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HOSSEUSIELLA AND *REHMANNIELLA*, TWO NEW GENERA IN THE TELOSCHISTACEAE

S. Y. Kondratyuk[1#], P.-E. Persson[2], M. Hansson[2], L. Lőkös[3], D. Liu[4], J.-S. Hur[4]
I. Kärnefelt[5] and A. Thell[5]

[1]*M. H. Kholodny Institute of Botany, Tereshchenkivska str. 2, 01004 Kiev, Ukraine;*
[#]*E-mail: ksya_net@ukr.net*
[2]*Department of Biology, The Biology Building, Lund University,*
Sölvegatan 35, 22362 Lund, Sweden; E-mails: pelle87@hotmail.com; mats.hansson@biol.lu.se
[3]*Department of Botany, Hungarian Natural History Museum,*
H-1431 Budapest, Pf. 137, Hungary; E-mail: lokos.laszlo@nhmus.hu
[4]*Korean Lichen Research Institute, Sunchon National University, Sunchon 540-742, South Korea*
[5]*Botanical Collections, Biological Museum, Lund University, Box 117, SE-221 00 Lund, Sweden;*
E-mail: arne.thell@biol.lu.se

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Two new genera in the subfamily Teloschistoideae (Teloschistaceae, Teloschistales) are described: *Hosseusiella* S. Y. Kondr., L. Lőkös et A. Thell for the *Caloplaca chilensis* group including three South American species and *Rehmanniella* S. Y. Kondr. et J.-S. Hur for the new species, *R. wirthii* S. Y. Kondr. from South Africa. The new genera are supported by a three-gene phylogeny based on ITS1/ITS2 nrDNA, 28S nrLSU, and 12S mtSSU sequences. The new taxonomic position of *Elixjohnia ovis-atra* in the subfamily Teloschistoideae is discussed. The two new species *Hosseusiella gallowayiana* and *Rehmanniella wirthii* are described, illustrated and compared with closely related taxa. *Hosseusiella gallowayiana* is recorded for the first time as the host for the lichenicolous fungus *Arthonia tetraspora* S. Y. Kondr. A key to the species of *Hosseusiella* is included, as well as new information of the related genus *Follmannia*. The following new combinations are proposed: *Hosseusiella chilensis* (Kärnefelt, S. Y. Kondr., Frödén et Arup) S. Y. Kondr., L. Lőkös, Kärnefelt et A. Thell, *Hosseusiella pergracilis* (Zahlbr.) S. Y. Kondr., L. Lőkös, Kärnefelt et A. Thell and *Elixjohnia ovis-atra* (Søchting, Søgaard et Sancho) S. Y. Kondr.

Key words: *Elixjohnia*, *Follmannia*, *Hosseusiella*, *Hosseusiella gallowayiana*, key, new genera, new species, phylogenetic analysis, *Rehmanniella*, *Rehmanniella wirthii*, South Africa, South America, Teloschistaceae, Teloschistoideae

INTRODUCTION

In the family Teloschistaceae subfamily Teloschistoideae several new genera have been recently described or resurrected, i.e. *Josefpoeltia* (Kondratyuk and Kärnefelt 1997); *Follmannia*, *Haloplaca*, *Scutaria*, *Sirenophila*, *Teloschistopsis* and others (Arup *et al.* 2013), *Filsoniana*, *Fulgogasparrea*, *Kaernefia*, *Niorma* (Kondratyuk *et al.* 2013), *Tassiloa* (Kondratyuk *et al.* 2015*a*), *Elixjohnia*, *Harusavskia*, *Lasarenkoiopsis*, *Ikaeria*, and *Nevilleiella* (Kondratyuk *et al.* 2017)

(Table 2). In addition, many new species of the Teloschistoideae, discovered in the field or in herbaria, have been described by the senior author and colleagues. Molecular phylogeny of the subfamily Teloschistoideae has been discussed by Arup *et al.* (2013), Kondratyuk *et al.* (2013, 2015*a*, *b*, 2017) and Søchting *et al.* (2014). Two new genera, *Hosseusiella* and *Rehmanniella,* and two new species, *Hosseusiella gallowayiana* and *Rehmanniella wirthii*, are described as new to science in this study, supported by a phylogenetic analysis based on ITS1/ITS2 nrDNA, nrLSU and mtSSU sequences.

Following the description of the genera *Hosseusiella* and *Rehmanniella* and the new species *Hosseusiella gallowayiana* and *Rehmanniella wirthii*, the subfamily Teloschistoideae now comprises 25 genera and approximately 60 species, mainly distributed in the Southern Hemisphere. The Xanthorioideae with 39 genera and 180 species, the Caloplacoideae with 25 genera and approximately 120 species, occurs mainly in the Northern Hemisphere, while the Brownliellioideae with 11 genera and approximately 17 species, occurs mainly in the Southern Hemisphere.

MATERIAL AND METHODS

More than 1,000 specimens belonging to the family Teloschistaceae, collected between 2014–2017, deposited in the Korean Lichen Research Institute, Sunchon National University, South Korea (KoLRI), with duplicates in the Hungarian Natural History Museum (BP) and the Lichen Herbarium in the M. H. Kholodny Institute of Botany of National Academy of Sciences of Ukraine (KW-L), were hand-sectioned under a dissecting microscope (Nikon SMZ-645; Nikon, Tokyo, Japan) and examined using standard microscopical techniques. Anatomical characters were observed using a Nikon Eclipse E-200 microscope and a Zeiss Scope, complemented with a digital camera AxioCam ERc 5s. Sections of apothecia were tested with water, K and KI (10% potassium iodide).

Total DNA was extracted directly from the thalli according to Ekman (1999) and was purified with DNeasy Plant Mini Kit (QIAGEN, 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 (Gardes and Bruns 1993) and ITS4 (White *et al.* 1990), the 28S LSU using the primer LR5 (Vilgalys and Hester 1990), and the 12S mtSSU using the primers mtSSU1-mtSSU3R and mtSSU2R (Fedorenko *et al.* 2009, 2012).

The amplification was done using a Takara JP/TP600 PCR machine (Takara Bio Inc., Japan). One initial cycle of 5 min at 94 °C was followed by 30 cycles of the following steps: 30 seconds at 94 °C, 39 seconds 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 Cooperation, Seoul, South Korea, for cleaning and sequencing. The sequencing was carried out using the fluorescent marker BigDye and an ABI 3730xl sequencing machine (Applied Biosystems, Carlsbad, CA, USA).

DNA was extracted from the thalli according to Park *et al.* (2014), including the extra step for polysaccharide removal. A part of the nuclear ribosomal RNA gene region including the internal transcribed spacers (ITS) 1 and 2 and the 5.8S subunit was amplified using the primers ITS4 and ITS5 (White *et al.* 1990). The PCR reactions were done in a Mastercycler pro (Eppendorf, Germany) PCR machine using the following program: 94 °C for 3 min, (94 °C for 45 s, 54 °C for 30 s, 72 °C for 1 min) ×30 and 72 °C for 5 min.

PCR products of good quality (as seen after agarose gel electrophoresis) were directly purified by Illustra ExoProStar 1-Step (GE Healthcare, UK) and sent for Sanger sequencing by Eurofins Genomics (Germany). In the case of an unspecific PCR product, the desired band was excised from the agarose gel and the DNA extracted using a Nucleospin PCR clean-up and Gel extraction kit from Macherey-Nagel (Germany) before being sent for sequencing, as previously described.

The consensus sequence was aligned with sequences from all related species retrieved from the GenBank database (Table 1). The consensus sequences were then deposited in GenBank under the accession numbers MG811841–MG811854. Phylogenetic analysis was performed using the ITS region and 28S nrLSU gene and 12S mtSSU sequences retrieved from the GenBank database and the 45 lichen-forming fungi investigated in this study. Sequence alignment was conducted in BioEdit and a phylogenetic tree was generated by the maximum parsimony (MP), minimum evolution (ME), and maximum likelihood (ML) analysis methods. Analyses were conducted using PAUP 4.0b10 on a Macintosh platform (Swofford 2003), and in Mega 5.0 (Tamura *et al.* 2011) with the number of bootstrap trials set to 1,000.

The taxon sampling consists of 48 taxa of the Teloschistoideae (Fig. 3) with *Brigantiaea ferruginea* as outgroup (Table 1).

About 100 nrDNA and mtDNA sequences were submitted to GenBank for the 45 taxa.

RESULTS

Phylogeny of the subfamily Teloschistoideae

A phylogenetic tree of the subfamily Teloschistoideae is presented in Figure 1. All genera are represented by type species, but many specimens are included for the new genera.

