

CONTRIBUTION TO THE KNOWLEDGE OF THE LICHEN BIOTA OF BOLIVIA. 8

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Abstract. This paper presents new records of 135 lichen taxa in Bolivia. Two species, *Myriotrema laeviusculum* (Nyl.) Hale and *Graphis tenoriensis* Chaves & Lücking, are new for the Southern Hemisphere; two, *Cladonia uncialis* (L.) Weber ex F. H. Wigg. and *Thelocarpon laureri* (Flot.) Nyl., are new for South America; and 27 species are new for Bolivia: *Acanthotrema brasilianum* (Hale) Frisch, *Bulbothrix laevigatula* (Nyl.) Hale, *B. lepreurii* Aubel, *Canoparmelia salacinifera* (Hale) Hale, *Catolechia wahlenbergii* (Flot. ex Ach.) Körb., *Chapsa alborosella* (Nyl.) Frisch, *Coccocarpia dissecta* Swinscow & Krog, *Graphis apertoinspersa* Rivas Plata & Lücking, *G. cinerea* Fée, *G. globosa* (Fée) Spreng., *G. haleana* R. C. Harris, *G. marginata* Raddi, *G. pilarensis* Cáceres & Lücking, *G. striatula* (Ach.) Spreng., *Hemithecium oryzaeforme* (Fée) Staiger, *Hypotrachyna protochlorina* Sipman, Elix & T. H. Nash, *H. sinuosella* Elix, T. H. Nash & Sipman, *H. tariensis* Elix, *Parmeliella isidiopannosa* Jørg., *Parmotrema conferendum* Hale, *P. enteroxanthum* Hale, *P. laciniellum* (Ferraro & Elix) Blanco *et al.*, *P. pilosum* (Stizenb.) Krog & Swinscow, *P. recipiendum* (Nyl.) Hale, *P. ruptum* (Lyng.) Hale ex DePriest & Hale, *Pyxine pungens* Zahlbr. and *Xanthoparmelia substenophylloides* Hale. Notes on distribution are provided for the species. *Bulbothrix goebelii* (Zenker) Hale is excluded from the list of Bolivian lichens; the record is referred to *B. laevigatula*.

Key words: biodiversity, biogeography, *Etayoa tryptethelii*, lichenized fungi, Neotropics, South America

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INTRODUCTION

This paper is the eighth part of the series presenting new data on the diversity and distribution of lichenized fungi in Bolivia – a country with one of South America's richest pools of biodiversity, still insufficiently known (e.g., Flakus & Wilk 2006; Flakus *et al.* 2011, 2012a, 2014, 2015). The paper updates our current knowledge of Bolivian lichens, reporting new records of 135 lichens from Bolivia, including two species new for the Southern Hemisphere, two new for South America, and 27 new for Bolivia.

MATERIAL AND METHODS

The examined specimens are housed at B, KRAM, LPB and UGDA; some duplicates are in the private

herbarium of A. Flakus. Secondary lichen metabolites were identified by thin-layer chromatography (TLC) following Culberson and Kristinsson (1970) and Orange *et al.* (2001). Notes on world distribution are included for species recorded as new for Bolivia (asterisk), new for South America (2 asterisks) and the Southern Hemisphere (3 asterisks). For the species known from at least five localities in Bolivia, only new records for departments, provinces and/or protected areas are reported, if not otherwise stated.

The following abbreviations are used: *AF* – A. Flakus, *JQ* – J. Quisbert, *MK* – M. Kukwa, *OP* – O. Plata, *PR* – P. Rodríguez Flakus, *AMBORÓ* – Parque Nacional y Área Natural de Manejo Integrado Ambaró; *APOLOBAMBA* – Área Natural de Manejo Integrado Nacional Apolobamba; *E. B. BENI* – Reserva de la Biosfera Estación Biológica del Beni; *CARRASCO* – Parque Nacional Carrasco; *COTAPATA* – Parque Nacional y Área Natural de Manejo Integrado Cotapata; *KAA-IYA* – Parque

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Nacional y Área Natural de Manejo Integrado Kaa-Iya del Gran Chaco; SAJAMA – Parque Nacional Sajama; TARIQUÍA – Reserva Nacional de Flora y Fauna Tariquía; (abbreviations of protected areas according to SERNAP Bolivia; <http://www.sernap.gob.bo>).

RESULTS

**Acanthotrema brasilianum* (Hale) Frisch

This species is previously known from Brazil, Colombia, Costa Rica, Peru and Venezuela (Frisch 2006; Cáceres 2007; Sipman *et al.* 2008, 2012; Rivas Plata & Lücking 2013).

It was also reported from Africa (Cameroon and Tanzania; Frisch 2006) but according to Rivas Plata *et al.* (2010) those records belong to *A. frischii* Lücking.

SPECIMENS EXAMINED. BOLIVIA. DEPT. BENI. PROV. Itenez, El Prado colony near Bella Vista, by Río San Martín, 13°17'46"S, 63°35'21"W, 155 m, lowland Amazon forest, corticolous, 15 Aug. 2008, *AF 11989, 11964* & *PR* (KRAM, LPB); DEPT. SANTA CRUZ. PROV. Ichilo, AMBORÓ, Macuñucu, 17°43'38"S, 63°35'37"W, 461 m, lowland Amazon forest, corticolous, 6 June 2011, *AF 22297, 22312* & *OP* (KRAM, LPB).

Alectoria ochroleuca (Hoffm.) A. Massal.

The species has been reported only rarely from Bolivia (Flakus *et al.* 2012a, 2015 and literature cited therein). New for Tiraque Province and Parque Nacional Carrasco.

SPECIMEN EXAMINED. BOLIVIA. DEPT. COCHABAMBA. PROV. Tiraque, CARRASCO, Cerro Juno, 17°19'27"S, 65°41'39"W, 4649 m, open high Andean vegetation, terricolous, 29 Nov. 2014, *AF 25871* (LPB).

Bulbothrix coronata (Fée) Hale

In Bolivia known previously from a single locality (Flakus *et al.* 2011).

SPECIMENS EXAMINED. BOLIVIA. DEPT. BENI. PROV. Ballivan, between Yucumo and Rurrenabaque, 15°05'S, 67°07'W, 600 m, corticolous, 31 June 1997, *K. Bach 363c et al.* (B); DEPT. LA PAZ. PROV. Franz Tamayo, between Apolo and Mapiri, 14°41'50"S, 68°25'07"W, 1490 m, savannah with scattered trees, corticolous, 22 Nov. 2011, *MK 10236a* (LPB).

**Bulbothrix laevigatula* (Nyl.) Hale

This widespread species is known from Africa (Angola), Asia (Japan, Philippines, Thailand), North America (Mexico, United States), Central America and the Caribbean (e.g., Cuba, Dominica, Dominican Republic, Jamaica, Saint Vincent, Trinidad and Tobago), and South America (Brazil, Colombia, Ecuador including the Galapagos Islands, French Guiana, Peru, Venezuela) (Hale 1976a; Sipman *et al.* 2008; Bungartz *et al.* 2013; Benatti 2014).

According to Benatti (2014) the species contains only lecanoric acid in the thallus medulla. In our material we also detected gyrophoric acid, but in minor amounts. The presence of gyrophoric acid makes our material resemble *B. papyrina* (Fée) Hale but the latter never contains lecanoric acid (Benatti 2014).

Flakus *et al.* (2011) reported one of the specimens cited below as *B. goebeli* (Zenker) Hale, but revision of its type indicated that this taxon contains lobaric acid and lacks isidia (Benatti & Elix 2012), so the Bolivian record belongs to *B. laevigatula*.

SPECIMEN EXAMINED. BOLIVIA. DEPT. COCHABAMBA. PROV. Chapare, near Bulo Bulo village, near Río Chimoré, 16°58'19"S, 65°21'11"W, 283 m, lowland Amazon forest, on bark, 9 Dec. 2010, *AF 19500* & *JQ* (KRAM, LPB); DEPT. LA PAZ. PROV. Larecaja, near Achiquiri, 18 km from Mapiri on road to Apolo, 15°13'31"S, 68°13'49"W, 1070 m, Yungas inferior secondary forest, corticolous, 16 May 2011, *MK 8646* (LPB, UGDA).

**Bulbothrix lepreurii* Aubel

Found previously in Brazil, Colombia and Guyana (Sipman *et al.* 2008; Benatti 2014).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. PROV. Franz Tamayo, between Apolo and Mapiri, 15°01'50"S, 68°18'33"W, 1120 m, Preandean Amazon forest, on twig, 23 Nov. 2011, *MK 10332* (LPB, UGDA).

Canoparmelia amazonica (Nyl.) Elix & Hale

Fourth Bolivian record of the species (Hale 1976b; Flakus *et al.* 2011, 2013).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. PROV. Franz Tamayo, between Apolo and Mapiri, 13 km

from Apolo, 14°50'51"S, 68°21'38"W, 1490 m, savannah with scattered trees, shrubs, along streams, corticolous, 23 Nov. 2011, *MK 10291* (LPB, UGDA).

***Canoparmelia caroliniana* (Nyl.) Elix & Hale**

In Bolivia reported previously from three localities (Flakus *et al.* 2012a, 2013).

SPECIMENS EXAMINED. BOLIVIA. DEPT. TARIJA. PROV. Burnet O'Connor, Lomas de la Soledad, road between Entre Ríos and Chiquiaca, 21°39'38"S, 64°07'31"W, 1670 m, Tucumano–Boliviano altimontano forest, corticolous, 10 Aug. 2012, *MK 11298* (LPB, UGDA).

****Canoparmelia salaciniifera* (Hale) Hale**

Previously reported in the Neotropics from Brazil, Colombia, Cuba, Honduras, Jamaica, Mexico and Venezuela, and also from the north-eastern USA and Thailand (Hale 1976b; Sipman *et al.* 2008; Pérez Pérez & Nash 2010).

SPECIMENS EXAMINED. BOLIVIA. DEPT. SANTA CRUZ. PROV. Cordillera, KAA-IYA, near Peto Blanco, 18°56'26"S, 60°22'39"W, 340 m, Chiquitano forest, corticolous, 5 Dec. 2011, *MK 10620* (LPB, UGDA).

