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The genus *Hyperphyscia* (Physciaceae, Ascomycota) in Argentina

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Filippini E., Quiroga G., Rodriguez J. M. & Estrabou C. (2015) The genus *Hyperphyscia* (Physciaceae, Ascomycota) in Argentina – Sydowia 67: 25–32.

A total of 13 species of genus *Hyperphyscia* were identified. A description is given for each species, including ecology and distribution data. The taxonomic status of each species is discussed. *Hyperphyscia confusa*, *H. pyrithrocardia* and *H. minor* are new records from Argentina. *Hyperphyscia cochlearis* is synonymous with *H. variabilis*. The new combination *Hyperphyscia endochrysea* is proposed.

Keywords: *Hyperphyscia endochrysea,* lichens, soralia morphology, taxonomy.

Hyperphyscia Müll. Arg. is a genus of lichenised ascomycetes in the family Physciaceae. This genus has a cosmopolitan distribution, it grows on several substrates and it has a foliose thallus with small lobes. *Hyperphyscia* is closely related to *Phaeophyscia*, both share the colour and size of the thallus and cortex without atranorin (K–). However, *Hyperphyscia* is characterised by the foliose, closely adnate thallus, scarce rhizinae or lacking them altogether, and a very thin lower cortex (almost lacking), and the presence of filiform pycnoconidia. Identification of *Hyperphyscia* at species level is difficult due to the overlap in variation range of most of the morphological and anatomical characters used to define species. Also many species are defined by fertile characters, especially the number of septa in mature ascospores (Scutari 1997, Esslinger et al. 2012). However the occurrence of fertile individuals is uncommon.

Other foliose Physciaceae genera in Argentina, such as *Dirinaria, Heterodermia, Phaeophyscia, Physcia* and *Pyxine* have been reviewed (Scutari 1995, Rodriguez et al. 2012); however, *Hyperphyscia* studies are incomplete or the determination of species is doubtful. In Argentina, species of Physciaceae are conspicuous elements of lichen communities (Filippini et al. 2014).

A thorough analysis was made of numerous samples *of Hyperphyscia* collected by the authors in central Argentina and herbaria collections, with details of its distinctive characters, as well as its ecology and distribution in Argentina.

Materials and methods

A total of 120 samples were analysed. These were collected in the Argentine provinces of Catamarca, Córdoba, La Rioja and San Luis. Also specimens from BAFC, CTES, G, and M were examined.

Specimen determinations were made using morphological, anatomical, and chemical characters (Moberg 1987, Scutari 1995, Sipman 2002 and Esslinger et al. 2012). For chemical features, spot tests and thin layer chromatography (TLC) were used to identify the secondary metabolites (Orange et al. 2001). A key to the treated species is provided.

Taxonomy

A total of 13 species of genus *Hyperphyscia* were identified. In the following a complete description is presented including ecology and distribution data. The taxonomic status of each species is discussed. *Hyperphyscia confusa*, *H. pyrithrocardia* and *H. minor* are new records from Argentina. *Hyperphyscia cochlearis* is synonymous with *H. variabilis*. The new combination *Hyperphyscia endochrysea* is proposed.

Characters of taxonomic value

A more accurate terminology is established for the morphology of lobes and soralia.

Shape of lobes

Previous works have documented a wide variation in shape and width. In *Hyperphyscia* at least four morphological patterns were found:

1 – Flat lobes, growing parallel to substrate, not bending upwards or downwards (as in *H. syncolla*).

2 – Convex margin lobes, with margin tips bending slightly downwards.

3 – Ascending margin lobes, with margin tips bending upwards, slightly concave (as in *H. adglutinata*).

4 – Spoon-shaped lobes, broadening at the tips and highly concave (as in *H. variabilis*).

Any of these patterns can be combined with different levels of attachment to the growing surface and there may also be more than one pattern in the same thallus.

Location and morphology of soralia

There is a high infraspecific variation in shape and origin of soralia. Previous descriptions of the morphology of soralia are rather confusing (Scutari 1995, Esslinger et al. 2012). Our observations enable us to propose the next classification of shape and origin of soralia.

Soralia origin can be on thallus lamina (laminal), on thallus margin (marginal) or laminal close to the margin (submarginal). In most of the sorediate species, the central part of the thallus is sometimes fully covered by soralia of indistinguishable origin.

Soralia shapes encountered with higher frequency are: punctiform (on thallus lamina, circular, sometimes crateriform), capitate (sometimes globose), labriform (including semicircular, orbicular, sometimes becoming confluent) and linear (on thallus margin, sometimes becoming reflexed, thus resembling labriform or capitate).

The species

Hyperphyscia adglutinata (Flörke) H. Mayrhofer & Poelt, in Hafellner et al., Herzogia 5: 62 (1979).

Basionym. – *Lecanora adglutinata* Flörke, Deutsche Lichenen 7. Typus. – Germany, Berlin, Flörke Deutsche Lichenen 7. 1819 (Lectotype PC).

Thallus bluish grey to light grey, up to 2 cm in diameter, orbicular, prothallus absent. Lobes 0.5 to 1 (–3) mm wide, flat and sometimes with ascending margin, adnate. Upper surface shiny, epruinose. Medulla white. Lower surface light brown at the centre, white at the margins. Soralia mainly laminal, arising from small protrusions or lobules on the lobe surface, maculiform or capitate. Isidia absent. Apothecia not seen. Pycnidia not seen. TLC no substances found.