Table 1
Specimens included in the phylogenetic analysis with GenBank accession numbers. Newly submitted sequences are in bold

Species name	Voucher details / references	ITS	LSU	mtSSU
Brigantiaea ferruginea	SK779, Kondratyuk *et al.* (2013)	KF264622		KF264684
Brigantiaea ferruginea	SK780, Kondratyuk *et al.* (2013)	KF264623		KF264685
Brigantiaea ferruginea	121967, South Korea, Kondratyuk *et al.* (2017)	KY614393		
Brigantiaea ferruginea	121971, South Korea, Kondratyuk *et al.* (2017)	KY614394		
Brigantiaea ferruginea	121981, South Korea, Kondratyuk *et al.* (2017)	KY614395		
Elixjohnia bermaguiana	SK979, Kondratyuk *et al.* (2013), as *Sirenophila bermaguiana*			KF264706
Elixjohnia bermaguiana	Type, Arup *et al.* (2013), as *Sirenophila bermaguiana*	KC179299	KC179245	KC179584
Elixjohnia gallowayi	isotype, Arup *et al.* (2013), as *Sirenophila gallowayi*	KC179301	KC179247	KC179586
Elixjohnia jackelixii	SK910, Kondratyuk *et al.* (2013), as *Sirenophila jackelixii*	KF264655	KF264683	KF264707
Elixjohnia jackelixii	SK911, Kondratyuk *et al.* (2013), as *Sirenophila jackelixii*			KF264708
Elixjohnia jackelixii	Arup *et al.* (2013), as *Sirenophila jackelixii*	KC179303	KC179248	KC179587
Elixjohnia ovis-atra	Arup *et al.* (2013), as *Sirenophila* sp. 20		KC179250	KC179589
Elixjohnia ovis-atra	Søchting *et al.* (2016), sub *Sirenophila ovis-atra*	KU578083		
Elixjohnia ovis-atra	Søchting *et al.* (2016), sub *Sirenophila ovis-atra*	KU578081		
Elixjohnia ovis-atra	Søchting *et al.* (2016), sub *Sirenophila ovis-atra*	KU578078		
Filsoniana australiensis	SK751, Kondratyuk *et al.* (2013)	KF264631	KF264665	KF264691
Follmannia orthoclada	Arup *et al.* (2013)	KC179291	KC179191	
Follmannia orthoclada	**SK J76 = SKH94, Chile, CL130446 KoLRI 020602, this paper**	**MG811841**		
Follmannia orthoclada	**SK J78 = SKi00, Chile, CL130446 KoLRI 020602, this paper**	**MG811842**		
Follmannia orthoclada	**SK J79 = SKi01, Chile, CL130446 KoLRI 020602, this paper**	**MG811843**		

Species name	Voucher details / references	ITS	LSU	mtSSU
Fominiella skii	Holotype, Vondrák *et al.* (2012)	HM582191		
Fominiella skii	Vondrák *et al.* (2012)	HM582188		
Fominiella skii	Vondrák *et al.* (2012)	HM582194		
Fominiella skii	Vondrák *et al.* (2012)	HM582190		
Fominiella tenerifensis	SK D19, Spain, Kondratyuk *et al.* (2017)		KY614447	KY614478
Fulgogasparrea appressa	Arup *et al.* (2013)	KC179332		
Fulgogasparrea brouardii	Gaya *et al.* (2015)	KT291448	KT291536	
Fulgogasparrea decipioides	SK689, Kondratyuk *et al.* (2013)	KF264644		KF264695
Fulgogasparrea decipioides	SK691, Kondratyuk *et al.* (2013)	KF264643		KF264694
Fulgogasparrea decipioides	Arup *et al.* (2013)	KC179333	KC179269	KC179608
Haloplaca sorediella	Arup *et al.* (2013)	KC179293		
Haloplaca suaedae	Vondrák *et al.* (unpubl.)	HM582197		
Harusavskia elenkinianoides	SK 996, Chile, Kondratyuk *et al.* (2017)	KY614403	KY614451	KY614484
Harusavskia elenkinianoides	SK 997, Chile, Kondratyuk *et al.* (2017)	KY614404	KY614452	KY614485
Harusavskia elenkinianoides	SK 269, Chile, Kondratyuk *et al.* (2017)	KY614405	KY614453	KY614486
Hosseusiella chilensis	Gaya *et al.* (2012)	JQ301660	JQ301551	JQ301485
Hosseusiella chilensis	**SK J43 = SK H65, Chile, CL 130422 KoLRI 020556, this paper**	**MG811844**		
Hosseusiella chilensis	**SK J44 = SK H67, Chile, CL 130418 KoLRI 020552, this paper**	**MG811845**		
Hosseusiella gallowayiana	**SK J46 = SK H78, Chile, CL 130553 KoLRI 020689, this paper**	**MG811846**		
Hosseusiella gallowayiana	**SK J47 = SK H79, Chile, CL 130553 KoLRI 020689, this paper**	**MG811847**		
Hosseusiella gallowayiana	**SK J71 = SK H80, Chile, CL 130218 KoLRI 017651, this paper**	**MG811848**		
Hosseusiella pergracilis	**SK J48 = SK H87, Chile, CL 130515 KoLRI 020651, this paper**	**MG811849**		
Hosseusiella pergracilis	**SK J72 = SK H90, Chile, CL 130397 KoLRI 020531, this paper**	**MG811850**		

Species name	Voucher details / references	ITS	LSU	mtSSU
Ikaeria aurantiellina	SK 538, Spain, Kondratyuk *et al.* (2017)	KY614411		KY614490
Ikaeria aurantiellina	SK 552, Spain, Kondratyuk *et al.* (2017)	KY614412		KY614491
Ikaeria aurantiellina	SK D29, Spain, Kondratyuk *et al.* (2017)	KY614413		KY614492
Ikaeria aurantiellina	SK D23, Spain, Kondratyuk *et al.* (2017)	KY614414		KY614493
Josefpoeltia parva	Eichenberger *et al.* (unpubl.)	AM697883		
Josefpoeltia sorediosa	SK991, Kondratyuk *et al.* (2013)	KF264645	KF264673	KF264696
Kaernefia kaernefeltii	SK921, Kondratyuk *et al.* (2013)	KF264652	KF264680	KF264703
Lazarenkoella zoroasteriorum	SK A45, Kondratyuk *et al.* (2015*b*)	KT456215	KT456230	KT456245
Lazarenkoella zoroasteriorum	SK A51, Kondratyuk *et al.* (2015*b*)	KT456216	KT456231	KT456246
Lazarenkoella zoroasteriorum	SK A55, Kondratyuk *et al.* (2015*b*)	KT456217	KT456232	KT456247
Lazarenkoiopsis ussuriensis	SK A36, Russia, Kondratyuk *et al.* (2017)			KY614497
Lazarenkoiopsis ussuriensis	SK A37, Russia, Kondratyuk *et al.* (2017)	KY614418	KY614455	KY614498
Lazarenkoiopsis ussuriensis	SK D22, Russia, Kondratyuk *et al.* (2017)	KY614419	KY614456	KY614499
Neobrownliella brownlieae	SK831, Kondratyuk *et al.* (2013)	KF264626	KF264661	KF264687
Neobrownliella brownlieae	SK838, Kondratyuk *et al.* (2013)	KF264627	KF264662	KF264688
Neobrownliella montisfracti	SK230, Kondratyuk *et al.* (2013)	KF264624	KF264659	
Nevilleiella lateritia	SK 878, Australia, Kondratyuk *et al.* (2017)	KY614426	KY614463	KY614501
Nevilleiella lateritia	SK 261, Australia, Kondratyuk *et al.* (2017)	KY614427	KY614464	KY614502
Nevilleiella marchantii	SK D18, Australia, Kondratyuk *et al.* (2017)	KY614425	KY614462	KY614500
Niorma chrysophthalma	Eichenberger *et al.* (unpubl.)	AM292836		
Niorma chrysophthalma	Gaya *et al.* (2012)		JQ301576	JQ301518
Niorma chrysophthalma	SK 818, Australia, Kondratyuk *et al.* (2013)	KF264654	KF264682	KF264705
Niorma hosseusiana	Arup *et al.* (2013)	KC179318		
Niorma hypoglauca	Arup *et al.* (2013)	KC179319		
Niorma sieberianus	Gaya *et al.* (2008)	EU639655		
Rehmanniella wirthii	**SK 243, this paper**	**MG811851**	**MG811852**	**MG811853**
Rehmanniella wirthii	**SK 244, this paper**			**MG811854**
Scutaria andina	Arup *et al.* (2013)	KC179298	KC179242	KC179581