****Catolechia wahlenbergii* (Flot. ex Ach.) Körb.**

A widespread species reported from Asia, Europe and North, Central and South America (Gilbert & Hawksworth 2009). In South America it is known from Argentina (Calvelo & Liberatore 2002).

SPECIMENS EXAMINED. BOLIVIA. DEPT. COCHABAMBA. PROV. Tiraque, CARRASCO, Camino de los Nubes–Cotany Alto road, 17°17'28"S, 65°44'05"W, 4146 m, open high Andean vegetation, terricolous, 2 Dec. 2014, *AF 26065* (KRAM, LPB); DEPT. LA PAZ. PROV. Franz Tamayo, APOLOBAMBA, Paso Sánchez, near Pelechuco–Keara road, 14°44'41"S, 69°06'36"W, 4780 m, open high Andean vegetation, terricolous, 17 Nov. 2014, *AF 25165* (LPB).

***Cetraria aculeata* (Schreb.) Fr.**

In Bolivia reported previously only by Fernández-Mendoza and Printzen (2013).

SPECIMEN EXAMINED. BOLIVIA. DEPT. COCHABAMBA. PROV. Tiraque, CARRASCO, Cerro Juno, near Antenas, 17°19'27"S, 65°41'39"W, 4649 m, open high Andean vegetation, terricolous, 29 Nov. 2014, *AF 25872* (LPB).

***Chaenotheca confusa* Tibell**

Second Bolivian locality of the species (Flakus *et al.* 2014).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. PROV. Franz Tamayo, APOLOBAMBA, below Pelechuco, 14°49'08"S, 69°03'50"W, 3560 m, Ceja de Monte Inferior (Altimontano), open area with shrubs and *Polylepis* trees, on *Polylepis* sp., 20 Nov. 2014, *MK 14672* (LPB, UGDA).

****Chapsa alborosella* (Nyl.) Frisch**

Previously reported in the Neotropics from Brazil, Colombia, Costa Rica, Peru and Venezuela, and elsewhere from India, Japan, Réunion, Sri Lanka, Tanzania and the USA (Frisch 2006; Cáceres 2007; Sipman *et al.* 2008, 2012; Rivas Plata & Lücking 2013).

SPECIMEN EXAMINED. BOLIVIA. DEPT. LA PAZ. PROV. Larecacha, between Tipuani and Guanay, 15°31'24"S, 67°58'06"W, 1200 m, Preandean Amazon forest, corticolous, 24 Nov. 2011, *AF 23194* (LPB).

Cladonia confusa* R. Sant. f. *confusa

Considered common in Bolivia, but under-recorded (Ahti 2000; Flakus *et al.* 2008, 2012a, 2014). New for Tarija department.

SPECIMENS EXAMINED. BOLIVIA. DEPT. TARIJA. PROV. Burnet O'Connor, Lomas de la Soledad, road between Entre Ríos and Chiquiaca, 21°39'38"S, 64°07'31"W, 1670 m, Tucumano–Boliviano altimontano forest, on ground, 10 Aug. 2012, *MK 11253* (LPB, UGDA).

***Cladonia dactylota* Tuck.**

In Bolivia known previously from several localities (Flakus 2008; Flakus *et al.* 2008, 2012a). New for Franz Tamayo Province and Área Natural de Manejo Integrado Nacional Apolobamba.

SPECIMEN EXAMINED. BOLIVIA. DEPT. LA PAZ. PROV. Franz Tamayo, APOLOBAMBA, near Rio Pelechuco, below Pelechuco close to new road to Apolo, 14°47'28"S, 69°01'32"W, 2860 m, open area with scattered trees, saxicolous, 16 Nov. 2014, *AF 25137* (LPB).

***Cladonia melanopoda* Ahti**

Reported several times from Bolivia (e.g., Ahti 2000; Flakus *et al.* 2008, 2012a). Here recorded as

new for Franz Tamayo Province and Área Natural de Manejo Integrado Nacional Apolobamba.

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Bautista Saavedra, APOLOBAMBA, near la Curva, close to Charazani, 15°06'33"S, 69°01'51"W, 3634 m, open area with shrubs, on rock, 14 Nov. 2014, *MK 14648* (LPB, UGDA).

*****Cladonia uncialis* (L.) Weber ex F. H. Wigg.**

A common circumpolar species in the Northern Hemisphere, previously known in the Neotropics only from the Dominican Republic (Ahti 2000).

Based on morphology, the Bolivian sample represents *C. uncialis* ssp. *uncialis* (Stenroos *et al.* 2015), but molecular study is needed for certain identification.

SPECIMENS EXAMINED. BOLIVIA. DEPT. COCHABAMBA. Prov. Tiraque, CARRASCO, Cerro Juno, near Antenas, 17°19'27"S, 65°41'39"W, 4649 m, open high Andean vegetation, terricolous, 29 Nov. 2014, *AF 25869* (KRAM, LPB).

***Coccocarpia adnata* Arv.**

In Bolivia reported previously from two localities (Kukwa *et al.* 2014).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Muñecas, APOLOBAMBA, above Camata, close to Charazani–Paujeyuyo road, 15°14'35"S, 68°45'09"W, 1900 m, open area with shrubs, on shrub, 13 Nov. 2014, *MK 14583* (LPB, UGDA).

****Coccocarpia dissecta* Swinscow & Krog**

Known previously from Costa Rica, Paraguay and the Paleotropics (Lücking *et al.* 2007).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Franz Tamayo, APOLOBAMBA, near Paujeyuyo, 15°02'22"S, 68°28'36"W, 1010 m, disturbed Sub-Andean Amazon forest, corticolous, 12 Nov. 2014, *MK 14540* (LPB, UGDA); Prov. Nor Yungas, COTAPATA, near Urpuma colony, 16°13'20"S, 67°52'34"W, 1989 m, Yungas montane forest, corticolous, 30 June 2010, *AF 17325*, *PR* (LPB).

***Coccocarpia domingensis* Vain.**

In Bolivia reported previously from three localities (Kukwa *et al.* 2014).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Muñecas, APOLOBAMBA, above Camata, close to Charazani–Paujeyuyo road, 15°14'35"S, 68°45'09"W, 1900 m, open area with shrubs, on shrub, 13 Nov. 2014, *MK 14583* (LPB, as admixture to *Coccocarpia adnata*).

***Coccocarpia epiphylla* (Fée) Kremp.**

In Bolivia reported recently from one locality (Kukwa *et al.* 2014).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Murillo, Sainani, Valle del Zongo, 16°07'20"S, 68°05'09"W, 2220 m, open area with shrubs and scattered trees, corticolous, 7 Dec. 2014, *AF 26243* (LPB).

***Coccocarpia erythroxyli* (Spreng.) Swinscow & Krog**

In Bolivia reported previously from several localities (Feuerer & Sipman 2005; Flakus 2008; Flakus *et al.* 2012a; Kukwa *et al.* 2014). New for Murillo Province.

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Murillo, Sainani, Valle del Zongo, 16°07'20"S, 68°05'09"W, 2220 m, open area with shrubs and scattered trees, corticolous, 7 Dec. 2014, *AF 26241* (KRAM, LPB).

***Coccocarpia pellita* (Ach.) Müll. Arg.**

In Bolivia reported previously by Ferraro (2002), Lücking (2008), Flakus *et al.* (2012a) and Kukwa *et al.* (2014). New for Franz Tamayo Province and Área Natural de Manejo Integrado Nacional Apolobamba.

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Franz Tamayo, APOLOBAMBA, near Paujeyuyo, 15°02'22"S, 68°28'36"W, 1010 m, disturbed Sub-Andean Amazon forest, corticolous, 12 Nov. 2014, *MK 14535* (LPB, UGDA).

***Coccocarpia prostrata* Lücking, Aptroot & Sipman**

In Bolivia reported only recently (Kukwa *et al.* 2014).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Franz Tamayo, APOLOBAMBA, near Paujeyuyo, 15°02'22"S, 68°28'36"W, 1010 m, disturbed Sub-Andean Amazon forest, corticolous, 12 Nov. 2014, *MK 14545* (LPB, UGDA).

***Coenogonium tuckermanii* Mont.**

In Bolivia reported only a few times (Nylander 1859; Rivas Plata *et al.* 2006; Flakus 2008).

SPECIMENS EXAMINED. BOLIVIA. DEPT. COCHABAMBA. Prov. Chapare, CARRASCO, San Jacinto, close to Villa Tunari–Lago Corani road, 17°10'26"S, 65°45'13"W, 1877 m, open area with shrubs and scattered trees, corticolous, 4 Dec. 2014, *AF 26222* (LPB, herb. Flakus).

***Coniocarpon cinnabarinum* DC.**

In Bolivia reported recently from six localities (Ertz *et al.* 2015). The record below is the second one from Carrasco Province.

SPECIMENS EXAMINED. BOLIVIA. DEPT. COCHABAMBA. Prov. Carrasco, CARRASCO, near Rio Lopez Mendoza, 17°30'25"S, 65°16'51"W, 2248m, lower montane Yungas cloud forest, corticolous, 27 Nov. 2014, *AF 25640, 25638* (KRAM, LPB).

***Cora arachnoidea* J. E. Hern. & Lücking**

In Bolivia reported previously from only two localities (Lücking *et al.* 2013; Flakus *et al.* 2014).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Nor Yungas, below Unduavi, on road between La Paz and Chulumani, 16°18'27"S, 67°53'48"W, 3210 m, Yungas cloud forest, on bryophytes, 31 May 2011, *AF 22219 & OP* (LPB, KRAM); COTAPATA, near Unduavi by Sillu Tincara pre-Columbian route, 16°17'22"S, 67°53'29"W, 3518 m, transition Páramo Yungueño–Yungas cloud forest, on bryophytes, 25 May 2011, *AF 21815 & OP* (LPB, KRAM).

***Cora ciferrii* (Tomas) Lücking, Grall & Thüs**

C. pavonia auct. non (Sw.) Fr.

Fourth locality of the species in Bolivia (Flakus *et al.* 2014).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Bautista Saavedra, APOLOBAMBA, near la Curva, close to Charazani, 15°06'15"S, 69°00'32"W, 3928 m, open area with shrubs, on bryophytes, 14 Nov. 2014, *MK 14623* (LPB, UGDA).

