New lichen records and rediscoveries from the Czech Republic and Slovakia

Jiří Malíček, Zdeněk Palice & Jan Vondrák

Abstract: Malíček, J., Palice, Z. & Vondrák, J. 2014. New lichen records and rediscoveries from the Czech Republic and Slovakia. – Herzogia **27**: 257–284.

Despite over two centuries of fairly intensive study, the lichen flora of Central European countries is still incompletely known. Based on revision of herbarium material and new field work, we report thirty-four species from the Czech Republic for the first time, and twenty-two from Slovakia. *Caloplaca brachyspora*, *Micarea confusa* and *Sclerophora amabilis* are new to Central Europe. *Caloplaca alaskensis* is reported outside the Arctic for the first time. Other noteworthy records worth of mention are e.g. *Arthonia incarnata*, *Bacidina etayana*, *Biatora pontica*, *Bryoria furcellata*, *Candelariella lutella*, *C. viae-lactae*, *Metamelanea caesiella*, *Peccania cernohorskyi*, *Rhizoplaca melanophthalma*, *Thelocarpon imperceptum*, *Verrucaria ulmi* and *Xanthoria papillifera*. Eight species (mainly from lowland forests) have not been found over 70 or more years from the territory of the Czech Republic or Slovakia. Four species were reported in the past but were omitted from the current national checklists. Other species new to the explored countries are *Bacidia pycnidiata*, *Bacidina brandii*, *B. saxenii*, *B. sulphurella*, *Buellia arborea*, *Caloplaca arcis*, *C. dichroa*, *C. tominii*, *C. xerica*, *Candelaria pacifica*, *Candelariella plumbea*, *Catillaria fungoides*, *Cladonia novochlorophaea*, *Collolechia caesia*, *Dendrographa decolorans*, *Fellhanera viridisorediata*, *Lecania sordida*, *Lecidea sphaerella*, *L. strasseri*, *Lecidella albida*, *Leptogium intermedium*, *Micarea globulosella*, *M. nowakii*, *Normandina acroglypta*, *Peltigera extenuata*, *Reichlingia leopoldii*, *Rhizocarpon timdalii*, *Rhizoplaca subdiscrepans*, *Rinodina capensis*, *Schismatomma umbrinum*, *Sclerococcum griseisporodochium*, *Thelocarpon citrum*, *Verrucaria beltraminiana*, *V. breussii*, *V. fuscovelutina*, *V. phloeophila*, and *Xylographa pallens*. ITS rDNA was used to confirm the identity of *Caloplaca alaskensis* and *C. arcis*. The lichen diversity of Central European countries and their phytogeographical connections are briefly discussed.

Zusammenfassung: Malíček, J., Palice, Z. & Vondrák, J. 2014. Neu- und Wiederfunde von Flechten aus der Tschechischen Republik und der Slowakei. – Herzogia **27**: 257–284.

Trotz zwei Jahrhunderten intensiver Untersuchungen ist die Flechtenflora Mitteleuropas unzureichend bekannt. Aufgrund von Revisionen von Herbarmaterial und Ergebnissen neuer Geländearbeit berichten wir über 34 neue Arten für Tschechien und 22 für die Slowakei. *Caloplaca brachyspora*, *Micarea confusa* und *Sclerophora amabilis* sind neu für Mitteleuropa. *Caloplaca alaskensis* wird zum ersten Mal ausserhalb der Arktis angeführt. Weitere bemerkenswerte Funde sind *Arthonia incarnata*, *Bacidina etayana*, *Biatora pontica*, *Bryoria furcellata*, *Candelariella lutella*, *C. viae-lactae*, *Metamelanea caesiella*, *Peccania cernohorskyi*, *Rhizoplaca melanophthalma*, *Thelocarpon imperceptum*, *Verrucaria ulmi* und *Xanthoria papillifera*. Acht Arten (überwiegend von Wäldern im Tiefland) sind seit mindestens 70 Jahren nicht auf dem Gebiet der Tschechischen Republik oder der Slowakei gefunden worden. Vier Arten wurden bereits publiziert, fehlten aber in den aktuellen nationalen Checklisten. Weitere Arten, die für die erforschten Länder neu sind, sind *Bacidia pycnidiata*, *Bacidina brandii*, *B. saxenii*, *B. sulphurella*, *Buellia arborea*, *Caloplaca arcis*, *C. dichroa*, *C. tominii*, *C. xerica*, *Candelaria pacifica*, *Candelariella plumbea*, *Catillaria fungoides*, *Cladonia novochlorophaea*, *Collolechia caesia*, *Dendrographa decolorans*, *Fellhanera viridisorediata*, *Lecania sordida*, *Lecidea sphaerella*, *L. strasseri*, *Lecidella albida*, *Leptogium intermedium*, *Micarea globulosella*, *M. nowakii*, *Normandina acroglypta*, *Peltigera extenuata*, *Reichlingia leopoldii*, *Rhizocarpon timdalii*, *Rhizoplaca subdiscrepans*, *Rinodina capensis*, *Schismatomma umbrinum*, *Sclerococcum griseisporodochium*, *Thelocarpon citrum*, *Verrucaria beltraminiana*, *V. breussii*, *V. fuscovelutina*, *V. phloeophila* und *Xylographa pallens*. Die Bestimmung von *Caloplaca alaskensis* und *C. arcis* wurde anhand von ITS rDNA bestätigt. Die Flechtendiversität mitteleuropäischer Länder und ihre pflanzengeographischen Beziehungen werden kurz diskutiert.

Key words: Biodiversity, checklist, lichen-forming fungi, microlichens.

Introduction

Lichen records form an important source of knowledge about regional diversity, the distribution and ecology of lichens, and changes of lichen biota in time. The collections themselves are also a source of material for further studies. In the Czech Republic, field research has been quite intensive in the last two decades, a result of regular meetings and excursions (cf. Kubešová et al. 2012), as well as surveys of protected areas, which are currently supported by the Nature Conservation Agency and the Ministry of the Environment (e.g. Halda et al. 2011b, Malíček & Vondrák 2012a, b). In Slovakia, exploration has been less intensive, but some areas have been thoroughly surveyed, especially the Muránska planina National Park (e.g. Guttová & Palice 1999, 2002, 2005, Guttová et al. 2012). In recent years many new records from both countries have been published, e.g. in Palice (1999), van den Boom & Palice (2006), Vondrák et al. (2007a, b), and Malíček & Palice (2013) for the Czech Republic; and in Guttová & Palice (1999, 2002, 2005) and Palice et al. (2006) for Slovakia. In the present paper we provide additional records of the authors for the Czech and Slovak checklists. We also note some species that have been regarded as regionally extinct (cf. Liška et al. 2008, Pišút et al. 2001, Guttová et al. 2013) but which have been rediscovered after a long period, usually about one hundred years.

A few of the lichens newly listed here are rather conspicuous, so their discovery is surprising (e.g. *Bryoria furcellata*, *Rhizoplaca melanophthalma*, *Xanthoria papillifera*). Unsurprisingly, however, most are easily overlooked small microlichens (e.g. inconspicuous pioneers of barren soil or mostly sterile lichen crusts). Ecologically, they are very varied: some are ephemeral crusts known mainly from human-disturbed habitats (e.g. *Thelocarpon imperceptum*), but others are indicators of natural habitats, such as old-growth forest epiphytes (*Bactrospora dryina* in floodplain and oak woodlands, *Arthonia incarnata* in montane spruce forests, *Sclerophora amabilis* in old-growth beech forests etc.). The list includes species with very different European distributions, including: Atlantic (e.g. *Dendrographa decolorans*, *Fellhanera viridisorediata*), Mediterranean (*Caloplaca xerica*, *Xanthoria papillifera*), continental (*Caloplaca tominii*), boreal (*Bryoria furcellata*, *Micarea globulosella*), and arctic-alpine (*Caloplaca alaskensis*). Some species are quite rare in Central Europe, as they require specific microhabitats (e.g. *Bactrospora dryina*, *Biatora pontica*, *Peccania cernohorskyi*). Our list also includes some recently recognized taxa: *Bacidina sulphurella*, *Candelaria pacifica*, *Peltigera extenuata*, *Rhizoplaca subdiscrepans*, *Thelocarpon citrum* and *Xylographa pallens*; some of these were recorded from the Czech Republic or Slovakia in the past but were subsumed under other taxa by later authors and/or were recognized by earlier authors only on a level of variety or form. Four species (*Caloplaca polycarpa*, *Lecanora glabrata*, *Melaspilea gibberulosa*, *Scutula dedicata*) were reported in the past but were omitted (presumably inadvertently) from the current national checklists.

Material and methods

Specimens were identified using routine methods, including TLC analyses (Orange et al. 2010) and UV light. Selected critical specimens were checked by the acknowledged specialists. Collected specimens are deposited in herbaria CBFS, PRA, and the private herbarium of J. Malíček (JM). We found some older herbarium specimens (of *Caloplaca brachyspora*, *Candelaria pacifica*, *Lecanora glabrata*, *Peltigera extenuata*, and *Rhizoplaca subdiscrepans*) in herbaria BRA, PRC and PRM. The list of taxa is in alphabetical order. In cases of some species currently ranked into artificial ‘dustbin’ genera, their generic names are indicated in quotation marks. Localities for each taxon are also in alphabetical order; Czech localities are

first ordered by region (e.g. Central Bohemia, South Moravia, etc.). The locality descriptions refer to the herbarium labels, with minor formal corrections. The asterisk (*) marks new country records. GPS coordinates use the WGS84 datum.

New records

Arthonia byssacea (Weigel) Almq.

Czech Republic. S Bohemia, Hluboká nad Vltavou, Zámostí, on left bank of Vltava river, about 3 km NNE of village, alt. 400 m, 49°05'29"N/14°28'1"E, on dry bark of old *Quercus robur*, 2010, J. Vondrák 7759, 7940 (CBFS); Písek, Vráž, in valley of river Lomnice, at junction of Lomnice with river Skalice, alt. c. 360 m, 49°24'50"N/14°08'36"E, on dry bark of *Quercus robur*, 2010, J. Vondrák 8146 (CBFS); S Moravia, distr. Břeclav, Lanžhot, Ranšpurk National Nature Reserve, c. 48°40'41"N/16°56'49"E, floodplain old-growth forest, alt. 150 m, on bark of *Fraxinus angustifolia* and *Quercus robur*, 2013, J. Malíček 6220, 6244 & J. Vondrák 11342 (CBFS, JM).

Previously recorded in the Czech Republic only in the first half of the 19th century; published several times by P. M. Opiz (cf. Vězda & Liška 1999). Recent Czech collections are mostly sterile, with conspicuous blackish pycnidia with white tops, but specimen JV 7759 is fertile.

Arthonia incarnata Th.Fr. ex Almq.

***Czech Republic.** S Bohemia, Šumava Mts, Volary, Nová Pec, NE slope of Mt. Hraničník, alt. ca 1150 m, 48°45'8"N/13°54'50"E, on bark of *Picea abies*, 2007, J. Vondrák 7615 (CBFS); Vimperk, Včelná pod Boubínem, spruce forest at top of hill Boubín, alt. ca 1200–1350 m, on bark of *Picea abies*, 2011, V. Pouska & J. Vondrák 8970 (CBFS).

Our specimens resemble *A. helvola* macroscopically and in their 2-septate ascospores, but can be distinguished by the K-negative reaction of the hymenium (Rediger 1937). The ecology of this species is not well known, but it may prefer mountain spruce forests in Central Europe.

Arthonia pruinata (Pers.) A.L.Sm.

Czech Republic. S Moravia, Břeclav, Lanžhot, protected area Ranšpurk, c. 5 km S of Lanžhot, at confluence of rivers Morava and Dyje, alt. 150 m, 48°40'41"N/16°56'47"E, on bark of *Quercus robur*, 2013, J. Malíček & J. Vondrák 11346 (CBFS).

In the Czech Republic, the species was recorded on bark of oaks in lowland areas of N and E Bohemia: Teplice and Proboštov (Anders 1922, as *A. impolita*) and Sendražice near Hradec Králové (Mann 1825, Opiz 1825, as *A. pruinosa*). In Central Europe, *Arthonia pruinata* is currently an extremely rare lichen (cf. Hafellner & Türk 2001, Wirth et al. 2013).

Arthothelium spectabile A.Massal.

Czech Republic. S Moravia, distr. Břeclav, Lanžhot, Ranšpurk National Nature Reserve, c. 48°40'41"N/16°56'49"E, floodplain old-growth forest, alt. 150 m, on bark of *Carpinus betulus*, 2013, J. Malíček 6219 & J. Vondrák 11343 (CBFS, JM).

Arthothelium spectabile was reported several times at the beginning of the 20th century mainly from Moravia (cf. Vězda & Liška 1999). It occurs in old-growth lowland forests, especially on hornbeam (Wirth et al. 2013) and it was probably a rare species even in the past.

Bacidia pycnidiata Czarnota & Coppins

***Slovakia.** Poloniny Mts, Ulič, Nová Sedlica, protected area Stužica, alt. 600–1200 m, 49°04'24"N/22°32'35", on mosses on bark of *Acer pseudoplatanus*, 2013, J. Malíček & J. Vondrák 11326 (CBFS).

B. pycnidiata sometimes forms anamorphic populations without apothecia, but our sample contains numerous pycnidia as well as apothecia. Czarnota & Coppins (2006) reported it from mosses over soil and from mosses on trees in human managed habitats. Our record is from natural old-growth woodland.

Bacidina brandii (Coppins & van den Boom) M.Hauck & V.Wirth

***Czech Republic.** Silesia, Karviná, Stonava: dump with young birch forest W of village, 49°48'51"N/18°31'01"E, alt. 260 m, on bryophytes growing on stump, 2010, J. Malíček 3174 et al. (JM).

The species seems to be sparsely distributed in Central Europe. It has been reported from Austria (Berger & Priemetzhofer 2010), Poland (Kubiak & Sparrius 2004) and more localities are known from western Germany (Wirth et al. 2013).

Bacidina etayana (van den Boom & Vězda) M.Hauck & V.Wirth

***Czech Republic.** S Bohemia, Šumava Mts, Volary: Mt. Trojmezná, 0.7 km NE of the top, dead old-growth spruce forest on N-facing slope, 48°46'34"N/13°50'03"E, on wood of dead standing trunk, alt. 1250 m, 2012, Z. Palice 15765, V. Pouska & J. Vondrák 10166 (PRA, CBFS).

The specimen was growing on hard wood in a pioneer nitrophytic lichen community (together with juvenile *Xanthoria* and *Lecania* spp.) on a sun-exposed trunk among otherwise acidophytic lichen assemblages on dead trees in an old-growth spruce forest. The specimen matches well the detailed description in Ekman et al. (2012).

Bacidina saxenii (Erichsen) M.Hauck & V.Wirth

***Czech Republic.** S Bohemia, Šumava Mts, Volary, near the railway station along railway in direction Lenora and Černý Kříž, alt. 750 m, 1995, Z. Palice s.n. (PRA); Nové Údolí, valley of the Světlá creek, c. 2 km NNE of Mt. Kamenná, on *Sambucus racemosa*, alt. 850 m, 1995, Z. Palice s.n. (PRA); Volary: at railway (in direction Vimperk and Nové Údolí), c. 100–200 m from the railway station, on small stones, alt. 755 m, 1998, Š. Bayerová & Z. Palice 824 (PRA); Stožec: Studená Vltava valley, near the water purification plant, 48°51'45"N/13°49'30"E, on small stones, alt. 775 m, 1998, Z. Palice 115 (PRA); Volary, Černý Kříž: along a forestry road "Hučicská", on shaded, vertical part of a solitary granite boulder, alt. 740 m, 2002, Z. Palice 5904 (PRA); Středočeská pahorkatina upland, Týn nad Vltavou, Temelín, in village, alt. 480 m, 49°11'45"N/14°20'37"E, on bryophytes in old shady railway, 2011, J. Vondrák 8894 (CBFS); E Bohemia, Orlické hory Mts, Dobruška, Sedloňov village, Polom settlement, on loose siliceous stone by military bunker, alt. 660–670 m, 1996, J. Halda & Z. Palice s.n. (PRA).

***Slovakia**. Bratislava – Lamač, near railway and gas stations, on plastic biscuit wrapper near the rails, 1997, Z. Palice s.n., det. P. Czarnota (PRA).

The genus *Bacidina* is in need of revision. Using current taxonomy, which is based mainly on thallus morphology (form and size of vegetative propagules) and internal pigmentation of apothecia, some specimens are not identifiable. It is unclear whether the difficulty arises from the existence of undescribed taxa, or from greater plasticity in the existing taxa than has been recognized. *B. saxenii* is said to be easily recognizable by the large vesicle-like cells (sometimes exceeding 20 µm in diameter) of the outer exciple, a brownish, K+ purplish pigment concentrated in a part of the exciple and epihymenium (sometimes accompanied by an olive pigment), and a colourless hypothecium (Jacobsen & Coppins 1989, Czarnota & Coppins 2007, Coppins 2009, Ekman et al. 2012). However, Bohemian material of non-pigmented *Bacidina chloroticula* is often very close to *B. saxenii* in the characters of the exciple, where at least a few cells exceeding 10 µm are regularly observed. According to Coppins (2009) globose lumina reach 7 µm in *B. chloroticula*. The relationship between *B. chloroticula*-like specimens and *B. saxenii* should be studied further. We cite here only typically pigmented specimens. The pycnidia in the Slovak specimen are pigmented in their outer parts (K + purple) and the conidia are more or less straight and longer (40–55 µm) than reported by Coppins (2009).