Species name	Voucher details / references	ITS	LSU	mtSSU
Sirenophila cliffwetmorei	SK A93, Australia, Kondratyuk *et al.* (2017)	KY614438	KY614471	KY614513
Sirenophila eos	SK912, Kondratyuk *et al.* (2013)	KF264656		
Sirenophila eos	Arup *et al.* (2013)	KC179300	KC179246	KC179585
Sirenophila eos	Gaya *et al.* (2015)	KT291455	KT291542	KT291489
Sirenophila gintarasii	Arup *et al.* (2013)	KC179302		
Sirenophila gintarasii	SK D17, Australia, Kondratyuk *et al.* (2017)	KY614437	KY614470	KY614512
Sirenophila maccarthyi	Arup *et al.* (2013)	KC179304	KC179249	KC179588
Stellarangia elegantissima	Arup *et al.* (2013)	KC179310	KC179254	KC179593
Stellarangia testudinea	Arup *et al.* (2013)	KC17912		
Tassiloa digitaurea	SK A34, Kondratyuk *et al.* (2015*a*)	KP096222		KP096224
Tassiloa wetmorei	Lumbsch *et al.* (2011)	HQ317923		
Teloschistes flavicans	FNM-139, Fedorenko *et al.* (2009, 2012)	EU681363		EU680955
Teloschistes flavicans	Arup *et al.* (2013)	KC179317	KC179255	KC179594
Teloschistes flavicans	FNM-218, Fedorenko *et al.* (2009, 2012)	EU681362		JN984150
Teloschistes flavicans	Gaya *et al.* (2012)		JQ301578	
Teloschistopsis bonae-spei	Arup *et al.* (2013)	KC179322	KC179257	KC179596
Teloschistopsis chryso-carpoides	Arup *et al.* (2013)	KC179323		
Teloschistopsis eudoxa	Arup *et al.* (2013)	KC179324	KC179258	KC179597
Villophora isidioclada	Arup *et al.* (2013)	KC179325	KC179266	KC179606
Wetmoreana texana	SK537, Kondratyuk *et al.* (2013)	KF264657		KF264710
Wetmoreana texana	SK536, Kondratyuk *et al.* (2013)	KF264658		KF264711
Wetmoreana texana	Arup *et al.* (2013)	KC179337	KC179273	KC179612

The subfamily Teloschistoideae is divided into 25 clades. Six groups can be discerned: the *Teloschistes* s. l. group with 8 clades, the *Follmannia* s. l. group with 4 clades, the *Filsoniana* s. l. group with 3 clades, the *Sirenophila-Lazarenkoiopsis* group with 5 or 6 clades, and, finally, the genera *Kaernefia* and *Stellarangia*, positioned as sister groups to the *Sirenophila-Lazarenkoiopsis* clade (Fig. 1).

New clades, in particular, the recently proposed *Ikaeria* is positioned as a sister group to *Yoshimuria* in the *Teloschistes* s. l. group, *Harusavskia* and *Nevillei-ella* are positioned in the *Filsoniana* s. l. group, and *Elixjohnia* and *Lazarenkoi-opsis* belong to the *Sirenophila-Lazarenkoiopsis* group (Fig. 1).

Table 2
Genera of the subfamily Teloschistoideae confirmed by molecular phylogeny

	Genus name	Type species	Original generic description / recent treatment
1	*Catenarina* Søchting, Søgaard, Arup, Elvebakk et Elix	*Catenarina desolata* Søchting, Søgaard et Elvebakk	Søchting *et al.* (2014)
2	*Elixjohnia* S. Y. Kondr. et J.-S. Hur	*Elixjohnia jackelixii* (S. Y. Kondr., Kärnefelt et A. Thell) S. Y. Kondr. et J.-S. Hur	Kondratyuk *et al.* (2017)
3	*Filsoniana* S. Y. Kondr., Kärnefelt, Elix, A. Thell et J.-S. Hur	*Filsoniana australiensis* (S. Y. Kondr., Kärnefelt et Filson) S. Y. Kondr., Kärnefelt, Elix, A. Thell, J. Kim, A. S. Kondratyuk et J.-S. Hur	Kondratyuk *et al.* (2013)
4	*Follmannia* C. W. Dodge	*Follmannia rufa* C. W. Dodge [current name *F. orthoclada* (Zahlbr.) Frödén, Arup et Søchting]	Arup *et al.* (2013)
5	*Fulgogasparrea* S. Y. Kondr., N.-H. Jeong, Kärnefelt, Elix, A. Thell et J.-S. Hur	*Fulgogasparrea decipioides* (Arup) S. Y. Kondr., Kärnefelt, Elix, A. Thell, M.-H. Jeong et J.-S. Hur	Kondratyuk *et al.* (2013)
6	*Gintarasiella* S. Y. Kondr. et J.-S. Hur	*Gintarasiella aggregata* (Kantvilas et S. Y. Kondr.) S. Y. Kondr. et J.-S. Hur	Kondratyuk *et al.* (2017)
7	*Haloplaca* Arup, Søchting et Frödén	*Haloplaca britannica* (R. Sant.) Arup, Frödén et Søchting	Arup *et al.* (2013)
8	*Harusavskia* S. Y. Kondr.	*Harusavskia elenkinianoides* S. Y. Kondr., X. Y. Wang, S.-O. Oh et J.-S. Hur	Kondratyuk *et al.* (2017)
9	*Hosseusiella* S. Y. Kondr., L. Lőkös et A. Thell	*Hosseusiella chilensis* (Kärnefelt, S. Y. Kondr., Frödén et Arup) S. Y. Kondr., L. Lőkös et A. Thell	this paper
10	*Josefpoeltia* S. Y. Kondr. et Kärnefelt	*Josefpoeltia boliviensis* S. Y. Kondr. et Kärnefelt [current name *J. parva* (Räsänen) Frödén et L. Lindblom]	Kondratyuk and Kärnefelt (1997)
11	*Ikaeria* S. Y. Kondr., D. Upreti et J.-S. Hur	*Ikaeria aurantiellina* (Harm.) S. Y. Kondr., D. Upreti et J.-S. Hur	Kondratyuk *et al.* (2017)
12	*Kaernefia* S. Y. Kondr., Elix, A. Thell et J.-S. Hur	*Kaernefia kaernefeltii* (S. Y. Kondr., Elix et A. Thell) S. Y. Kondr., Elix, A. Thell, J. Kim, A. S. Kondratyuk et J.-S. Hur	Kondratyuk *et al.* (2013)
13	*Lazarenkoiopsis* S. Y. Kondr., L. Lőkös et J.-S. Hur	*Lazarenkoiopsis ussuriensis* (Oxner, S. Y. Kondr. et Elix) S. Y. Kondr., L. Lőkös et J.-S. Hur	Kondratyuk *et al.* (2017)
14	*Neobrownliella* S. Y. Kondr., Elix, Kärnefelt et A. Thell	*Neobrownliella brownlieae* (S. Y. Kondr., Elix et Kärnefelt) S. Y. Kondr., Elix, Kärnefelt et A. Thell	Kondratyuk *et al.* (2015*b*)
15	*Nevilleiella* S. Y. Kondr. et J.-S. Hur	*Nevilleiella marchantii* (S. Y. Kondr. et Kärnefelt) S. Y. Kondr. et J.-S. Hur	Kondratyuk *et al.* (2017)

	Genus name	Type species	Original generic description /recent treatment
16	*Niorma* A. Massal.	*Niorma hypoglauca* (Nyl.) S. Y. Kondr., Kärnefelt, Elix, A. Thell, M. H. Jeong et J.-S. Hur	Kondratyuk *et al.* (2013)
17	*Rehmanniella* S. Y. Kondr. et J.-S. Hur	*Rehmanniella wirthii* S. Y. Kondr.	this paper
18	*Scutaria* Søchting, Arup et Frödén	*Scutaria andina* (Räsänen) Søchting, Frödén et Arup	Arup *et al.* (2013)
19	*Sirenophila* Søchting, Arup et Frödén	*Sirenophila gintarasii* (S. Y. Kondr. et Kärnefelt) Arup, Frödén et Søchting	Arup *et al.* (2013)
20	*Stellarangia* Frödén, Arup et Søchting	*Stellarangia elegantissima* (Nyl.) Frödén, Arup et Søchting	Arup *et al.* (2013)
21	*Tassiloa* S. Y. Kondr., Kärnefelt, A. Thell, Elix et J.-S. Hur	*Tassiloa digitaurea* (Søgaard, Søchting et Sancho) S. Y. Kondr., Kärnefelt, A. Thell, J. Kim, A. S. Kondratiuk et J.-S. Hur	Kondratyuk *et al.* (2015*a*)
22	*Teloschistes* Norman	*Teloschistes flavicans* (Sw.) Norman	Kondratyuk *et al.* (2013)
23	*Teloschistopsis* Frödén, Søchting et Arup	*Teloschistopsis chrysocarpoides* (Vain.) Frödén, Arup et Søchting	Arup *et al.* (2013)
24	*Villophora* Søchting, Arup et Frödén	*Villophora isidioclada* (Zahlbr.) Søchting, Frödén et Arup	Arup *et al.* (2013)
25	*Wetmoreana* Arup, Søchting et Frödén	*Wetmoreana texana* (Wetmore et Kärnefelt) Arup, Søchting et Frödén	Arup *et al.* (2013)

In the combined phylogenetic analysis, based on ITS1/ITS2 nrDNA, 28S nrLSU, and 12S mtSSU sequences, the new genus *Hosseusiella*, comprising three species, *H. chilensis*, *H. gallowayiana* and *H. pergracilis*, bears a sister position to the South American *Follmannia*. However, the joint support of *Follmannia* and *Hosseusiella* together is rather low, but *Hosseusiella* alone is strongly supported (Fig. 1, Table 2).