***Cora glabrata* (Spreng.) Fr.**

Several previous Bolivian records of the species appear to represent other recently distin-

guished taxa; the record below is the fourth one from Bolivia (Flakus *et al.* 2012a, 2014).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Bautista Saavedra, APOLOBAMBA, near la Curva, close to Charazani, 15°06'15"S, 69°00'32"W, 3928 m, open area with shrubs, on bryophytes, 14 Nov. 2014, *MK 14624* (LPB, UGDA).

***Crocodia aurata* (Ach.) Link**

Common in Bolivia (Kukwa *et al.* 2014). New for Chapare, Carrasco and Muñecas provinces and Área Natural de Manejo Integrado Nacional Apolobamba.

SPECIMENS EXAMINED. BOLIVIA. DEPT. COCHABAMBA. Prov. Chapare, near Incachaca, 17°12'54"S, 65°49'30"W, 2028 m, Yungas cloud forest near road, corticolous, 8 July 2009, *AF 12981* (LPB); Prov. Carrasco, CARRASCO, Meruvia close to Monte Punku, 17°35'06"S, 65°14'54"W, 3283 m, *Podocarpus–Polylepis* forest, corticolous, 26 Nov. 2014, *AF 25555* (LPB); DEPT. LA PAZ. Prov. Muñecas, APOLOBAMBA, above Camata, close to Charazani–Paujeyuyo road, 15°14'18"S, 68°45'09"W, 1800 m, open area with shrubs, on shrub, 13 Nov. 2014, *MK 14603* (LPB, UGDA).

***Cystocoleus ebeneus* (Dillwyn) Thwaites**

In Bolivia reported previously from three localities (Flakus & Wilk 2006; Flakus 2008).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Franz Tamayo, APOLOBAMBA, Paso Sánchez, near Pelechuco–Keara road, 14°44'41"S, 69°06'36"W, 4780 m, open high Andean vegetation, 17 Nov. 2014, *AF 25166* (KRAM, LPB); Prov. Larecaja, near Ancoruma, close to Sorata–Mapiri road, 14°42'48"S, 68°35'36"W, 4641 m, open high Andean vegetation, bryophyllous, 21 Nov. 2014, *AF 25518* (LPB).

***Dibaeis columbiana* (Vain.) Kalb & Gierl**

In Bolivia reported previously from four localities (Gierl & Kalb 1993; Flakus & Wilk 2006; Flakus *et al.* 2012a, 2015).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Larecaja, near Consata, 15°20'46"S, 68°29'16"W, 1240 m, Yungas montano inferior secondary forest, on rock, 15 May 2011, *MK 8594* (LPB); Prov. Nor Yungas, on road between La Paz and Chulumani, 16°14'10"S, 67°44'20"W, Yungas secondary cloud forest, terricolous, 24 May 2011, *MK 9337* (LPB, UGDA).

***Diorygma antillarum* (Vain.) Nelsen, Lücking & Rivas Plata**

In Bolivia reported previously from two localities (Schiefelbein *et al.* 2014).

SPECIMENS EXAMINED. BOLIVIA. DEPT. SANTA CRUZ. Prov. Ichilo, AMBORÓ, Macuñucu, 17°43'38"S, 63°35'37"W, 461 m, lowland Amazon forest, corticolous, 6 June 2011, *AF 22303 & OP* (KRAM, LPB); DEPT. TARIJA. Prov. Aniceto Arce, Filo de Sidras, 22°14'50"S, 64°33'28"W, 1064 m, Tucumano–Boliviano submontane forest, corticolous, 22 Nov. 2010, *AF 18421, 18618, 18674* (KRAM, LPB); near Tarija, 22°14'56"S, 64°32'55"W, 883 m, Tucumano–Boliviano secondary submontane forest, corticolous, 21 Nov. 2010, *AF 18343, 18378* (KRAM, LPB).

***Flavocetraria cucullata* (Bellardi) Kärnefelt & Thell.**

In Bolivia reported several times but only a few records are recent (Herzog 1922; Hasselroth 1953; Menhofer 1992; Feuerer *et al.* 1998; Bjerke & Elvebakk 2004; Flakus *et al.* 2012a). New for Cochabamba department.

SPECIMENS EXAMINED. BOLIVIA. DEPT. COCHABAMBA. Prov. Tiraque, CARRASCO, Diente del Diablo, close to Antenas Sillar–Cotany Alto road, 17°16'55"S, 65°44'14"W, 4335 m, open high Andean vegetation, terricolous, 2 Dec. 2014, *AF 26052, MK 14669* (LPB, UGDA).

***Glyphis cicatricosa* Ach.**

In Bolivia reported previously from several localities (Flakus & Wilk 2006; Flakus *et al.* 2013). New for Parque Nacional y Área Natural de Manejo Integrado Kaa–Iya del Gran Chaco.

SPECIMENS EXAMINED. BOLIVIA. DEPT. SANTA CRUZ. Prov. Cordillera, KAA-IYA, near Peto Blanco, park guard's station, 18°51'36"S, 60°18'00"W, 290 m, transition Chiquitano–Chaqueño forest, corticolous, 5 Dec. 2011, *AF 23725* (KRAM, LPB).

***Glyphis scyphulifera* (Ach.) Staiger**

Fourth Bolivian record of the species (Flakus *et al.* 2013; Kukwa *et al.* 2013).

SPECIMEN EXAMINED. BOLIVIA. DEPT. SANTA CRUZ. Prov. Cordillera, KAA-IYA, Bañados del Izozog, near

Río Parapeti, 18°28'40"S, 62°05'03"W, 320 m, Ribereño forest, corticolous, 2 Dec. 2010, *AF 18895 & JQ* (LPB).

****Graphis acharii* Fée**

In Bolivia known previously from only two localities (Kukwa *et al.* 2013).

SPECIMENS EXAMINED. BOLIVIA. DEPT. COCHABAMBA. Prov. Chapare, near Incachaca, 17°12'54"S, 65°49'30"W, 2028 m, Yungas cloud forest near road, corticolous, 7 July 2009, *AF 12985* (KRAM, LPB).

****Graphis apertoinpersa* Rivas Plata & Lücking**

Previously known from the type locality in Peru (Rivas Plata & Lücking 2013).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Murillo, Valle del Zongo, 16°07'41"S, 68°05'55"W, 2446 m, Yungas cloud forest, corticolous, 29 May 2011, *AF 22069 & OP* (KRAM, LPB).

***Graphis argentata* Lücking & Umaña**

In Bolivia reported previously from four localities (Flakus *et al.* 2013; Kukwa *et al.* 2013).

SPECIMENS EXAMINED. BOLIVIA. DEPT. COCHABAMBA. Prov. Chapare, near Incachaca, 17°12'54"S, 65°49'30"W, 2028 m, Yungas cloud forest near road, corticolous, 7 July 2009, *AF 13012, 13013, 13028* (KRAM, LPB).

***Graphis cincta* (Pers.) Aptroot**

Second Bolivian locality of the species (Schiefelbein *et al.* 2014).

SPECIMENS EXAMINED. BOLIVIA. DEPT. SANTA CRUZ. Prov. Cordillera, between Tucavaca and Roboró, 18°36'11"S, 59°53'06"W, 320 m, transition Chiquitano–Chaqueño forest, corticolous, with *Etayoa trypethelii*, 4 Dec. 2011, *AF 23546* (KRAM, LPB).

****Graphis cinerea* Fée**

Previously known from Brazil, Colombia, Costa Rica and Venezuela (Staiger 2002; Lücking *et al.* 2008; Sipman *et al.* 2008).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Nor Yungas, km 69 on Coroico–La Paz road, 16°13'33"S, 67°49'20"W, 2700 m, Yungas secondary cloud forest, corticolous, 23 May 2011, *AF 21483 & OP* (LPB); near Nogalani, on Coroico–La Paz road, 16°12'57"S, 67°49'15"W, 2168 m, Yungas secondary cloud forest, corticolous, 23 May 2011, *AF 21392 & OP* (LPB).

***Graphis duplicata* Ach.**

Fifth record of the species in Bolivia (Flakus *et al.* 2013; Kukwa *et al.* 2013).

SPECIMENS EXAMINED. BOLIVIA. DEPT. TARIJA. Prov. Aniceto Arce, Filo de Sidras, 22°14'50"S, 64°33'28"W, 1064 m, Tucumano–Boliviano submontane forest, corticolous, 22 Nov. 2010, *AF 18602.2* (LPB).

****Graphis globosa* (Fée) Spreng.**

Previously known from Brazil and from the type collection with no locality given (Lücking *et al.* 2009).

SPECIMENS EXAMINED. BOLIVIA. DEPT. TARIJA. Prov. Aniceto Arce, Filo de Sidras, 22°14'50"S, 64°33'28"W, 1064 m, Tucumano–Boliviano submontane forest, corticolous, 22 Nov. 2010, *AF 18614* (KRAM, LPB, UGDA).

****Graphis haleana* R. C. Harris**

Previously recorded in Brazil and the USA (Florida) (Lücking *et al.* 2009).

SPECIMENS EXAMINED. BOLIVIA. DEPT. SANTA CRUZ. Prov. José Miguel de Velasco, PN Noel Kempff Mercado, Savana de los Fierros near Florida, 14°36'11"S, 61°52'24"W, 205 m, savannah, corticolous, 15 Dec. 2009, *AF 15628* & *PR* (KRAM, LPB).

***Graphis illinata* Eschw.**

In Bolivia reported previously from three localities (Flakus & Wilk 2006; Schiefelbein *et al.* 2014).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Franz Tamayo, APOLOBAMBA, near Paujeyuyo, 15°02'46"S, 68°27'46"W, 960 m, Sub-Andean Amazon forest close to plantation, corticolous, 12 Nov. 2014, *MK 14515* (LPB, UGDA).

***Graphis librata* Knight**

Second locality of the species in Bolivia (Schiefelbein *et al.* 2014).

SPECIMENS EXAMINED. BOLIVIA. DEPT. SANTA CRUZ. Prov. Cordillera, KAA-IYA, near Peto Blanco, park guard's station, 18°51'36"S, 60°18'00"W, 290 m, transition Chiquitano–Chaqueño forest, corticolous, 5 Dec. 2011, *AF 23700* (KRAM, LPB).

