (2008) [19]	EU639607	-	-
<i>Caloplaca thracopontica</i>	-	HM538525	-	-
<i>Eilifdahlia dahlii</i>	SK956, Kondratyuk <i>et al.</i> (2014) [6]	KJ021221	KJ021252	KJ021277
<i>Eilifdahlia dahlii</i>	SK959, Kondratyuk <i>et al.</i> (2014) [6]	KJ021318	KJ021253	KJ021279
<i>Eilifdahlia wirthii</i>	SK262, Kondratyuk <i>et al.</i> (2014) [6]	KJ021319	KJ021254	KJ021280
<i>Elenkiniana ehrenbergii</i>	Søchting and Figueras (2007) [20]	DQ888715	-	-
<i>Elenkiniana gloriae</i>	SK750, Kondratyuk <i>et al.</i> (2014) [6]	KJ021323	-	-
<i>Elenkiniana gloriae</i>	SK611, Kondratyuk <i>et al.</i> (2014) [6]	KJ021321	KJ021256	KJ021282
<i>Elenkiniana gloriae</i>	SK613, Kondratyuk <i>et al.</i> (2014) [6]	KJ021322	-	KJ021283
<i>Franwilsia bastowii</i>	SK810, Kondratyuk <i>et al.</i> (2014) [6]	KJ021324	KJ021257	KJ021284
<i>Franwilsia kilcundaensis</i>	SK920, Kondratyuk <i>et al.</i> (2014) [6]	KJ021326	KJ021259	KJ021286
<i>Franwilsia renatae</i>	SK235, Kondratyuk <i>et al.</i> (2014) [6]	KJ021329	-	KJ021289
<i>Fulgensia cranfieldii</i>	SK983, Kondratyuk <i>et al.</i> (2014) [6]	KJ021333	KJ021262	KJ021292
<i>Fulgensia fulgens</i>	SK735, Kondratyuk <i>et al.</i> (2014) [6]	KJ021335	-	KJ021295
<i>Fulgensia poeltii</i>	Gaya <i>et al.</i> (2008) [19]	EU639586	-	-
<i>Fulgogasparrea decipioides</i>	SK689, Kondratyuk <i>et al.</i> (2013) [5]	KF264644	-	KF264695
<i>Gyalolechia aurea</i>	Arup <i>et al.</i> (2013) [1]	KC179434	KC179196	KC179530
<i>Gyalolechia canariensis</i>	Gaya <i>et al.</i> (2008) [19]	EU639587	-	-
<i>Gyalolechia canariensis</i>	SK583, Kondratyuk <i>et al.</i> (2014) [6]	KJ021332	-	-
<i>Huneckia pollinii</i>	SK3206, Kondratyuk <i>et al.</i> (2014) [6]	KJ021336	KJ021265	KJ021296
<i>Huneckia pollinii</i>	SK870, Kondratyuk <i>et al.</i> (2014) [6]	KJ021337	KJ021266	KJ021297
<i>Huneckia rheinigera</i>	SK3204, Kondratyuk <i>et al.</i> (2014) [6]	KJ021222	-	-
<i>Ioplaca pindarensis</i>	Gaya <i>et al.</i> (2012) [3]	JQ301672	-	-
<i>Jasonhuria bogilana</i>	KoLRI 120454, South Korea: Jeollanam-do, Yeosu-si, Nam-myeon, Geumohdo, Usil coast side road, 34°30'40.01" N, 127°46'38.07" E, 1 m alt., on rock U Jayalal, JS Park, JA Ryu (120454), 26 Apr 2012, KoLRI 015444	KT220196	KT220205	KT220214
<i>Jasonhuria bogilana</i>	KoLRI 120469, South Korea: Jeollanam-do, Goheung-gun, Geum-san-myeon, Eojeon-ri, Geumohdo, Simpo coast, 34°26'16.09" N, 127°07'15.04" E, 20 m alt., on rock, U Jayalal, JS Park, and JA Ryu (120469), 27 Apr 2012, KoLRI 015459	KT220197	KT220206	KT220215
<i>Jasonhuria bogilana</i>	KoLRI 120641, South Korea: Jeollanam-do, Yeosu-si, Hwayang-myeon, Imok-ri, Baelga coast, 34°39'00.04" N, 127°34'04.07" E, 12 m alt., on rock, U Jayalal, JS Park, and JA Ryu (120641), 28 Apr 2012, KoLRI 015635	KT220198	KT220207	KT220216
<i>Jasonhuria bogilana</i>	KoLRI 120647, the same locality, U Jayalal, JS Park, and JA Ryu (120647), 28 Apr 2012, KoLRI 015642	KT220199	KT220208	KT220217
<i>Josefpoeltia soresdiosa</i>	SK991, Kondratyuk <i>et al.</i> (2013) [5]	KF264645	KF264673	KF264696
<i>Kaernefia kaernefeltii</i>	SK921, Kondratyuk <i>et al.</i> (2013) [5]	KF264652	KF264680	KF264703
<i>Leproplaca obliterans</i>	Arup <i>et al.</i> (2013) [1]	KC179449	KC179207	-
<i>Leproplaca xantholyta</i>	Arup <i>et al.</i> (2013) [1]	KC179451	KC179208	KC179542
<i>Leproplaca xantholyta</i>	Gaya <i>et al.</i> (2012) [3]	JQ301670	JQ301565	-