The phylogenetic tree of the subfamily Teloschistoideae based exclusively on ITS-sequences also includes species of *Tarasginia* and *Raesaeneniana* from the subfamily Brownlielloideae.

Hosseusiella S. Y. Kondr., L. Lőkös, Kärnefelt et A. Thell, *gen. nov.*

MycoBank no.: MB 824004.

Similar to Follmannia, *but differs in having a regular, rosette-like thallus forming convex isidious tufts, in having better developed, convex, regularly radiating lobes and finger-like isidia, in having "textura intricata" plectenchyma in the cortical layer and in the true exciple, and in having shorter ascospores and shorter conidia.*

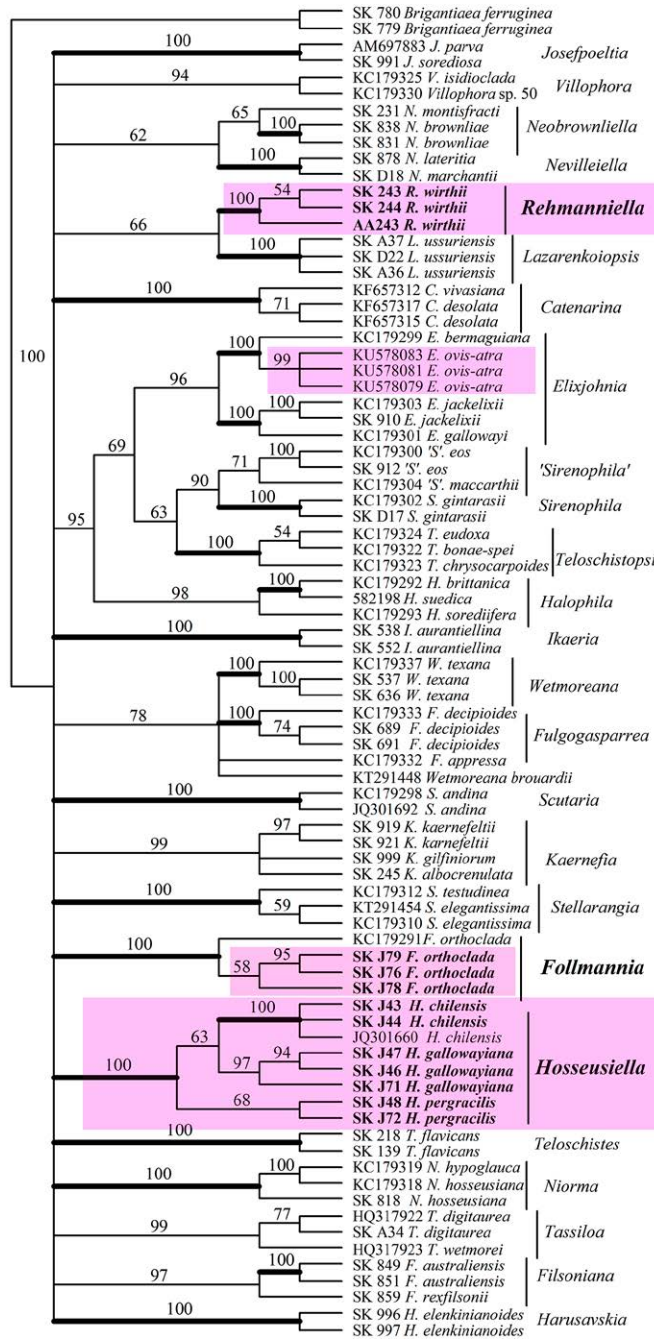

Fig. 1. Phylogenetic tree of the members of the subfamily Teloschistoideae after ITS1/ITS2 data set

Type species: *Hosseusiella chilensis* (Kärnefelt, S. Y. Kondr., Frödén et Arup) S. Y. Kondr., L. Lőkös, Kärnefelt et A. Thell.

Thallus small, crustose to foliose forming well-developed rosettes with well-developed lobes in the peripheral zone, or microfruticose forming bulky cushions in the centre; yellowish red or brownish orange to dark reddish orange or orange yellow, usually paler, yellow to yellowish orange at terminal portions of the lobes or tips of isidia, surface shiny or matt; isidiate or with numerous isidia forming convex tufts; in one species the centre is covered by apothecia or verrucules from apothecial initials. Thalline lobes well developed, regularly radiating, rather narrow and convex, irregularly branched closely adpressed to the substrate or lax to ascending and terete; without or with numerous isidia, forming convex tufts of an isidious mass; attached to substrate by medullary hyphae, lower cortex absent or present, where lobes lift from the substrate.

Apothecia numerous to rare, stipitate, lecanorine, biatorine or zeorine, disc concave or plane, orange to reddish or brownish orange; margin yellowish orange; true exciple of textura intricata; asci 8-spored; ascospores hyaline, bipolar, narrowly ellipsoid. Conidia narrowly bacilliform.

Chemistry: Thallus and apothecia contain parietin, teloschistin, fallacinal, parietinic acid and emodin.

Ecology: *Hosseusiella chilensis* is mainly an epiphytic taxon growing on bark of both dead and living twigs or branches of various shrubs, trees and cacti, always sun exposed (often in open, preferably grazed, shrub vegetation, from about 25 to 1100 m a.s.l.), whereas *H. gallowayiana* and *H. pergracilis* are epilithic lichens growing on siliceous rocks from the coastal zone to low altitudes in lowlands and mountains.

Etymology: Named in honour of the German botanist Carl Curt Hosseus (1878–1950) professor in botany at the University of Córdoba, Argentina (1916–1946) and director of the Botanical Museum. He collected extensively in South America, and published numerous papers on bamboo canes, conifers, cacti and mosses of South America and Argentina in particular.

Species diversity and distribution: The genus is composed of three species, rather common in southern part of the South American continent.

Taxonomic notes: As mentioned in the original description of *Caloplaca chilensis* Kärnefelt, S. Y. Kondr., Frödén et Arup, the morphology of this species was intermediate between that of *Caloplaca* and *Xanthoria*. Moreover, ITS sequences showed no similarity with either *Xanthoria* or closely related placodioid species. The authors concluded that "the DNA data clearly showed that "*Caloplaca*" *chilensis* belonged to *Caloplaca* as then defined, but no closely related species could be identified" (Kärnefelt *et al.* 2002).

Futher molecular data for *Hosseusiella chilensis* (as *Caloplaca chilensis*) were submitted to GenBank and published by Gaya *et al.* (2012, 2015). From a consideration of the data for *Follmannia orthoclada* and *Hosseusiella chilensis* it was

concluded, that "*Caloplaca*" *chilensis* may be a member of the *Follmannia* clade without bootstrap support. With the inclusion of additional specimens, species and molecular markers in the present study, *Hosseusiella* and *Follmannia* are supported as separate genera (Fig. 1).

Hosseusiella is morphologically similar to *Follmannia*, but differs in forming regular, rosette-like thallus to convex isidiose tufts, in having better developed, very convex, regularly radiating lobes and finger-like isidia, in having "textura intricata" plectenchyma in the cortical layer and in the true exciple where hyphae with 5–15 μm long and 1.5–2 μm thick lumina are observed. In addition, the ascospores and conidia are shorter in *Hosseusiella*.

Hosseusiella and *Harusavskia* both form rosette-like thalli, but *Hosseusiella* differs in having ascospores without a halo.

Hosseusiella differs from the similar *Teuvoahtiana* by the lack of rosette-like thallus, as well as in having "textura intricata" plectenchyma in the cortical layer of thallus.