Discussion. – This species is very similar to *H. variabilis* but differs from the latter because of its marginal soralia.

Distribution. – This species is known from Europe, Africa, Australia, and America, and for Argentina it has been cited from the provinces of Buenos Aires, Córdoba and Jujuy (Scutari 1995, Calvelo & Liberatore 2002, Filippini et al. 2014).

Material examined. – ARGENTINA, Córdoba, Alejandro Roca, on bark of *Prosopis* sp., 28 Oct 2013, *leg. et det.* E. Filippini N° 2831, N° 2867, N° 2909, N° 2910, N° 2929, N° 3934, N° 3935 (CORD); Córdoba, General Deheza, on bark of *Celtis ehrenbergiana*, 20 Nov 2013, *leg. et det.* E. Filippini N° 2874, N° 2908, N° 2914, N° 2922 (CORD); Córdoba, Parque General San Martín, on bark, *leg. et det.* G. Torres N° 2905 (CORD); Córdoba, Estancia Yucat, on bark of *Celtis ehrenbergiana*, 1 May 2014, *leg. et det.* E. Filippini N° 2938, N° 2937 (CORD).

Hyperphyscia confusa Essl., C. A. Morse & S. Leavitt, in Esslinger et al., The Bryologist 115 (1): 31 (2012).

Typus. – USA, Nebraska, Holt. Co.: 1.5 mi S, 1 mi E of O'Neill, private land near Dry Creek State Wildlife Management Area, 42°26.03´N, 98°37.03´W, elev. ca. 598 m, riparian woods of cottonwood, eastern red cedar, American elm, Chinese elm, silver maple; on bark of silver maple, abundant, 17/V/2009, Advaita 7447 (Holotype KANU).

Thallus greenish grey, up to 3 cm in diameter, circular, prothallus absent. Lobes 1 to 3 mm wide, loosely adnate and with slightly ascending margins. Upper surface not shiny, epruinose. Medulla white. Lower surface pale brown to white near the margins and occasionally dark in centre. Soralia marginal, in crescent shape becoming reflexed to labriform, globose when mature and becoming confluent at the centre of the thallus. Isidia absent. Apothecia not seen. Pycnidia not seen. TLC no substances found.

Discussion. – *Hyperphyscia confusa* resembles *H. adglutinata*, but morphology and origin of soralia are different. In *H. confusa* soralia are coarsely granular and sometimes pseudocorticate and isidioid, which gives the thallus a more coarse aspect to the naked eye.

Distribution. – It is known from America and this is the first record from Argentina.

Material examined. – ARGENTINA, Córdoba, Alejandro Roca, on bark of *Prosopis* sp., 28 Oct 2013, *leg. et det.* E. Filippini N° 2832, N° 2938, N° 2940 (CORD).

Hyperphyscia coralloidea (Lynge) Scutari, in Scutari, The Lichenologist 23: 21 (1991).

Basionym. – *Physcia coralloidea* Lynge, in Vid. Selsk. Skrifter I. Math. Naturv. Kl. 16: 30 (1924). Typus. – Brasil,

Rio Grande do Sul, Pelotas, Malme, Lichenes 859C (Holoype S, isotype UPS).

Thallus greenish, up to 3 cm in diameter, orbicular, black prothallus often present. Lobes up to 5 mm wide, slightly imbricate with ascending margin, loosely adnate. Lobe margins with granular to coralloid "isidia". Upper surface pruina scattered. Medulla white. Lower surface pale brown to white near the margin, blackish at the centre. Apothecia dark brown to black disc, ascospores *Pachysporaria*-type, 16–20 × 9–11 µm, 1-septate. Pycnidia not seen. TLC no substances found.

Discussion. – For a more complete discussion see description of *H. granulata* below. Scutari (1995) used *H. coralloides* to refer to this species.

Distribution. – This species is known from Africa and South America (Brazil) and for Argentina it has been cited from the provinces of Buenos Aires and Córdoba (Scutari 1995, Rosato & García 2014).

Material examined. – ARGENTINA, Chaco, Resistencia, on bark of *Erythrina crista-galli*, 28 May 1994, *leg.* C. Vesconi, *det.* E. Filippini et al. Nº 11 (CTES); Córdoba, Alejandro Roca, on bark of *Celtis ehrenbergiana*, 29 Oct 2013, *leg. et det.* E. Filippini Nº 2833, Nº 2865, Nº 2879, Nº 2890, Nº 2919, Nº 2926 (CORD); Córdoba, Estancia Yucat, on bark of *Prosopis* sp., 1 May 2014, *leg. et det.* E. Filippini Nº 2834, Nº 2880, Nº 2889 (CORD); Córdoba, General Deheza, on bark of *Celtis ehrenbergiana,* 20 Nov 2013, *leg. et det.* E. Filippini Nº 2872, Nº 2878, Nº 2882, Nº 2883, Nº 2885, Nº 2886, Nº 2887, Nº 2888, Nº 2933 (CORD); Córdoba, Reserva Natural Vaquerías, on bark of *Lithraea molleoides*, 10 Nov 1993, *leg.* L. García, *det.* E. Filippini Nº 2881 (CORD); Córdoba, Marcos Juárez, on bark, 8 Jun 2013, *leg. et det.* E. Filippini Nº 2884 (CORD).