Table 1. Continued

Species name	Voucher details/References	ITS	LSU	mt DNA
<i>Loekoesia austrocoreana</i>	KoLRI 120511, South Korea: Jeollanam-do, Yeosu-si, Nam-myeon, Yusong-ri, Geu-mohdo, on rock, 34°31'55.03" N, 127°45'55.05" E, alt. 11 m a.s.l. Coll., U Jayalal, JS Park, and JA Ryu (120511), 27 Apr 2012, KoLRI 015502-isotype	KT220200	KT220209	KT220218
<i>Loekoesia austrocoreana</i>	KoLRI 120523, the same locality (120523), KoLRI 015515-isotype	KT220201	KT220210	KT220219
<i>Loekoesia austrocoreana</i>	SK261, KoLRI 120525-1, the same locality (120525-1), KoLRI 015507-isotype	KT220202	KT220211	KT220220
<i>Marchantiana maulensis</i>	SK994, Kondratyuk <i>et al.</i> (2014) [6]	KJ023182	KJ023184	-
<i>Marchantiana occidentalis</i>	SK981, Kondratyuk <i>et al.</i> (2014) [6]	KJ021227	KJ021268	KJ021303
<i>Marchantiana occidentalis</i>	SK982, Kondratyuk <i>et al.</i> (2014) [6]	KJ021228	KJ021269	KJ021304
<i>Mikhtomia gordejvii</i>	SK80515, Kondratyuk <i>et al.</i> (2014) [6]	KJ021231	-	KJ021307
<i>Mikhtomia gordejvii</i>	SK80646, Kondratyuk <i>et al.</i> (2014) [6]	KJ021232	-	KJ021308
<i>Mikhtomia oxnerii</i>	SK90117, Kondratyuk <i>et al.</i> (2014) [6]	KJ021233	-	KJ021311
<i>Mikhtomia oxnerii</i>	SK90755, Kondratyuk <i>et al.</i> (2014) [6]	KJ021234	-	KJ021312
<i>Oleghlumia demissa</i>	SK C65, Ukraine: Mykolaiv oblast, Arbusynka district, right bank of Pivdenny Buh River, lower of Konstantinovka village, about 3~5 km lower along the river from Yuzhnoukrainsk town, near stone rapids on river, SE vertical surfaces of granite outcrops, at the plots 22, 23 and 24, 47°48'23" N, 31°10'10.6" E, alt. ca 18 m a.s.l., Coll., SY Kondratyuk (20311), NM Fedorenko, 17 May 2003 (KW-L 70478)	KT220203	KT220212	KT220221
<i>Oleghlumia demissa</i>	Arup and Grube (1999) [21]	AF353960	-	-
<i>Oleghlumia demissa</i>	Arup <i>et al.</i> (2013) [1]	-	KC179172	KC179505
<i>Oleghlumia demissa</i>	Arup and Grube (1999) [21]	AF353962	-	-
<i>Oleghlumia demissa</i>	Arup and Grube (1999) [21]	AF353961	-	-
<i>Oxneria alfredii</i>	FNM 152, Fedorenko <i>et al.</i> (2009) [18]	FNM 152	-	-