Key to the species of *Hosseusiella*

1a Thallus corticolous; with numerous apothecia in the centre, isidia absent *H. chilensis*

1b Thallus saxicolous; thallus with numerous isidia, apothecia rather rare or poorly developed 2

2a Isidia large, 0.2–0.3(–0.35) mm diam. and to 0.5–1.5(–2) mm long, branched, differentiated from ascending overlapping thalline lobes; thallus visibly crustose, flat, forming large confluent aggregations without distinct lobes, with minute wart-like finger-like isidia or microfruticose, forming bulky formations due to numerous ascending and densely overlapping thalline lobes and isidia; [thalline lobes 0.1–0.25 mm wide (Zahlbruckner 1925)] *H. pergracilis*

2b Isidia small, 60–100 μm diam. and to 60–100(–150) μm long, much broader and usually paler of thalline lobes, pure yellow; thallus regularly rounded, rosette-like; thalline lobes 0.2–0.7 mm wide *H. gallowayiana*

Hosseusiella chilensis (Kärnefelt, S. Y. Kondr., Frödén et Arup) S. Y. Kondr., L. Lőkös, Kärnefelt et A. Thell, *comb. nova*

MycoBank no.: MB 824007.

Basionym: *Caloplaca chilensis* Kärnefelt, S. Y. Kondr., Frödén et Arup, in Kärnefelt *et al.*, The Bryologist 105: 302 (2002).

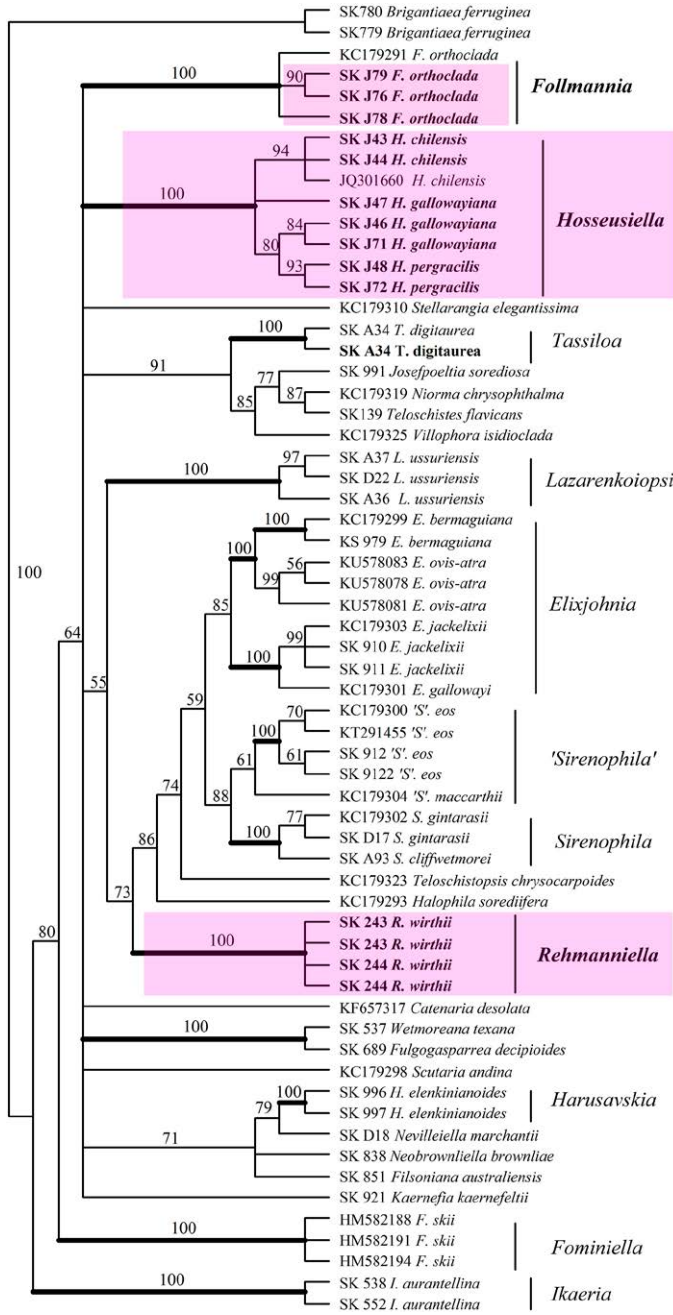

Fig. 2. Phylogenetic tree of the members of the subfamily Teloschistoideae after combined data set based on ITS1/ITS2 nr DNA, 28S nrLSU and 12S mtSSU sequences

For a detailed description see Kärnefelt *et al.* (2002).

Specimens of *Hosseusiella chilensis* examined: Chile, La Serena, Fray Jorge National Park, on branches of tree, *Hosseusiella chilensis* damaged by *Arthonia tetraspora* in parts. Lat.: 30° 37′ 32.4″ S; Long.: 71° 39′ 45.7″ W; Alt.: *ca*. 279 m a.s.l. Coll.: Oh, S.-O., Hur, J.-S., 15.11.2013 (CL130418) (KoLRI 020552 voucher for DNA SK H67 = J44); the same locality (CL130422) (KoLRI 020556 voucher for DNA SK H65 = J43); the same locality (CL130545) (KoLRI 020681).

Hosseusiella gallowayiana S. Y. Kondr., L. Lőkös, J.-S. Hur, Kärnefelt et A. Thell, *spec. nova*
(Figs 3–4)

MycoBank no.: MB 824009.

Similar to Hosseusiella pergracilis*, but differs in having a microfruticose thallus, consisting of bulky cushions formed by numerous ascending and densely overlapping thalline lobes hardly differentiated from isidia, as well as in having rare apothecia.*

Type: Chile, La Serena, on rock, *Hosseusiella gallowayiana* damaged by *Arthonia tetraspora* S. Y. Kondr. in parts. Lat.: 29° 43′ 55.9″ S; Long.: 71° 19′ 11.2″ W; Alt.: *ca*. 115 m. Coll.: Oh, S.-O., Hur, J.-S., 12.11.2013 (CL130361) (KoLRI 020494 – holotype); the same locality, CL130362 (KoLRI 020495 – isotype).

Thallus 0.5–2(–3) cm wide but forming larger aggregations, microfruticose with narrowly attached, overlapping thalline lobes or isidia-like structures in the central portion of the thallus, ascending towards the peripheral portion; deep reddish orange, brownish orange to dull brownish orange in the centre, becoming paler yellowish towards the lobe tips. Thalline lobes, ascending and terete in the centre, lobes 0.1–0.3 mm wide in middle portions to 0.2–0.5(–0.7) mm wide towards the tips, in section from ovoid to elongated, 0.2–0.3 × 0.3–0.7 mm or 0.2–0.7 mm wide; in section cortical layer (10–)20–50(–80[–100]) μm thick, irregularly developed on all sides of terete thalline lobes, prosoplectenchymatous, hyphae with lumina *ca*. 1–1.5(–2) μm diam. orientated longitudinally; algal cells (7–)12–16(–17) μm with yellow oil droplets of 1–3 μm diam., aggregated in clusters (30–)50–100 μm across; medulla with distinct scleroplectenchymatous or prosoplectenchymatous tissue of 15–20(–30) μm diam.; isidia 0.2–0.3(–0.35) mm diam. and 0.5–1.5(–2) mm long, branched.

Apothecia rare, terminal at the tips of lobes, 0.5 mm diam., 0.3 mm thick in section, biatorine to zeorine; thalline margin with numerous isidia, concolorous with central part of thallus, dull orange or brownish orange; in section thalline exciple 50–120 μm thick, cortical layer developed irregularly, if present to 30 μm thick with more conglutinated upper portion to 10(–15) μm

thick and "textura intricata" below; true exciple 30–60(–100) μm wide in the uppermost lateral portion with outermost layer to 10–15 μm thick of palisade plectenchyma, 20–30 μm thick in lower lateral and basal portions, algal zone with clusters of algal cells only in lower portion observed to 60 μm diam., rounded or in irregular continuous, algal cells 7–12 μm diam., with yellow oil droplets; hymenium to 90 μm high; epihymenium 15–20 μm thick, brownish yellow; asci 8-spored, simple and bipolar ascospores observed in the same asci; ascospores narrowly ellipsoid, cylindrical or fusiform, attenuated towards the tips, one cell sometimes somewhat longer, 10–13(–17) × 4–5(–6) μm in water and 9–13(–14) × (4–)5.5–7 μm in K; ascospore septum (2–)3–4.5(–8) μm wide in water and (3–)4–6(–7) μm wide in K. Conidiomata rare, conidia small, bacilliform, (2–)2.5–3.2(–3.5) × 0.8–1.2 μm.

Spot tests: Cortical layer of thalline exciple, uppermost portion of true exciple and epihymenium K+ purple.

Ecology: It grows on rocks from coastal zone to localities of low altitudes. *Hosseusiella gallowayiana* is recorded as the host for *Arthonia tetraspora* S. Y. Kondr. for the first time.