Bacidina sulphurella (Samp.) M.Hauck & V.Wirth

***Slovakia.** Muránska planina National Park, Pohronská Polhora, confluence of brooks in Čertova dolina ravine, 48°44'14"N/19°51'27"E, alt. 680 m, on bark of *Fagus sylvatica*, 2012, J. Malíček 5285, A. Guttová, J. Halda & Z. Palice (JM); Hrdzavá valley W of town, along yellow marked tourist path in central part of protected area, 48°44'57"N/20°00'19"E, alt. 590 m, on bark of young *Ulmus glabra*, 2012, J. Malíček 5244 (JM, deposited under *Bacidia laurocerasi*).

A widespread lichen, which has often not been distinguished from the similar and predominantly saxicolous *B. arnoldiana* (Brand et al. 2009), and which was not included in the new Slovak checklist (Guttová et al. 2013).

Bactrospora dryina (Ach.) A.Massal.

Czech Republic. S Bohemia, České Budějovice, Hluboká nad Vltavou, in valley of river Vltava, ca 4 km NE of village, at protected area Karbanice, alt. ca 380 m, 49°05'01"N/14°27'46"E, in fissures in bark of *Quercus robur*, 2011, J. Vondrák 8470 (CBFS); ibid.: 2013, J. Vondrák 11340 (CBFS); S Moravia, distr. Břeclav, Lanžhot, Ranšpurk National Nature Reserve, c. 48°40'41"N/16°56'49"E, floodplain old-growth forest, alt. 150 m, on bark of old *Quercus robur* and *Tilia cordata*, 2013, J. Malíček 6204, 6235 & J. Vondrák 11341, 11344 (CBFS, JM).

In the Czech Republic *B. dryina* was recorded only in the 19th century (cf. Vězda & Liška 1999). It is a characteristic lichen of old-growth lowland forests which used to be more common in Central

Europe. It is considered extinct in Slovakia (Pišút et al. 2001) and critically endangered in Poland (Cieśliński et al. 2006), probably owing to loss of suitable habitats. The similar *B. corticola*, which differs in its K/I- exciple and shorter ascospore cells, has only one historical record in Central Europe, from northern Germany (Egea & Torrente 1993). It has mainly a North European distribution and it is unlikely to occur in the study area.

Biatora pontica Printzen & Tønsberg

***Slovakia.** W Carpathians, Muránska planina plateau: the Hrdzavá valley – a deciduous forest on N-facing slope below the peat-bog "V machoch", c. 48°45'N/19°59'50"E, on bark of *Acer pseudoplatanus*, alt. 600–650 m, 2003, A. Guttová, Z. Palice 6227 & C. Printzen (PRA); ibid.: hornbeam-beech forest in the valley of the brook, 48°44'50"N/20°01'12"E, on bark of *Fagus*, alt. 497 m, 2012, Z. Palice 15400 (PRA); Muránska planina Mts, Brezno, Tisovec, protected area Čertova dolina, alt. 700–750 m, 48°44'15"N/19°51'29"E, on bark of *Fagus sylvatica*, 2011, J. Vondrák 9244 (CBFS); ibid.: 48°44'05–15"N/19°51'30–33"E, alt. 640–705 m, on bark of *Abies alba*, *Acer pseudoplatanus*, and *Fagus sylvatica*, 2012, A. Guttová, J. Halda, J. Malíček 5287 & Z. Palice 15390, 15397, 15447 (JM, PRA); W Slovakia, distr. Malacky, Záhorská ves, Horný les National Nature Reserve, old-growth flood-plain forest 3 km SSE of village, 48°21'10"N/16°52'20"E, alt. 150 m, on bark of old *Populus alba*, 2014, J. Malíček 6900 et al. (JM).

This sorediate species resembles *B. efflorescens*, with which it often grows. It is distinguished by its blue-grey coloured apothecia, that are rarely produced, and the presence of xanthones (soralia C+ orange). The diagnostic UV+ whitish substance (before charring) called '*pontica*-unknown' (Rf 6 in solvents A, B, C; Printzen & Tønsberg 2003), detectable by TLC, distinguishes it from sterile samples of sorediate, xanthone-containing *Lecidella* species. In Europe, it is known from the Alps (Printzen & Tønsberg 2003) and southern Scandinavia (Santesson et al. 2004) and it was recently published from Poland (Kukwa et al. 2012).

Bryoria furcellata (Fr.) Brodo & D.Hawksw.

***Czech Republic.** S Bohemia, Šumava Mts, Nová Pec: Mt. Plechý, glacier cirque of the Plešné jezero lake, on vertical rock-face beneath the Stifter monument, alt. 1300 m, 1996, Z. Palice s.n. (PRC).

The specimen is quite small but has the distinctive, characteristic spinules arising from soralia and a Pd+ red spot reaction indicating the presence of fumarprotocetraric acid. In Central Europe (except the Alps) it seems to be a rare species restricted to humid mountain areas.

Buellia arborea Coppins & Tønsberg

***Czech Republic.** W Bohemia, Šumava Mts, Železná Ruda: glacial cirque of the Černé jezero lake, central part, on wood of *Picea*, alt. 1200–1250 m, 1995, Z. Palice 13361 (PRC).

***Slovakia.** W Carpathians, Muránska planina plateau: nature reserve Šarkanica, S-facing steep rocky slope with scattered trees, 48°43'04.5"N/19°59'03.5"E, on hard, dry wood of *Larix*, alt. 960 m, 2009, Z. Palice 12720 (PRA); Mt. Cigánka, well lit deciduous forest on S-facing slope, 48°45'18.5"N/20°03'20.5"E, alt. 815 m, 2010, J. Halda & Z. Palice 13469 (PRA).

All specimens are sterile, but have characteristic bluish crater-like soralia, and atranorin and placodiolic acid (Tønsberg 1992) were detected by TLC.

Caloplaca alaskensis Wetmore [*Calogaya alaskensis* (Wetmore) Arup, Frödén & Søchting]

***Slovakia.** W Carpathians, N.P. Velká Fatra, Mt. Ostredok [1592], subalpine lichen-dominated-calcicolous community at sites with late-lying snow on N-facing slope, 48°54'10"N/19°04'45"E, terricolous, alt. 1560–1575 m, 1994, Z. Palice 16175 (PRA); Malá Fatra Mts, Žilina, Terchová, Mt Chleb, slopes SE of peak, alt. c. 1590 m, 49°11'14"N/19°03'08"E, on limestone in alpine zone, 2011, J. Vondrák 10616 (CBFS); ibid.: S slope below Mt Pekelník, alt. c. 1560 m, 49°11'25"N/19°01'02"E, on bryophytes in limestone crevices and directly on limestone in alpine zone, 2011, J. Vondrák 10625 (CBFS).

Although closely related to *Caloplaca biatorina* and other species with lobate thalli (Arup et al. 2013), the thallus of C. *alaskensis* is reduced to scattered convex yellow areoles eroded into laminal or crateriform soralia. It is a rather inconspicuous lichen resembling *Caloplaca citrina* and similar sorediate taxa. *Caloplaca alaskensis* is known to be widely distributed in the Arctic (Søchting et al. 2008), but our records are the only ones from outside the Arctic or Subarctic. Sample JV10616 was sequenced for ITS (Genbank accession number: KF890254); it is >99 % identical to the GenBank sequence of

Caloplaca [as *Calogaya*] *alaskensis* from Sweden (KC179341); the only difference between the two sequences (length 518 bp) is in two 1-bp indel positions and one C/T substitution.

Caloplaca arcis (Poelt & Vězda) Arup [*Flavoplaca arcis* (Poelt & Vězda) Arup, Frödén & Søchting]

***Czech Republic.** Central Bohemia, Praha, Vyšehrad, on fort walls, alt. ca 240 m, 50°03'43"N/14°25'25"E, on concrete and bricks, mostly on exposed horizontal faces, 2011, L. Syrovátková, F. Bouda & J. Vondrák 8688 (CBFS, record confirmed by ITS molecular data; Genbank accession nr: km598764); S Moravia, Břeclav, Lednice, in town, on concrete crown of brick wall at chateau, alt. 160 m, 48°48'3"N/16°48'15"E, 2014, B. Coppins, A. Acton, N. Sanderson & J. Vondrák (not collected).

In southern Europe, this species grows on base-rich siliceous rocks or limestone (Vondrák et al. 2009), but it is largely synanthropic in higher latitudes growing on stone walls or concrete (our data; Coppins, pers. comm.). Similar behaviour is known in other Teloschistaceae: e.g. *Caloplaca albolutescens*, *C. austrocitrina* and *C. limonia*.

Caloplaca brachyspora Mereschk.

***Slovakia.** Belianske Tatry Mts, Monkova dolina, alt. 1280 m, on limestone [in subalpine zone], 1993, E. Lisická 6787 (BRA CR7689; sub *Caloplaca* sp.); Malá Fatra Mts, Žilina, Terchová, Mt Chlieb, slopes SE of peak, alt. 1590 m, 49°11'14"N/19°03'08"E, on limestone in alpine zone, 2011, J. Vondrák 10654 (CBFS); ibid.: on S slope below Mt Pekelník, alt. 1560 m, 49°11'25"N/19°01'02"E, 2011, J. Vondrák 10647 (CBFS); ibid.: Mt. Vel'ký Kriváň, 0.4 km NW of peak, alt. 1570 m, 49°11'25"N/19°01'40"E, 2011, J. Vondrák 10648, 10649, 10653 (CBFS); Velká Fatra Mts, Drobkovo – Štrochy, [on limestone], 1996, E. Lisická 408 (BRA CR11108; sub *Caloplaca* sp.).

For over a hundred years, *C. brachyspora* was known only from its type locality in the Crimean Yayla Mountains, from the monastery of Kosma and Demian (Mereschkowsky: Lichenes Rossiae Exsiccati 276). Its characters, especially the short and broadly ellipsoid ascospores with thin septa, are described briefly in Vondrák et al. (2010). Surprisingly, the species appears to be common in the Western Carpathians; it is one of the most frequent *Caloplaca* in limestone outcrops in the alpine zone of the Malá Fatra Mts. and it was also collected by E. Lisická from two other Slovak mountains. It may have a rather eastern distribution in Europe, as we did not find any similar material from the Alps in GZU.

Caloplaca dichroa Arup [*Flavoplaca dichroa* (Arup) Arup, Frödén & Søchting]

***Slovakia.** Malá Fatra Mts, Žilina, Terchová, Mt. Vel'ký Kriváň, c. 0.4 km NW of peak, alt. c. 1570 m, 49°11'25"N/19°01'40"E, on N-exposed limestone outcrops, 2011, J. Vondrák 10631 (CBFS, sterile specimen).

Sterile crusts of *C. dichroa* are usually distinguishable from a common *Caloplaca flavocitrina* and other sorediate species by their entirely blastidiate character, real soralia are absent. Blastidiate *C. limonia* has distinctly larger vegetative diaspores. See Vondrák et al. (2009) for further characters.

Caloplaca polycarpa (A.Massal.) Zahlbr. [*Flavoplaca polycarpa* (A.Massal.) Arup, Frödén & Søchting]

Slovakia. Slovenský kras National Park, Turňa nad Bodvou, Zádiel: Zádielská tiesňava, deep canyon in limestone, south part of protected area, 48°37'06"N/20°50'04"E, alt. 330–350 m, on limestone rock, 2012, J. Malíček 5300, A. Guttová, J. Halda & Z. Palice (JM); Slovenský kras karst, Rožňava, Turňa nad Bodvou, rocky valley Hájska dolina, alt. 300–500 m, on limestone rock, 2006, J. Vondrák 4880 (CBFS); Malé Karpaty Mts, Bratislava, Devín, SW slopes of Mt Devínská Kobyla, alt. 250 m, 48°11'N/17°00'E, limestone rock, 2004, J. Vondrák 1877 (CBFS).

This calcicolous lichen has a distribution centered in the Mediterranean basin, with scattered localities in Central Europe (e.g. Vondrák & Wirth 2013). In the Czech Republic, it is not rare in limestone areas (Vondrák et al. 2007a). It has commonly been confused with similar species from the *C. holocarpa* and *C. velana* groups. Although the species was not included in the Slovak checklist (Guttová et al. 2013), it is not new to the country, as it was previously recorded from the Muránska planina plateau (Guttová & Palice 2005).

Caloplaca tominii Savicz [*Xanthocarpia tominii* (Savicz) Frödén, Arup & Søchting]

***Slovakia.** Cerová vrchovina upland, Fiľakovo, Hajnáčka, Šurice, S-slope of hill Soví hrad, 48°13'32–34"N/19°54'44–45"E, alt. 240–250 m, on lime-rich outcrop of pyroclastics in steppe, 2012, Z. Fačkovcová, A. Guttová, J. Liška, Z. Palice 15923 & J. Vondrák 10211, 10199 (CBFS, PRA).

Caloplaca tominii is an epigaeic or epilithic sorediate lichen mainly distributed in arid continental regions in Eurasia (Vondrák et al. 2011). In the Slovak locality, *C. tominii* is a common lichen together with *Caloplaca molariformis* sharing a similar distribution pattern (Vondrák et al. 2013a).

Caloplaca xerica Poelt & Vězda

***Slovakia.** Cerová vrchovina upland, Fiľakovo, Hajnáčka, volcanic hill in village, alt. 250–300 m, 48°13'04–06"N/19°57'18–19"E, on sun-exposed, base-rich volcanic outcrop, 2012, Z. Fačkovcová, A. Guttová, J. Liška, Z. Palice 15860, 15954, 15973 & J. Vondrák 10185 (CBFS, PRA); ibid., Šurice, S-slope of hill Soví hrad, alt. c. 250 m, 48°13'34"N/19°54'45"E, on lime-rich outcrop of pyroclastics in steppe, 2012, J. Vondrák 10214 (CBFS); Kováčovské kopce hills, Štúrovo, Kamenica nad Hronom, rocks in S-slope of hill Burdov, alt. 150–200 m, on sun-exposed basal part of andesite rock, 2006, J. Vondrák 4814 (CBFS); Krupinská pahorkatina foothills of Javorie Mts, Krupina, Cerovo, ruin of castle Čabraď in Litava river walley, andesitic conglomerates, 2003, J. Vondrák 1263 (CBFS); Malé Karpaty Mts, Bratislava, Devín, SW slopes of Mt. „Devínská kobyla", alt. 250 m, 48°11'N/17°00'E, limestone rock, 2004, J. Vondrák 1792 (CBFS).

The mainly Mediterranean *C. xerica* probably reaches its northern distribution limits in Germany (Wirth et al. 2013), the Czech Republic (Vondrák et al. 2007a) and Slovakia (our data).

Candelaria pacifica M.Westb. & Arup

***Czech Republic.** Central Bohemia: Na kaštanech u nádraží v Černošicích, 1937, R. Traxler (PRC); Sedlčany region, Nalžovice, Nalžovické Podhájí: trees along road below settlement, alt. 350 m, on bark of *Fraxinus excelsior*, 2003, J. Malíček 156 (JM); Sedlčany region, Skrýšov valley of "Jedelský potok" brook, 900 m ENE of village, 49°38'54"N/14°18'44"E, alt. 330 m, on twigs of *Larix decidua*, 2010, J. Malíček 2454 (JM). W Bohemia: Český les Protected Landscape Area, Pivoň, two protected old lime trees near the church, 49°29'13.0"N/12°44'18.8"E, alt. 590 m, 2013, on bark of old *Tilia cordata*, J. Malíček 5923, Z. Palice 16676, et al. (JM, PRA); Český les Mts, Hostouň, Mutěnín: protected old lime tree along road at W border of village, 49°32'39"N/12°44'25"E, alt. 500 m, on bark of old *Tilia cordata*, 2013, J. Malíček 5936, A. Hrdinová & L. Syrovátková (JM). N Bohemia: An alten Roβkastanien in Neugarten b. B.-Leipa, ca. 270 m s. m., 1931, J. Anders (PRC, Lich. exsic. Bohem. boreal. n. 211); Nordböhmen: Niederliebich [Dolní Libchava], Pflaumenbaum, 1910, E. Proschaiter? (PRC). E Bohemia: Na švestkách u Hor. Jelení, 1911, A. Volc (PRC). S Bohemia: distr. Tábor, in cortice Populi sp. Prope p. Řepeč / cota 497/, 1978, J. Liška (PRC); distr. Tábor: *Acer platanoides* secundum viam publicam in pago Turovec, 420 m s.m., 1975, J. Liška (PRC); distr. Tábor, in cortice Fraxini excelsioris in pago Drhovice prope p. Dražice, 480 m s.m., 1978, J. Liška (PRC); Dobronice, akát u kostelíku, alt. 400 m, 1997, Z. Palice s.n. (PRA); Soběslav, Krátošice, intravillane, 49°19'31.7"N/14°47'12.6"E, on bark of *Fraxinus* in front of chapel, alt. 522 m, 2013, Z. Palice 16705 (PRA); Šumava Mts, Horní Planá, Pernek village, on bark of solitary *Tilia* beside a road leading to railway-stop, alt. 760 m, 2001, Z. Palice 5250 (PRA). W Moravia: distr. Žďár n. Sázavou, Měřín, NW of village, on road to Černá, on bark of *Acer platanoides*, 2005, J. Malíček 249 & A. Müller (JM); distr. Žďár n. Sázavou, Černá, avenue with *Acer platanoides* and *A. pseudoplatanus*, in W part of village, alt. 530 m, on bark of *Acer platanoides*, 2005, J. Malíček 269 & A. Müller (JM); V Cikhaji, 1905, M. Servít (PRC). S Moravia: Bílé Karpaty Protected Landscape Area, Velká nad Veličkou, Zahrady pod Hájem National Nature Reserve, 48°53'N/17°32'E, alt. 350–480 m, on bark of *Prunus domestica*, 2011, J. Malíček 3804 (JM); Znaim, Zuckerhandelstraβe, auf Linde, 1919, A. Oborny (PRC); Mazků les u Zvole na Moravě, 1906, M. Servít (PRC).