<i>Pyrenodesmia alociza</i>	SK747, Kondratyuk <i>et al.</i> (2014) [6]	KJ021239	-	KJ021313
<i>Pyrenodesmia teicholyta</i>	Vondrák <i>et al.</i> (2012) [22]	JN641791	-	-
<i>Pyrenodesmia teicholyta</i>	Arup <i>et al.</i> (2013) [1]	-	KC179176	-
<i>Pyrenodesmia variabilis</i>	Gaya <i>et al.</i> (2003) [23]	AY233224	-	-
<i>Rufoplaca scotoplaca</i>	Arup <i>et al.</i> (2013) [1]	KC179457	KC179235	KC179573
<i>Rufoplaca tristiuscula</i>	Arup <i>et al.</i> (2013) [1]	KC179460	KC179237	KC179575
<i>Seiophora californica</i>	Arup <i>et al.</i> (2013) [1]	KC179643	-	-
<i>Seiophora lacunosa</i>	SK B07, Ukraine: AR Crimea, Arabatskaya strelka, on soil at the fortress, 200 m to NW, 10 Jun 2003, OY Khodosovsev (KW-L 70478 sub <i>Lichenonium xanthoriae</i>)	KT220204	KT220213	KT220222
<i>Seiophora villosa</i>	Martin and Winka (2000) [24]	AF098407	-	-
<i>Teloschistes flavicans</i>	FNM-139, Fedorenko <i>et al.</i> (2009, 2012) [2, 18]	EU681363	-	EU680955
<i>Teloschistes flavicans</i>	Arup <i>et al.</i> (2013) [1]	KC179317	KC179255	KC179594
<i>Usnochroma carphinea</i>	Arup <i>et al.</i> (2013) [1]	KC179468	KC179259	KC179598
<i>Usnochroma carphinea</i>	-	EU639595	-	-
<i>Usnochroma carphinea</i>	Gaya <i>et al.</i> (2012) [3]	-	JQ301548	-
<i>Usnochroma scoriophila</i>	Gaya <i>et al.</i> (2012) [3]	JQ301664	JQ301560	-
<i>Variospora alpigena</i>	Arup and Grube (1999) [21]	AF353956	-	-
<i>Variospora latzelii</i>	Vondrák <i>et al.</i> unpublished	JN813418	-	-
<i>Variospora velana</i>	Arup <i>et al.</i> (2013) [1]	KC179476	KC179265	KC179605
<i>Xanthocarpia ochracea</i>	SK637, Kondratyuk <i>et al.</i> (2014) [7]	KJ133483	-	-
<i>Xanthoria parietina</i>	FNM-177, Fedorenko <i>et al.</i> (2009, 2012) [2, 18]	EU681289	-	EU680868
<i>Xanthoria parietina</i>	Gaya <i>et al.</i> (2012) [3]	-	JQ301589	-
<i>Yoshimuria galbina</i>	SK704, Kondratyuk <i>et al.</i> (2014) [6]	-	-	KJ023197
<i>Yoshimuria cerussata</i>	SK768, Kondratyuk <i>et al.</i> (2014) [6]	KJ021248	-	-
<i>Yoshimuria spodoplaca</i>	SK725, Kondratyuk <i>et al.</i> (2014) [6]	KJ021249	-	KJ023194

fluorescent marker BigDye and an ABI 3730xl sequencing machine (Applied Biosystems, Carlsbad, CA, USA).