Hyperphyscia endochrysea (Nyl.) Filippini, Quiroga, J. M. Rodr., Estrabou, **comb. nov.**
MycoBank no.: MB 812897

Basionym. – *Physcia* endochrysea (Nyl.) Hampe, in Krempelhuber Flora 61: 480 (1878). *Physcia obscura* f. *endochrysea* Nyl, in Nylander, Acta Societatis Scientiarum Fennicae, 7: 440 (1863). Typus. – Argentina, Lorentz & Hieronymus, 1872–1874 (lectotype designated here M!).

Thallus brownish green to dark brown, up to 3 cm in diameter, orbicular, black prothallus present. Lobes up to 0.5 mm wide, flat, closely adnate, slightly elongate. Upper surface shiny, black. Medulla whitish, on lower layers partially orange to orange-red (K+ purple). Lower surface black, fused to substrate. Vegetative propagules absent. Apothecia up to 1.5 mm in diameter, black disc (Figs. 1–2), ascospores *Pachysporaria*-type, 20–23 × 8–10 µm, 1-septate. Pycnidia not seen. TLC skyrin.

Discussion. – Scutari (1992, 1995) published this taxon as *Physcia endochrysea* Kremp. She indicated that this taxon should be transferred to *Hyperphyscia*. Calvelo & Liberatore (2002) erroneously mention *Hyperphyscia endochrysea* (Kremp.) Moberg. Moreover, following Art. 49 of Melbourne Code the earlier author of the transferred name *Physcia obscura* f. *endochrysea* was Nylander. Therefore the correct name of the new combination is *Hyperphyscia endochrysea* (Nyl.) Filippini et al. The lectotype was selected by Roland Moberg in 1990 but it has never been published.

Distribution. – This species is known from America (Uruguay and Mexico) and for Argentina it has been cited from the provinces of Buenos Aires, Catamarca, San Luis and Córdoba (Scutari 1995, Filippini et al. 2014).

Material examined. – ARGENTINA, Córdoba, Loma Bola, near Villa Dolores, on bark of *Prosopis nigra*, 15 May 2011, *leg.* Rodriguez, *det.* Filippini et al. Nº 2847 (CORD).

Hyperphyscia granulata (Poelt) Moberg, in Moberg, Nord. J. Bot. 7(6): 721 (1987).

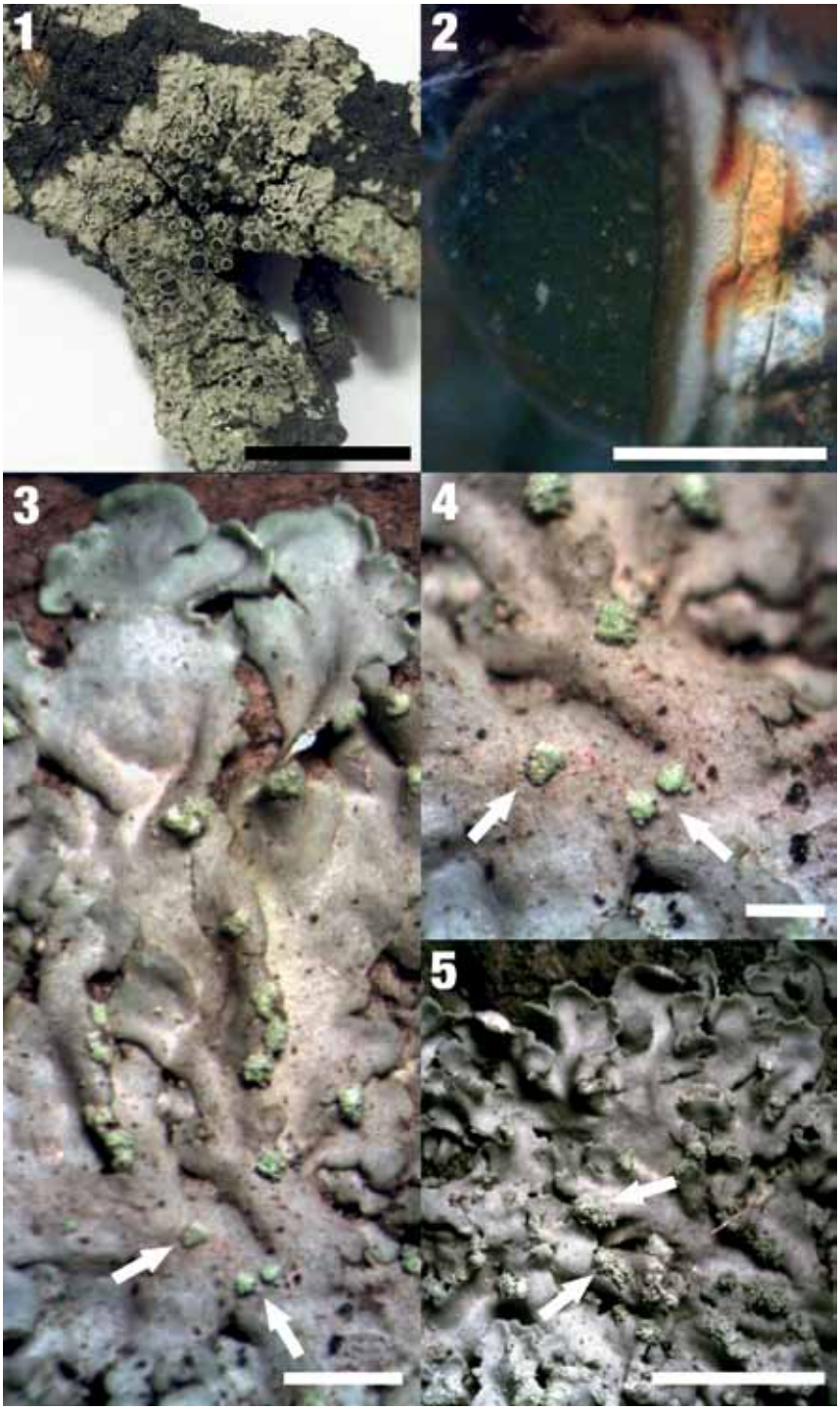
Basionym. – *Physciopsis granulata* Poelt, Khumbu Himal 6: 91 (1974). Typus. – Nepal, Ost-Nepal, oberhalb Domre, subtropische Stufe, 1962 Poelt L1747 (Holotype M!).