***Graphis lineola* Ach.**

Second Bolivian record of the species (Kukwa *et al.* 2013).

SPECIMENS EXAMINED. BOLIVIA. DEPT. SANTA CRUZ. Prov. Cordillera, between Tucavaca and Roboré, 18°36'11"S, 59°53'06"W, 320 m, transition Chiquitano–Chaqueño forest, corticolous, 4 Dec. 2011, *AF 23540.1* (KRAM, LPB).

****Graphis marginata* Raddi**

Pantropical species known in the Neotropics from Brazil and Costa Rica (Lücking *et al.* 2008, 2009).

SPECIMEN EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Nor Yungas, service station near Chusipata, on Coroico–La Paz road, 16°17'09"S, 67°51'00"W, 3228 m, Yungas cloud forest with *Ericaceae*, corticolous, 24 May 2011, *AF 21652* & *OP* (LPB).

***Graphis mexicana* (Hale) Kalb, Lücking & Lumbsch**

Second locality of the species in Bolivia (Kukwa *et al.* 2013).

SPECIMENS EXAMINED. BOLIVIA. DEPT. TARIJA. Prov. Aniceto Arce, Filo de Sidras, 22°14'50"S, 64°33'28"W, 1064 m, Tucumano–Boliviano submontane forest, muscicolous, 22 Nov. 2010, *AF 18434.1*, *18458*, *18471* (KRAM, LPB).

***Graphis parilis* Kremp.**

In Bolivia reported previously from one locality (Kukwa *et al.* 2013).

SPECIMENS EXAMINED. BOLIVIA. DEPT. TARIJA. Prov. Aniceto Arce, Filo de Sidras, 22°14'50"S, 64°33'28"W, 1064 m, Tucumano–Boliviano submontane forest, corticolous, 22 Nov. 2010, *AF 18567.1* (KRAM, LPB).

****Graphis pilarensis* Cáceres & Lücking**

Previously known only from Brazil (Cáceres 2007).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Bautista Saavedra, 28 km from Charazani, on Charazani–Apolo road, 15°12'43"S, 68°47'25"W, 1650 m, Yungas montane forest, open area with boulders, corticolous, 18 May 2011, *AF 21063* & *OP* (LPB).

***Graphis puiggarii* (Müll. Arg.) Lücking**

Fifth locality of the species in Bolivia (Schiefelbein *et al.* 2014).

SPECIMEN EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Franz Tamayo, between Apolo and Mapiri, 14°41'50"S, 68°25'07"W, 1490 m, savannah with scattered trees, 22 Nov. 2011, corticolous, *AF 23007* (LPB).

****Graphis striatula* (Ach.) Spreng.**

Pantropical species reported in the Neotropics from Brazil, Colombia, Costa Rica, the Dominican Republic and Puerto Rico (Staiger 2002; Cáceres 2007; Lücking *et al.* 2008, 2009; Sipman *et al.* 2008).

SPECIMEN EXAMINED. BOLIVIA. DEPT. TARIJA. Prov. Aniceto Arce, Filo de Sidras, 22°14'50"S, 64°33'28"W, 1064 m, Tucumano–Boliviano submontane forest, corticolous, 22 Nov. 2010, *AF 18567.2* (LPB).

***Graphis tenella* Ach.**

In Bolivia reported previously from one locality (Kukwa *et al.* 2013).

SPECIMENS EXAMINED. BOLIVIA. DEPT. COCHABAMBA. Prov. Carrasco, CARRASCO, near Sehuencas, 17°30'12"S, 65°16'30"W, 2220 m, Yungas cloud forest, corticolous, 21 July 2008, *AF 10459*, *MK & PR* (KRAM, LPB).

******Graphis tenoriensis* Chaves & Lücking**

Previously known only from Costa Rica (Lücking *et al.* 2008, 2009).

SPECIMENS EXAMINED. BOLIVIA. DEPT. SANTA CRUZ. Prov. Cordillera, KAA-IYA, near Peto Blanco, park guard's station, 18°56'26"S, 60°22'39"W, 340 m, Chiquitano forest, corticolous, 5 Dec. 2011, *AF 23626* (KRAM, LPB, UGDA).

***Graphis vestitoides* (Fink) Staiger**

In Bolivia reported previously from one locality (Kukwa *et al.* 2013).

SPECIMENS EXAMINED. BOLIVIA. DEPT. BENI. Prov. Yacuma, E. B. BENI, near la Estación Biológica, 14°51'07"S, 66°20'23"W, 175 m, island of lowland Amazon forest among savannah, corticolous, 6 Nov. 2010, *AF 17900* & *F. Saavedra* (LPB).

****Hemithecium oryzaeforme* (Fée) Staiger**

Previously known from Ecuador and from the type specimen with no locality given (Staiger 2002; Nöske *et al.* 2007).

SPECIMENS EXAMINED. BOLIVIA. DEPT. SANTA CRUZ. Prov. Cordillera, KAA-IYA, near Peto Blanco, park guard's station, 18°51'36"S, 60°18'00"W, 290 m, transition Chiquitano–Chaqueño forest, corticolous, 5 Dec. 2011, *AF 23699* (KRAM, LPB).

***Heterodermia comosa* (Eschw.) Follman & Rédon**

In Bolivia known previously from only a few recent records (Flakus *et al.* 2012a, 2014 and literature cited therein). New for Muñecas Province and Área Natural de Manejo Integrado Nacional Apolobamba.

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Muñecas, APOLOBAMBA, above Camata, close to Charazani–Paujeyuyo road, 15°14'18"S, 68°45'09"W, 1800 m, open area with shrubs, on shrub, 13 Nov. 2014, *MK 14603* (LPB, UGDA).

***Heterodermia leucomela* subsp. *boryi* (Fée) Swinscow & Krog**

In Bolivia known from several records (Feuerer & Sipman 2005; Flakus *et al.* 2012a, 2014). New for Bautista Saavedra Province and Área Natural de Manejo Integrado Nacional Apolobamba.

SPECIMEN EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Bautista Saavedra, APOLOBAMBA, near La Curva, close to Charazani, 15°06'33"S, 69°01'51"W, 3634 m, open area with shrubs, on *Polylepis* sp., 14 Nov. 2014, *MK 14654* (LPB).

***Heterodermia parva* Moberg**

Second locality of the species in Bolivia (Flakus *et al.* 2012a).

SPECIMENS EXAMINED. BOLIVIA. DEPT. COCHABAMBA. Prov. Tiraque, CARRASCO, close to Antenas Sillar, 17°12'55"S, 65°42'35"W, 3750 m, open area with shrubs, corticolous, 30 Nov. 2014, *AF 26014* (KRAM, LPB, herb. Flakus).

***Heterodermia squamulosa* Degel.**

In Bolivia only recently reported from six localities (Flakus *et al.* 2013). New for Muñecas

Province and Área Natural de Manejo Integrado Nacional Apolobamba.

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Muñecas, APOLOBAMBA, above Camata, close to Charazani–Paujeyuyo road, 15°14'18"S, 68°45'09"W, 1800 m, open area with shrubs, on rock, 13 Nov. 2014, *MK 14614* (LPB).

***Hypogymnia subphysodes* (Kremp.) Filson**

In Bolivia reported previously from three localities (Flakus *et al.* 2011, 2012a).

SPECIMENS EXAMINED. BOLIVIA. DEPT. COCHABAMBA. Prov. Carrasco, CARRASCO, La Cumbre, El Camino de las Nubes, 17°17'46"S, 65°43'56"W, 4100 m, Páramo Yungueño, on rock, 19 Aug. 2012, *MK 11781* (LPB); DEPT. LA PAZ. Prov. Bautista Saavedra, APOLOBAMBA, la Cumbre close to Charazani–Pelechuco road, 14°48'09"S, 69°10'51"W, 4850 m, open high Andean vegetation, saxicolous, 15 Nov. 2014, *AF 25008* (LPB).

***Hypotrachyna columbiensis* (Zahlbr.) Divakar, Crespo, Sipman, Elix & Lumbsch**

Everniastrum columbiense (Zahlbr.) Sipman

Second Bolivian locality of the species (Flakus *et al.* 2011).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Larecaja, Jocollone, 15°37'35"S, 68°41'21"W, 3545 m, Páramo Yungueño vegetation, open built-up agricultural area, on soil, 14 May 2011, *MK 8510* (LPB, UGDA).

***Hypotrachyna dentella* (Hale & Kurok.) Hale**

In Bolivia reported previously from two localities, both in Aniceto Arce Province (Dept. Tarija) (Flakus *et al.* 2012b; Divakar *et al.* 2013).

SPECIMENS EXAMINED. BOLIVIA. DEPT. TARIJA. Prov. Burnet O'Connor, Lomas de la Soledad, road between Entre Ríos and Chiquiacá, 21°39'38"S, 64°07'31"W, 1670 m, Tucumano–Boliviano altimontano forest, 10 Aug. 2012, *MK 11309* (LPB, UGDA).

***Hypotrachyna nepalensis* (Taylor) Divakar, Crespo, Sipman, Elix & Lumbsch**

Everniastrum nepalense (Taylor) Sipman

Second locality of the species in Bolivia (Flakus *et al.* 2011).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Nor Yungas, near Pongo, near Coroico–La Paz road, 16°19'28"S, 67°57'21"W, 3822 m, Páramo Yungueño, on rock, 26 Nov. 2011, *MK 10455* (LPB, UGDA).

***Hypotrachyna peruviana* (Nyl.) Hale**

In Bolivia reported previously from four localities (Sipman *et al.* 2009; Flakus *et al.* 2011).

SPECIMENS EXAMINED. BOLIVIA. DEPT. COCHABAMBA. Prov. Carrasco, CARRASCO, near Sehuenas, 17°26'14"S, 65°15'20"W, 2150 m, Yungas cloud forest, on bryophytes, 18 Aug. 2012, *MK 11746* (LPB, UGDA).

***Hypotrachyna physcioides* (Nyl.) Hale**

Reported several times from Bolivia (e.g., Feuerer *et al.* 1998; Sipman *et al.* 2009; Flakus *et al.* 2011; Divakar *et al.* 2013). Second record from Tarija department. New for Burnet O'Connor Province.