The consensus sequence was aligned with all related

species sequences retrieved from the GenBank database. The consensus sequences were then deposited into GenBank under the accession numbers KT220196~KT220222 (Table

1). Phylogenetic analysis was performed using the ITS region and LSU gene of nrDNA and 12S SSU mtDNA sequences of the treated fungi retrieved from the GenBank database and the 5 lichen-forming fungi investigated in this study. Sequence alignment was conducted in BioEdit and a phylogenetic tree was generated by the maximum parsimony, minimum evolution, and maximum likelihood analysis methods performed in MEGA 5.0 [25] with the number of bootstrap trials set to 1,000.

Altogether 27 sequences on nrDNA and mtDNA are submitted to GenBank.

RESULTS AND DISCUSSION

Description of taxa.

Jasonhuria S. Y. Kondr., L. Lőkös et S. -O. Oh, **gen. nov.**
Mycobank No. MB 812929.

Thallus saxicolous, crustose, grey to greyish white; cortex paraplectenchymatous. Apothecia biatorine to lecanorine; disc orange-brown to brownish red or rust-red; thalline margin concolorous with the thallus; proper margin black, true exciple paraplectenchymatous, outer region aeruginose pigmented. Conidia ellipsoid. Constituents: atranorin, gyrophoric and lecanoric acids (major compounds), parietin (traces).

Type species: *Jasonhuria bogilana* (Y. Joshi et Hur) S. Y. Kondr., L. Lőkös, J. Kim, A. S. Kondratiuk et S. -O. Oh.

Thallus saxicolous, crustose, areolate to cracked areolate, grey to greyish white. Cortex paraplectenchymatous, necral layer absent. Apothecia biatorine to lecanorine, adnate to sessile; disc orange-brown to brownish red to rust-red, plane to convex, epruinose; thalline margin concolorous with the thallus; proper margin black. Hymenium hyaline, hypothecium hyaline, without oil-droplets; true exciple paraplectenchymatous, outer region ± aeruginose pigmented. Paraphyses thin, with a few swollen cells at the top. Asci 8-spored, ascospores polarilocular, ellipsoid, ascospore septum of medium width. Pycnidia present, ostiole black. Conidia ellipsoid.

Chemistry: Thallus and medulla K+ yellow, C–, Pd–, UV–. Apothecial discs K+ red, C–, Pd–. Ostiolar tissue of pycnidia and aeruginose region of proper exciple K–. Constituents: atranorin, gyrophoric and lecanoric acids (major compounds), parietin (traces).

Ecology: Known from the coastal regions, where it grows abundantly on large siliceous boulders (rocks) both on subvertical and horizontal faces exposed to the sun along with *Caloplaca kobearia* (Nyl.) Zahlbr., *Buellia* spp., *Lecanora* spp., *Heterodermia diademata* (Taylor) D. D. Awasthi, *Physcia* spp., *Endocarpon petrolepideum* Ach., *Phylliscum* spp., *Aspicilia* spp., *Xanthoparmelia saxeti* (Stizenb.) Amo de Paz, A. Crespo, Elix et Lumbsch, *Xanthoparmelia* spp., *Ramalina* spp., *Verrucaria* spp.

Species diversity: *Jasonhuria* is presently a monophyletic genus; however, it is likely that additional species, occurring in Eastern Asia, will be described in the genus.

Distribution: The type species was originally found in Bogil Island, southern South Korea, but is now, in addition, known from numerous coastal, inland and island localities.

Etymology: The genus honours the South Korean lichenologist Prof. Jae-Seoun Hur (Suncheon, Korean Lichen Research Institute [KoLRI], South Korea), the founder of the KoLRI of Sunchon National University, to acknowledge his great contributions to the Korean lichen flora, his investigations of complete genomes of lichen-forming fungi including their practical application, Prof. Hur furthermore described the type species of the genus.

Taxonomic notes: The genus *Jasonhuria* is characterized by a crustose, cracked areolate to areolate, greyish thallus, reacting K+ yellow, a rust-red apothecial disc, a black proper margin, a grey thalline margin and maritime distribution, as well as atranorin, gyrophoric and lecanoric acids as major compounds.