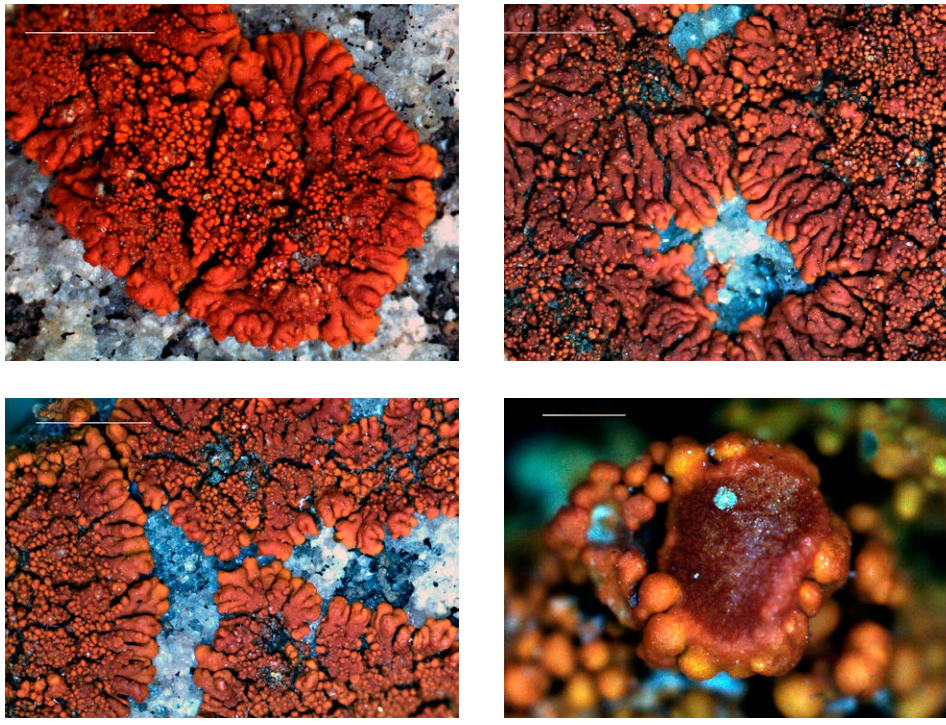

Fig. 3. Hosseusiella gallowayiana (CL130533), general habit (scale 1 mm), and enlarged apothecia (bottom right, scale 0.5 mm)

Etymology: The species is named after David John Galloway (1942–2014) in recognition of his many contributions to the Southern Hemisphere lichens.

Distribution: Known from scattered localities in Chile, South America.

Taxonomic notes: The species is characterised by terete lobes with different modes of attachment to the substrate, at first closely attached, later rather lax, erect and overlapping.

Hosseusiella gallowayiana and *H. chilensis* have similar anatomical characters and distribution, as well as the same parasite *Arthonia tetraspora*. However, the new species differs in having a more bulky, thick and semiconvex thallus, due to numerous isidia and ascending terete thalline lobes in the centre of the thallus.

Hosseusiella gallowayiana is also similar to *H. pergracilis*, a rare South American isidiate species (Zahlbruckner 1925). The latter, however, differs in having an obviously crustose, flat thalli forming large confluent aggregations or microfruticose bulky cushions with numerous ascending and densely overlapping lobes, larger, hardly differentiated thalli without apothecia and conidiomata (Zahlbruckner 1925).

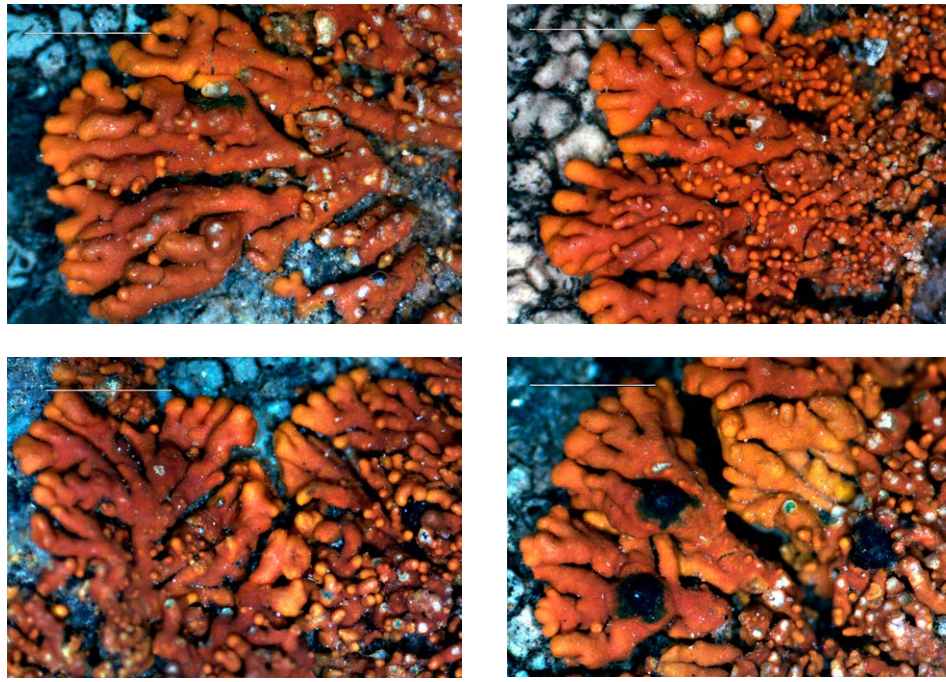

Fig. 4. Hosseusiella gallowayiana (CL130361, holotype), enlarged thalline lobes with isidia and with lichenicolous fungus *Arthonia tetraspora* (bottom right; scale 1 mm)

The rounded and regularly rosette-like thalli of *Hosseusiella gallowayiana* are reminiscent of both *Austroplaca lucens* (Nyl.) Søchting, Frödén et Arup and *Rusavskia elegans* (Link) S. Y. Kondr. et Kärnefelt, two species that differ from *Hosseusiella gallowayiana* in lacking isidia, while *Zeroviella papillifera* (Vain.) S. Y. Kondr. et J.-S. Hur is distinguished by scarce and scattered isidia. All of these taxa differ from *H. gallowayiana* in having paraplectenchymatous cortical layers and scleroplectenchymatous true exciples (Kondratyuk 2004, Kondratyuk *et al.* 2015*c*).

Follmannia orthoclada (Zahlbr.) Frödén, Arup et Søchting has similar morphology, but differs in having irregularly developed, separate, convex, shiny lobes, an intricately prosoplectenchymatous cortex with a thick epicortex (Arup *et al.* 2013).

Both "*Caloplaca*" *malmeana* Zahlbr. (= *Callopisma brachysporum* Malme 1926, non *Caloplaca brachyspora* Mereschk. 1913) and "*Caloplaca*" *dissimilis* (Malme) Zahlbr. (= *Callopisma dissimile* Malme) occur in South America, but differ in having squamulose thalli with much smaller thalline areoles, in lobulate, crenulate isidia, which become sorediose, in having a hypothallus, as well as shorter and wider ascospores (Malme 1926).

Specimens CL130361 (holotype) and CL130553 of *Hosseusiella gallowayiana* are damaged by *Arthonia tetraspora* S. Y. Kondr., a parasitic fungus originally described on *H. chilensis* (Kärnefelt *et al.* 2002).

Additional specimens of *Hosseusiella gallowayiana* examined: Chile, La Serena, Fray Jorge National Park, on rock, *Hosseusiella gallowayiana* damaged by *Arthonia tetraspora* S. Y. Kondr. in parts. Lat.: 30° 37′ 32.4″ S; Long.: 71° 39′ 45.7″ W; Alt.: *ca.* 279 m a.s.l. Coll.: Oh, S.-O., Hur, J.-S., 15.11.2013 [site 10] (CL130553) (KoLRI 020689 voucher for DNA SK H79 = J47, SK H78 = J46). – Chile, Patagonia, Torres del Paine, Y200 30 km, on rock. Lat.: 51° 22′ 36.4″ S; Long.: 72° 45′ 18.8″ W; Alt.: *ca.* 38 m a.s.l. Coll.: Oh, S.-O., Hur, J.-S., 19.01.2013 [site 7] (CL130218) (KoLRI 017651 voucher for DNA SK H80 = J71).

Hosseusiella pergracilis (Zahlbr.) S. Y. Kondr., L. Lőkös et A. Thell, *comb. nova*
(Figs 5–6)

MycoBank no.: MB 824012.

Basionym: *Caloplaca pergracilis* Zahlbr., Medd. Göteb. Bot. Trädg. 2: 20 (1925). Synonym: *Gasparrinia pergracilis* (Zahlbr.) Follmann, Nova Hedwigia 14: 265 (1967).

Specimens of *Hosseusiella pergracilis* examined: Chile, Caleta Tototal Baja, on rock. Lat.: 28° 17′ 15.7″ S; Long.: 71° 10′ 37.6″ W; Alt.: *ca.* 203 m a.s.l. Coll.: Oh, S.-O., Hur, J.-S., 14.11.2013 [site 09] (CL130515) (KoLRI 020651 voucher for DNA SK H87 = J48). – Chile, La Higuera, Caleta De Hornos, on rock. Lat.: 29° 38′ 29.1″ S; Long.: 71° 17′ 54.9″ W; Alt.: *ca.* 110 m a.s.l. Coll.: Oh, S.-O., Hur, J.-S., 14.11.2013 [site 03] (CL130397) (KoLRI 020531 voucher for DNA SK H90 = J72).