SPECIMENS EXAMINED. BOLIVIA. DEPT. TARIJA. Prov. Burnet O'Connor, Lomas de la Soledad, road between Entre Ríos and Chiquiacá, 21°39'38"S, 64°07'31"W, 1670 m, Tucumano–Boliviano altimontano forest, on rock, 10 Aug. 2012, *MK 11307* (LPB, UGDA).

***Hypotrachyna protochlorina* Sipman, Elix & T. H. Nash**

Previously known only from Brazil (Sipman *et al.* 2009).

SPECIMENS EXAMINED. BOLIVIA. DEPT. TARIJA. Prov. Burnet O'Connor, Lomas de la Soledad, road between Entre Ríos and Chiquiacá, 21°39'38"S, 64°07'31"W, 1670 m, Tucumano–Boliviano altimontano forest, on rock, 10 Aug. 2012, *MK 11320* (LPB, UGDA).

***Hypotrachyna sinuosella* Elix, T. H. Nash & Sipman**

Previously reported from Colombia, Costa Rica and Venezuela (Sipman *et al.* 2009).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Bautista Saavedra, APOLOBAMBA, near La Curva, close to Charazani, 15°06'15"S, 69°00'32"W, 3928 m, open area with shrubs, on rock, 14 Nov. 2014, *MK 14629* (LPB, UGDA).

****Hypotrachyna tariensis* Elix**

Previously reported in the Neotropics from Colombia, Costa Rica, Ecuador and Peru, and elsewhere from Papua New Guinea (Sipman *et al.* 2009).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Bautista Saavedra, APOLOBAMBA, near la Curva, close to Charazani, 15°06'15"S, 69°00'32"W, 3928 m, open area with shrubs, on shrub, 14 Nov. 2014, *MK 14630* (LPB, UGDA).

***Hypotrachyna vexans* (W. L. Culb. & C. F. Culb.) Divakar, Crespo, Sipman, Elix & Lumbsch**

Everniastrum vexans (W. L. Culb. & C. F. Culb.) Sipman

In Bolivia reported previously from numerous localities (Flakus *et al.* 2011, 2012a). New for Santa Cruz department.

SPECIMENS EXAMINED. BOLIVIA. DEPT. SANTA CRUZ. Prov. Florida, AMBORÓ, above La Yunga, senda Los Helechos, 18°03'30"S, 63°54'36"W, 2330 m, Yungas cloud forest, on tree, 8 June 2011, *MK 9836* (LPB, UGDA).

***Lobariella pallida* (Hook. f.) Moncada & Lücking**

In Bolivia reported previously from five localities (Kukwa *et al.* 2014). New for Muñecas Province and Área Natural de Manejo Integrado Nacional Apolobamba.

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Muñecas, APOLOBAMBA, above Camata, close to Charazani–Paujeyuyo road, 15°14'35"S, 68°45'09"W, 1900 m, open area with shrubs, on shrub, 13 Nov. 2014, *MK 14580* (LPB, UGDA).

***Lobariella subcrenulata* Moncada & Lücking**

Second record of the species in Bolivia (Kukwa *et al.* 2014).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Muñecas, APOLOBAMBA, above Camata, close to Charazani–Paujeyuyo road, 15°14'18"S, 68°45'09"W, 1800, open area with shrubs, on shrub, 13 Nov. 2014, *MK 14601* (LPB, UGDA).

***Megalaria versicolor* (Flot.) Fryday & Lendemer**

In Bolivia reported by Flakus (2008) and Flakus *et al.* (2012a, 2015). New for Carrasco Province.

SPECIMENS EXAMINED. BOLIVIA. DEPT. COCHABAMBA. Prov. Carrasco, CARRASCO, near Río Lopez Mendoza, 17°30'25"S, 65°16'51"W, 2248 m, lower montane Yungas cloud forest, corticolous, 27 Nov. 2014, *AF 25639* (LPB); Sehuencas close to Monte Punku, 17°30'19"S, 65°16'40"W, 2222 m, lower montane Yungas cloud forest, corticolous, 27 Nov. 2014, *AF 25700* (KRAM, LPB).

******Myriotrema laeviusculum* (Nyl.) Hale**

Previously reported only from Costa Rica, Cuba and the USA (Sipman *et al.* 2012; Esslinger 2015).

SPECIMENS EXAMINED. BOLIVIA. DEPT. SANTA CRUZ. Prov. Cordillera, on road from Tucavaca to Roboré, 18°37'56"S, 59°36'50"W, 220 m, transition Chiquitano–Chaqueño forest, corticolous, 4 Dec. 2011, *AF 23472* (KRAM, LPB).

***Nephroma helveticum* Ach.**

In Bolivia known previously from only a few records (Nylander 1861; Kukwa *et al.* 2014). New for Tiraque Province and Parque Nacional Carrasco.

SPECIMEN EXAMINED. BOLIVIA. DEPT. COCHABAMBA. Prov. Tiraque, CARRASCO, E of Ichuloma, old guard's camp, 17°18'23"S, 65°45'60"W, 3360 m, open area with shrubs, corticolous, 1 Dec. 2014, *AF 26028* (LPB).

***Parmelia warmingii* Vain.**

A poorly known species, in Bolivia reported recently from two localities (Flakus *et al.* 2015).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Bautista Saavedra, APOLOBAMBA, near La Curva, close to Charazani, 15°06'15"S, 69°00'32"W, 3928 m, open area with shrubs, on rock, 14 Nov. 2014, *MK 14617* (LPB, UGDA).

****Parmeliella isidiopannosa* P. M. Jørg.**

Previously known from Costa Rica, Ecuador and Venezuela (Jørgensen 2003; Jørgensen & Arvidsson 2004).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Muñecas, APOLOBAMBA, above Camata, close to Charazani–Paujeyuyo road, 15°14'35"S, 68°45'09"W, 1900 m, open area with shrubs, on rock, 13 Nov. 2014, *MK 14615* (LPB, UGDA).

***Parmotrema aberrans* (Vain.) Hale**

In Bolivia reported previously from three localities (Kukwa *et al.* 2012; Flakus *et al.* 2014).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Franz Tamayo, between Apolo and Mapiiri, 14°41'50"S, 68°25'07"W, 1490 m, savannah with scattered trees, corticolous, 22 Nov. 2011, *MK 10129* (LPB, UGDA); between Apolo and Mapiiri, 14°50'51"S, 68°21'38"W, 1490 m, savannah with scattered trees, shrubs, along streams, corticolous, 23 Nov. 2011, *MK 10279, 10291a, 10295* (LPB, UGDA).

***Parmotrema argentinum* (Kremp.) Hale**

In Bolivia known previously from three localities (Kukwa *et al.* 2012).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Franz Tamayo, between Apolo and Mapiiri, 14°41'50"S, 68°25'07"W, 1490 m, savannah with scattered trees, corticolous, 22 Nov. 2011, *MK 10155, 10231* (LPB, UGDA); Prov. Nor Yungas, Coroico, near Sol y Luna hotel, 16°11'56"S, 67°43'26"W, 1870 m, gardens with trees, on tree, 13 Dec. 2011, *MK 10798* (LPB, UGDA); DEPT. TARIJA. Prov. Burnet O'Connor, TARIQUÍA, near Salinas, 21°49'15"S, 64°12'44"W, 1400 m, Tucumano-Boliviano montano forest, corticolous, 10 Aug. 2012, *MK 11199* (LPB, UGDA).

***Parmotrema cetratum* (Ach.) Hale**

In Bolivia reported several times previously (Herzog 1922; Feuerer *et al.* 1998; Flakus *et al.* 2011, 2012a, 2015). New for Área Natural de Manejo Integrado Nacional Apolobamba.

SPECIMENS EXAMINED. BOLIVIA. Dept. La Paz. Prov. Bautista Saavedra, APOLOBAMBA, near La Curva, close to Charazani, 15°06'33"S, 69°01'51"W, 3634 m, open area with shrubs, on *Polylepis* sp., 14 Nov. 2014, *MK 14644* (LPB, UGDA).

***Parmotrema commensuratum* (Hale) Hale**

Second record of the species in Bolivia (Flakus *et al.* 2014).

The specimen contained atranorin, norlobaridone, loxodin, salazinic and consalazinic acids. The last two substances were not reported by Hale (1977) and Flakus *et al.* (2014).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Nor Yungas, Coroico, near Sol y Luna hotel,

16°11'56"S, 67°43'26"W, 1870 m, gardens with trees, corticolous, 13 Dec. 2011, *MK 10780* (LPB, UGDA).

****Parmotrema conferendum* Hale**

Previously reported from Argentina, Colombia, the USA and Venezuela (Hale 1977; Sipman *et al.* 2008).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Nor Yungas, above Coroico, alt. 1600 m, on *Juniperus* sp., 30 Sept. 1997, *S. Stab LB182a* (B); Coroico, near Sol y Luna hotel, 16°11'56"S, 67°43'26"W, 1870 m, gardens with trees, on rock, 13 Dec. 2011, *MK 10809* (LPB, UGDA).

***Parmotrema conformatum* (Vain.) Hale**

Reported previously from Bolivia only once (Flakus *et al.* 2014).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Franz Tamayo, between Apolo and Mapiiri, 14°41'50"S, 68°25'07"W, 1490 m, savannah with scattered trees, corticolous, 22 Nov. 2011, *MK 10119, 10122* (LPB, UGDA); Prov. Larecacha, between Tipuani and Guanay, 15°31'24"S, 67°58'06"W, 1200 m, Preandean Amazon forest, corticolous, 24 Nov. 2011, *MK 10437* (LPB, UGDA); Prov. Nor Yungas, Coroico, near Sol y Luna hotel, 16°11'56"S, 67°43'26"W, 1870 m, garden, corticolous, 13 Dec. 2011, *MK 10775* (LPB, UGDA).

***Parmotrema cristiferum* (Taylor) Hale**

Third record of the species in Bolivia (Kukwa *et al.* 2012).

SPECIMENS EXAMINED. BOLIVIA. DEPT. SANTA CRUZ. Prov. Cordillera, KAA-IYA, near Peto Blanco (park guard's station), 18°56'26"S, 60°22'39"W, 340 m, Chiquitano forest, corticolous, 5 Dec. 2011, *MK 10645* (LPB, UGDA).