***Slovakia.** Tribečské vrchy: ad corticem Robiniae pseudoacaciae in decl. merid. montis Žibrica, alt. c. 300 m.s.m., 1963, L. Opold (PRC, Lichenes Slovakiae exsiccati n. 15).

Candelaria pacifica was distinguished from *C. concolor* quite recently (Westberg & Arup 2011). The thallus of *C. pacifica* is formed of egg yolk-yellow squamules to lobes, which are usually wider than they are long. The lower surface of the lobes is grey (the photobiont cells shine through), with an arachnoid appearance owing to the absence of a lower cortex, never white as in *C. concolor*. Rhizines are present, but are much shorter than in *C. concolor*. Apothecia were not observed in Czech material. *Candelaria pacifica* prefers bark of various deciduous trees (often fruit trees and lime trees) in open urbanized landscapes. *Candelaria concolor* seems to be rarer in the Czech Republic and we expect the same in Slovakia.

Candelariella lutella (Vain.) Räsänen

***Slovakia.** Muránska planina National Park, Muráň, walnut avenue at N border of village, 48°44'37"N/20°02'54"E, alt. 420 m, on twigs of *Juglans regia*, 2012, J. Malíček 5261, A. Guttová, J. Halda & Z. Palice, conf. M. Westberg (JM).

Candelariella lutella is a boreal lichen occurring mostly on small twigs of conifers and *Quercus*. In Europe, it is known from Macedonia (Mayrhofer et al. 2012), Montenegro (Bilovitz et al. 2008), Scandinavia and the Alps (Westberg 2007). The low altitude and substrate (slender twigs of a walnut tree) at the Muráň site are slightly atypical. We suspect that our material does not belong to *C. lutella* s. str., but to a similar, undescribed Mediterranean taxon which lacks the yellow granular thallus charac-

teristic of the boreal *C. lutella*. We have also collected this Mediterranean taxon in Bulgaria (Vondrák 2006, as *C. lutella*) and in Greece (unpublished, deposited in CBFS, JV 8898).

Candelariella plumbea Poelt & Vězda (Fig. 1)

***Czech Republic.** Central Bohemia, Český kras karst, Třebotov, rock at SW slope of Kulivá hora hill, c. 1 km SW of village, alt. c. 330 m, 49°57'51"N/14°17'10"E, on sun-exposed limestone outcrop, 2012, I. Frolov & J. Vondrák 9639 (CBFS); S Bohemia, Českobudějovická pánev basin, České Budějovice, Mydlovary, settling pit „MAPE", alt. 400 m, 49°05'58"N/14°20'07"E, on horizontal surface of concrete, 2009, J. Vondrák 7356 (CBFS); S Moravia, Moravský Krumlov, rocky steppe on a slope above Rokytná river, 49°03'00"N/16°19'10"E, on calcareous conglomerate, 2004, J. Vondrák 1791 (CBFS);

A grey thallus (sometimes blastidiate, see Wirth et al. 2013) distinguishes *C. plumbea* from the very similar *C. rosulans*, described from North America (= European *C. oleifera*; Westberg & Sohrabi 2012). In addition to records of *C. plumbea* with a grey thallus (cited above), we observed lichens shifting from grey to yellow thallus and lichens with distinctly yellow thallus. The yellow thallus morphotypes of *C. rosulans* from Central Europe are possibly conspecific with *C. plumbea* with grey thallus.

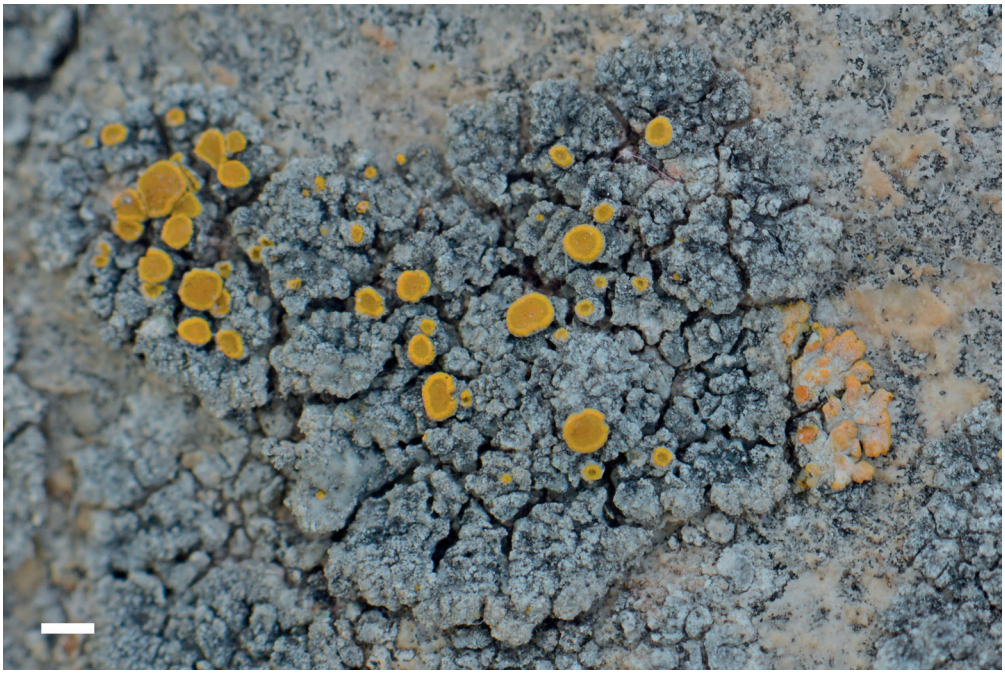

Fig. 1: *Candelariella plumbea* is a variable lichen occurring in limestone areas, usually on vertical and overhanging rocks (JM 5636, scale = 1 mm).

Candelariella viae-lactae G.Thor & V.Wirth

***Czech Republic.** S Moravia, Mikulov, Klentnice, protected area Soutěska, alt. 400 m, 48°51'48"N/16°38'40"E, on bark of *Quercus*, 2007, J. Vondrák 4964 (CBFS); ibid.: 2013, J. Vondrák 10677 (CBFS).

Our samples of epiphytic *C. viae-lactae* with a grey blastidiate thallus and zeorine apothecia have conspicuous hairs on the thalline exciple. Although this character appears not to have been described to date in the literature, we have also observed it in samples from the Russian Black Sea coast (three specimens in CBFS).

Catillaria fungoides Etayo & van den Boom (Fig. 2)

***Czech Republic.** S Bohemia, distr. Jindřichův Hradec, Novobystřická vrchovina: W slope of crest Homolka, Fabián, "Lesovna v Dubovici", c. 12 km S of Jindřichův Hradec, 49°02'N/14°58'50"E, on bark of *Malus*, alt. 540 m, 1999, Z. Palice 1865 (PRA); S Moravia, distr. Břeclav, Lanžhot, Ranšpurk National Nature Reserve, c. 48°40'41"N/16°56'49"E, floodplain old-growth forest, alt. 150 m, on bark of young *Fraxinus angustifolia*, 2013, J. Malíček 6241 & J. Vondrák (JM); Pálava Protected Landscape Area, Klentnice, Tabulová, Růžový vrch a Kočičí kámen National Nature Reserve, upper part of Stolová hora hill (459 m), c. 48°50'22"N/16°38'10"E, alt. 450 m, on bark of *Fraxinus excelsior*, 2013, J. Malíček 6399 (JM); Mikulov, Klentnice, protected area "Děvín - Kotel - Soutěska" (forest E of Mt Děvín), alt. 500 m, 48°52'9"N/16°39'9"E, 2013, J. Vondrák 11631 (CBFS); ibid.: along green-marked tourist path 0.4 km SSE of Horní Věstonice, 48°52'03"N/16°37'56"E, alt. 315 m, *Fraxinus excelsior*, 2014, J. Malíček 6934 (JM).

***Slovakia.** Cerová vrchovina upland, Fiľakovo, Hajnáčka, Gortva, hill Stéblová skala, alt. 420–460 m, 48°14'42"N/19°58'43"E, on oak bark in forest-steppe on E-slope, 2012, Z. Palice, J. Liška & J. Vondrák 10177 (CBFS); W Carpathians, distr. Revúca: W-slope of Žabica hill (1 km SW of Muráň), an orchard of middle-aged *Juglans* trees in a pasture, 48°44.00'N/20°02.43'E, on bark of *Juglans*, alt. 456 m, 2007, A. Guttová, Z. Palice 11860 & J. Steinová (PRA); W Carpathians, distr. Revúca, Muráň, valley of Hrdzavý potok brook near margin of village, 48°44'37"N/20°02'11"E, on bark of dying *Salix*, alt. 409 m, 2013, Z. Palice 16920 (PRA); W Slovakia, distr. Malacky, Záhorská Ves, Horný les National Nature Reserve, flood-plain forest 3 km SSE of village, 48°21'08–10"N/16°51'41–47"E, alt. 150 m, on bark and branch of young *Fraxinus angustifolia*, 2014, J. Malíček 6894, Z. Palice 17759 et al. (JM).

The species is characteristic of Xanthorion communities of eutrophied bark of young solitary trees (van den Boom et al. 2007). Evidently it is an overlooked species so far collected in only a few countries of the Old World (Etayo & van den Boom 2002, van den Boom et al. 2007). *Catillaria fungoides* is often associated with *C. nigroclavata* (e.g. in the last two cited records), which has very similar apothecia. Apothecia of *C. fungoides* are said to differ in their inspersed hymenium and slightly larger spores (Etayo & van den Boom 2002). The first character is clearly visible in our fertile specimens (JM 6241, ZP 16920); the second is not reliable according to van den Boom et al. (2007). Our material was compared to Dutch material collected and sent by P. van den Boom, who co-described this taxon.

Fig. 2: *Catillaria fungoides* is an overlooked nitrophytic species preferring bark of young trees. It is very characteristic due to the black soralia (ZP 16290, scale = 1 mm).

Cladonia novochlorophaea (Sipman) Brodo & Ahti

***Czech Republic.** W Bohemia, Krušné hory Mts, Boží Dar, meadows 700 m NNW of village, 50°25'06"N/12°54'57"E, alt. 1000 m, on acidic soil, 2011, J. Malíček 3912 et al. (JM).

Probably rare in the Czech Republic, as it prefers more oceanic parts of Europe (cf. Leuckert et al. 1971, Kowalewska et al. 2008).

Collolechia caesia (Fr.) A.Massal.

***Slovakia.** Slovenský kras National Park, Turňa nad Bodvou, Zádiel: Zádielská tiesňava, deep canyon in limestone, south part of protected area, 48°37'09"N/20°50'11"E, alt. 400 m, on vertical limestone rock, associated with *Placynthium subradiatum*, 2012, J. Malíček 5309, A. Guttová, J. Halda & Z. Palice, det. M. Schultz (JM).

Collolechia caesia has traditionally been misidentified as *Placynthium garovaglioi* and reported under this name. It differs from *Placynthium* in its crustose-leprose thallus, absence of an upper cortex, incrustations of calcium oxalate crystals, asci with a distinct internal amyloid ring-structure and multiseptate acicular-fusiform spores (Jørgensen 2005). In the Czech Republic and Slovakia, it is probably a rare lichen restricted to karst areas.

Dendrographa decolorans (Turner & Borrer ex Sm.) Ertz & Tehler

***Czech Republic.** S Bohemia, České Budějovice, Hluboká n. Vltavou, protected woodland area Karvanice in Vltava River valley, c. 4.5 km N of town, alt. c. 370 m, 49°05'49"N/14°27'52"E, on bark of *Quercus robur*, 2010, J. Vondrák 7930 (CBFS); České Budějovice, Hluboká nad Vltavou, in valley of river Vltava in protected area "Baba", alt. c. 370 m, 49°04'40"N/14°27'12"E, on bark of *Quercus robur*, 2011, J. Vondrák 8446, 8447 (CBFS); S Moravia, distr. Břeclav, Lanžhot, Ranšpurk National Nature Reserve, c. 48°40'41"N/16°56'49"E, floodplain old-growth forest, alt. 150 m, on bark of *Carpinus betulus*, *Fraxinus angustifolia* and *Quercus robur*, 2013, J. Malíček 6243, 6250 & J. Vondrák 11347, 11348 (JM, CBFS).

This sorediate lichen has been recorded only as a sterile crust in the Czech Republic. In four collections analyzed by us, we confirmed unknown fatty acids by TLC, as reported by Wolseley & Hawksworth (2009). It is a distinctive lichen (see Nimis & Martellos 2008 for images) growing in dry places on bark of old trees in lowland woodlands.

Eopyrenula leucoplaca (Wallr.) R.C.Harris

Czech Republic. S Moravia, Pálava Protected Landscape Area, Horní Věstonice, Děvín-Kotel-Soutěska National Nature Reserve, in forest along red tourist path in S part of reserve, 1.0–1.5 km N of Klentnice, c. 48°51'30"N/16°38'41"E, alt. 370 m, on bark of old *Fraxinus excelsior*, 2013, J. Malíček 6371 & J. Vondrák (JM).

Slovakia. Muránska planina Mts, Revúca, Muráň, hill c. 2500 m W of village, alt. c. 800 m, 48°44'14"N/20°00'30"E, on bark of *Fraxinus excelsior*, 2011, J. Vondrák 9247 (CBFS).

Last recorded in Slovakia at the end of the 19th century (cf. Szatala 1927) and from the Czech Republic by Suza (1944).

Fellhanera viridisorediata Aptroot, M.Brand & Spier

***Czech Republic.** S Bohemia, Šumava Mts, Volary: boggy, taiga-like forest with *Pinus* dominating near the Hučina brook, c. 0.6 km ESE from the railway-stop Černý Kříž, 48°51'30"N/13°52'11"E, on dry twigs of young *Picea*, alt. 740 m, 2010, J. Halda & Z. Palice 13352 (PRA); ibid., young managed spruce forest by a brooklet below the forestry road 'Krejčová', 48°51'24.5"N/13°51'10.5"E, on twigs of young *Picea*, alt. 750 m, 2014, Z. Palice 17821 (PRA); Novohradské hory Mts, Pohorská ves, Pohoří na Šumavě: Stodůlecký vrch Nature Monument, boggy pine forest, 48°35'09"N/14°42'20"E, alt. 955 m, on twig of *Picea abies*, 2012, J. Malíček 5709, J. Kocourková, Z. Palice & J. Vondrák (JM); N Bohemia, Vysoká Lípa: National Park "České Švýcarsko", on N-facing rock-face above a narrow E-declining streamless ravine, nature reserve Babylon, ca 2.5 km NW of Jetřichovice, 50°52'11.8"N/14°22'46.2"E, alt. 330 m, on twig of young *Picea abies*, 2014, Z. Palice 17688 (PRA).

According to Wirth et al. (2013) this species is not rare in Germany and we expect the same to be true in the Czech Republic. It probably occurs in most suitable places where other (facultatively) foliicolous species also occur (*Fellhanera bouteillei*, *F. subtilis*, *Fellhaneropsis myrtillicola*, *Scoliciosporum curvatum*). The collected material is fertile except the specimen from northern Bohemia where roccellic acid was detected by TLC. Characteristic crater-like soralia are present in younger thalli in all samples, as well as a few dark apothecia in southern Bohemian material.

Lecania sordida Reese Næsborg (Fig. 3)

***Czech Republic.** W Bohemia, Český les Protected Landscape Area, Pivoň, cemetery at N border of village, 49°29'18"N/12°44'23"E, alt. 595 m, on vertical concrete wall, 2013, J. Malíček et al. 5924, det. P. van den Boom (JM, dupl. in PRC).

This recently described saxicolous lichen has been reported from Central Europe only from Germany and Switzerland (Reese Næsborg 2008). It prefers calcareous substrates in urban habitats.

Lecanora glabrata (Ach.) Malme

Slovakia. Montes Slovenské stredohorie, regio protecta Poľana, reservatio naturalis Hrončecký grúň, alt. 900–1000 m s. m., ad corticem arborum (*Fraxinus excelsior*), 1996, Š. Bayerová 1676 (PRA); Muránska planina plateau: collected at many sites, J. Malíček 2364, 2383, 2411, 3074, 4090, 5268 & Z. Palice 1745, 1798, 4202, 5559, 5615, 9035, 11883, 11909 (JM, PRA); Slovenský kras National Park, Turňa nad Bodvou, Zádiel: Zádielská tiesňava Nature Reserve, bottom of deep canyon in limestone, central part of protected area, 48°38'11"N/20°49'20"E, alt. 470 m, on bark of *Fagus sylvatica*, 2012, J. Malíček 5333 (JM); Bukovské vrchy Mts, Nová Sedlica, along forest road c. 1.5 km ENE of village, 49°03'29"N/22°32'18"E, alt. 680 m, on bark of *Fagus sylvatica*, 2013, J. Malíček 6487 & J. Vondrák (JM).