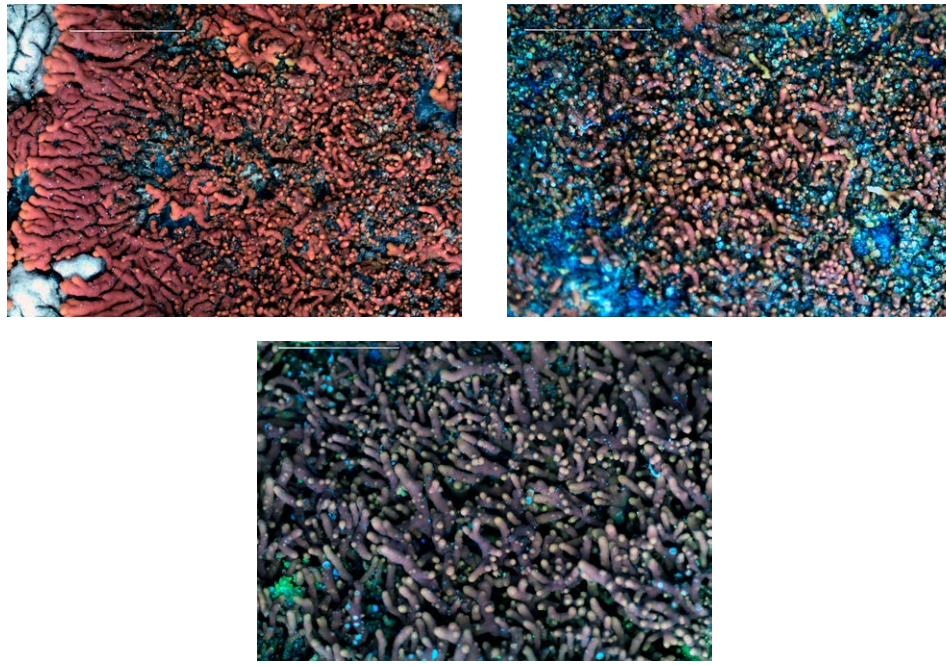

Fig. 5. *Hosseusiella pergracilis* (CL130397), general habit. Scale 2 mm (top) and 1 mm (bottom)

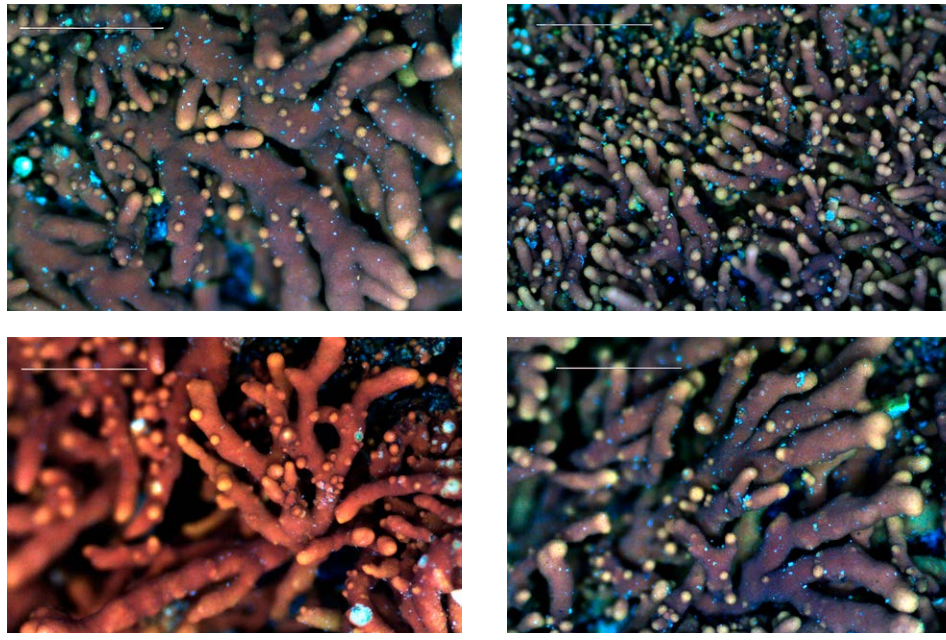

Fig. 6. *Hosseusiella pergracilis* (CL130397), enlarged portions of thalline lobes with isidia in peripheral (top) and central portion of thallus (bottom). Scale 1 mm

The genus *Follmannia* C. W. Dodge was resurrected by Arup *et al.* (2013) based on phylogenetic analyses of nrITS and nrLSU sequences, using a single specimen.

Additional ITS-sequences for *Follmannia orthoclada* are included in this study.

Specimens of *Follmannia orthoclada* examined: Chile, Cuesta Buenos ayres, on rock. Lat.: 29° 35′ 11.7″ S; Long.: 71° 14′ 52.9″ W; Alt.: *ca.* 257 m a.s.l. Coll.: Oh, S.-O., Hur, J.-S., 13.11.2013 [site 04] (CL130409) (KoLRI 020543 voucher for DNA SK H94 = J76). – Chile, Punta Lobos, Huasco Baja, on rock. Lat.: 28° 17′ 15.7″ S; Long.: 71° 10′ 37.6″ W; Alt.: *ca.* 1 m a.s.l. Coll.: Oh, S.-O., Hur, J.-S., 14.11.2013 [site 04] (CL130466) (KoLRI 020602 voucher for DNA SK i00 = J78).

Rehmanniella S. Y. Kondr. et J.-S. Hur, *gen. nov.*

MycoBank no.: MB 824013.

Similar to Neobrownliella, *but differs in having larger, convex areoles with numerous sessile apothecia with a well-developed proper margin, and a well-developed epinecral layer on the outer side of the proper margin.*

Type species: *Rehmanniella wirthii* S. Y. Kondr.

Thallus crustose, areolate or continuous, initially thin, becoming thicker, grey or yellow grey, indistinct and hardly differentiated from the substrate, with numerous rusty, reddish orange biatorine apothecia.

Apothecia 0.2–0.7 mm diam., biatorine, immersed, becoming sessile; proper margin dull orange, dull yellowish orange to dark orange or reddish orange, with whitish pruina on outer side; disc plane, from dull reddish orange to pinkish orange, with yellowish pruina, 5–13 aggregated per areole; in section biatorine, true exciple dull orange or orange-brown in outermost layer of the lateral portion and a hyaline inner portion, a hyaline epinecral layer rich on crystals, the basal portion *Blastenia*-type; algal zone absent in apothecia; paraphyses without swellings towards the tips, richly branched in the upper portion; subhymenium hyaline, with oil droplets; asci 8-spored, mature ascospores rather rare, narrowly ellipsoid, fusiform to almost cylindrical, rather small and with narrow septa. Conidiomata frequent, appearing like small apothecia, dull orange, mature conidia not observed.

Spot tests: Epihymenium and outermost portion of true exciple K+ purple.

Ecology: It grows on siliceous rocks.

Etymology: *Rehmanniella* is named after the Polish geographer, geomorphologist, botanist and explorer Anton Rehmann (1840–1917), who was one of the first collectors of bryophytes and vascular plants in South Africa, during the periods 1875–1877 and 1879–1880. Rehmann published in German and

is regarded as an Austrian botanist. Lviv in Galicia (now Ukraine), where he lived, was then a part of the Austro-Hungarian Empire (as Lemberg).

Distribution: Known only from the type locality in South Africa.

Taxonomic notes: *Rehmanniella* is similar to species of *Neobrownliella*, but differs in having rather large, to 1.5 mm broad areoles with numerous and aggregated, sessile apothecia with a well-developed, pronounced proper margin with a distinct epinecral layer on the outer side of the proper margin, as well as in its position in the *Sirenophila-Lazarenkoiopsis* clade of the Teloschistoideae.

With whitish pruina on the outer side of proper margin of the biatorine apothecia, *Rehmanniella wirthii* resembles the Australian "*Caloplaca*" *johnwhinrayi* S. Y. Kondr. et Kärnefelt, but differs in having biatorine apothecia, in shorter ascospores, and in narrower ascospore septum, as well as in its ecology and in its distribution.

The gene phylogeny of *Rehmanniella* suggested a relationship with the Northern Hemisphere *Lazarenkoiopsis*. However, the support of this branch was extremely low (51–55), while separate monophyletic branches of the *Rehmanniella* and *Lazarenkoiopsis* have high levels of bootstrap support.

Rehmanniella wirthii S. Y. Kondr., *spec. nova*
(Fig. 7)

MycoBank no.: MB 824014.