Thallus light grey, bluish grey, sometimes dark ash, up to 3 cm, irregular, dark grey prothallus not always visible. Lobes up to 1 (–1.5) mm wide, adnate and slightly ascending margin exposing orange lower surface. Upper surface shiny, epruinose. Medulla white with orange spots. Lower surface black, but orange tinge in lobe tips. Soralia absent. Isidia globular, covering inner parts, sometimes resembling granular soredia. Apothecia dark brown to black disk, 0.5–1 mm in diam., crenate margins, ascospores 15–24 × 8–11 µm, 1-septate. Pycnidia immersed, pycnoconidia filiform, 12–15 µm long. TLC skyrin.

Discussion. – *Hyperphyscia granulata* has isidia that resemble granular soralia or isidioid granules. Thus it can be confused with *H. coralloidea*; however the laminal origin of isidia and their easily observable cortex separate them. Besides *H. granulata* has an orange tinge in the lower surface of marginal lobes while *H. coralloidea* is completely black on the underside.

Distribution. – It is known from Africa, Eurasia, Asia, Central and South America. For Argentina it has been cited from the provinces of Buenos Aires and Córdoba (Scutari 1995, Rodriguez et al. 2009). This is the first record from the province of Entre Ríos.

Material examined. – ARGENTINA, Entre Ríos, Parque Nacional Pre-Delta, on bark, 27 Apr 1997, *leg.* M. Vercesi, *det.* N. Scutari, Nº221 (BACF); Córdoba, Estancia



Figs. 1–2. *Hyperphyscia endochrysea*. **1.** Thallus appressed with lobes up to 0.5 mm wide, flat, and closely adnate. Bar 1 mm. **2.** Apothecia in cross section: medulla orange (arrows). Bar 2 mm. **Figs. 3–5.** *Hyperpyscia variabilis*. **3.** Lobes up to 3 mm wide with ascending margin and laminal to submarginal soralia. Bar 2 mm. **4.** Detail of laminal soralia from Fig. 3. Bar 1 mm. **5.** Lobes up to 1 mm wide with spoon-shaped and a few orbicular soralia. Bar 3 mm.

Yucat, on bark of *Celtis ehrenbergiana*, 1 May 2014, *leg. et det*. E. Filippini N° 2836, N° 2891, N° 2892, N° 2893, N° 2936 (CORD).

Hyperphyscia minor (Fée) D. D. Awasthi, in J. of the Hattori Bot. Lab. 65: 208 (1988).

Basionym. – *Parmelia minor* Fée, Essai Crypt. Exot. (Paris): 125. 1824. Typus. – Martinique (Antilles?), ad ramos *Quassiae excelsae* (holotype G).

Thallus brownish grey, up to 2 cm in diameter, irregular. Lobes up to 0.5 mm wide, flat closely adnate, black prothallus present. Upper surface shiny, epruinose. Medulla spotted with orange pigments (K+ dark purple). Lower surface black. Soralia submarginal, globose. Isidia not seen. Apothecia up to 1 mm in diameter, disc dark brown, soft edge, ascospores *Pachysporaria*-type, 13.7–19 × 7–9.3 µm, 1-septate. Pycnidia not seen. TLC skyrin and unknown substances, brown grey, after charring R_f 5.

Discussion. – This species is characterised by the black prothallus, the closely adnate lobes, and the partially orange medulla.

Distribution. – It is known from Asia and America, this is the first record from Argentina.

Material examined. – ARGENTINA, Córdoba, Estancia Yucat, on bark of *Acacia caven*, 5 Jul 2012, *leg. et det*. E. Filippini N° 2837, N° 2927(CORD); Córdoba, Alejandro Roca, on bark *Prosopis* sp., 28 Oct 2013, *leg. et det*. E. Filippini N° 2928 (CORD).

Hyperphyscia pandani (H. Magn.) Moberg, in Moberg, Nord. J. Bot. 7(6): 722 (1987).

Basionym. – *Physcia pandani* H. Magn., in Magnusson & Zahlbruckner, Ark. Bot. 32(2): 65 (1945). Typus. – Hawaiian Islands, Kauai, Haena bay, on *Pandanus* sp., 1983 Selling 5628 (holotype S, isotype UPS).

Thallus light brown, coalescent, up to 2 cm in diameter, irregular, prothallus absent. Lobes up to 0.8 mm (–1 mm) wide, mainly spoon-shaped, loosely adnate with orange rim, and some flat. Upper surface epruinose, shiny. Medulla orange (K+ dark purple). Lower surface black, lightening at lobe tips to orange. Soralia submarginal to laminal, isidium like, globose to capitate, confluent on thallus centre becoming maculiform. Apothecia not seen. Pycnidia not seen. TLC skyrin and unknown substances, brown grey, after charring R_f 5.