An overlooked lichen that is very similar to other members of the *Lecanora subfusca* group (e.g. *L. argentata*). It is widely distributed in Carpathian beech and hornbeam forests, especially in the Muránska planina mountains. *Lecanora glabrata* prefers smooth bark of *Fagus* and *Carpinus*, but also grows on *Fraxinus* and some other genera. It has been reported several times from Slovakia (e.g. Hazslinszky 1884, Servít & Černohorský 1935, Suza 1948) but is absent from the new Slovak checklist (Guttová et al. 2013). The identity of historical collections was not checked, but based on experience from the revision of Czech material (Malíček 2014), most specimens may be misidentified and should be verified.

'*Lecidea*' *erythrophaea* Flörke ex Sommerf.

Czech Republic. S Bohemia, Šumava Mts, Volary, Černý Kříž: Mt. Jelení vrch (c. 3 km SSW of Černý Kříž), 48°50'00–05"N/13°51'15–20"E, remnants of beech forest on E slope, on bark of *Acer platanoides* and *Ulmus glabra*, alt. 860–900 m, 2000 & 2011, Z. Palice 3910 & 15288 (PRA); Volary: Mt. Stožec – Medvědice, a mountain scree forest, 48°53'N/13°50'10"E, on bark of *Acer platanoides*, alt. 900–950 m, 2000, A. Guttová, J. Halda, Z. Palice 4163 & P. Uhlík (PRA); Volary, Nová Pec, NE slope of Mt. Hraničník, alt. c. 1150 m, 48°45'08"N/13°54'50"E, on bark of *Acer pseudoplatanus*, 2007, J. Vondrák 7596 (CBFS); N Moravia, Jeseníky Mts., old-growth mixed forest with beech dominating, below Františkova myslivna (nature reserve "Bučina"), bark of *Acer pseudoplatanus*, alt. 1050–1100 m, 2002, J. Halda & Z. Palice 6518 (PRA).

Slovakia. Poloniny Mts, Ulič, Nová Sedlica, protected area Stužica, alt. 600–1200 m, 49°04'24"N/22°32'35", on bark of *Acer pseudoplatanus*, 2013, J. Vondrák 11133 & J. Malíček (CBFS).

In the Czech Republic and Slovakia, *L. erythrophaea* was recorded only a few times in the late 19th and early 20th centuries (see Vězda & Liška 1999, Szatala 1942). The species is characterized by reddish-brown *Lecidella*-like apothecia, *Biatora*-type asci, capped paraphyses, narrowly ellipsoid ascospores, and insoluble pigment granules in the exciple. For the main characteristics see Wirth et al. (2013). In Central Europe, it is quite a rare woodland species of subneutral bark. In the Czech Republic and Slovakia, it appears to be an old-growth forest species confined to humid woodlands.

'Lecidea' sphaerella Hedl.

***Czech Republic.** W Bohemia, Krušné hory Mts, Stříbrná: Rájecké údolí, near a former game-keeper's-house, 50°22.67'N/12°33.06'E, on bark of *Acer platanoides*, alt. 660–670 m, 2004, J. Liška, Z. Palice 9297 & P. Uhlík (PRA); Šumava Mts, Modrava: deciduous forest at the Czech-German border near Weitfällerská slať peat bog, on bark of *Acer pseudoplatanus*, alt. 1060 m, 1995, Z. Palice 4280 (PRA); Javoří Pila: Mt. Medvěd, NNW slope, spruce plantation with dispersed old maples, 49°00.47'N/13°25.07'E, on bark and wood of *Acer pseudoplatanus* snag, alt. 1125–1130 m, 2005, F. Bouda, Z. Palice 9676, 9679, 9695, O. Peksa & J. Steinová (PRA); ibid.: NE slope, 49°00.52'N/13°25.24'E, bark of old *Acer pseudoplatanus*, alt. 1125 m, 2005, F. Bouda, Z. Palice 9741, O. Peksa & J. Steinová (PRA); S Bohemia, Šumava Mts, Volary, Mt. Jelení vrch, E slope, fragment of old-growth beech forest, on weathered bark of *Fagus*, alt. 850–900 m, 1995, Z. Palice 3893 (PRA); Volary: Mt. Stožec, nature reserve "Stožecká skála", scree forest around Stožecká kaple chapel, 48°52'45"N/13°49'30"E, on *Acer platanoides*, alt. 940 m, 1996, Z. Palice 4099 (PRA); ibid.: on bark of *Fraxinus*, alt. 900 m, 1998, Z. Palice 1571 (PRA); Volary, Stožec: E slope of hill "Na vrchu" [873.8], managed young mixed forest below "Tovární cesta" (forest trail), 1.3 km SW of Černý

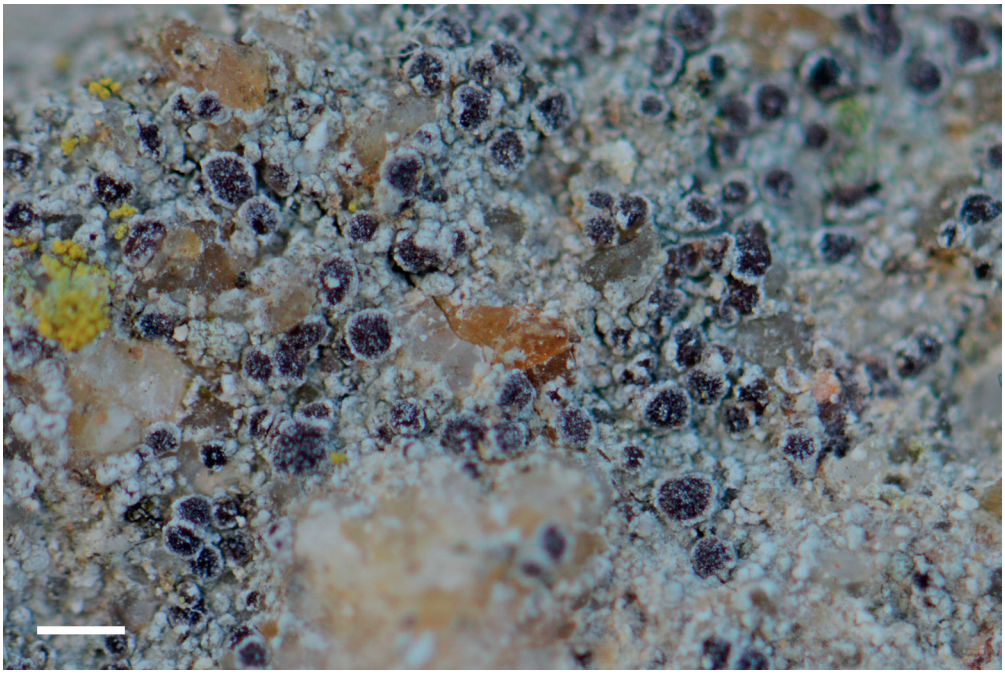

Fig. 3: *Lecania sordida* is a widespread but rare lichen. It prefers calcareous substrates, e.g. concrete (JM 5924, scale = 1 mm).

Kříž (railway station), bark of *Acer platanoides*, alt. 830 m, 2001, Z. Palice 4621, det. C. Printzen (PRA); Želnava: Mt. Bulov, rocky crest with a scree forest ESE of the top, c. 2 km NE of village, 48°49'17"N/13°59'30"E, on bark at base of *Fraxinus excelsior*, alt. 975 m, 2010, J. Malíček & Z. Palice 13679 (PRA); Nová Pec: Mt. Hraničník, N slope, remnants of mountain mixed forest, 48°45'15–25"N/13°54'30"E, on bark of *Acer pseudoplatanus* together with *Lecania cyrtella*, alt. 1200–1250 m, 1995, Z. Palice 1346 (PRA); ibid.: NNW slope, 48°45'11"N/13°54'15"E, on bark and bryophytes over trunk of *Acer pseudoplatanus* and *Fagus* snag, alt. 1170 m, 2000 & 2007, Z. Palice 4083 & 11270 (PRA); Nová Pec, shady forest in valley of Rasovka brook 1.4 km SW of Klápa settlement, on bank of brook, 48°45'25"N/13°55'11"E, alt. 990 m, on bark of *Acer pseudoplatanus*, 2012, J. Malíček 4718, F. Bouda, O. Peksa, D. Svoboda & L. Syrovátková (JM).

This is a woodland species of slightly nutrient-rich bark but it is not a member of Xanthorion communities. It prefers shaded and humid microhabitats but apparently may tolerate small-scale forestry. It seems to be easily overlooked. The colour of the apothecia varies from completely pale to dark brown depending on local habitat conditions and age. The species may be mistaken for *Biatora helvola* or *Lecania cyrtellina*, with which shares a similar ecology and the type of ascospores. *L. sphaerella* is distinguished by distinctly thick-walled (gelatinized) ends of the excipular hyphae and a darkened subhymenium when the apothecia are pigmented. In addition, *B. helvola* is easily distinguishable from *L. sphaerella* by the presence of gyrophoric acid in the apothecia and *Lecania cyrtellina* almost always produces pycnidia with crescent-shaped conidia (Wirth et al. 2013). The species was called *Lecidea* (*Biatora*) *sylvana* (sensu Th.Fr., non Körb.) by older authors (Hedlund 1892, Santesson et al. 2004). Körber's taxon was described from the Czech Republic and is a synonym of *Biatora globulosa* (Printzen 1995). Most references to *Biatora sylvana* from the Czech Republic (cf. Vězda & Liška 1999, under *Catillaria globulosa*) refer to the original specimen by Körber except the record by Spitzner (1897), which needs revision.

'Lecidea' strasseri Zahlbr.

***Slovakia.** Muránska planina National Park, Muráň, limestone quarry at N border of village, 48°44'41"N/20°02'50"E, alt. 450 m, on moss on limestone rock, 2012, J. Malíček 5256, A. Guttová, J. Halda & Z. Palice (JM).

This species is closely related to the arctic-alpine *Lecidea berengeriana* but seems to prefer lower elevations (e.g., oak woodlands). *Lecidea strasseri* has even been suggested to be a synonym of *L. berengeriana* (Printzen 1995), but with more material available it has been possible to distinguish it based on minor morphological characteristics and ecology as a separate taxon (Spribille et al. 2010, Printzen in litt.). It was previously published from Slovakia as *Lecidea* aff. *berengeriana* (det. C. Printzen) from more or less the same locality as that reported here (Guttová & Palice 2005: 25).

Lecidella albida Hafellner

***Czech Republic.** Central Bohemia, Vltava River valley, Prostřední Lhota, Vymyšlenská pěšina Nature Reserve, oaks on rocky slopes, 49°44'33"N/14°22'50"E & 49°44'45.5"N/14°21'45.2"E, alt. 290–340 m, on bark of *Quercus petraea*, 2012, J. Malíček 4432 & 4440, K. Knudsen, J. Kocourková & J. Vondrák (JM); S Bohemia, Český Krumlov, Nové Dobrkovice, protected area "Vyšenské kopce", in the valley of brook "Hučnice", alt. 490 m, on bark of *Salix fragilis*, 2006, J. Vondrák 4233 (CBFS, PRA; with apothecia).

An overlooked lichen, which occurs mostly as a sterile sorediate crust resembling a pale form of *Lecanora expallens*. Secondary metabolites detected by TLC (atranorin, thiophanic acid, capistratone, arthothelin) correspond to results of Dietrich (2007).

Leptogium intermedium (Arnold) Arnold

***Czech Republic.** N Moravia, Jeseníky Protected Landscape Area, Bělá pod Pradědem, Šumárník Nature Reserve 5 km W of town, rock on top of Šumný Mt. (1073 m), 50°11'19"N/17°07'45"E, alt. 1060–1070 m, on calcareous soil associated with mosses, *Lempholemma polyanthes*, and *Agonimia tristicula*, 2012, J. Malíček 5231 (JM).

Three localities from the Czech Republic (Český kras, Třebíč, Mokrá hora near Brno) are cited by Guttová (2006) in her Ph.D. thesis, but these records have not been formally published. The species strongly resembles a diminutive form of *L. gelatinosum*. Nowadays both species are rare in the Czech Republic, *L. gelatinosum* being recently reported from the Bohemian Karst (Svoboda 2007), Železné hory Mts (Halda et al. 2011a) and also known from the Krkonoše Mts (Palice, unpublished data).

Melaspilea gibberulosa (Ach.) Zwackh

Slovakia. Muránska planina National Park, Muránska Huta, Šiance National Nature Reserve: central part of reserve, c. 48°46'17"N/20°05'06"E, alt. 750–950 m, on bark of *Quercus petraea*, 2011, J. Malíček et al. 4110 (JM); Poloniny Mts, Ulič, Nová Sedlica, protected area Stužica, alt. 600–1200 m, 49°04'24"N/22°32'35", on mosses on bark of *Fagus sylvatica*, 2013, J. Malíček 6492, 6525 & J. Vondrák 11325, 11329, 11334 (JM, CBFS).

More records of this taxon are included in the first list of Czech and Slovak lichens (Vězda 1980), but it is absent from the recent checklists because it was regarded as a non-lichenized fungus (Vězda & Liška 1999, Malíček et al. 2013). However we have observed a distinct thallus with more or less dispersed cells of a trentepohlioid photobiont. *Melaspilea gibberulosa* seems to be an indicator of old-growth forests in Central Europe.

Metamelanea caesiella (Th.Fr.) Henssen

***Czech Republic.** Central Bohemia, Beroun, Srbsko, S-exposed rocks in protected area Koda ca 1.5 km SW of the village, alt. 300–350 m, 49°56'N/14°08'E, on overhanging hard limestone rock, 2004, J. Vondrák 2610, det. M. Schultz (CBFS); Beroun, Králův Dvůr, Trubín, S-oriented rocks in protected area "Trubínský vrch", alt. 330–350 m, 49°56'40"N/13°59'40"E, on lime-enriched basaltic rock under an overhang, 2004, J. Vondrák 2427, det. M. Schultz (CBFS); S Bohemia, Český Krumlov, Nové Dobrkovice, protected area "Vyšenské kopce", alt. 520 m, under dry and lit, SW exposed limestone overhang, 2005, J. Vondrák 2704, det. M. Schultz (CBFS).

A poorly known lichen sparsely reported from Europe (Jørgensen 2007, Schultz et al. 2007). The Czech specimens form sterile leprose crusts on overhanging limestone rocks. Although the species frequently lacks apothecia, it is recognizable due to the rather thick, poorly lichenized, subpulverulent nodulose-areolate thallus containing packets of chroococcoid cyanobacteria (Jørgensen 2007). Usually a pale felt of mycobiont hyphae is formed among areoles and the thallus shows a paraplectenchymatic structure in section (Schultz et al. 2007; for more details see therein).

Micarea confusa Coppins & van den Boom

***Czech Republic.** N Bohemia, W Sudetes, Krkonoše Mts, Velký Kotel corrie – E slope, uppermost part, 50°45'08"N/15°31'56"E, on humus in crevice of gneissic rock, alt. 1400 m, 2002, J. Halda & Z. Palice 6882 (PRA);

E Bohemia, W Sudetes, Krkonoše Mts, Mt. Sněžka – W facing boulder scree above the SE margin of Krakonošova rukavice corrie, 50°43'30" N/15°44'10" E, on bare soil and over bryophytes below stone overhang, alt. 1550 m, 2000, Š. Bayerová, J. Liška & Z. Palice 4095, conf. P. van den Boom (PRA).

New to Central Europe. The lichen closely resembles *Micarea denigrata* and is distinguished from the latter by consistently shorter mesoconidia and its ecology (substrates rich in heavy metals). In the Czech Republic it has been collected in more or less natural habitats at high altitudes in the Krkonoše Mountains, while in Belgium and the Netherlands, where the species was described, it occurs in industrial sites (Coppins & van den Boom 1995). It has also been recorded on wood in Spain (Sarrión Torres 2001).