Similar to Neobrownliella montisfracti*, but differs in having a grey to whitish grey thallus, where the areoles become much thicker and semiconvex in the centre of thallus; in having sessile apothecia, in having a well-developed epinecral layer on the outer side of the proper margin, in having numerous apothecia, often 5–13 per areole, in having longer ascospores, and an African distribution.*

Type: South West Africa, Namibia, distr. Omaruru, Central Namib Desert: Myl72, Languberg, SW vom Gipfel. Lat.: 21° 49′ 43.3″ S; Long.: 14° 04′ 58.6″ E; Alt.: *ca*. 130 m a.s.l. Coll.: Wirth, V. and Heklau, M., 14.05.2002. (STU – holotype, for DNA SK243 and SK244).

Thallus crustose, 1–2 cm wide, grey or dirty whitish grey, hardly differentiated from the substrate, areolate or continuous, thin and flat, becoming thick and uneven with irregularly swollen central portion; upper surface uneven and dusty, mostly distinct because of aggregated dull, rusty reddish orange biatorine apothecia, in contrast to the thallus. Areoles 0.5–1 mm wide, initially thin and flat, becoming thicker to 1–1.5 mm wide, with several apothecia. Thalline areoles 70–90(–100) μm thick in section, with numerous crys-

tals, insoluble in K, 15–25(–35) μm wide, with numerous air bubbles; algal cells (12–)15–20(–22) μm wide.

Apothecia 0.2–0.7 mm diam., biatorine, immersed, becoming sessile, not constricted at base; proper margin 0.3–0.5 mm wide, dull orange, dull yellowish orange to dark orange or reddish orange, pinkish orange, often with a whitish pruina on the outermost lower lateral portion; disc plane, reddish orange to pinkish orange, yellowish pruina, aggregated, often 5–13 per areole; in section biatorine, true exciple 40–50 μm thick in the uppermost lateral por-

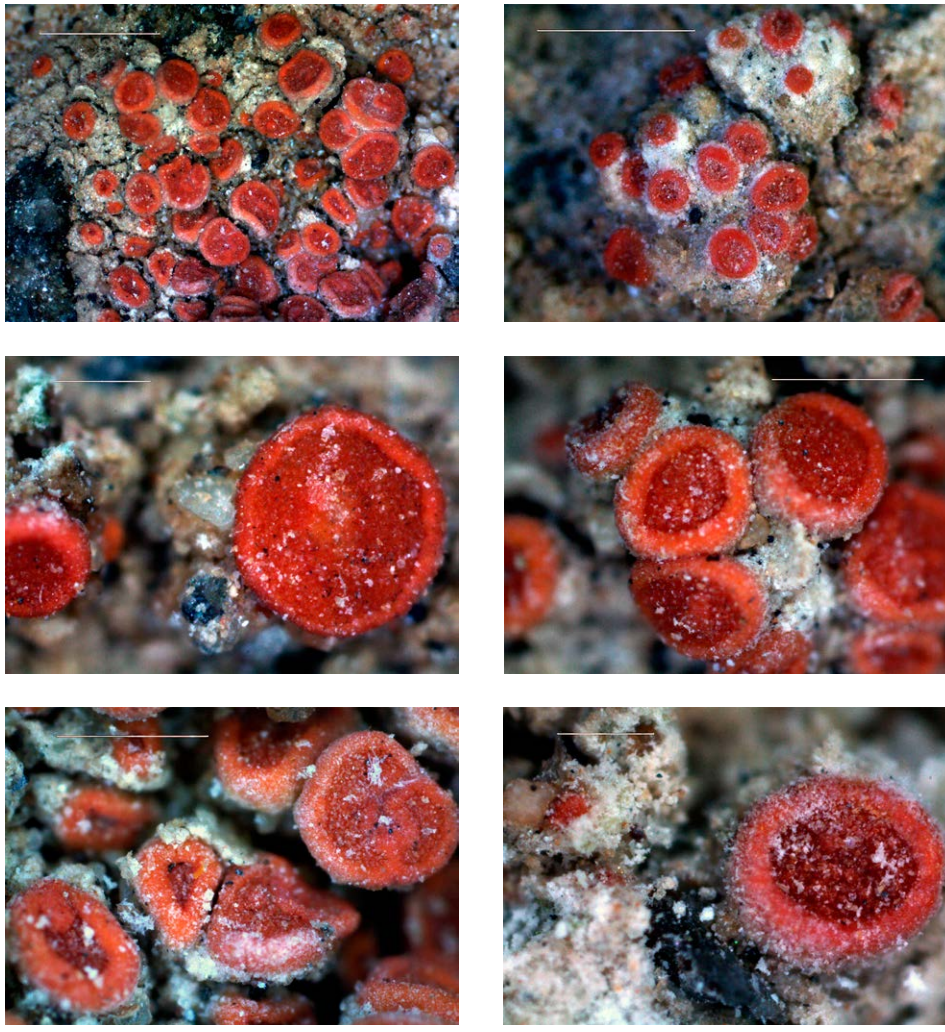

Fig. 7. Rehmanniella wirthii (holotype), general habit (top and centre, scale 1 mm), and enlarged apothecia (bottom, scale 0.5 mm)

tion, distinctly raised above the level of the disc, 60–70 μm wide in the lower lateral portion, outermost layer of lateral portion of true exciple 10–15(–20) μm thick, dull orange or orange-brownish, inner portion 25–35 μm wide, hyaline, supplied with a hyaline, 10–15(–50) μm thick, epinecral layer, broadening in the outer lower portion, rich on the crystals, (10–)15–20(–40) μm across; in basal portion to 20 μm thick, more or less of the *Blastenia*-type (Kondratyuk *et al.* 2014), 50(–90) μm thick, hyaline; algal zone absent in apothecia, thalline algal layer continuous below apothecia; hymenium 60–75 μm high; paraphyses not swollen towards the tips, 3–4(–5.5) μm diam., richly branched in the upper portion; subhymenium (30–)40–70(–80) μm thick, hyaline, with rare oil droplets, 3–4 μm diam.; asci 8-spored, ascospores poorly developed, bipolar ascospores rare, narrowly ellipsoid, fusiform to almost cylindrical 10–12(–14) × (4.2–)4.5–5.5 μm in water and (9–)11–13(–14) × (4.5–)5–6.5 μm in K with attenuated ends; ascospore septum narrow (1–)1.5–2(–3) μm wide in water and (1–)1.5–2(–3) μm thick in K.

Conidiomata frequent, with similar shape to small apothecia, dull orange, mature conidia not observed.

Spot tests: Epihymenium and outermost portion of true exciple K+ purple.

Ecology: Growing on siliceous rocks along cracks in rock surface in somewhat dusty portions, often associated with *Caloplaca* cf. *wesselsii* S. Y. Kondr. et V. Wirth (see also Wirth and Kondratyuk 2010).

Etymology: The species epithet in honour of Volkmar Wirth, who supplied us with the collections of this species.

Distribution: Known from the type locality in the Namib Desert.

Taxonomic notes: *Rehmanniella wirthii* is similar to the Australian species *Neobrownliella montisfracti* (S. Y. Kondr., Elix et Kärnefelt) S. Y. Kondr., Elix, Kärnefelt et A. Thell. Both species have a grey or dirty whitish grey crustose thallus and reddish orange or pinkish orange biatorine apothecia, and grow on siliceous rocks, however *N. montisfracti* differs from *R. wirthii* in having immersed apothecia, shorter ascospores, 7–11 μm long, slightly broader septa, 1.5–3 μm wide, and in distribution (Kantvilas 2016).

The Australian species "*Caloplaca*" *johnwhinrayi* S. Y. Kondr. et Kärnefelt is morphologically similar, but differs in having zeorine apothecia, the presence of oil droplets in the paraphyses and longer ascospores (12–15 μm), with broader septa (3–6 μm). Furthermore, "*C.*" *johnwhinrayi* prefers limestone as substrate (Kantvilas 2016).

New combination

The combined phylogenetic analysis based on ITS nrDNA, 28S nrLSU, and 12S mtSSU sequences shows that the recently described *Sirenophila ovis-*

atra (Søchting *et al.* 2016) is better positioned in the genus *Elixjohnia* and a new combination is proposed here. The species grows on maritime rocks in the *Verrucaria* zone in southern Patagonia, the Falkland Islands and Macquarie Island, often as a parasite on members of the genus *Hydropunctaria*.

Elixjohnia ovis-atra (Søchting, Søgaard et Sancho) S. Y. Kondr., *comb. nova* – MycoBank no.: MB 824015 – Basionym: *Sirenophila ovis-atra* Søchting, Søgaard et Sancho, in Søchting *et al.*, Opuscula Philolichenum 15(2): 2 (2016).

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