Discussion. – It is easily distinguishable by the combination of orange medulla, spoon-shaped lobes, and lack of prothallus.

Distribution. – It is known from Africa, Australia, America, Asia and for Argentina it has been cited from the provinces of Buenos Aires and Córdoba (Scutari 1995, Rodriguez et al. 2009).

Material examined. – ARGENTINA, Córdoba, Vaquerías, on bark of *Lithraea molleoides*, 10 Sept 1993, *leg.* C. Estrabou and L. García, *det*. N.C. Scutari N° 2838 (CORD); Córdoba, Reserva Natural Vaquerías, on bark of *Celtis ehrenbergiana*, 10 Jun 1993, *leg.* C. Estrabou and L. García, *det*. E. Filippini N° 2838 (CORD); San José de las Salinas, on bark of *Prosopis nigra*, 12 May 2001, *leg.* C. Estrabou, *det*. R. Moberg N° 2839 (CORD).

Hyperphyscia pruinosa Moberg, in Moberg, Nord. J. Bot. 7(6): 723 (1987).

Typus. – Kenya, Central Prov., Mt. Kenya National Park, Sirimon Track (Sirimon Gate-Campsite), 0° 03´ S, 37° 17´E, alt. 2850 m, on trunk of *Podocarpus milanjianus*, 1979, Moberg 4042 (holotype UPS!, isotype BAFC 37383!).

Thallus light grey to bluish grey, up to 5 cm in diameter, irregular, prothallus absent. Lobes up to 2 mm wide, flat but some with ascending margin, loosely adnate, crenate. Upper surface weakly pruinose to epruinose, shiny. Medulla white. Lower surface black at the centre, brown to pale at the margins. Soralia submarginal, globose to capitate, granular at the centre. Isidia absent. Apothecia abundant, dark brown to black disc, sorediate margins, ascospores *Pachysporaria*-type, 17.6–20.1 × 9.2–10.9 µm, 1-septate. Pycnidia frequent, pycnoconidia filiform, 10.9–13.7 × 0.9–1.1 µm. TLC no substances found.

Discussion. – The presence of pruina is highly variable and should not be used as a character of taxonomic value for the identification of this species, at least in Argentinian specimens.

Distribution. – This species is known from Africa, Australasia, Central and South America. It has been cited from the province of Buenos Aires (Scutari 1995) and this is the first record from the province of Córdoba.

Material examined. – ARGENTINA, Córdoba, Alejandro Roca, on bark of *Celtis ehrenbergiana*, 29 Oct 2013, *leg. et det*. E. Filippini N° 2840 (CORD); Córdoba, Estancia Yucat, on bark of *Celtis ehrenbergiana*, 2 May 2014, *leg. et det*. E. Filippini N° 2894, N° 2895, N° 2896, N° 2897, N° 2898, (CORD); Córdoba, General Deheza, on bark of *Celtis ehrenbergiana*, 20 Nov 2013, *leg. et det*. E. Filippini N° 2923, N° 2924, N° 2932 (CORD).

Hyperphyscia pyrithrocardia (Müll. Arg.) Moberg & Aptroot, in Aptroot, Flora of the Guianas, Series E: Fungi and Lichens. Pyxinaceae 34 (1987).

Basionym. – *Physcia adglutinata* var. *pyrithrocardia* Müll. Arg., Flora 63: 278 (1880). Typus .– Venezuela, Caracas, Ernst 23 (G, holotype).

Thallus greenish grey, up to 6 cm in diameter, irregular, foliose but slightly crustose, black prothallus often present. Lobes 0.1 – 0.6 mm (–1 mm) wide, with convex margin and a few with ascending

margins, some tips are crenulated. Upper surface shiny, epruinose, flaking exposing the medulla. Medulla white, with orange patches (K+ dark purple/violet). Lower surface mainly black, with orange patches (K+ purple/violet) but in some areas more whitish. Soralia laminal, punctiform at the beginning, confluent at the centre of thallus. Isidia marginal, not on all lobes. Apothecia disc light brown coloured, ascospores *Physcia*-type, 15.8–20.5 × 7.1–8.3 µm, 1-septate. Pycnidia not seen. TLC skyrin and unknown substances, brown grey, after charring R_f 5.

Discussion. – This species is easily distinguishable by the combination of slightly crustose thallus, with flaking upper cortex exposing the orange spotted medulla.

Distribution. – It is known from South America (Venezuela and Surinam). This is the first record from Argentina.

Material examined. – ARGENTINA, Córdoba, Capilla del Monte, near Cruz del Eje, on bark of *Prosopis nigra*, *leg.* F. Robbiati, *det.* E. Filippini et al. N° 2097 (CORD); Córdoba, Estancia Yucat, on bark of *Acacia caven*, 23 Mar 2013, *leg.* L. Battistón, *det.* E. Filippini et al. N° 2842 (CORD).

Hyperphyscia syncolla (Nyl.) Kalb, in Lichenes Neotropici, fasc. 6 (201–250): 11 (1983).

Basionym. – *Physcia syncolla* Tuck. ex Nyl, Acta Soc. Sci. Fenn. 7: 441 (1863). Typus .– Nova Granata, Villeta, 1200 m, 1860 Lindig (holotype, PC).