***Parmotrema dilatatum* (Vain.) Hale**

In Bolivia reported previously from five localities (Hale 1965; Kukwa *et al.* 2012; Flakus *et al.* 2014). New for Bautista Saavedra Province, and the first contemporary record from Franz Tamayo Province.

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Bautista Saavedra, 28 km from Charazani town, on road between Charazani and Apolo, 15°12'43"S, 68°47'25"W, 1650 m, Yungas montane forest, open area with boulders, on rock, 18 May 2011, *MK 8883*

(LPB, UGDA); Prov. Franz Tamayo, between Apolo and Mapiri, 15°01'50"S, 68°18'33"W, 1120 m, Preandean Amazon forest, corticolous, 23 Nov. 2011, *MK 10307* (LPB, UGDA).

***Parmotrema disparile* (Nyl.) Hale**

In Bolivia known previously from only one record (Flakus *et al.* 2014).

SPECIMENS EXAMINED. BOLIVIA. DEPT. TARIJA. Prov. Burnet O'Connor, TARIQUÍA, near Salinas, 21°49'15"S, 64°12'44"W, 1400 m, Tucumano-Boliviano montano forest, corticolous, 10 Aug. 2012, *MK 11240a* (LPB, UGDA); Prov. Burnet O'Connor, 26 km from Entre Ríos, near Soledad, 21°39'52"S, 64°07'22"W, 1700 m, Tucumano-Boliviano montano forest, corticolous, 11 Aug. 2012, *MK 11341* (LPB, UGDA).

***Parmotrema eciliatum* (Nyl.) Hale**

Fifth locality of the species in Bolivia (Kukwa *et al.* 2012).

SPECIMENS EXAMINED. BOLIVIA. DEPT. TARIJA. Prov. Burnet O'Connor, Lomas de la Soledad, road between Entre Ríos and Chiquiacá, 21°39'38"S, 64°07'31"W, 1670 m, Tucumano-Boliviano altimontano forest, corticolous, 10 Aug. 2012, *MK 11258* (LPB, UGDA).

****Parmotrema enteroxanthum* Hale**

Previously known from Colombia and Venezuela (Hale 1977; Sipman *et al.* 2008).

SPECIMENS EXAMINED. BOLIVIA. DEPT. SANTA CRUZ. Prov. Cordillera, KAA-IYA, near Peto Blanco, 18°51'36"S, 60°18'00"W, 310 m, transition Chiquitano-Chaqueño forest, corticolous, 5 Dec. 2011, *MK 10669* (LPB, UGDA).

***Parmotrema flavescens* (Kremp.) Hale**

Second locality of the species in Bolivia (Kukwa *et al.* 2012).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Muñecas, APOLOBAMBA, above Camata, close to Charazani-Paujeyuyo road, 15°14'18"S, 68°45'09"W, 1800 m, open area with shrubs, on rock, 13 Nov. 2014, *MK 14609* (LPB, UGDA).

***Parmotrema flavomedullosum* Hale**

In Bolivia reported previously from two localities (Kukwa *et al.* 2012).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Franz Tamayo, between Apolo and Mapiri, 14°41'50"S, 68°25'07"W, 1490 m, savannah with scattered trees, corticolous, 22 Nov. 2011, *MK 10213* (LPB, UGDA); Prov. Nor Yungas, Coroico, near Sol y Luna hotel, 1870 m, 16°11'56"S, 67°43'26"W, garden, on tree, 13 Dec. 2011, *MK 10786* (LPB, UGDA); DEPT. TARIJA. Prov. Burnet O'Connor, TARIQUÍA, near Salinas, 21°49'15"S, 64°12'44"W, 1400 m, Tucumano-Boliviano montano forest, corticolous, 10 Aug. 2012, *MK 11211* (LPB, UGDA).

***Parmotrema gardneri* (C. W. Dodge) Sérus.**

In Bolivia reported previously by Kukwa *et al.* (2012) and Flakus *et al.* (2014). New for Franz Tamayo and Cordillera provinces.

SPECIMENS EXAMINED. BOLIVIA. DEPT. COCHABAMBA. Prov. Carrasco, CARRASCO, Koricaza, 17°33'21"S, 65°16'29"W, 2950 m, Páramo Yungueño, corticolous, 18 Aug. 2012, *MK 11700* (LPB, UGDA); DEPT. LA PAZ. Prov. Franz Tamayo, between Apolo and Mapiri, 14°41'50"S, 68°25'07"W, 1490 m, savannah with scattered trees, corticolous, 22 Nov. 2011, *MK 10117* (LPB, UGDA); DEPT. SANTA CRUZ. Prov. Cordillera, SSW of Roboré, 18°36'11"S, 59°53'06"W, 320 m, transition Chiquitano-Chaqueño forest, corticolous, 4 Dec. 2011, *MK 10580* (LPB, UGDA).

****Parmotrema laciniellum* (Ferraro & Elix) Blanco, Crespo, Divakar, Elix & Lumbsch**

Previously known from Argentina (Ferraro & Elix 2000).

SPECIMENS EXAMINED. BOLIVIA. DEPT. TARIJA. Prov. Burnet O'Connor, 90 km from Tarija on the way to Entre Ríos, 21°25'32"S, 64°19'05"W, 2250 m, Tucumano-Boliviano altimontano forest, with *Alnus acuminata* and *Podocarpus* sp., on *Podocarpus* sp., 9 Aug. 2012, *MK 11161* (LPB, UGDA).

***Parmotrema mellissii* (Dodge) Hale**

In Bolivia reported previously by Kukwa *et al.* (2012) and Flakus *et al.* (2014). New for Franz Tamayo and Burnet O'Connor provinces.

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Franz Tamayo, between Apolo and Mapiri, 14°41'50"S, 68°25'07"W, 1490 m, savannah with scattered trees, corticolous, 22 Nov. 2011, *MK 10236*, *10215* (LPB, UGDA); Prov. Nor Yungas, Coroico, near Sol y Luna hotel, 1870 m, 16°11'56"S, 67°43'26"W, garden,

corticolous, 13 Dec. 2011, *MK 10744*, *10818* (LPB, UGDA); DEPT. TARIJA. Prov. Burnet O'Connor, Lomas de la Soledad, road between Entre Ríos and Chiquiaca, 21°39'38"S, 64°07'31"W, 1670 m, Tucumano–Boliviano altimontano forest, corticolous, 10 Aug. 2012, *MK 11317* (LPB, UGDA).

***Parmotrema mesotropum* (Müll. Arg.) Hale**

In Bolivia reported previously by Hale (1965) and Flakus *et al.* (2012a, 2014). New for Parque Nacional y Área Natural de Manejo Integrado KAA-IYA del Gran Chaco.

In the studied material some specimens morphologically similar to *P. mesotropum* but containing caperatic acid instead of constipatic acid complex were also found. Another such sample was reported previously (as *P. cf. mesotropum*) by Flakus *et al.* (2012a). This material may represent an undescribed species but the lack of molecular data (specimens too old for standard DNA analysis) prevents establishment of its phylogenetic position at present.

SPECIMENS EXAMINED. BOLIVIA. DEPT. SANTA CRUZ. Prov. Cordillera, KAA-IYA, near Peto Blanco (park guard's station), 18°56'26"S, 60°22'39"W, 340 m, Chiquitano forest, corticolous, 5 Dec. 2011, *MK 10642* (LPB, UGDA).

SPECIMENS CONTAINING CAPERATIC ACID EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Abel Iturralde, Tumpasa, 14°03'S, 67°49'W, 400 m, on wood, 3 March 1987, *S. Stab LB26* (B); 46 km por camino de Ixiamas hacia Alto Madidi, 13°38'S, 68°26'W, 300 m, bosque siempreverde, epiphytic, 13 Aug. 1997, *K. Bach 392*, *393 et al.* (B); Prov. Sud Yungas, above Yanacachi, 3200 m, on stone, 3 March 1987, *S. Stab LB62* (B).

***Parmotrema mirandum* (Hale) Hale**

In Bolivia reported previously from a single locality (Kukwa *et al.* 2012).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Franz Tamayo, between Apolo and Mapi, 14°41'50"S, 68°25'07"W, 1490 m, savannah with scattered trees, corticolous, 22 Nov. 2011, *MK 10114* (LPB, UGDA); Prov. Franz Tamayo, between Apolo and Mapi, 13 km from Apolo, 14°50'51"S, 68°21'38"W, 1490 m, savannah with scattered trees, shrubs, along streams, corticolous, 23 Nov. 2011, *MK 10292* (LPB, UGDA).

***Parmotrema mordenii* (Hale) Hale**

Second locality of the species in Bolivia (Flakus *et al.* 2014).

SPECIMENS EXAMINED. BOLIVIA. DEPT. TARIJA. Prov. Burnet O'Connor, TARIQUÍA, near Salinas, 21°49'15"S, 64°12'44"W, 1400 m, Tucumano–Boliviano montano forest, saxicolous, 10 Aug. 2012, *MK 11242* (LPB, UGDA).

***Parmotrema neotropicum* Kurok.**

In Bolivia reported previously from a few localities (Kukwa *et al.* 2012; Flakus *et al.* 2013). Second locality in Tamayo Province.

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Franz Tamayo, between Apolo and Mapi, 14°41'50"S, 68°25'07"W, 1490 m, savannah with scattered trees, corticolous, 22 Nov. 2011, *MK 10179* (LPB, UGDA).

****Parmotrema pilosum* (Stizenb.) Krog & Swinscow**

Previously reported in South America from Argentina, Chile, Ecuador and Uruguay, and elsewhere from Africa (Hale 1976c; Krog & Swinscow 1981; Calvelo & Liberatore 2002).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Franz Tamayo, between Apolo and Mapi, 14°41'50"S, 68°25'07"W, 1490 m, savannah with scattered trees, corticolous, 22 Nov. 2011, *MK 10172*, *10230* (LPB, UGDA).