Micarea globulosella (Nyl.) Coppins

***Czech Republic.** Central Bohemia, distr. Benešov, Bernartice, Sedlice: Hadce u Želivky National Nature Monument, pine forest with serpentinite outcrops at right bank of Želivka dam, 49°41'12"N/15°06'05"E, alt. 380–390 m, on stump of *Pinus*, 2013, J. Malíček 6164 et al. (JM); W Bohemia, Šumava Mts, Modrava: unnamed point [<1120] with managed beech forest, c. 0.5 km W–WSW of former bridge over Roklanský potok brook, 49°01.12'N/13°26.17'E, on bark of *Fagus*, alt. 1100 m, 2006, E. Loskotová, Z. Palice 10934 & O. Peksa (PRA); S Bohemia, Šumava Mts, Volary: a depression in spruce forest near southern margin of Plešné jezero lake, 48°46'30"N/13°51'55"E, on bark at base of *Picea*, alt. 1095 m, 1998, Z. Palice 1510 (PRA); Mt. Plechý [1378], dead natural spruce forest c. 0.7 km NW of the top, just N of the point 'Rakouská louka', 48°46'33.3"N/13°50'56.2"N, on bark of dead *Picea* near brooklet, alt. 1310 m, 2011, Z. Palice 14537 & V. Pouska (PRA); Mt. Trojmezná, 130–150 m NNW of the top, dead old-growth spruce forest on N-facing slope, 48°46'22"N/13°49'33.5"E, on bark at base of dead standing *Picea*, alt. 1330 m, 2012, I. Frolov, Z. Palice 15772, 15776, 16089, 16090, V. Pouska & J. Vondrák (PRA); ibid.: 0.7 km NE of the top, dead natural spruce forest on N-facing slope, 48°46'34"N/13°50'03"E, on bark at base of dead standing *Picea* (E exp.), alt. 1250 m, 2013, Z. Palice 17195 & V. Pouska (PRA); Nová Pec: Mt. Hraničník, NE-slope, remnants of mountain mixed forest, 48°45'02.8"N/13°54'34.4"E, on bark of *Acer pseudoplatanus*, alt. 1197 m, 2013, Z. Palice 17169 & V. Pouska (PRA).

All listed specimens were tested by the C reagent giving at least a faint reddish spot reaction, and the presence of gyrophoric acid was confirmed by TLC in two of the samples. In the Šumava Mountains, another rare species, *Micarea synotheoides*, also occurs (Czarnota 2007). It differs from *M. globulosella* in the absence of gyrophoric acid and its overall slightly paler habit and more gelatinose thallus. The Bohemian material of *M. globulosella* is heterogeneous. Comparing to the collection from a low elevation in Central Bohemia, the specimens from montane forests in the Šumava Mts produce distinct emergent pycnidia, the thallus is poorly developed and the concentration of gyrophoric acid is low. This heterogeneity is in accordance with observations by Czarnota (2007), who suggests that the Central European montane material may represent an undescribed taxon.

Micarea nowakii Czarnota & Coppins

***Czech Republic.** S Bohemia, Šumava Mts, Volary: Mt. Plechý, well lit boggy spruce forest NW of "Rakouská louka" and NE of "Trojmezí", 48°46'30–40"N/13°50'30–45"E, on wood (twig) half-immersed in a pool, alt. c. 1300 m, 1998, Z. Palice 1542 (PRA); Volary: Mt. Trojmezná, 0.7 km NE of the top, dead natural spruce forest at N-facing slope, 48°46'34"N/13°50'03"E, on wood of lying trunk, alt. 1250 m, 2012, Z. Palice 15780, V. Pouska & J. Vondrák (as cf.; PRA); N Moravia, Králický Sněžník Mts, Staré město, Králický Sněžník Mt., in valley of Morava brook, 50°12'12"N/16°50'45"E, alt. 1200 m, on stump of *Picea abies*, 2011, J. Malíček 3383 & L. Syrovátková (JM).

This recently described species resembles *M. misella* or *M. denigrata*, but differs in having a sharply delimited pigment in the epihymenium and especially in the presence of micareic acid and absence of gyrophoric acid (Czarnota 2007). It was described from Poland (Czarnota 2007) and has also been reported from Sweden (Svensson & Westberg 2010) and Germany (Czarnota et al. 2014). Micareic acid was detected by TLC in all samples, although in the collection ZP 15780 only in trace amounts (cf. micareic acid). This sample is only tentatively assigned to *M. nowakii* since only pycnidia and no apothecia are present.

Normandina acroglypta (Norman) Aptroot

***Slovakia.** Muránska planina plateau: nature reserve Šarkanica, a forested SW-facing rock outcrop above Martinova dolina valley, 48°42'43"N/19°59'31"E, on *Frullania* sp. on a thick branch of *Tilia*, alt. 550 m, 2009, Z. Palice 12893 (PRA); Muránska planina plateau: the Hrdzavá valley, hornbeam-oak-ash-lime forest on rocky SSE-facing slope,

48°44'52.1"N/20°01'15.5"E, on mossy bark of *Tilia*, alt. 512 m, 2012, Z. Palice 15423 (PRA); Muránska planina National Park, Pohronská Polhora, junction of brooks in Čertova dolina ravine, 48°44'14"N/19°51'27"E, alt. 680 m, on bark of young *Acer pseudoplatanus*, 2012, J. Malíček 5286, A. Guttová, J. Halda & Z. Palice (JM).

All Slovak material is sterile but it was compared to a fertile specimen from Scotland (ZP 10387). The specimen JM 5286 was analyzed by TLC and zeorin was detected as a major secondary metabolite. This compound has not been previously mentioned in the literature for this species, but according to the Norwegian lichen database (http://nhm2.uio.no/botanisk/nxd/lav/nld_e.htm) one specimen of *N. acroglypta* from Sør Trøndelag (Haugan 4839a) contains zeorin (det. T. Tønsberg). Secondary metabolites are rarely reported from Verrucariaceae and only a few terpenoids are known from *Flakea* and *Botryolepraria* (Thor & Kashiwadani 1996, Kukwa & Pérez-Ortega 2010). *Normandina acroglypta* resembles several other mostly sterile lichens without a spot reaction of soralia, e.g. *Lecania croatica* and *Mycobilimbia epixanthoides*. Unlike those two species, the thallus of *Normandina* is somewhat areolate-subsquamulose, at least in part, and usually not continuous. The species has a similar ecology to *Normandina pulchella* and it too may grow on shaded rocks covered by bryophytes, especially by liverworts of the genus *Frullania*, which is likely the case of both published Czech records (Servít 1936, 1954, as *Thelidium acroglyptum*).

Peccania cernohorskyi (Servít) Czeika & Guttová (Fig. 4)

***Slovakia.** Slovenský kras National Park, Turňa nad Bodvou, Zádiel: Zádielská tiesňava, deep canyon in limestone, south part of protected area, 48°37'09"N/20°50'11"E, alt. 400 m, on vertical limestone rock, 2012, J. Malíček 5307, A. Guttová, J. Halda & Z. Palice, conf. M. Schultz (JM).

Most published localities are from the Czech Republic (from where it was originally described), especially the area known as the Bohemian Karst (Servít & Černohorský 1935, Czeika et al. 2007, Šprňar et al. 2008, Jørgensen et al. 2013). *Peccania cernohorskyi* is however more widespread (M. Schultz in litt.), but is easily mistaken for other cyanolichens, namely *Anema* spp. and *Peccania coralloides*. Recently reported also from France (Roux 2012) and Siberia (Urbanavichus 2010). It was even listed, with some uncertainty, from California (Schultz 2009).

Peltigera extenuata (Nyl. ex Vain.) Lojka

***Czech Republic.** Central Bohemia, Sedlčany region, Chramosty: Mečkov gamekeeper's house, 49°39'16"N/14°19'05"E, alt. 350 m, on soil, 2007, J. Malíček 949 (JM); Sedlčany region, Milešov, xerothermic grasslands on SW facing slope at SE border of village, 49°35'04"N/14°13'27"E, alt. 425 m, on ±sandy soil on granitoid bedrock, 2013, J. Malíček 6192 & J. Steinová (JM); N Bohemia, distr. Česká Lípa, Doksy, railway at N border of Staré Splavy, 50°35'42"N/14°37'39"E, alt. 275 m, on sandy soil along railway, 2013, J. Malíček 6057 (JM); [S Moravia], Thajatal, rechter Hang oberhalb Znaim, …Konitzer… [illegible], 1919 and 1923, A. Oborny (PRC); Znaim, Granitztal, 1915, A. Oborny (PRC); Znaim, Stadtwäldchen, Schottergrube, 1918, A. Oborny (PRC).

Peltigera extenuata differs from the similar *P. didactyla* in the C+ red reaction of the soralia (due to methyl gyrophorate and gyrophoric acid), the character of the rhizines and the presence and position of apothecia (Goffinet et al. 2003, Vitikainen 2007, Sérusiaux et al. 2009). However according to our observations, the rhizines are variable, as noted by Vitikainen (2007). Furthermore, the differences in rhizines between the two taxa given by authors are not uniform (cf. Vitikainen 2007, Sérusiaux et al. 2009, Wirth et al. 2013). We publish here only specimens of *P. extenuata* with distinct C+ red soralia, following Goffinet et al. (2003). Revision of our specimens and collection in PRC shows that *P. extenuata* is distinctly rarer than *P. didactyla*. However, we did not test secondary metabolites using TLC. Apothecia were found in only one specimen (JM 949).

Pertusaria pseudocorallina (Lilj.) Arnold (Fig. 5)

Czech Republic. Central Bohemia, Křivoklátsko Protected Landscape Area, Roztoky u Křivoklátu, open acidophilous oak forest on S-exposed slopes of Sokolí hill, 50°01'43"N/13°52'51"E, alt. 390 m, on siliceous outcrop, 2011, J. Malíček 3731 (JM).

In the Czech Republic, this taxon is known only from several old records in the north part of Bohemia: Adršpaské skály [Adersbach] (Mann 1825), the castle Hněvín in Most [Schloβberg, Brüx] (Štika 1858), and Chomutov [Komotau] (Erichsen 1936). The species has an oceanic bias and has not been reliably recorded from either Moravia or Slovakia. Vězda & Liška (1999) mentioned also an excerp-

Fig. 4: *Peccania cernohorskyi* has been known only from the Czech Republic for a long time. Material from the type locality in Central Bohemia (PRC, scale = 1 mm).

ted Moravian record by Suza (1925, as *Pertusaria isidioidea*), which refers to an epiphytic collection by F. Kovář and evidently does not belong to *P. pseudocorallina*, which is saxicolous.

Reichlingia leopoldii Diederich & Scheid.

***Slovakia.** N.P. Slovenský raj, Hrabušice: Veľký Sokol brook valley, 48°55'30"N/20°20'50"–21'00"E, on bark of *Ulmus* and *Acer pseudoplatanus*, alt. 650 m, 1998, Š. Bayerová, J. Halda & Z. Palice 850 & 900 (PRA); N.P. Slovenský raj, Hrabušice: Suchá Belá gorge, 48°57'15–20"N/20°23'05–10"E, on bark of *Acer pseudoplatanus*, alt. 600–620 m, 1998, Š. Bayerová, J. Halda & Z. Palice 921 (PRA); Muránska planina plateau: Javorníková dolina valley – the ravine part (48°44'10"N/20°00'30"–20°01'E), on bark of *Fagus*, alt. 480–500 m, 2001, A. Guttová, J. Halda & Z. Palice 5379 (PRA); Muránska planina plateau, Zlatno: nature reserve Zlatnica, steep S-facing slope above Sviniarka valley, dark fir-beech forest, 48°49.28'N/20°06.18'E, on bark of *Acer pseudoplatanus*, alt. 825 m, 2007, A. Guttová, J. Halda & Z. Palice 11458 (PRA); Muránska planina National Park, Pohronská Polhora, in deep ravine at W border of Čertova dolina Nature Reserve, 48°44'15"N/19°51'29"E, alt. 700–750 m, 2011, on bark of *Acer pseudoplatanus*, *Abies alba* and *Fagus sylvatica*, J. Vondrák 9203, 9189 & 9206 (CBFS); ibid.: 48°44'05"N/19°51'31"E & 48°44'06"N/19°51'42"E, alt. 640 & 758 m, on bark of *Acer pseudoplatanus*, 2012, A. Guttová, J. Halda, J. Malíček 5283 & Z. Palice 15476 (JM, dupl. in PRC, PRA); Muránska planina National Park, Muráň, Hrdzavá valley W of town, along yellow marked tourist path in E part of protected area, 48°44'53"N/20°01'05"E, alt. 470 m, on bark of *Acer pseudoplatanus*, 2012, J. Malíček 5240 et al. (JM).

This sterile lichen strongly resembles some *Lepraria* species in its sorediate felty thallus, but is distinctive by the production of brown conidia arising on the thallus surface, trentepohlioid photobiont and the presence of 2'-*O*-methylperlatolic acid. It prefers humid shady sites, usually in valleys of brooks and rivers, where it occurs on bark of deciduous trees and more rarely on rocks.

Rhizocarpon timdalii Ihlen & Fryday

***Czech Republic.** S Bohemia, Novohradské hory Mts, Hojná Voda: Mt. Kraví hora [953], 200 m SE of the top, half-shaded boulder field at ESE-facing slope, 48°43'48"N/14°43'20"E, on granite boulder, alt. 867 m, 2012, Z. Palice 15620, conf. A. Fryday (PRA).

Fig. 5: *Pertusaria pseudocorallina* was regarded as an extinct species in the Czech Republic. It prefers oceanic climate (JM 3731, scale = 1 mm).

The species belongs to the difficult complex around *R. obscuratum*, which was recently revised by Ihlen (2004). *R. timdalii* is distinguishable from similar taxa mainly by its distinctly convex areoles, dominant *cinereorufa*-green pigment in apothecia and eumuriform ascospores (Ihlen 2004). Its distribution is still poorly known. The species was described from southern Fennoscandia, the British Isles (Wales) and the northeastern U.S.A. (Ihlen & Fryday 2002). It was recently reported from the western Carpathians, Belarus and the Crimean Peninsula (Matwiejuk 2011). The Bohemian specimen contained no substances by TLC as well as those reported by Matwiejuk (2011). According to Ihlen & Fryday (2002), about half of specimens contained an unknown fatty acid, with the occurrence of the fatty acid exhibiting no obvious geographic correlation.

Rhizoplaca melanophthalma (DC.) Leuckert & Poelt

***Czech Republic.** N Bohemia, Lovosice, Třebenice, rocks on S. slope of ruin Košťálov, alt. 460 m, 50°29'23"N/13°59'04"E, 2003, J. Vondrák 1127, 1173; ibid.: 2012, J. Vondrák 9590 (CBFS).

This specimen was used in the phylogeographical study of the *R. melanophthalma* complex by Leavitt et al. (2013a), which revealed six species. In the ITS phylogeny, the Czech specimen was placed in the geographically most widespread clade, *R. melanophthalma* s. str. (Leavitt et al. 2013b).

Rhizoplaca subdiscrepans (Nyl.) R.Sant.

***Czech Republic.** Central Bohemia, Kladno, Zákolany, rocks in valley of Zákolanský potok brook, c. 200 m SE of railway stop Zákolany, alt. 250 m, 50°11'48"N/14°15'11"E, on SW-exposed chert rock, 2012, J. Vondrák 9843, O. Vondráková & I. Frolov (CBFS, previously reported by Hilitzer 1929, as *Lecanora rubina*); N Bohemia, Lovosice, Třebenice, rocks on S slope of ruin Košťálov, alt. 460 m, 50°29'23"N/13°59'4"E, 2012, J. Vondrák 9589, 9622 (CBFS).

The species was known from various localities in Central Bohemia, though cited as *Lecanora rubina* (Vill.) Ach. [= *Rhizoplaca chrysoleuca* (Sm.) Zopf]. All revised samples from that region north of Prague (PRM; leg. A. Hilitzer and J. Suza as *Lecanora rubina*) belong to *Rhizoplaca subdiscrepans*.

It is not known whether the *R. chrysoleuca* s.str. occurs in the Czech Republic; see also the note under *R. chrysoleuca* in Vězda & Liška (1999). For the present it should be excluded from the checklist of the Czech Republic.

Rinodina capensis Hampe

***Czech Republic.** W Bohemia, Šumava Mts, Modrava: Medvědí hřbet crest, remnants of old-growth deciduous forest between Mt. Beerenkopf (1158 m) and Mt. Medvěd (1136 m), c. 49°00'N/13°25'E, on old *Acer pseudoplatanus*, alt. 1120 m, 1995, Z. Palice 1541 (PRA); S Bohemia, Šumava Mts, Nová Pec: glacier cirque of Plešné jezero lake, *Acer pseudoplatanus*, alt. 1200–1250 m, 1996, Z. Palice s.n., det. H. Mayrhofer (PRC; together with *Rinodina orculata*); Volary: not far from yellow tourist footpath above the right bank of Plešné jezero lake, on older solitary *Fagus* surrounded by young *Picea* stand, alt. c. 1130 m, 1998, Z. Palice 539 (PRA); Frymburk: Vítkův Kámen, wooded area of the castle-ruin (48°38'40"N/14°06'15"E), on bark of *Acer platanoides*, alt. 1030 m, 1997, Z. Palice 3874 (PRA); Horní Vltavice, Zátoň: Jilmová skála Nature Monument, scree old-growth forest, 48°57'13"N/13°47'48"E, alt. 1000–1030 m, on trunk of dead *Fagus sylvatica*, 2014, J. Malíček 7324 (JM).

This is a characteristic woodland species that might have been partly overlooked in the past. Presently, it seems to be quite rare, preferrably occurring in well lit montane old-growth forests. It is easily to identify among atranorin containing corticolous species of *Rinodina* with the *Physcia*-type of ascospores due to the slightly amyloid exciple (Giralt & Mayrhofer 1994).

Schismatomma umbrinum (Coppins & P.James) P.M.Jørg. & Tønsberg

***Czech Republic.** S Bohemia, Kaplice, Děkanské Skaliny, at ruin of castle Sokolčí, alt. c. 590 m, 48°44'45"N/14°33'8"E, 2011, J. Vondrák 8455, 8456, conf. D. Ertz (CBFS).