Thallus green, grey, greyish brown to dark grey, foliose but with verrucose aspect at the centre, 1 to 3 cm in diameter, prothallus absent. Lobes up to 1 mm wide, flat closely adnate, but in some substrates loosely adnate. Upper surface weakly pruinose but sometimes densely pruinose. Medulla white. Lower surface pale to light brown in the lobes and dark brown at the centre. Vegetative propagules absent. Apothecia abundant, black disc, ascospores *Pachysporaria*-type, 11.9–19.9 × 6.9–12.1 µm, 1-septate. Pycnidia not seen. TLC no substances found.

Discussion. – The absence of soralia and abundantly occurrence of apothecia is a key factor to identify this species. It can be confused with *H. endochrysea*, but can be differentiated by its white medulla and pale underside, while *H. endochrysea* has a black underside and the medulla is partially orange to orange-red.

Distribution. – It is known from Africa, Australia, Asia, North and South America. For Argentina it has been cited from the provinces of Buenos Aires, Jujuy, Misiones, and Santiago del Estero (Calvelo & Liberatore 2002). This is the first record from the provinces of Catamarca, Córdoba, Corrientes, La Rioja, and San Luis.

Material examined. – ARGENTINA, Catamarca, RN 38 near El Portezuelo, on bark of *Acacia furcatispina*, 12 Jul 2011, *leg. et det.* J.M. Rodriguez N° 2863, N° 2864 (CORD); La Rioja, Parque Nacional Talampaya, on shrub, Sep 2006, *leg.* L. Dominguez, *det.* J.M. Rodriguez N° 2844 (CORD); La Rioja, Famatina, on bark, Oct 2014, *leg.* N. Cantón, *det* E. Filippini N° 2860, N° 2862 (CORD); San Luis, Reserva Mogote Bajo, on bark of *Lithraea molleoides*, 15 May 2011, *leg.* J.M. Rodriguez, *det.*E. Filippini N° 2845 (CORD); Corrientes, Estancia Coem-Botá, on bark, 18 Jul 1992, *leg.* L. Ferraro, *det.* N. Scutari N° 4218, N° 4197 (CTES); Corrientes, Río Uruguay and Arroyo Cuay Grande, on bark, 6 Sep 1979, *leg.* L. Ferraro, *det.* N.C. Scutari N° 1562 (CTES); Corrientes, Facultad de Ciencias Agrarias, on bark, 24 Jun 1992, *leg.* L. Ferraro, *det.* N.C. Scutari N° 4181 (CTES); Corrientes, Paso de la Patria, on bark, 16 Jun 1993, *leg.* L. Ferraro, *det.* N.C. Scutari N° 4506 (CTES); Corrientes, Tabay, on bark, 6 Jun 1993, *leg.* L. Ferraro, *det.* N.C. Scutari N° 2615 (CTES); Córdoba, Espinillo Bravo, near Punilla, on bark of *Lithraea molleoides*, 13 Jun 2009, *leg.* J.M. Rodriguez, *det.* E. Filippini et al. N° 2140 (CORD); Córdoba, Espinillo Bravo, near Punilla, on bark of *Acacia caven*, 13 Jun 2009, *leg.* J.M. Rodriguez, *det.* E. Filippini et al. N° 2213 (CORD); Córdoba, San Javier, on bark of *Prosopis* sp., 16 May 2011, *leg.* J.M. Rodriguez, *det.* E. Filippini N° 2853, N° 2854, N° 2855(CORD); Córdoba, Loma Bola near El Pueblo, on bark of *Prosopis nigra*, 15 May 2011, *leg.* J.M. Rodriguez, *det.* E. Filippini N° 2835 (CORD); Córdoba, San José de las Salinas, on bark of *Prosopis nigra*, May 2001, *leg.* C. Estrtabou, *det.* E. Filippini N° 1702, N° 1703 (CORD); Córdoba, Miramar near Río Segundo river mouth, on bark, 24 May 2005, *leg.* J.M. Rodriguez, *det.* E. Filippini N° 2178 (CORD); Córdoba, San Vicente, on bark of *Melia azedarach,* Apr 1997, *leg. et det.* C. Estrabou N° 2359 (CORD); Córdoba, Estancia Yucat, on bark of *Celtis ehrenbergiana*, 1 May 2014, *leg. et det.* E. Filippini N° 2846, N° 2856, N° 2859 (CORD); Córdoba, Alejandro Roca, on bark of *Celtis ehrenbergiana*, 27 Mar 2014, *leg. et det.* E. Filippini et al. N° 2843, N° 2930 (CORD).

Hyperphyscia tuckermanii (Lynge) Moberg, in Moberg, Nord. J. Bot. 7 (6): 725 (1987).

Basionym. – *Physcia tuckermanii* Lynge (ad. int.), Vid. Selsk. Skrifter I. Math. Naturv. Kl. 16:37 (1924). Typus. – Brasil, Rio Grande do Sul, Santo Angelo (pr. Cachoeira), Serro Pellado, *leg.* Malme, Lichenes n° 952 (holotype S).

Thallus greyish brown, slightly shiny, orbicular, to 2 cm in diameter, prothallus absent. Lobes up to 1 mm wide, flat, loosely adnate. Upper surface weakly pruinose. Medulla white. Lower surface black, paler near the margins, occasionally with orange spots. Isidia marginal, flat (phyllidia), resembling tiny lobes more abundant in central than outer lobes, sometimes underdeveloped and others with darkened filidia tips. Apothecia dark brown to black disc, ascospores *Pachysporaria*-type 18–21 × 11–12 µm, 1-septate. Pycnidia not seen. TLC no substances found.