Molecular data of *Caloplaca agrata* (Vain.) Zahlbr., *C. leptozona* (Nyl.) Zahlbr., *C. subleptozona* Y. Joshi et Upreti, *C. poliotera* (Nyl.) J. Steiner, and *C. subpoliotera* Y. Joshi et Upreti, supposed to be related with the type species are missing. Possibly some of them will become members of the new genus after future analyses.

Jasonhuria is similar to *Usnochroma* Søchting, Arup et Frödén in having gyrophoric acid, but differs in having a white or whitish grey colour of thallus (vs. pale yellow), in having anthraquinones in the thallus (vs. thallus without anthraquinones), and in the lack of usnic acid in the thallus.

Jasonhuria forms a weakly supported clade together with the genus *Loekoesia*, why we prefer to describe two monotypic genera (Fig. 1). Furthermore, preliminary analyses reveal several undescribed species in both genera, forming two strongly supported clades.

Loekoesia S. Y. Kondr., S. -O. Oh et J. -S. Hur, **gen. nov.**
Mycobank No. MB 812930.

Thallus crustose, entire to areolate; grey; soralia rounded, stipitate, aggregated in irregular groups, bright white; soredious mass bluish to whitish; soredia powdery. Hypothallus bluish black. Apothecia black, biatorine, true exciple paraplectenchymatous with well-developed matrix. Thallus K+ yellow, then greenish yellow, Pd+ slowly becoming pale yellow; probably contains atranorin and other compounds.

Type species: *Loekoesia austrocoreana* (S. Y. Kondr., L. Lőkös et J. -S. Hur) S. Y. Kondr., J. Kim, A. S. Kondratiuk, S. -O. Oh et J. -S. Hur.

Thallus crustose, entire to areolate; plumbeous or lead grey to greyish white with brighter white soralia, sometimes coalescing in places; soralia rounded, stipitate, often aggregated in irregular groups; soredious mass bluish or becoming whitish. Soredia powdery, bluish. Hypothallus bluish black. Apothecia black, biatorine; true exciple paraplectenchymatous with well-developed matrix; ascospores bipolar hyaline, elongated ellipsoid with rounded ends, ascospore septum