This usually sterile crust containing schizopeltic acid (UV+) as a major constituent (Tønsberg 1992) is likely overlooked in acidophytic sciophilous saxicolous lichen communities.

'Sclerococcum' griseisporodochium Etayo

***Slovakia.** W Carpathians, Muránska planina plateau: Javorníková dolina valley, the narrower, ravine part (48°44'10"N/20°00'30"–20°01'E), on moist vertical calcareous rock, alt. 480–520 m, 2001, A. Guttová, J. Halda & Z. Palice 5367 (PRA); Slovenský kras karst, Rožňava, Bôrka, in protected area 'Havrania skala' NE of village, alt. c. 750 m, 2006, J. Vondrák 4597 (CBFS).

Today considered to be a lichenized hyphomycete (Smith 2009), apparently belonging in a separate genus within Arthoniales which also contains several other sporodochiate taxa (Ertz et al. 2011, 2013). Its correct generic placement is uncertain, pending molecular studies. It was reported from the Czech Republic by Vondrák et al. (2007b) from lowland and submontane limestone areas.

Sclerophora amabilis (Tibell) Tibell

***Czech Republic.** W Bohemia, Český les Protected Landscape Area, Bělá nad Radbuzou, Nad Hutí Nature Reserve, N part of protected area, old-growth forest on E-facing slope of Nad Hutí Mt. (716 m), c. 49°32'29"N/12°39'25"E, alt. 670–690 m, on dead trunk of *Fagus sylvatica*, 2013, F. Bouda & J. Malíček 5933 (JM); Šumava Mts, Modrava, Javoří Pila: Mt. Medvěd, NE slope, spruce plantation with scattered old maples, 49°00.52'N/13°25.24'E, on bark of old *Acer pseudoplatanus*, alt. 1125 m, 2005, F. Bouda, Z. Palice 9327, O. Peksa & J. Steinová (PRA).

New for Central Europe. Species of *Sclerophora* are indicators of well preserved old-growth forests and they are all very rare in the Czech Republic. *S. amabilis* is similar to *S. pallida* and *S. peronella*, but differs in its intermediate ascospore size (5–6 µm in diam.) and taller ascomata (see Tibell 1999 for other differences). Tibell (1999) points out that European material differs slightly from specimens from New Zealand, where the species was originally described, and the European material may represent a distinct species.

Scutula dedicata Triebel, Wedin & Rambold

Czech Republic. Central Bohemia, Brdy Mts, Jince, on railway 0.8 km S of Čenkov, W of pond, 49°45'56.7"N/14°00'15.5"E, alt. 410 m, railway embankment, on *Peltigera didactyla*, 2012, J. Malíček 4952 (JM, dupl. in M); Vltava River valley, Kamýk nad Vltavou, sand pit at W margin of village, 49°38'16"N/14°14'58"E, alt. 300 m, on *Peltigera didactyla* on sandy soil, 2014, J. Malíček 7245 & A. Kulíková (JM); W Bohemia, Kdyně, Dobříkov: railway station, 49°22'18"N/13°05'18"E, alt. 520 m, railway embankment, on *Peltigera didactyla*, 2010, J. Malíček 2947 (JM); S Bohemia, Šumava Mts, Volary: at road-side Nová Pec – Černý Kříž, a transient wood-storage place c. 100 m W of the railway stop Pěkná, on decaying thallus of *Peltigera didactyla*, alt. 735 m, 2001,

Z. Palice 5280 (PRA); Prachatice, Husinec, Výrov, stony heap near village, alt. ca 500 m, 49°03'00"N/13°59'50"E, lichenicolous on *Peltigera didactyla*, 2010, O. Merkulova & J. Vondrák 7853 (CBFS).

From the Czech Republic, this taxon has already been published from the Šumava Mts (Kocourková 2000) as a lichenicolous fungus and the last specimen listed above was recently issued in an exsiccate (Hafellner 2013). Although it is distinctly lichenized, it was not included in the checklist (Liška et al. 2008). The first two specimens were fertile and the ascospore dimensions, (8–) 9–11.5 × 3.0–3.5 (–4.0) µm, indicated *S. dedicata* following Triebel et al. (1997). The collection JM 4952 is accompanied by an anamorphic state identified as *Libertiella* aff. *fennica* Alstrup by D. Triebel. This anamorph, present also in JV 7853, JM 2947 and the specimen published by Kocourková (2000), is characterized by conspicuous, pale to black, globose to subglobose pycnidia, 0.1–0.3 mm in diam., containing tear-shaped or subglobose conidia which are 4–7 (–8.5) × (2.5–) 3–4 µm (measurements of 35 conidia from various pycnidial phenotypes). Such conidia correspond roughly with mesoconidia of *S. dedicata* in Triebel et al. (1997), but they are slightly wider. Conidia known in *Scutula heeri*, a similar taxon, are very different in their size and shape from those in our sample.

Thelocarpon citrum (Wallr.) Rossman

***Czech Republic.** S Bohemia, Šumava Mts, Volary, Černý Kříž: Studená Vltava valley, in front of game-keeper house, 48°51.66'N/13°51.46'E, on sandy soil in alluvium of the river, alt. 740 m, 2005, Z. Palice 8985 (PRA).

Thelocarpon citrum (syn. *T. vicinellum* Nyl.) usually occurring on soil was not distinguished from epixylic *T. superellum* by recent monographers (e.g. Kocourková-Horáková 1998). Aptroot & Sparrius (2010) argue for distinguishing these two taxa because the terricolous specimens are consistently smaller and no intermediates were found between specimens occurring on soil and wood. We follow their concept. Terricolous records published as *T. superellum* by Kocourková-Horáková (1998) and Vondrák et al. (2006) probably also belong to *T. citrum*.

Thelocarpon imperceptum (Nyl.) Migula

***Czech Republic.** Central Bohemia, Bohemian Karst, distr. Praha – západ, Roblín, Kuchařík, W-WSW-facing, east upper side of the quarry 'Na skalkách', 49°58'16"N/14°15'22.5"E, immersed in loamy/sandy soil, alt. 365 m, 2012, Z. Palice 15124 (PRA).

This is a sporadically recorded species known so far only from a few countries in Europe, mainly from historical collections, and recently collected only in the Netherlands (van den Boom 2000), Poland (Bielczyk et al. 2009) and Ukraine (Khodosovtsev et al. 2011, as *Athelium imperceptum*). The fruits are immersed in soil and hence easily overlooked, although it is probably not a common species.

Toninia philippea (Mont.) Timdal

Czech Republic. Central Bohemia, Praha – Radotín, Kosoř, protected area Černá rokle, E of village, S-SW facing xerothermic slopes, 49°59'21–23"N/14°20'08–18"E, alt. 250–300 m, on limestone in shrubby steppe, 2011, Z. Palice 14995 & J. Vondrák 10493 (PRA, CBFS, cum *Caloplaca variabilis* s. l.).

The only previous record from the Czech Republic was published by Servít (1930 & 1954: 90, as *Catillaria subgrisea*) from a xerothermic region around Prague, where we confirmed its occurrence after some 80 years.

Verrucaria beltraminiana (A.Massal.) Trevis.

***Slovakia.** Belianské Tatry Mts, Lendak, S-exposed slopes of Skalné vráta Mt., 500 m NE of Plesnivec cottage, 49°13'36.7"N/20°16'53.1"E, alt. 1500 m, on limestone rock, 2010, J. Malíček 3230, conf. O. Breuss (JM).

This taxon strongly resembles *Verrucaria* (*Verruculopsis*) *lecideoides*. Both species are characterized by perithecia arising between angular grey areoles. *V. beltraminiana* differs from the former in larger ascospores and the absence of a black basal layer (Wirth et al. 2013).

Verrucaria breussii Diederich & van den Boom

***Czech Republic.** Central Bohemia, Bohemian Karst, Svatý Jan pod Skalou, S-SW-facing xerothermic slope with oak, below the view-point, 49°58'11"/14°08'17"E, on bark of *Quercus*, alt. 370–380 m, 2005, J. Halda & Z. Palice 8839, det. O. Breuss (as *Verrucaria sorbinea*) (PRA); ibid.: S-facing slope with oaks, ESE of the view-point, 49°58.21'N/14°08.27'E, on bark of *Quercus*, alt. 370–390 m, 2007, Z. Palice 11044, 11101, 11105, 11127,

11137 (PRA); Kolín, Velký Osek, protected floodplain forest Libický luh, alt. 200 m, 50°6'35"N/15°10'3"E, on bark of *Populus*, 2014, J. Vondrák 11859 & F. Bouda (CBFS); S Moravia, Pálava Protected Landscape Area, Horní Věstonice, Děvín-Kotel-Soutěska National Nature Reserve, in forest along red tourist path near S border of reserve, 0.5 km N of Klentnice, 48°51'21"N/16°38'41"E, alt. 340 m, at base of *Tilia cordata*, 2013, J. Malíček 6340 & J. Vondrák 11630 (CBFS, JM).

Our recent experiences show that this may be a common species of lowland forests, where it usually occurs at the base of trunks of various broad-leaved tree species. *Agonimia allobata* has a similar ecology and external morphology, but in *V. breussii* the perithecia are more pigmented and largely immersed in the thallus. *Verrucaria viridigrana* has also a similar ecology, but differs in ascospore dimensions, less pigmented perithecia with a thin hyaline layer on the surface and has a more distinct, at least partly blastidiate/coralloid thallus (Breuss 1998b).

Verrucaria fuscovelutina Servít

***Czech Republic.** Central Bohemia, Prague, Motol, natural monument "Kalvárie", W part, S-SE facing slope, 50°03.95'N/14°19.38–39'E, on crumbling shaded diabase rock, alt. 315 m, 2007, Z. Palice 11103, 11159, det. O. Breuss (PRA); ibid.: alt. 320 m, 2009, Z. Palice 13136 & A. Redchenko (PRA).

A poorly known taxon previously recorded only from three localities: in Montenegro (Servít 1949, type locality), Austria (Breuss & Berger 2010) and Finland (Pykälä 2013). It belongs to the difficult *Verrucaria nigrescens* group and is close to *V. fuscoatroides* (Breuss & Berger 2010) and *V. nigroumbrina* (Pykälä 2013), both taxa described by Servít. In Prague it was collected on crumbling rock pieces. It was reported to grow on pebbles in Finland too (Pykälä 2013), so is probably a locally occurring pioneer species.

Verrucaria phloeophila Breuss

***Slovakia.** W Carpathians, Muránska planina plateau: nature reserve Šarkanica, S-SSE-facing slope, a well-lit oak-lime forest, 48°42'53"N/19°59'22.5"E, on bark at foot of *Quercus polycarpa*, alt. 670 m, 2009, Z. Palice 12989 (PRA); Muránska planina plateau: Mt. Šiance – S-SSE slope, light scree forest, 48°46'10"N/20°04'30"E, on bark at base of old *Quercus*, alt. 800–860 m, 1999, A. Guttová, J. Halda & Z. Palice 2102, det. O. Breuss (PRA); ibid.: SE exposed slopes with limestone rocks and hardwood forest, c. 3 km NE of Muráň, alt. 600–800 m, 48°46'13"N/20°04'47"E, on bark of *Quercus*, 2011, J. Vondrák 9187, 9288, conf. O. Breuss 2012 (CBFS); ibid.: S-facing crest with well lit forest, 0.9 km W-WNW of Muránska Huta, 48°46'25.7"N/20°05'27.5"E, alt. 892 m, 2011, F. Bouda, I. Černajová, J. Malíček, Z. Palice 14493, L. Syrovátková & J. Vondrák (PRA).

Interestingly, the type material of this taxon (holotype and paratypes) originates from two ecologically different collections that may eventually represent two different taxa: one growing on bark (mainly *Quercus*) and the second on wood subjected to water (Breuss 1998a). The terricolous *Verrucaria geophila* Zahlbr., which also occurs in the Muránska planina plateau (Palice et al. 2006), appears to be morphologically close to specimens from bark and might be conspecific.

Verrucaria ulmi Breuss

***Slovakia.** Muránska planina Mts, Revúca, Muráň, loc. "Šiance", SE exposed slopes with limestone rocks and hardwood forest, c. 3 km NE of village, alt. 600–800 m, 48°46'13"N/20°04'47"E, on bark of *Quercus*, 2011, J. Vondrák 9289, conf. O. Breuss 2012 (CBFS).

The Muránska planina National Park is a diversity hotspot for corticolous *Verrucaria*. In addition to the two previously mentioned, *Verrucaria hegetschweileri*, *V. breussii* (as *V. sorbinea*), *V. tuerkii*, and *V. viridigrana* have been reported (Breuss 1998b, Guttová & Palice 1999, 2005, Palice et al. 2006). *Verrucaria ulmi* is distinguished from the above mentioned taxa by the blackish pigmented thallus, ±closed, non-spreading involucrellum (firmly enclasping the exciple, basally non-continuous, formed usually only in spots) and relatively large ascospores reaching 30 µm (Breuss 1998a). So far it has been collected only twice, in Lower Austria: on bark of *Ulmus* (Breuss 1994) and *Acer pseudoplatanus* (Breuss 2010).

Xanthoria papillifera (Vain.) Poelt (Fig. 6)

***Czech Republic.** S Moravia, Mikulov, rocks on eastern slope of the Kozí hrádek ruin, alt. 270 m, 48°48'34"N/16°38'18"E, 2001, J. Vondrák 203 (CBFS); Mikulov, chateau on hill in the town, alt. ca 250 m, 48°48'30"N/16°38'20"E, 2002, J. Vondrák 249 (CBFS); Mikulov, protected area Kočičí kámen rock c. 2 km N of

Fig. 6: *Xanthoria papillifera* is a lichen with the continental distribution. It is characteristic by cylindrical isidia and the thallus covering usually large areas (scale = 1 cm).

town, alt. 345 m, 48°49'49.9"N/16°38'12.7"E, 2005, J. Vondrák 2847 (CBFS); Mikulov, protected area Kočičí skála rock ca 1.5 km N of town, alt. 361 m, 48°49'33.9"N/16°38'30.3"E, 2005, J. Vondrák 2811 (CBFS); ibid.: 2009, J. Malíček 2158 (JM); Horní Věstonice, Děvín-Kotel-Soutěska National Nature Reserve, limestone outcrops along blue-marked tourist path 0.9 km SSE of village, W-facing slope of Obora Mt. (483 m), 48°51'47"N/16°38'00"E, alt. 390 m, on limestone rock, 2014, J. Malíček 6941 et al. (JM).

It is a rare continental *Xanthoria* distributed mainly in central and southeastern Europe ranging eastwards to Caucasus and Karakorum (Poelt 1954, Giralt et al. 1993). The species occurs on calcareous rocks, usually on exposed sites on tops affected by bird excrement, where it covers large areas. In the Czech Republic, *X. papillifera* was collected only from limestones in the Pálava region.

Xylographa pallens (Nyl.) Harm.

***Czech Republic.** E Bohemia, Krkonoše Mts, Špindlerův Mlýn, Vysoké kolo (1509 m) Mt., E-facing slope, alt. 1340 m, on wood, 2004, J. Malíček 65, det. T. Spribille (JM); S Bohemia, Šumava Mts, Stožec, Černý Kříž: valley of Lesní potok brook 1.1 km SSE of settlement, 48°51'06.8"N/13°51'55.2"E, alt. 750 m, on tree stump, 2010, J. Malíček 2723 & Z. Palice, det. T. Spribille (JM, together with *Xylographa vitiligo*).

A poorly known taxon similar to the common *X. parallela*, from which differs in usually star-like aggregated apothecia. It is a widespread species in Europe occurring mainly in montane to subalpine conifer forests (Spribille et al. 2014). The taxon was previously reported from the Czech Republic as *X. parallela* var. *pallens* by Servít (1910) from Moravia, but the relevant Servít specimen in PRC is apparently poorly developed *X. parallela* following the description in Spribille et al. (2014).

Discussion

Our results show that, despite over 200 years of fairly intensive study, the lichen flora of central European countries is still incompletely known. In the Czech Republic, there are several reasons for this. First, the lichen biota can be expected to be rich, as the Czech Republic forms an area of overlap for oceanic and continental as well as Mediterranean and boreal species; all these elements are represented (though not well represented) in the lichen biota. Second, the geology is extremely variable and several substrate specialists are known from the country, e.g. *Aspicilia dominiana* on diabases (Černohorský 1940, Malíček & Palice 2009) or *Aspicilia serpentinicola* and *Porpidia nadvornikiana* on serpentinites (Palice et al. 2005, Nordin 2013). Finally, several species of old-growth forest remnants in various woodland types are present, though they were not recorded until intensive investigations were carried out. For instance *Arthonia incarnata*, *Buellia arborea*, *Lecidea sphaerella*, *Micarea globulosella*, *M. nowakii*, *Rinodina capensis*, and *Sclerophora amabilis* are new Czech country records from montane spruce and beech old-growth forests.

The new Slovak checklist (Guttová et al. 2013) contains about 100 lichen species more than the checklist of the Czech Republic (Liška et al. 2008). Slovakia has the high Carpathian mountains (above 2000 m a.s.l.) and many large regions with a rugged topography and covered by rather natural vegetation; the presence of montane and alpine areas with calcareous substrates is especially important for total lichen diversity. The Czech Republic, however, lacks these features. However, Slovakia also has about 100 species more than Poland (Fałtynowicz 2003), even though many these favorable features are present in Poland. However, they are restricted in Poland to small areas and the most of the landscape is formed by intensively managed lowlands.