Discussion. – This species is easily identifiable by its flat marginal filidia that are slightly erect

resembling *H. coralloidea* granules. However the lobules in *H. coralloidea* are marginal.

Distribution. – It is known from Africa and South America (Brazil). For Argentina it has been cited from the provinces of Buenos Aires and Córdoba (Scutari 1995, Filippini et al. 2014).

Material examined. – ARGENTINA, Córdoba, Reserva Natural Vaquerías, near Valle Hermoso, on bark of *Lithraea molleoides*, 22 Nov 1993, *leg.* C. Estrabou, *det.* R. Moberg Nº 2848 (CORD); Córdoba, Alejandro Roca, on bark of *Celtis ehrenbergiana*, 27 Mar 2014, *leg. et det.* E. Filippini et al. Nº 2861, Nº 2858 (CORD); Córdoba, Alejandro Roca, on bark of *Celtis ehrenbergiana*, 29 Oct 2013, *leg. et det.* E. Filippini et al. Nº 2849 (CORD); Córdoba, General Deheza, on bark of *Celtis ehrenbergiana,* 20 Sep 2013, *leg. et det.* E. Filippini Nº 2857 (CORD).

Hyperphyscia variabilis Scutari, in Scutari, The Lichenologist 23: 22 (1991).

Typus. – Brazil, Brasilia, Fleig 2992 (H Holotype).

Syn. nov. *Hyperphyscia cochlearis* Scutari, in Scutari, Mycotaxon 62: 94 (1997). Typus. – Brazil, Sao Paulo, Serra das Contas, oberhalb von Socorro, etwa 130 km nördlich von Sao Paulo, 800 m, 15-IV-1979, *leg.* K. Kalb & G. Plöbst (KALB-holotypus).

Thallus: bluish grey to greenish grey, up to 6 cm in diameter, orbicular, prothallus absent. Lobes: 1 to 2.5 (–4) mm, ascending margin to spoon-shaped, adnate loosely adnate, sometimes imbricate. Upper surface: shiny, epruinose or with spots of pruina, Medulla: white. Lower surface: brown to dark brown at the centre, white or paler at the margins. Soralia: marginal to submarginal (rarely laminal), punctiform becoming capitate and confluent, linear to irregular, towards the centre. Isidia: absent. Apothecia: not seen. Pycnidia: not seen. TLC: no substances found.

Discussion. – Morphological characters of this species are highly variable, (Scutari 1997). Lobes (width and shape), soralia (origin and shape), coloration on both upper and lower surface and presence of pruina overlaps widely with *H. cochlearis* and *H. adglutinata*. Among these three similar species the key factor in separating *H. adglutinata* is the origin of soralia, the latter being laminal.

The *H. variabilis* specimens studied in this work present lobes up to 3 mm wide, with ascending margin, to spoon-shaped, and the shape and position of soralia are quite variable. We also observed specimens with intermediate lobes and soralia morphology (Figs. 3–5). Moreover, Scutari (1997) remarks that when sterile, it is impossible to separate *H. variabilis* from *H. cochlearis,* and the only distinctive character is the presence of 3-septate ascospores in the former and 1-septate ascospore in the latter. This difference is problematic because the 3-septate ascospores are only found in the holotype. Neither Scutari's specimens nor our specimens have apothecia. Esslinger et al. (2012) also highlight that in these species 3-septate mature ascospores are often present. Therefore we propose the synonym of *H. cochlearis* in *H. variabilis*.

Distribution. – Is is known from Africa and South America (Brazil). For Argentina it has been cited from the provinces of Buenos Aires and Córdoba (Scutari 1995).

Material examined. – ARGENTINA, Córdoba, Alejandro Roca, on bark of *Celtis ehrenbergiana*, 28 Oct 2014, *leg. et det.* E. Filippini Nº 2851, Nº 2865, Nº 2901, Nº 2903, Nº 2904, Nº 2911, Nº 2921, Nº 2925, Nº 2931, Nº 2939 (CORD); Córdoba, General Deheza, on bark of *Prosopis* sp., 20 Nov 2013, *leg. et det.* E. Filippini Nº 2852, Nº 2876, Nº 2869, Nº 2876, Nº 2869, Nº 2899, Nº2900, Nº 2915, Nº 2907, Nº 2906, Nº 2918, Nº 2920 (CORD); Córdoba, Vertientes de La Granja, on bark of *Magnolia* sp., 5 Jan 2012, *leg. et det.* J.M. Rodriguez Nº 2902 (CORD); Estancia Yucat, on bark, *leg.* J.M. Rodriguez, *det.* E. Filippini Nº 2916 (CORD); Córdoba, Cerro Colorado, on bark of *Celtis ehrenbergiana*, 12 Jul 2007, *leg.* J.M. Rodriguez, *det.* E. Filippini Nº 2917 (CORD).

Hyperphyscia viridissima (Müll. Arg.) Scutari, in Scutari, The Lichenologist 23: 21 (1991).

Basionym. – *Physcia viridissima* Müll. Arg., Flora 63: 278 (1880). Typus .– Argentina, Buenos Aires, *leg.* Schynder 15 (holotype G!).

Thallus: grey to whitish grey at the margins and dark green at the centre, up to 0.5 cm in diameter, orbicular, coalescent with other thalli, prothallus sometimes present, dark grey. Lobes: 0.5 to 1 mm wide, flat, closely adnate. Upper surface: shiny, epruinose, Medulla: white. Lower surface: white. Vegetative propagules: absent. Apothecia: up to 1 mm in diameter, disc dark brown to black, ascospores *Conradii*-type 19–26 × 9 µm, 3-septate. Pycnidia: not seen. TLC: no substances found.