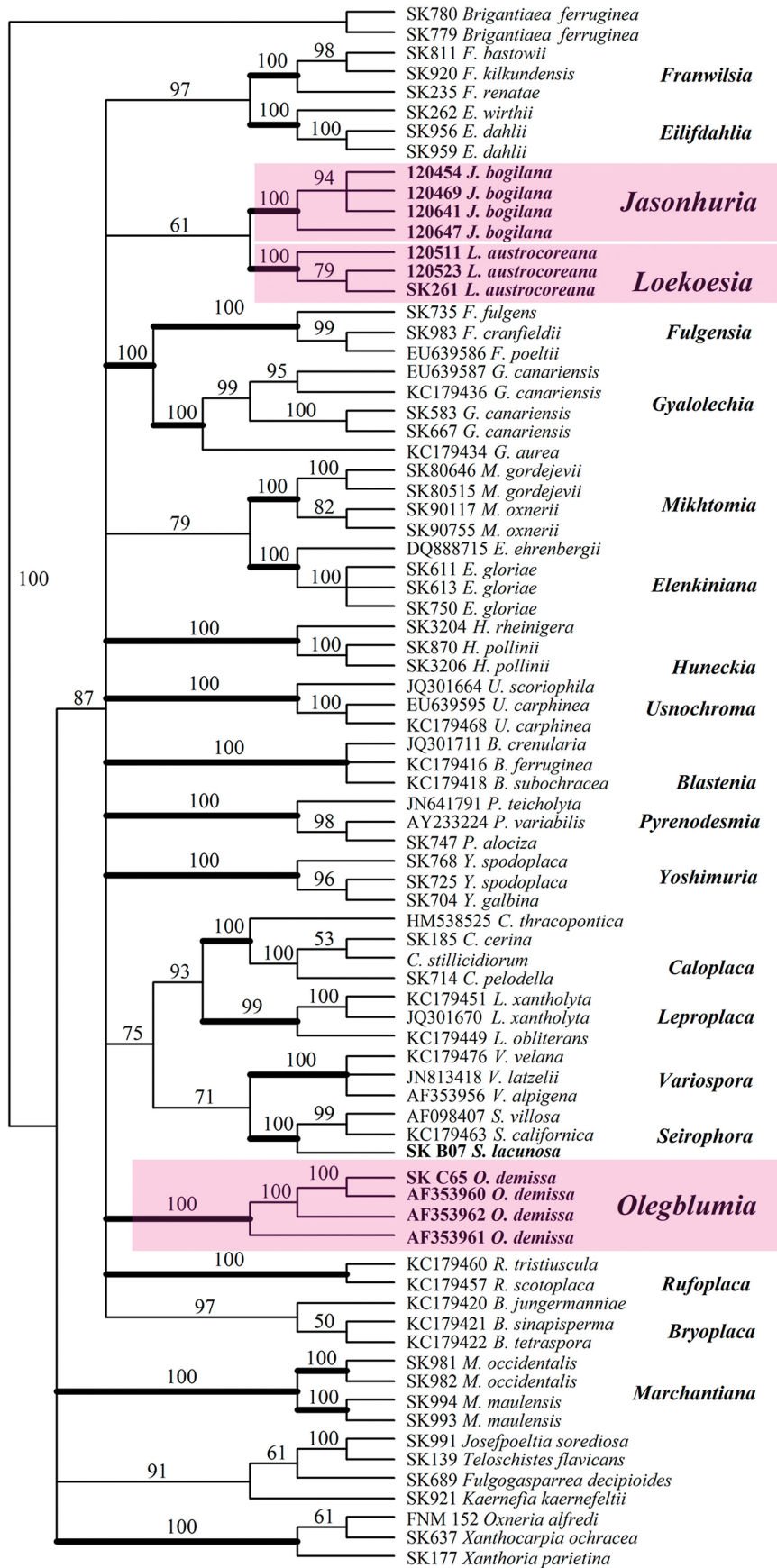


Fig. 1. Phylogenetic tree of the caloplacoid lichens based on combined data set.

of medium width.

Chemistry: Thallus K+ yellow, then greenish yellow; Pd+ slowly becoming pale yellow; epihymenium K+ purple and becoming lighter to/or hyaline or dull crimson; probably contains atranorin and other compounds.

Ecology: In coastal zone on rock surface growing together with *Pyxine endochrysin* Nyl., *Physcia adscendens* (Fr.) H. Olivier, *Caloplaca squamosa* (B. de Lesd.) Zahlbr. and species of the genera *Aspicilia*, *Myelochroa*, *Buellia*, *Dimelaena*, *Verrucaria*, and *Lecanora*.

Etymology: This new genus is named after the Hungarian lichenologist Dr László Lőkös (1959~) (Budapest, BP, Hungary), who contributed much to the knowledge of North and South Korean lichens.

Distribution: The new genus occurs in South Korea.

Taxonomic notes: *Loekoesia austrocoreana* is similar to *Caloplaca albovariegata* (B. de Lesd.) Wetmore, a western North American species growing on calcareous and non-calcareous rocks, having a blue-grey thallus, stipitate areoles, a thick irregular cortex with an epinecral layer, and clumps of algae forming a variegated surface. Thus, *Loekoesia austrocoreana* differs from *C. albovariegata* by a regular cortex, presence of a lower hymenium, shorter and narrower ascospores and wider ascospore septa, a distinctly bluish epihymenium and a bluish lateral true exciple and a K– reaction in the thalline cortex and the lateral outermost part of the true exciple, as well as in the lack of an epinecral layer and clumps of algae [4, 26–28].

A number of other members of the genus *Pyrenodesmia* A. Massal., i.e., *P. variabilis* (Pers.) A. Massal., '*Caloplaca*' *conversa* (Kremp.) Jatta, '*Caloplaca*' *atroalba* (Tuck.) Zahlbr., '*Caloplaca*' *peleophylla* (Tuck.) Zahlbr., differ from *Loekoesia austrocoreana* in having much wider ascospores and in the lack of soredia.