Much higher lichen diversity, exceeding 2000 taxa, is known from countries with the Alps, specifically Austria (Hafellner & Türk 2001) and Germany (Wirth et al. 2013). Alpine areas are especially enriched by high-mountain lichens (e.g. *Caloplaca cacuminum*, *C. paulii*, *Dactylina ramulosa*, *Lecanora flavopunctata*) as well as epiphytic lichens preferring high humidity (e.g. *Byssoloma subdiscordans*, *Degelia plumbea*, *Gyalideopsis piceicola*, *Pannaria rubiginosa*, *Sticta limbata*), which are mostly absent from other Central European countries.

Acknowledgements

We are grateful to Pieter van den Boom (Arafura), Othmar Breuss (Wien), Paweł Czarnota (Poręba Wielka), Damien Ertz (Meise), Alan Fryday (East Lansing), Helmut Mayrhofer (Graz), Christian Printzen (Frankfurt am Main), Matthias Schultz (Hamburg), Toby Spribille (Graz), Dagmar Triebel (München) and Martin Westberg (Stockholm) for revision of selected specimens. Linda in Arcadia provided useful criticism and kindly revised the English of an earlier draft of the manuscript. We thank all those colleagues who helped us during the field research. This study was also supported as a long-term research development project no. RVO 67985939, by the program NAKI of the Ministry of Culture of the Czech Republic (DF12P01OVV025), the Grant Agency of Faculty of Environmental Sciences, CULS, Prague, 42900/1312/3114, the Czech and Slovak interacademic programme 'Inventory of lichenized fungi of important habitats in Slovakia and the Czech Republic' (Topic 14/2012-2014) and by the grant no. 647412 of The Charles University Grant Agency.

References

Anders, J. 1922. Die Flechten Nordböhmens. III. Nachtrag. – Hedwigia **63**: 269–322.

Aptroot, A. & Sparrius, L. 2000. Notes on *Thelocarpon citrum* (Wallr.) Rossman (syn. *T. herteri* J. Lahm, *T. vicinellum* Nyl.) and a report of *T. sphaerosporum* H. Magn. with pycnidia, both colonizing sandy areas recently stripped of their top soil. – Lichenologist **32**: 513–514.

Arup, U., Søchting, U. & Frödén, P. 2013. A new taxonomy of the family Teloschistaceae. – Nordic J. Bot. **31**: 16–83.

Berger, F. & Priemetzhofer, F. 2010. Die Flechtenflora im Nationalpark Thayatal (Niederösterreich, Österreich). – Wiss. Mitt. Niederösterr. Landesmuseum, St. Pölten, **21**: 135–184.

Bielczyk, U., Jędrzejczyk-Korycińska, M. & Kiszka, J. 2009. Lichens of abandoned zinc-lead mines. – Act. Mycol. **44**: 139–149.

Bilovitz, P. O., Knežević, B., Stešević, D., Vitikainen, O., Dragićević, S. & Mayrhofer, H. 2008. New or otherwise interesting lichenized and lichenicolous fungi from Montenegro. – Fritschiana **62**: 1–44.

van den Boom, P. P. G. 2000. Some interesting records of lichens and lichenicolous fungi from The Netherlands IV. – Österr. Z. Pilzk. **9**: 141–145.

van den Boom, P. P. G., van den Boom, B. & Yazici, K. 2007. *Catillaria fungoides* found in Cape Verde, The Netherlands and Turkey, with notes on accompanying species. – Österr. Z. Pilzk. **16**: 1–3.

van den Boom, P. P. G. & Palice, Z. 2006. Some interesting lichens and lichenicolous fungi from the Czech Republic. – Czech Mycol. **58**: 105–116.

Brand, M., Coppins, B., van den Boom, P. P. G. & Sérusiaux, E. 2009. Further data on the lichen genus *Bacidia* s. l. in the Canary Islands and Western Europe, with descriptions of two new species. – Biblioth. Lichenol. **99**: 81–91.

Breuss, O. 1994. *Verrucaria ulmi* sp. n. (lichenisierte Ascomyceten, Verrucariaceae), eine weitere corticole Art aus Österreich. – Linzer Biol. Beitr. **26**: 645–647.

Breuss, O. 1998a. Drei neue holz- und borkenbewohnende *Verrucaria*-Arten mit einem Schlüssel der bisher bekannten Taxa. – Linzer Biol. Beitr. **30**: 831–836.

Breuss, O. 1998b. Eine neue *Verrucaria*-Art mit Goniocystenthallus. – Linzer Biol. Beitr. **30**: 277–279.

Breuss, O. 2010. Bemerkenswerte Flechtenfunde aus Niederösterreich und der Steiermark 3. – Stapfia **92**: 2–4.

Breuss, O. & Berger, F. 2010. Die *Verrucaria*-Arten mit braunem Lager in den österreichischen Kalkalpen. Eine vorläufige Übersicht mit Bestimmungsschlüssel. – Biblioth. Lichenol. **104**: 77–116.

Cieśliński, S., Czyżewska, K. & Fabiszewski, J. 2006. Red list of the lichens in Poland. – In: Mirek, Z., Zarzycki, K., Wojewoda, W. & Szeląg, Z. (eds). Red list of plants and fungi in Poland. Pp. 71–89. – Kraków: W. Szafer Institute of Botany, Polish Academy of Sciences.

Coppins, B. J. 2009. *Micarea* Fr. (1825). – In: Smith, C. W., Aptroot, A., Coppins, B. J., Fletcher, A., Gilbert, O. L., James, P. W. & Wolseley, P. A. (eds). The Lichens of Great Britain and Ireland. Pp. 583–606. – London: Natural History Museum Publications.

Coppins, B. J. & Aptroot, A. 2009. *Bacidia* De Not. (1846). – In: Smith, C. W., Aptroot, A., Coppins, B. J., Fletcher, A., Gilbert, O. L., James, P. W. & Wolseley, P. A. (eds). The Lichens of Great Britain and Ireland. Pp. 189–207. – London: Natural History Museum Publications.

Coppins, B. J. & van den Boom, P. P. G. 1995. *Micarea confusa*: a new species from zinc and cadmium - contaminated soils in Belgium and the Netherlands. – Lichenologist **27**: 81–90.

Czarnota, P. 2007. The lichen genus *Micarea* (Lecanorales, Ascomycota) in Poland. – Polish Bot. Stud. **23**: 1–199.

Czarnota, P. & Coppins, B. J. 2006. A new *Bacidia* with long-necked pycnidia from Central Europe. – Lichenologist **38**: 407–410.

Czarnota, P. & Coppins, B. J. 2007. Contribution to the knowledge of rare *Bacidia* s.lat. (Lecanorales, lichenized Ascomycetes) from Central Europe including a new, pallid forma of *Bacidia hemipolia*. – Nova Hedwigia **85**: 503–513.

Czarnota, P., Kison, H.-U. & Seelemann, A. 2014. Remarkable records of lichens and lichenicolous fungi from the Harz National Park (Lower Saxony and Saxony-Anhalt, Germany). – Herzogia **27**: 67–82.

Černohorský, Z. 1940. Epilithische Flechtengesellschaften der Prager Diabasfelsen. – Preslia **18–19**: 37–52.

Diederich, P. & Coppins, B. J. 2009. *Reichlingia* Diederich & Scheid. (1996). – In: Smith, C. W., Aptroot, A., Coppins, B. J., Fletcher, A., Gilbert, O. L., James, P. W. & Wolseley, P. A. (eds). The Lichens of Great Britain and Ireland. Pp. 790–791. – London: Natural History Museum Publications.

Dietrich, M. 2007. Die xanthonhaltigen, epiphytischen sorediösen Krustenflechten *Lecidella albida* und *L. subviridis* in der Schweiz. – Meylania **39**: 14–17.

Egea, J. M. & Torrente, P. 1993. The lichen genus *Bactrospora*. – Lichenologist **25**: 211–255.

Ekman, S., Jonsson, F. & Hermansson, J. 2012. *Bacidina etayana* and *B. saxenii* new to Sweden. – Graphis Scripta **24**: 14–18.

Erichsen, C. F. E. 1936. Beiträge zur Kenntnis der Flechtengattung *Pertusaria*. – Feddes Repert. spec. nov. regn. veg. **41**: 77–101.

Ertz, D., Bungartz, F., Diederich, P. & Tibell, L. 2011. Molecular and morphological data place *Blarneya* in *Tylophoron* (Arthoniaceae). – Lichenologist **43**: 345–356.

Ertz, D., Fischer, E., Killmann, D., Razafindrahaja, T. & Sérusiaux, E. 2013. *Savoronala*, a new genus of Malmideaceae (Lecanorales) from Madagascar with stipes producing sporodochia. – Mycol. Progr. **12**: 645–656.

Fałtynowicz, W. 2003. The lichens, lichenicolous and allied fungi of Poland. An annotated checklist. – Kraków: W. Szafer Institute of Botany, Polish Academy of Sciences.

Giralt, M. & Mayrhofer, H. 1994. Four corticolous species of the genus *Rinodina* (lichenized Ascomycetes, Physciaceae) containing atranorin in southern Europe and adjacent regions. – Nova Hedwigia **59**: 129–142.

Giralt, M., Nimis, P. L. & Poelt, J. 1993. Studien über einige Arten der Flechtengattung *Xanthoria* mit isidiiformen vegetativen Diasporen. – J. Hattori Bot. Lab. **74**: 271–285.

Goffinet, B., Miadlikowska, J. & Goward, T. 2003. Phylogenetic inferences based on nrDNA sequences support five morphospecies within the *Peltigera didactyla* complex (lichenized Ascomycota). – Bryologist **106**: 349–364.

Guttová, A., Lackovičová, A. & Pišút, I. 2013. Revised and updated checklist of lichens of Slovakia (May 2013). – Biologia **68**: 345–350. [+ 50 pp. electronic appendix]

Guttová, A. & Palice, Z. 1999. Lišajníky Národného parku Muránska planina I – Hrdzavá dolina [Lichens of National Park Muránska planina – the Hrdzavá dolina Valley]. – Výzkum a ochrana prírody Muránskej planiny **2**: 35–47.

Guttová, A. & Palice, Z. 2002. Lišajníky Národného parku Muránska planina II – Javorníková dolina [Lichens of the Muránska Planina National Park II – Javorníková dolina valley]. – Výzkum a ochrana prírody Muránskej planiny **3**: 53–68.

Guttová, A. & Palice, Z. 2005. Lišajníky Národného parku Muránska planina III – Cigánka [Lichens of the Muránska Planina National Park III – Cigánka]. – Reussia, **1**, Suppl. **1** [2004]: 11–47.

Guttová, A., Palice, Z., Czarnota, P., Halda, J. P., Lukáč, M., Malíček, J. & Blanár, D. 2012. Lišajníky Národného parku Muránska planina IV – Fabova hoľa [Lichens of the Muránska Planina National Park IV – Fabova hoľa]. – Acta Rer. Natur. Mus. Nat. Slov. **43**: 51–76.

Hafellner, J. 2013. Lichenicolous Biota (Nos 151–180). – Fritschiana **76**: 47–68.

Hafellner, J. & Türk, R. 2001. Die lichenisierten Pilze Österreichs – eine Checkliste der bisher nachgewiesenen Arten mit Verbreitungsangaben. – Stapfia **76**: 3–167.

Halda, J. P., Bouda, F., Fessová, A., Kocourková, J., Malíček, J., Müller, A., Peksa, O., Svoboda, D., Šoun, J. & Vondrák, J. 2011a. Lichens recorded during the autumnal bryo-lichenological meeting in Železné hory Mts (Czech Republic), September 2009. – Bryonora **47**: 40–51.

Halda, J., Hauer, T., Kociánová, M., Mühlsteinová, R., Řeháková, K. & Šťastná, P. 2011b. Biodiverzita cévnatých rostlin, lišejníků, sinic a řas na skalách s ledopády v Labském dole [Biodiversity of vascular plants, lichenized fungi, cyanophytes and algae on rocks with icefalls in the Labský důl valley]. – Opera Corcontica **48**: 45–68.

Hazslinszky, F. 1884. A Magyar birodalom zuzmó-flórája. – Budapest: Magyar Term. Társ. Évk.

Hilitzer, A. 1929. Addenda ad lichenographiam Bohemiae. Series 3. – Acta Bot. Bohem., Praha, **8**: 104–118.

Ihlen, P. G. 2004. Taxonomy of the non-yellow species of *Rhizocarpon* (Rhizocarpaceae, lichenized Ascomycota) in the Nordic countries, with hyaline and muriform ascospores. – Mycol. Res. **108**: 533–570.

Ihlen, P. G. & Fryday, A. M. 2002. *Rhizocarpon timdalii*, a new lichen species from north-west Europe and north-east North America. – Lichenologist **34**: 95–100.

Ihlen, P. G. & Wedin, M. 2008. An annotated key to the lichenicolous Ascomycota (including mitosporic morphs) of Sweden. – Nova Hedwigia **86**: 275–365.

Jacobsen, P. & Coppins, B. J. 1989. On the identity of some "endemic" North German lichens. – Nova Hedwigia **49**: 255–273.

Jørgensen, P. M. 2005. *Placynthium garovaglioi* not present in Scandinavia. – Graphis Scripta **17**: 3–5.

Jørgensen, P. M. 2007. Lichinaceae. – Nordic Lichen Flora **3**: 46–76.

Jørgensen, P. M., Schultz, M. & Guttová, A. 2013. Validation of *Anema tumidulum* (Lichinaceae, lichenized Ascomycota), a widespread cyanophilic lichen. – Herzogia **26**: 1–7.

Khodosovtsev, A.Ye., Naumovich, A. O., Vondráková, O. S. & Vondrák, J. 2010. *Athelium imperceptum* Nyl. (Thelocarpaceae, Ascomycota), a scarcely known ephemeral lichen of biological soil crusts, new to Ukraine. – Чорноморський ботанічний журнал [Chornomors'k. bot. z.] **6**: 385–389.

Kocourková, J. 2000. Lichenicolous fungi of the Czech Republic (the first commented checklist). – Acta Mus. Nat. Pragae, ser. B., Hist. Natur. **55** [1999]: 59–169.

Kocourková-Horáková, J. 1998. Distribution and ecology of the genus *Thelocarpon* (Lecanorales, Thelocarpaceae) in the Czech Republic. – Czech Mycol. **50**: 271–302.

Kowalewska, A., Kukwa, M., Ostrowska, I., Jabłońska, A., Oset, M. & Szok, J. 2008. The lichens of the *Cladonia pyxidata-chlorophaea* group and allied species in Poland. – Herzogia **21**: 61–78.

Kubešová, S., Peksa, O., Palice, Z., Marková, I., Mikulášková, E., Hájek, M., Kocourková, J., Guttová, A., Svoboda, D., Plášek, V. & Kučera, J. 2012. Terénní exkurze bryologicko-lichenologické sekce ČBS – důležitý zdroj poznatků o bryo- a lichenoflóře ČR a SR [Field excursions of the bryological-lichenological section of the Czech Botanical Society – an important source of knowledge on the bryo- and lichenoflora of the Czech Republic and Slovakia]. – Bryonora **50**: 44–47.

Kubiak, D. & Sparrius, L. B. 2004. *Bacidia adastra*, *B. brandii* and *B. neosquamulosa* found in North-Eastern Poland. – Graphis Scripta **16**: 61–64.

Kukwa, M., Łubek, A., Szymczyk, R. & Zalewska, A. 2012. Seven lichen species new to Poland. – Mycotaxon **120**: 105–118.

Kukwa, M. & Pérez-Ortega, S. 2010. A second species of *Botryolepraria* from the Neotropics and the phylogenetic placement of the genus within Ascomycota. – Mycol. Progr. **9**: 345–351.

Leavitt, S. D., Fernández-Mendoza, F., Pérez-Ortega, S., Sohrabi, M., Divakar, P. K., Vondrák, J., Lumbsch, H. T. & St. Clair, L. L. 2013a. Local representation of global diversity in a morphologically cryptic lichen-forming fungal species-complex with a cosmopolitan distribution (*Rhizoplaca*, Ascomycota). – J. Biogeogr. **40**: 1792–1806.

Leavitt, S. D., Fernández-Mendoza, F., Pérez-Ortega, S., Sohrabi, M., Divakar, P. K., Lumbsch, H. T. & St. Clair, L. L. 2013b. DNA barcode identification of lichen-forming fungal species in the *Rhizoplaca melanophthalma* species-complex (Lecanorales, Lecanoraceae), including five new species. – MycoKeys **7**: 1–22.

Leuckert, C., Ziegler, H. G. & Poelt, J. 1971. Zur Kenntnis der *Cladonia chlorophaea*-Gruppe und ihrer Problematik in Mitteleuropa. – Nova Hedwigia **22**: 503–534.

Liška, J., Palice, Z. & Slavíková, Š. 2008. Checklist and Red List of lichens of the Czech Republic. – Preslia **80**: 151–182.

Llimona, X. & Hladun, N. L. 2001. Checklist of the lichens and lichenicolous fungi of the Iberian Peninsula and Balearic Islands. – Bocconea **14**: 5–581.