***Parmotrema rampoddense* (Nyl.) Hale**

Rarely reported in Bolivia (Hale 1965; Flakus *et al.* 2011, 2012a).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Nor Yungas, Coroico, near Hotel Sol y Luna, 1870 m, 16°11'56"S, 67°43'26"W, garden, corticolous, 13 Dec. 2011, *MK 10814* (LPB, UGDA); DEPT. SANTA CRUZ. Prov. Cordillera, KAA-IYA, 259 km on road from Tucavaca to Roboré, 18°32'37"S, 60°30'03"W, 370 m, transition Chiquitano–Chaqueño forest, corticolous, 3 Dec. 2011, *MK 10500a* (LPB, UGDA).

****Parmotrema recipiendum* (Nyl.) Hale**

Previously reported from Argentina, Brazil, Colombia and Paraguay (Hale 1965; Calvelo & Liberatore 2002; Sipman *et al.* 2008).

SPECIMENS EXAMINED. BOLIVIA. DEPT. COCHA-

BAMBA. Prov. Ayopaya, 20 km de Cocapata hacia Cotacajes, 16°46'S, 66°44'W, 2000 m, bosque semideciduo disturbado, corticolous, 15 May 1997, *K. Bach 84 et al.* (B).

Parmotrema reticulatum (Taylor) M. Choisy *s.l.*

In Bolivia reported previously several times (Nylander 1859; Herzog 1922; Feuerer *et al.* 1998; Flakus *et al.* 2011, 2012b, 2014). New for Franz Tamayo and Burnet O'Connor provinces.

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Franz Tamayo, between Apolo and Mapiiri, 14°41'50"S, 68°25'07"W, 1490 m, savannah with scattered trees, corticolous, 22 Nov. 2011, *MK 10234, 10131* (LPB, UGDA); *ibid.*, 14°50'51"S, 68°21'38"W, 1490 m, 23 Nov. 2011, *MK 10274* (LPB, UGDA); DEPT. TARIJA. Prov. Burnet O'Connor, near San Diego, 21°26'28"S, 64°14'37"W, 1620 m, Tucumano-Boliviano altimontano forest, on rock, 9 Aug. 2012, *MK 11190* (LPB, UGDA); TARIQUÍA, near Salinas, 21°49'15"S, 64°12'44"W, 1400 m, Tucumano-Boliviano montano forest, on rock, 10 Aug. 2012, *MK 11235* (LPB).

Parmotrema robustum (Degel.) Hale

In Bolivia reported previously by Kukwa *et al.* (2012) and Flakus *et al.* (2014). New for Tarija department.

SPECIMENS EXAMINED. BOLIVIA. DEPT. TARIJA. Prov. Burnet O'Connor, Lomas de la Soledad, road between Entre Ríos and Chiquiaca, 21°39'38"S, 64°07'31"W, 1670 m, Tucumano-Boliviano altimontano forest, corticolous, 10 Aug. 2012, *MK 11283* (LPB, UGDA).

****Parmotrema ruptum*** (Lynge) Hale *ex* DePriest & Hale

Previously known from Brazil, Paraguay and Uruguay (Spielmann 2009 and literature cited therein).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Muñecas, APOLOBAMBA, above Camata, close to Charazani-Paujeyuyo road, 15°14'18"S, 68°45'09"W, 1800 m, open area with shrubs, on rock, 13 Nov. 2014, *MK 14602, 14611* (LPB, UGDA).

Parmotrema sancti-angelii (Lynge) Hale

In Bolivia reported previously from a single locality only (Kukwa *et al.* 2012).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ.

Prov. Nor Yungas, Coroico, Hotel Sol y Luna, 16°11'56"S, 67°43'26"W, 1870 m, garden, on rock, 13 Dec. 2011, *MK 10825, 10828* (LPB, UGDA).

Parmotrema subarnoldii (Abbeyes) Hale

Second locality in Bolivia (Kukwa *et al.* 2012).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Nor Yungas, near Nogalani, on Coroico-La Paz road, 16°12'57"S, 67°49'15"W, 2168 m, Yungas secondary cloud forest, corticolous, 23 May 2011, *MK 9141* (LPB, UGDA).

Parmotrema subisidiosum (Müll. Arg.) Hale

In Bolivia reported previously from two localities (Kukwa *et al.* 2012).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Franz Tamayo, between Apolo and Mapiiri, 14°41'50"S, 68°25'07"W, 1490 m, savannah with scattered trees, corticolous, 22 Nov. 2011, *MK 10163, 10165* (LPB, UGDA).

Parmotrema tinctorum (Despr. *ex* Nyl.) Hale

Reported from Bolivia by Kukwa *et al.* (2012) and Flakus *et al.* (2014). New for Reserva Nacional de Flora y Fauna Tariquía.

SPECIMENS EXAMINED. BOLIVIA. DEPT. TARIJA. Prov. Burnet O'Connor, TARIQUÍA, near Salinas, 21°49'15"S, 64°12'44"W, 1400 m, Tucumano-Boliviano montano forest, on rock, 10 Aug. 2012, *MK 11195, 11214, 11234* (LPB, UGDA).

Peltigera dolichorrhiza (Nyl.) Nyl.

Reported from Bolivia by Herzog (1922) and Kukwa *et al.* (2014). New for Carrasco Province.

SPECIMENS EXAMINED. BOLIVIA. DEPT. COCHABAMBA. Prov. Carrasco, CARRASCO, near Phaqcha, 17°27'13"S, 65°16'44"W, 2850 m, montane cloud forest, close to river, on soil, 20 July 2008, *MK 6181* (LPB, UGDA).

Peltigera fibrilloides (Gyeln.) Vitik.

Feuerer and Sipman (2005) reported only one Bolivian locality of the species.

SPECIMENS EXAMINED. BOLIVIA. DEPT. COCHABAMBA. Prov. Carrasco, CARRASCO, near Sehuencas, 17°30'12"S, 65°16'30"W, alt. 2220 m, montane cloud forest, along road and close to settlement, on soil, 21 July 2008, *MK 6379* (LPB, UGDA).

***Peltigera laciniata* (G. Merr.) Gyeln.**

In Bolivia known previously from several localities (Gyelnik 1930; Vitikainen 1994; Feuerer *et al.* 1998; Kukwa *et al.* 2014). New for Larecaja Province.

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Larecaja, Titilaya, 15°39'55"S, 68°42'51"W, 2773 m, transition Youngas forest–Valles Secos vegetation, on soil, 14 May 2011, *MK 8444* (LPB, UGDA).

***Peltigera rufescens* (Weiss) Humb.**

In Bolivia reported previously by Nylander (1859), Rusby (1896), Feuerer *et al.* (1998) and Kukwa *et al.* (2014). New for Área Natural de Manejo Integrado Nacional Apolobamba.

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Franz Tamayo, APOLOBAMBA, near Puyo Puyo, 14°56'55"S, 69°07'58"W, 4795 m, high Andean open vegetation, on soil, 5 July 2010, *AF 17682 & PR* (LPB, KRAM).

***Peltigera ulcerata* Müll. Arg.**

In Bolivia reported previously by Feuerer *et al.* (1998) and Kukwa *et al.* (2014). New for Oruro and Tarija departments, Franz Tamayo Province and Área Natural de Manejo Integrado Nacional Apolobamba.

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ, Prov. Franz Tamayo, APOLOBAMBA, near Puyo Puyo, 14°56'55"S, 69°07'58"W, 4795 m, high Andean open vegetation, on ground, 5 July 2010, *AF 17693 & PR* (LPB); DEPT. ORURO, Prov. Sajama, SAJAMA, Jecha K'ala, 18°09'52"S, 68°49'08"W, 4184 m, Puna Sureña, pajonales vegetation, on soil, 20 June 2010, *AF 16692 & PR* (LPB, KRAM); DEPT. TARIJA, Prov. Aniceto Arce, Papachacra, 21°41'36"S, 64°29'33"W, 2195 m, Tucumano–Boliviano montane forest, on soil, 26 Nov. 2010, *AF 19800 & JQ* (LPB).

***Phaeophyscia hispidula* (Ach.) Essl.**

Fourth locality in Bolivia (Flakus *et al.* 2013).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Muñecas, APOLOBAMBA, above Camata, close to Charazani–Paujeyuyo road, 15°14'18"S, 68°45'09"W, 1800 m, open area with shrubs, on rock, 13 Nov. 2014, *MK 14608, 14612* (LPB, UGDA).

***Phyllobaeis imbricata* (Hook.) Kalb & Gierl**

In Bolivia found previously at several localities (Flakus *et al.* 2012a and literature cited therein). New for Franz Tamayo Province, and the first modern record for Larecaja Province.

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Franz Tamayo, near Correo, 14°59'06"S, 68°26'09"W, 1630 m, Yungas montane forest, open area near road, on rock, 17 May 2011, *MK 8786* (LPB, UGDA); Prov. Larecaja, Jocollone, 15°37'35"S, 68°41'21"W, 3545 m, Páramo Yungueño vegetation, open agricultural area, on soil, 14 May 2011, *MK 8538* (LPB, UGDA).

***Platygramme caesiopruinosa* (Fée) Fée**

In Bolivia reported previously from nine localities (Flakus *et al.* 2013; Kukwa *et al.* 2013; Schiefelbein *et al.* 2014). New for Chapare Province.

SPECIMENS EXAMINED. BOLIVIA. DEPT. COCHABAMBA. Prov. Chapare, near Incachaca, 17°12'54"S, 65°49'30"W, 2028 m, Yungas cloud forest near road, 7 July 2009, *AF 13023* (LPB).

***Pleurosidium chlorophanum* (Wahlenb.) Zopf**

In Bolivia reported previously only by Nylander (1861).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Larecaja, la Cumbre Ancoruma, close to Sorata–Mapiri road, 14°43'09"S, 68°35'55"W, 4650 m, open high Andean vegetation, saxicolous, 21 Nov. 2014, *AF 25489* (KRAM, LPB).

***Pseudephebe pubescens* (L.) M. Choisy**

Fifth record of the species in Bolivia (Feuerer & Sipman 2005; Flakus & Wilk 2006; Flakus *et al.* 2011).

SPECIMEN EXAMINED. BOLIVIA. DEPT. COCHABAMBA. Prov. Tiraque, CARRASCO, Diente del Diablo, close to Antenas Sillar–Cotany Alto road, 17°16'55"S, 65°44'14"W, 4335 m, open high Andean vegetation, saxicolous, 2 Dec. 2014, *AF 26053* (LPB).