'*Caloplaca*' *oblongula* (H. Magn.) Wetmore differs from *Loekoesia austrocoreana* in having light purplish brown epihymenium, in having non-septate or one-septate, larger longer and wider ascospores ($15.5\text{--}21 \times 5.5\text{--}8.5 \mu\text{m}$ vs. $13\text{--}14 \times 5\text{--}6 \mu\text{m}$), with narrower septa ($0\text{--}1.5 \mu\text{m}$ vs. $4\text{--}6 \mu\text{m}$ wide), as well as in having a K+ purple apothecial margin [28].

The genus *Loekoesia* is similar to some representatives of the Australian genus *Marchantiana* S. Y. Kondr., Kärnefelt, Elix, A. Thell et J. -S. Hur of the Teloschistoideae, i.e., *M. kalbiorum* (S. Y. Kondr. et Kärnefelt) S. Y. Kondr., Kärnefelt, A. Thell, Elix, J. Kim, A. S. Kondratiuk et J. -S. Hur, but differs in its distribution and in its position in the subfamily Caloplacoideae after phylogenetic analysis based on combined set of ITS and LSU nrDNA and 12S small subunit (SSU) mtDNA sequences.

As mentioned earlier, *Loekoesia* forms a weakly supported clade together with the genus *Jasonhuria*. However, preliminary analyses show that hitherto undescribed species are to be described in both genera proposed here, forming two strongly supported clades, explaining why two new genera are described already.

Olegblumia S. Y. Kondr., L. Lőkös et J. -S. Hur, **gen. nov.**
Mycobank No. MB 812931.

Thallus lobate, distinctly rosette-like, upper surface brown to brownish grey; lobes flat to subconvex, very narrow; soralia laminal with convex, highly uplifted brownish soredious mass; soredia irregularly rounded, brown to brownish green; constituents: vicanicin and caloploicin.

Type species: *Olegblumia demissa* (Flot.) S. Y. Kondr., L. Lőkös, J. Kim, A. S. Kondratiuk, S. -O. Oh et J. -S. Hur.

Thallus lobate, distinctly rosette-like, 5–8 mm diam., often in large aggregations; upper surface brown, dark brown to greenish brown in peripheral portions and greyish brown or whitish greyish in the centre, thallus whitish pruinose, whitish grey to whitish brown or brownish grey, grey in shaded conditions. Lobes to 1–1.5 (~2) mm long, flat to subconvex, very narrow to 0.1–0.2 (~0.3) mm wide, towards the tips branched or divided into 2–3 (~4) secondary lobules almost the same width; total width of terminal portion of single lobe with all secondary lobules to (0.3~) 0.4–1 mm wide. Soralia mainly in the centre of thallus, laminal (in the middle of lobe), at first punctiform or regularly rounded to (0.1~) 0.2–0.3 mm diam., soon becoming elongated along the lobe, fissure-like, to 0.3–0.4 mm long/across, eroded portions with somewhat uplifted margins of cortical layer with convex, highly uplifted brownish soredious or soredious/isidious mass to confluent often whitish eroded-soredious mass in the centre. Soredia irregularly rounded, ca. (20~) 30–50 μm across, becoming isidious, brown to dark brown or brownish green well contrasting to light (white) medulla. Apothecia, conidiomata and conidia unknown.

Chemistry: Vicanicin and caloploicin.

Ecology: The single species of this genus grows on hard siliceous rocks, usually on vertical and inclined surfaces. It is often associated with *Aspicilia contorta* (Hoffm.) Körb., sometimes significantly damaged by parasites of the genus *Lichenostigma* Hafellner, *Lichenothelia scopularia* (Nyl.) D. Hawksw. [29], *Caloplaca aractina* (Fr.) Häydrén, *Lecanora* aff. *frustulosa* Stizenb., *Lecanora lithophila* Oxner, *Aspicilia* sp., *Physcia* sp., and *Candelariella vitellina* (Hoffm.) Müll. Arg.