Discussion. – *Hyperphyscia viridissima*, *H. syncolla* and *H. endochrysea* are the only three species lacking vegetative propagules. *Hyperphyscia viridissima* can be distinguished from the other two by its closely adnate thallus, resembling a crustose lichen, the presence of prothallus, and the 3-septate ascospores.

Distribution. – It is known from South America (Uruguay and Brazil). For Argentina it has been cited from the provinces of Buenos Aires and Tucuman (Scutari 1995, Calvelo & Liberatore 2002). This is the first record from the province of Córdoba.

Material examined. – ARGENTINA, Córdoba, Corral de Bustos, on bark of *Fraxinus americana*, 10 Oct 2013, *leg.* S. Silva, *det.* E. Filippini Nº 2850 (CORD).

Key to *Hyperphyscia* species

1. Thallus without vegetative propagules 2
1*. Thallus with vegetative propagules..... 4
2. Medulla partially orange to orange-red, lower surface black ..... *H. endochrysea*
2*. Medulla white, lower surface white to light brown in the lobes, dark brown at the centre, not black 3
3. Lower surface white, ascospores 1-septate ..... *H. syncolla*
3*. Lower surface pale to light brown at the lobes, dark brown at the centre, ascospores 3-septate ..... *H. viridissima*
4. Medulla orange 5
4*. Medulla entirely white or with orange patches (only in medulla of lower layers) 6
5. Upper cortex sometimes flaking, black prothallus present ..... *H. pyrithrocardia*
5*. Upper cortex not flaking, black prothallus absent ..... *H. pandani*
6. Isidia present, marginal, small and flat (phyllidia) or laminal 7
6*. Soralia present or Isidium-like granules (always of marginal origin)..... 8
7. Isidia marginal, flat (phyllidia) *H. tuckermanii*
7*. Isidia laminal, globose (sometimes resembling soralia), medulla sometimes spotted with orange pigments ..... *H. granulata*
8. Granules marginal, resembling isidium-like structures, soralia absent ..... *H. coralloidea*
8*. Granules absent, soralia present 9
9. Soralia initially laminal 10
9*. Soralia initially marginal..... 11
10. Medulla white ..... *H. adglutinata*
10*. Medulla (sometimes only in lower layers) spotted with orange pigments (K+ dark purple) ..... *H. minor*
11. Soralia in crescent shape becoming reflexed to labriform, coarsely granular, sometimes pseudocorticate and isidioid (coarse aspect to the naked eye)..... *H. confusa*
11*. Soralia different..... 12
12. Soralia globose, turning confluent with granular soredia at the centre..... *H. pruinosa*
12*. Soralia very variable (punctiform, globose, linear, confluent) ..... *H. variabilis*

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References

Calvelo S., Liberatore S. (2002) Catálogo de los Líquenes de la Argentina. *Kurtziana* **29**(2): 1–4.

Esslinger T. L., Morse C. A., Leavitt S. D. (2012) A new North American species of *Hyperphyscia* (*Physciaceae*). *The Bryologist* **115**(1): 31–41.

Filippini E. R, Rodríguez J. M., Estrabou C. (2014) Lichen community from an endangered forest under different management practices in central Argentina. *Lazaroa* **35**: 55–63. doi: 10.5209/rev_LAZA.2014.v35.45637.

Moberg R. (1987) The genera *Hyperphyscia* and *Physconia* in East Africa. *Nordic Journal of Botany* **7**(6): 719–728.

Orange A., James P. W., White F. J. (2001) *Microchemical methods for the identification of lichens*. British Lichen Society.

Rodriguez J. M., Estrabou C., Fenoglio R., Robbiati F., Salas M. C., Quiroga G. (2009) Recuperación post-fuego de la comunidad de líquenes epífitos en la provincia de Córdoba, Argentina. *Acta Botanica Brasilica* **23**(3): 854–859.

Rodriguez J. M., Estrabou C., Quiroga G. (2012) El género *Heterodermia* (Lecanorales-*Physciaceae*) en el centro norte de Argentina. *Acta Botanica Brasilica* **26**(4): 1000–1005.

Rosato V. G., García R. A. (2014) Clave de líquenes creciendo sobre cemento y hormigón en la provincia de Buenos Aires, Argentina. *Glalia* **6**(1): 1–14.

Scutari N. C. (1992) Estudios sobre Pyxinaceae foliosas (Lecanorales, Ascomycotina) de la Argentina, IV: clave de los géneros y las especies de la Provincia de Buenos Aires. *Boletín de la Sociedad Argentina de Botánica* **28**: 169–173.

Scutari N. C. (1995) Los macrolíquenes de Buenos Aires, I: *Dirinaria*, *Heterodermia* e *Hyperphyscia* (Physciaceae, Ascomycotina). *Darwiniana* **33**(1–4): 149–176.

Scutari N. C. (1997) Three new species of *Hyperphyscia* (Physciaceae, lichenised Ascomycotina), with a revision of *Hyperphyscia adglutinata*. *Mycotaxon* **61**: 87–102.

Sipman H. (2002) *Compiled, provisional key to the species of Hyperphyscia with short diagnoses;* http://www.bgbm.org/sipman/keys/Hyperphyscia.htm (accessed 17 Nov 2014).

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