***Pseudocyphellaria crocata* (L.) Vain.**

Fourth locality of the species in Bolivia (Feuerer *et al.* 1998; Kukwa *et al.* 2014).

SPECIMENS EXAMINED. BOLIVIA. DEPT. COCHABAMBA. Prov. Carrasco, CARRASCO, Sehuencas,

2220 m, 17°30'12"S, 65°16'30"W, corticolous, 21 July 2008, *PR* 758, *AF* & *MK* (LPB).

***Psiloparmelia distincta* (Nyl.) Hale**

Numerous Bolivian records of the species (Flakus *et al.* 2015 and literature cited therein). New for Carrasco Province and Parque Nacional Carrasco.

SPECIMENS EXAMINED. BOLIVIA. DEPT. COCHABAMBA. Prov. Carrasco, CARRASCO, La Cumbre, El Camino de las Nubes, 17°17'46"S, 65°43'56"W, 4100 m, Páramo Yungueño, on rock, 19 Aug. 2012, *MK* 11780, 11797 (LPB, UGDA).

***Psiloparmelia flavobrunnea* (Müll.Arg.) Elix & Nash**

In Bolivia reported previously by Elix and Nash (1992) and Flakus *et al.* (2013). Second record for Bautista Saavedra Province.

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Bautista Saavedra, APOLOBAMBA, near La Curva, close to Charazani, 15°06'15"S, 69°00'32"W, 3928 m, open area with shrubs, on rock, 14 Nov. 2014, *MK* 14626 (LPB, as host in specimen of *Lichenostigma* sp.).

****Pyxine pungens* Zahlbr.**

Previously reported from Australia, Indonesia, Central and South America (Brazil, Costa Rica, Guyana, Paraguay, Venezuela) (Jungbluth & Marcelli 2011).

SPECIMEN EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Nor Yungas, near Pongo, near Coroico–La Paz road, 16°19'28"S, 67°57'21"W, 3822 m, Páramo Yungueño, on twig, 26 Nov. 2011, *MK* 10450c (LPB).

***Ramboldia russula* (Ach.) Kalb, Lumbsch & Elix**

In Bolivia reported previously from a few localities; it is still under-collected (Nylander 1859; Kalb *et al.* 2008; Flakus *et al.* 2012a).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Franz Tamayo, between Apolo and Mapiri, 14°41'50"S, 68°25'07"W, 1490 m, savannah with scattered trees, corticolous, 22 Nov. 2011, *MK* 10235 (LPB, UGDA); DEPT. SANTA CRUZ. Prov. Cordillera, SSW of Roboré, 18°36'11"S, 59°53'06"W, 320 m, transition Chiquitano–Chaqueño forest, corticolous, 4 Dec. 2011, *MK* 10563b (LPB, UGDA).

***Reimnitzia santensis* (Tuck.) Kalb**

Second Bolivian record of the species (Schiefelbein *et al.* 2014).

SPECIMENS EXAMINED. BOLIVIA. DEPT. SANTA CRUZ. Prov. Cordillera, near Peto Blanco, park guard's station, 18°48'25"S, 60°14'54"W, 330 m, transition Chiquitano–Chaqueño forest, corticolous, 6 Dec. 2011, *AF* 23777 (KRAM, LPB).

***Siphula pteruloides* Nyl.**

In Bolivia reported previously from four localities (Feuerer *et al.* 1998; Feuerer & Sipman 2005; Flakus *et al.* 2014).

SPECIMEN EXAMINED. BOLIVIA. DEPT. COCHABAMBA. Prov. Tiraque, CARRASCO, close to Antenas Sillar–Cotany Alto road, 17°14'22"S, 65°43'07"W, 3870 m, open area with shrubs, terricolous, 30 Nov. 2014, *AF* 26023 (LPB).

***Stereocaulon ramulosum* (Sw.) Räusch**

The commonest species of the genus in Bolivia (e.g., Feuerer *et al.* 1998; Flakus *et al.* 2011, 2012a, 2015). New for Muñecas Province and Área Natural de Manejo Integrado Nacional Apolobamba.

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Muñecas, APOLOBAMBA, above Camata, close to Charazani–Paujeyuyo road, 15°14'35"S, 68°45'09"W, 1900 m, open area with shrubs, on rock, 13 Nov. 2014, *MK* 14577, 14594 (LPB, UGDA).

***Stereocaulon tomentosum* Fr.**

Fifth Bolivian record of the species (Feuerer *et al.* 1998; Flakus *et al.* 2011).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Bautista Saavedra, APOLOBAMBA, near La Curva, close to Charazani, 15°06'15"S, 69°00'32"W, 3928 m, open area with shrubs, on rock, 14 Nov. 2014, *MK* 14631 (LPB, UGDA).

***Stereocaulon vesuvianum* Pers.**

In Bolivia recorded six times previously (Feuerer & Sipman 2005; Flakus *et al.* 2011, 2012a, 2015). New for Área Natural de Manejo Integrado Nacional Apolobamba.

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Bautista Saavedra, APOLOBAMBA, near La

Curva, close to Charazani, 15°06'15"S, 69°00'32"W, 3928 m, open area with shrubs, on soil, 14 Nov. 2014, *MK 14622*, *14636* (LPB, UGDA).

***Teloschistes flavicans* (Sw.) Norman**

In Bolivia reported previously from numerous localities (e.g., Feuerer *et al.* 1998; Søchting & Fröden 2002; Flakus *et al.* 2012a, 2015). New for Muñecas Province and Área Natural de Manejo Integrado Nacional Apolobamba.

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Bautista Saavedra, APOLOBAMBA, near la Curva, 15°06'33"S, 69°01'51"W, 3634 m, open area with shrubs, on *Polylepis* sp., 14 Nov. 2014, *MK 14652* (LPB, UGDA); Prov. Muñecas, APOLOBAMBA, above Camata, 15°14'35"S, 68°45'09"W, 1900 m, open area with shrubs, on soil, 13 Nov. 2014, *MK 14578* (LPB, UGDA).

***Thamnomia papelillo* R. Sant.**

In Bolivia reported previously by Santesson (2004), Flakus (2008) and Flakus *et al.* (2012a, 2015). New for Tiraque Province and Área Natural de Manejo Integrado Nacional Apolobamba.

SPECIMENS EXAMINED. BOLIVIA. DEPT. COCHABAMBA. Prov. Tiraque, CARRASCO, Cerro Juno, near Antenas, 17°19'27"S, 65°41'39"W, 4649 m, open high Andean vegetation, terricolous, 29 Nov. 2014, *AF 25870* (LPB); *ibid.*, 17°19'50"S, 65°41'22"W, 4662 m, *AF 25904* (KRAM, LPB); DEPT. LA PAZ. Prov. Bautista Saavedra, APOLOBAMBA, near La Curva, 15°06'33"S, 69°01'51"W, 3634 m, open area with shrubs, terricolous, 14 Nov. 2014, *AF 24968* (KRAM, LPB); la Cumbre, 14°48'09"S, 69°10'51"W, 4850 m, open high Andean vegetation, terricolous, 15 Nov. 2014, *AF 25007* (KRAM, LPB).

***Thamnomia vermicularis* (Sw.) Schaer.**

A very common species in Bolivia at higher altitudes of the Andes (Nylander 1861; Menhofer 1992; Feuerer *et al.* 1998; Flakus & Wilk 2006; Flakus 2008; Flakus *et al.* 2012a). New for Tiraque Province and Parque Nacional Carrasco.

SPECIMENS EXAMINED. BOLIVIA. DEPT. COCHABAMBA. Prov. Tiraque, CARRASCO, Cerro Juno, 17°19'27"S, 65°41'39"W, 4649 m, open high Andean vegetation, terricolous, 29 Nov. 2014, *AF 25874* (KRAM, LPB); *ibid.*, 17°19'50"S, 65°41'22"W,

4662 m, *AF 25905* (LPB); *ibid.*, 17°19'34"S, 65°42'13"W, 4389 m, *AF 25921* (KRAM, LPB); Di-ente del Diablo, 17°16'55"S, 65°44'14"W, 4335 m, open high Andean vegetation, terricolous, 2 Dec. 2014, *AF 26051* (LPB).

***Thelocarpon andicola* Flakus & Kukwa**

Second locality of this recently described species (Flakus & Kukwa 2014).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Bautista Saavedra, APOLOBAMBA, near la Curva, close to Charazani, 15°06'15"S, 69°00'32"W, 3928 m, open area with shrubs, saxicolous, 14 Nov. 2014, *AF 24955* (KRAM, LPB).

*****Thelocarpon laureri* (Flot.) Nyl.**

Previously known only from Africa (Canary Islands), Australia, Europe and North America (Salisbury 1966; Orange *et al.* 2009; McCarthy 2015).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Bautista Saavedra, APOLOBAMBA, near La Curva, close to Charazani, 15°06'15"S, 69°00'32"W, 3928 m, open area with shrubs, saxicolous, 14 Nov. 2014, *AF 24954* (KRAM, LPB).

****Xanthoparmelia substenophylloides* Hale**

Previously reported in South America from Argentina, Brazil, Colombia, Peru, Uruguay and Venezuela, and elsewhere from South Africa (Hale 1989; Nash *et al.* 1995; Sipman *et al.* 2008).

SPECIMENS EXAMINED. BOLIVIA. DEPT. LA PAZ. Prov. Muñecas, APOLOBAMBA, above Camata, close to Charazani–Paujeyuyo road, 15°14'18"S, 68°45'09"W, 1800 m, open area with shrubs, on rock, 13 Nov. 2014, *MK 14606* (LPB, UGDA).

***Yoshimuriella peltigera* auct.**

In Bolivia reported previously from three localities (Kukwa *et al.* 2014).

SPECIMENS EXAMINED. BOLIVIA. DEPT. BENI. Prov. Ballivian, Puento Rio Quiquibey, 4 km hacia San Borja, 700 m, bosque natural, sobre corteza, 14 July 1979, *S. G. Beck 1736* (LPB); DEPT. LA PAZ. Prov. Nor Yungas, COTAPATA, Chairó, 16°13'19.2"S, 67°52'34"W, 1370 m, corticolous, 11 May 2006, *PR 70*, *J. Beltrán*, *J. Torrez* (LPB).

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