Malíček, J. 2014. A revision of the epiphytic species of the *Lecanora subfusca* group (Lecanoraceae, Ascomycota) in the Czech Republic. – Lichenologist **46**: 489–513.

Malíček, J., Berger, F., Bouda, F., Cezanne, R., Eichler, M., Kocourková, J., Müller, A., Palice, Z., Peksa, O., Šoun, J. & Vondrák, J. 2013. Lichens recorded during the autumnal bryo-lichenological meeting in Novohradské hory Mts in 2012. – Bryonora **51**: 24–35.

Malíček, J. & Palice, Z. 2009. Tři pozoruhodné lišejníky na diabasech v Praze a v Českém krasu [Three noteworthy lichens growing on diabases in Prague and in the Bohemian Karst]. – Fragm. Ioan. Coll. **11**: 21–33.

Malíček, J. & Palice, Z. 2013. Lichens of the virgin forest reserve Žofínský prales (Czech Republic) and surrounding woodlands. – Herzogia **26**: 253–292.

Malíček, J. & Vondrák, J. 2012a. Lišejníky NPR Jazevčí, Porážky a Zahrady pod Hájem v Bílých Karpatech [Lichens of National Nature Reserves Jazevčí, Porážky and Zahrady pod Hájem in the White Carpathians]. – Acta Mus. Richnov., Sect. natur. **19**: 1–11.

Malíček, J. & Vondrák, J. 2012b. Lišejníky NPR Čertoryje v Bílých Karpatech [Lichens of the Čertoryje National Nature Reserve in the White Carpathians Mts]. – Bryonora **50**: 8–13.

Mann, W. 1825. Lichenum in Bohemia observatorum dispositio succinctaque descriptio. – Pragae.

Matwiejuk, A. 2011. *Rhizocarpon timdalii* (Rhizocarpaceae, lichenized Ascomycota), a species new to Poland. – Polish Bot. J. **56**: 125–126.

Mayrhofer, H., Malíček, J., Rohrer, A., Svoboda, D. & Bilovitz, P. O. 2012. New or otherwise interesting lichenized and lichenicolous fungi from Macedonia. – Fritschiana **71**: 1–35.

Navarro-Rosinés, P. & Hladun, N. L. 1996. Las especies saxícolo-calcícolas del grupo de *Caloplaca lactea* (Teloschistaceae, líquenes), en las regiones mediterránea y medioeuropea. – Bull. Soc. Linn. Provence **47:** 139–166.

Nimis, P. L. & Martellos, S. 2008. ITALIC – The information system on Italian lichens. – Version 4.0. University of Trieste, Department of Biology, IN4.0/1. Online: http://dbiodbs.univ.trieste.it/ [4. 2. 2013].

Nordin, A. 2013. On *Aspicilia serpentinicola* and some other *Aspicilia* names. – Graphis Scripta **25**: 18–20.

Opiz, P. M. 1825. Nachtrag zu Böheims phanerogamisch- und cryptogamischen Gewächsen von Opiz. – Flora (Regensburg) **8** (Beil. **2**): 52–59.

Orange, A. 2009. *Thelidium* A. Massal. (1855). – In: Smith, C. W., Aptroot, A., Coppins, B. J., Fletcher, A., Gilbert, O. L., James, P. W. & Wolseley, P. A. (eds). The Lichens of Great Britain and Ireland. Pp. 879–883. – London: The British Lichen Society.

Orange, A., James, P. W. & White, F. J. 2010. Microchemical methods for the identification of lichens. – London: British Lichen Society.

Palice, Z. 1999. New and noteworthy records of lichens in the Czech Republic. – Preslia **71**: 289–336.

Palice, Z., Guttová, A. & Halda, J. P. 2006. Lichens new for Slovakia collected in the National Park Muránska planina (W Carpathians). – In: Lackovičová, A., Guttová, A., Lisická, E. & Lizoň, P. (eds). Central European lichens – diversity and threat. Pp. 179–192. – Ithaca: Mycotaxon Ltd.

Palice, Z., Slavíková-Bayerová, Š., Gruna, B., Liška, J. & Uhlík, P. 2005. Poznámka k výskytu *Porpidia nadvornikiana* v České republice [A note on the occurrence of *Porpidia nadvornikiana* in the Czech Republic]. – Bryonora **35**: 6–8.

Pišút, I., Guttová, A., Lackovičová, A. & Lisická, E. 2001. Červený zoznam lišajníkov Slovenska (december 2001). – In: Baláž, D., Marhold, K. & Urban, P. (eds). Červeny zoznam rastlin a živočichov Slovenska. Ochr. Prir. **20** (Suppl.): 23–30.

Poelt, J. 1954. Die Gelappten Arten der Flechtengattung *Caloplaca* in Europa mit besonderer Berücksichtigung Mitteleuropas. – Mitt. Bot. Staatsamml. München **2**: 11–31.

Printzen, C. 1995. Die Flechtengattung *Biatora* in Europa. – Biblioth. Lichenol. **60**: 1–275.

Printzen, C. & Tønsberg, T. 2003. Four new species and three new apothecial pigments of *Biatora*. – Biblioth. Lichenol. **94**: 133–145.

Pykälä, J. 2013. Additions to the lichen flora of Finland. VII. – Graphis Scripta **25**: 21–29.

Redinger, K. 1937. Arthoniaceae. – In: Dr. L. Rabenhorst's Kryptogamen Flora von Deutschland, Österreich und der Schweiz, Band 9, Abteilung 2(1), Lieferung 1: 1–180.

Reese Næsborg, R. 2008. Taxonomic revision of the *Lecania cyrtella* group based on molecular and morphological evidence. – Mycologia **100**: 397–416.

Roux, C. 2012. Liste des lichens et champignons lichénicoles de France. Listo de la likenoj kaj nelikeniĝintaj fungoj de Francio. – Bull. Soc. Linn. Provence **16**: 3–220.

Santesson, R., Moberg, R., Nordin, A., Tønsberg, T. & Vitikainen, O. 2004. Lichen-forming and lichenicolous fungi of Fennoscandia. – Uppsala: Uppsala University.

Sarrión Torres, F. J. 2001. Flora y vegetación de líquenes epífitos de Sierra Madrona-Valle de Alcudia (Ciudad Real): relaciones con el estado de conservación de sus bosques. − Ms., tesis doctoral, UCM Madrid.

Schultz, M. 2009. Chasing small cyanolichens. – Bulletin of the Californian Lichen Society **16**: 34–37.

Schultz, M., Wirth, V. & Feuerer, T. 2007. Erstfunde von Flechten und lichenicolen Pilzen in Deutschland. – Herzogia **20**: 329–334.

Sérusiaux, E., Goffinet, B., Miadlikowska, J. & Vitikainen, O. 2009. Taxonomy, phylogeny and biogeography of the the lichen genus *Peltigera* in Papua New Guinea. – Fungal Diversity **38**: 185–224.

Servít, M. 1910. První příspěvek k lichenologii Moravy [A first contribution to lichenology of Moravia]. – Zprávy Kommis. Přír. Prozk. Moravy, Brno, **6**: 1−83.

Servít, M. 1930. Flechten aus der Tschechoslovakei. I. Die Umgebung von Praha. − Věstn. Král. České Společn. Nauk **1929/13**: 1−50.

Servít, M. 1936. Neue und seltenere Flechten aus den Familien Verrucariaceae und Dermatocarpaceae. − Beih. Bot. Centralbl., sect. B, Dresden, **55**: 251−274.

Servít, M. 1949. Nové nebo méně známé druhy lišejníkové čeledi Verrucariaceae. Species Verrucariacearum (Lichenes) novae vel minus cognitae. – Sborn. Nár. Mus. v Praze, **5** (B/9): 1–51.

Servít, M. 1954. Československé lišejníky čeledi Verrucariaceae [Lichens of the family Verrucariaceae in Czechoslovakia]. – Praha: ČSAV.

Servít, M. & Černohorský, Z. 1935. Flechten aus der Čechoslovakei. IV. – Věstn. Král. České Společn. Nauk. Tř. Mat.-Přír. **1934/4**: 1–34.

Smith, C. W. 2009. *Sclerococcum* Fr. (1825). – In: Smith, C. W., Aptroot, A., Coppins, B. J., Fletcher, A., Gilbert, O. L., James, P. W. & Wolseley, P. A. (eds). The Lichens of Great Britain and Ireland. P. 837. – London: Natural History Museum Publications.

Søchting, U., Lorentsen, L. B. & Arup, U. 2008. The lichen genus *Caloplaca* (Ascomycota, Lecanoromycetes) on Svalbard. Notes and additions. – Nova Hedwigia **87**: 69–96.

Spitzner, V. 1897. Druhý příspěvek ku květeně lišejníků moravsko-slezských [A second contribution to the Moravian-Silesian lichen flora]. – Výroč. Zpr. Zem. Vyšší Realné Školy v Prostějově **1896/97**: 21–32.

Spribille, T., Pérez-Ortega, S., Tønsberg, T. & Schirokauer, D. 2010. Lichens and lichenicolous fungi of the Klondike Gold Rush National Historic Park, Alaska, in a global biodiversity context. – Bryologist **113**: 439–515.

Spribille, T., Resl, P., Ahti, T., Pérez-Ortega, S., Tønsberg, T., Mayrhofer, H. & Lumbsch, H. T. 2014. Molecular systematics of the woodinhabiting, lichenforming genus *Xylographa* (Baeomycetales, Ostropomycetidae) with eight new species. – Symb. Bot. Upsal., in press.

Špryňar, P., Palice, Z. & Soldán, Z. 2008. Vycházka za mechorosty, lišejníky a cévnatými rostlinami z Berouna do Srbska [Excursion focused on bryophytes, lichens and vascular plants from Beroun to Srbsko]. – Český kras **34**: 44–53.

Štika, O. 1858. Kurze Uibersicht der Kryptogamen aus der nächsten Umgebung der Stadt Brüx. – Jahresbericht des K. K. Obergymnasiums zu Brüx **1858**: 1–24.

Suza, J. 1925. Nástin zeměpisného rozšíření lišejníků na Moravě vzhledem k poměrům evropským. – Spisy přír. fakulty Mas. Univ., Brno, **55**: 1–151.

Suza, J. 1944. K lichenologickému svérázu Žďárských hor. – Práce Morav. Přír. Společn. **16**: 1–15.

Suza, J. 1948. Lišejníky Malých Karpat (Slovensko). – Act. Acad. Scient. Natur. Moravio-Silesiacae **20**: 1–28.
Svensson, M. & Westberg, M. 2010. Additions to the lichen flora of Fennoscandia. – Graphis Scripta **22**: 33–37.
Svoboda, D. 2007. Lichens of the central part of the Bohemian Karst. – Novit. Bot. Univ. Carol. **18**: 15–52.
Szatala, Ö. 1927. Lichenes Hungariae I. Pyrenocarpeae – Gymnocarpeae (Coniocarpineae). Magyarország zúzmóflórája. – Folia Cryptogamica **1/5**: 337–434.
Szatala, Ö. 1942. Lichenes Hungariae. III. Gymnocarpeae (Cyclocarpineae. Peltigeraceae – Lecideaceae). Magyarország zuzmóflórája. – Folia Cryptogamica **2/5** [1939]: 267–460.
Thor, G. & Kashiwadani, H. 1996. Zeorin and two other triperpenoids found in *Flakea papillata*. – Systema Ascomycetum **14**: 87–90.
Tibell, L. 1999. Calicioid lichens and fungi. – Nordic Lichen Flora **1**: 20–71.
Timdal, E. 1989. The production of rhodocladonic acid in *Cladonia bacilliformis* and *C. norvegica* triggered by the presence of a lichenicolous mite. – Graphis Scripta **2**: 125–127.
Tønsberg, T. 1992. The sorediate and isidiate, corticolous, crustose lichens in Norway. – Sommerfeltia **14**: 1–331.
Triebel, D., Wedin, M. & Rambold, G. 1997. The genus *Scutula* (lichenicolous ascomycetes, Lecanorales): species on the *Peltigera canina* and *P. horizontalis* groups. – Symb. Bot. Ups. **32**: 323–337.
Vězda, A. 1980. Katalog československých lišejníků. – Ms. [Depon in: Botanický ústav AV ČR, Průhonice]
Vězda, A. & Liška, J. 1999. A Catalogue of Lichens of the Czech Republic. – Průhonice: Institute of Botany, Academy of Sciences of the Czech Republic.
Vitikainen, O. 2007. Peltigeraceae. – Nordic Lichen Flora **3**: 113–131.
Vondrák, J. 2006. Contribution to the lichenized and lichenicolous fungi in Bulgaria. I. – Mycologia Balcanica **3**: 7–11.
Vondrák, J., Frolov, I., Říha, P., Hrouzek, P., Palice, Z., Nadyeina, O., Halici, G., Khodosovtsev, A. & Roux, C. 2013a. New crustose Teloschistaceae in Central Europe. – Lichenologist **45**: 701–722.
Vondrák, J., Halda, J., Malíček, J., Müller, A. & Uhlík, P. 2006. Lišejníky zaznamenané během 18. bryologicko-lichenologických dnů v Moravskoslezských Beskydech (22.-25.9.2005) [Lichens recorded during the 18th Bryological and Lichenological Days in the Moravskoslezské Beskydy Mts (North-east Moravia, Czech Republic) in 2005]. – Bryonora **37**: 19–23.
Vondrák, J., Halici, M. G., Kocakaya, M. & Vondráková, O. 2012. Teloschistaceae (lichenized Ascomycetes) in Turkey. 1. – Some records from Turkey. – Nova Hedwigia **94**: 385–396.
Vondrák, J., Kocourková, J., Palice, Z. & Liška, J. 2007a. New and noteworthy lichens in the Czech Republic – genus *Caloplaca*. – Preslia **39**: 163–184.
Vondrák, J., Kocourková, J., Slavíková-Bayerová, Š., Breuss, O., Sparrius, L. & Hawksworth, D. L. 2007b. Noteworthy Lichens, Lichenicolous and other allied Fungi recorded in Bohemian Karst, Czech Republic. – Bryonora **40**: 31–40.
Vondrák, J., Palice, Z., Mareš, J. & Kocourková, J. 2013b. Two superficially similar lichen crusts, *Gregorella humida* and *Moelleropsis nebulosa*, and a description of the new lichenicolous fungus *Llimoniella gregorellae*. – Herzogia **26**: 31–48.
Vondrák, J., Říha, P., Arup, U. & Søchting, U. 2009. The taxonomy of the *Caloplaca citrina* group (Teloschistaceae) in the Black Sea region; with contributions to the cryptic species concept in lichenology. – Lichenologist **41**: 571–604.
Vondrák, J., Říha, P., Redchenko, O., Vondráková, O., Hrouzek, P. & Khodosovtsev, A. 2011. The *Caloplaca crenulatella* species complex; its intricate taxonomy and description of a new species. – Lichenologist **43**: 467–481.
Vondrák, J. & Wirth, V. 2013. *Caloplaca*. – In: Wirth, V., Hauck, M. & Schultz, M. (eds). Die Flechten Deutschlands. Pp. 262–317. – Stuttgart: Ulmer.
Westberg, M. 2007. *Candelariella* (Candelariaceae) in western United States and northern Mexico: the polysporous species. – Bryologist **110**: 375–390.
Westberg, M. & Arup, U. 2011. *Candelaria pacifica* sp. nova (Ascomycota, Candelariales) and the identity of *C. vulgaris*. – Biblioth. Lichenol. **106**: 353–364.
Westberg, M. & Sohrabi, M. 2012. A conspectus of the lichen genus *Candelariella* (Candelariaceae, Ascomycota) in Southwest Asia with emphasis on Iran. – Nova Hedwigia **95**: 531–546.
Wirth, V., Hauck, M. & Schultz, M. 2013. Die Flechten Deutschlands. – Stuttgart: Ulmer.
Wolseley, P. A. & Hawksworth, D. L. 2009. *Schismatomma* Flot. & Körb. ex A. Massal. (1852). – In: Smith, C. W., Aptroot, A., Coppins, B. J., Fletcher, A., Gilbert, O. L., James, P. W. & Wolseley, P. A. (eds). The Lichens of Great Britain and Ireland. Pp. 834–837. – London: Natural History Museum Publications.

Manuscript accepted: 01 October 2014.

Addresses of the authors

Jiří Malíček, Charles University in Prague, Faculty of Sciences, Department of Botany, Benátská 2, 128 01 Praha 2, Czech Republic. E-mail: jmalicek@seznam.cz

Zdeněk Palice, Institute of Botany, Academy of Sciences of the Czech Republic, Zámek 1, 252 43 Průhonice, Czech Republic; and Charles University in Prague, Faculty of Sciences, Department of Botany, Benátská 2, 128 01 Praha 2, Czech Republic. E-mail: zdenek.palice@ibot.cas.cz

Jan Vondrák, Institute of Botany, Academy of Sciences of the Czech Republic, Zámek 1, 252 43 Průhonice; Department of Botany, Faculty of Biological Sciences, University of South Bohemia, Branišovská 31, 370 05, České Budějovice, Czech Republic; and Faculty of Environmental Sciences, Czech University of Life Sciences Prague, Kamýcká 1176, Praha 6, Suchdol, Czech Republic. E-mail: j.vondrak@seznam.cz