Species diversity and distribution: The genus is monotypic, known from Europe and North America.

Etymology: The genus is named after the Ukrainian lichenologist Oleg Blum (1937~) (Kyiv, Ukraine), who made important contributions to lichen ecology of Eurasian lichens, as well as in the usage of lichens as bioindicators for anthropogenic pollution of the environment.

Taxonomic notes: This genus *Olegblumia* is easily distinguished from the other caloplacoid lichens by the brownish, soredious, lobate thallus, and the negative reaction with K.

According to morphological and chemical characters it is similar to the genera *Elenkiniana* S. Y. Kondr., Kärnefelt, Elix, A. Thell et J. -S. Hur, and *Leproplaca* (Nyl.) Hue of the subfamily Caloplacoideae, however, comparing with molecular

characters it is closely related only to *Usnochroma* or *Pyrenodesmia*.

The brownish lobate thallus, containing the depsidones vicanicin and caloploicin, shows similarity with some species of the genus *Elenkiniana*.

The lobate soredious thallus reminds of some species of the genus *Leproplaca*, particularly *L. cirrochroa* (Ach.) Th, Fr., but differs by its brownish thallus, compared with bright yellow to bright orange or reddish orange in *Leproplaca*. Further differences are the brownish soredious mass, not bright yellow, and the depsidones instead of anthraquinones of the parietin chemosyndrome in *Leproplaca*.

This new monotypic genus is known only as sterile and was earlier positioned in the Lecanoraceae, in the genera *Lecanora* and *Placolecnora* Räsänen, because of its general appearance. Molecular analyses finally confirmed its position in the Teloschistaceae [21] where *Olegblumia* appears as a sister group to the genus *Usnochroma*.

New combinations.

Jasonhuria bogilana (Y. Joshi et Hur) S. Y. Kondr., L. Lökös, J. Kim, A. S. Kondratiuk et S. -O. Oh, **comb. nov.**
Mycobank No. MB 812932.

Basionym: *Caloplaca bogilana* Y. Joshi et Hur, The Lichenologist 42: 716 (2010).

Type: South Korea, Jeonnam Prov., Wando Co., Bogil Island, 34°09'14.7" N, 126°37'33.2" E, alt. 5 m, on rock, 31 Dec 2004, JS Hur, 041679 (KoLRI 002475, holotype).

Loekoesia austrocoreana (S. Y. Kondr., L. Lökös et J. -S. Hur) S. Y. Kondr., J. Kim, A. S. Kondratiuk, S. -O. Oh et J. -S. Hur, **comb. nov.**

Mycobank No. 812934.

Basionym: *Caloplaca austrocoreana* S. Y. Kondr., L. Lökös et J.-S. Hur, in Kondratyuk *et al.*, Acta Bot. Hung. 55: 42 (2013).

Type: South Korea, Jeollanam-do, Yeosu-si, Nam-myeon, Yusong-ri, Geumohdo, on rock, 34°31'55.03" N, 127°45'55.05" E, alt. 11 m a.s.l. Coll., U Jayalal, JS Park, and JA Ryu (120513), 27 Apr 2012, KoLRI 015504-holotype.

Olegblumia demissa (Flot.) S. Y. Kondr., L. Lökös, J. Kim, A. S. Kondratiuk, S. -O. Oh et J. -S. Hur, **comb. nov.**
Mycobank No. MB 812935.

Basionym: *Imbricaria demissa* Flot., Jber. Schles. Ges. Vaterl. Kultur 28: 133 (1850).

Synonym: *Caloplaca demissa* (Flot.) Arup et Grube, Lichenologist 31: 428 (1999).

Conclusions. Future analyses of molecular characters reveal additional species to be described in all the three monotypic genera proposed here, which very likely will confirm their necessity analyses in which additional genera of the Caloplacoideae, firstly *Mikhtomia* s. lat., *Variospora* s. lat. and *Seiropora* s. lat., will be included and discussed.

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