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NEW AND RARE LICHEN SPECIES OF THE POLISH TATRA MOUNTAINS

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Abstract: The paper reports the occurrence of 51 interesting lichen species in the Polish Tatra Mts. Eleven species are new to the area: *Bacidia rubella* (Hoffm.) A. Massal., *Buellia papillata* (Sommerf.) Tuck., *Lecanactis dilleniana* (Ach.) Körb., *Lecanora varia* (Hoffm.) Ach., *Melaspilea gibberulosa* (Ach.) Zwackh., *Micarea tuberculata* (Sommerf.) R. A. Anderson, *Miriqudica leucophaea* (Flörke *ex* Rabenh.) Hertel & Rambold, *Polysporina lapponica* (Ach. *ex* Schaer.) Degel., *Ramalina intermedia* (Delise *ex* Nyl.) Nyl., *R. pollinaria* (Westr.) Ach. and *Rhizocarpon lavatum* (Fr.) Hazsl. Of these taxa, *Buellia papillata* is new to Poland and *Melaspilea gibberulosa* is new to the entire Tatra Mts range.

Key words: Lichens, *Melaspilea gibberulosa*, distribution, ecology, Tatra Mts, Carpathians, Poland

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INTRODUCTION

The Tatra Mts have the most abundant lichen flora of all the Carpathian ranges. Many lichens occurring there represent an arctic-alpine element, which determines the specific character of this flora. The Tatra Mts provide very good conditions for the growth of extremely rare lichen species. Many mountain species have their only Polish stations there. Knowledge of the Tatra Mts lichens is still not complete and consistent. The occurrence and distribution of the majority of lichen species require more accurate research.

This paper presents new records of interesting lichen species collected in the Polish Tatra Mts. It provides information on the occurrence and ecology of the following lichens: *Buellia papillata* (Sommerf.) Tuck., reported for the first time from Poland; *Melaspilea gibberulosa* (Ach.) Zwackh, reported as new to the whole Tatra Mts range; and other species new to the Polish Tatras: *Bacidia rubella* (Hoffm.) A. Massal., *Lecanactis dilleniana* (Ach.) Körb., *Lecanora varia* (Hoffm.) Ach., *Micarea tuberculata* (Sommerf.) R. A. Anderson, *Miriqudica leucophaea* (Flörke *ex* Rabenh.) Hertel & Rambold, *Polysporina lapponica* (Ach. *ex* Schaer.) Degel., *Ramalina intermedia* (Delise *ex* Nyl.) Nyl., *R. pollinaria* (Westr.) Ach., *Rhizocarpon lavatum* (Fr.) Hazsl. Other extremely rare and interesting species are presented and their distribution in the study area is discussed. The morphology of lichen species new to the Polish Tatra Mts is characterized. The data are based on lichenological materials collected by the author in the Polish Tatra Mts in 2002–2003. Some information is based on specimens deposited in KRAM-L and never cited before.

The distributions of the lichen species examined are given in the ATPOL grid square system (Cieśliński & Fałtynowicz 1993). The herbarium material is housed in the Lichen Herbarium of the W. Szafer Institute of Botany, Polish Academy of Sciences (KRAM-L). The symbol "+" indicates a non-lichenized fungus.

LICHEN SPECIES NEW TO THE POLISH TATRA MTS

Bacidia rubella (Hoffm.) A. Massal.

Thallus grey-green, very thin, cobwebby to granular-isidiate. Granules to 0.3 mm diam, globose, moniliform to deeply indented, ± dispersed. Apothecia to 1.1 mm diam., pale red-brown, older dark,

dispersed to dense. Disc flat to ± convex. Margin distinct to absent in older apothecia. Hypothecium ± colorless, K–; hymenium 70–100 µm tall, colorless, K–; epihymenium K–. Ascospores 2.5 × 55.0–60.0 µm, acicular, 7–8-septate, colorless.

This lichen is widespread in Poland (Fałtynowicz 2003). It is known from many stations in the whole Polish Carpathian Mts (Bielczyk 2003; Kościelniak & Kiszka 2003).

SPECIMEN EXAMINED. WEST TATRA MTS: [Gd–59] Polana Stare Kościeliska glade in lower part of Dolina Kościeliska valley, alt. 960 m, corticolous on trunk of older *Tilia* sp., *Flakus 195* (KRAM-L); associated with *Anaptychia ciliaris, Ramalina farinacea* and *Ramalina pollinaria*.

Buellia papillata (Sommerf.) Tuck.

Thallus white-grey, thick, crustose, granular to verrucose. Granules to 1.0 mm diam., irregular to squamulose-like. Apothecia black to 1.0(–1.2) mm diam., frequent, dispersed to densely grouped; margin distinct, rounded to irregular, thin. Disc flat to ± convex. Hymenium 60–87 µm tall, pale brown to ± colorless; hypothecium ± dark brown. Ascospores (4.5–)5.0–5.5(–7.5) × (10.0–) 14.0–15.0(–17.5) µm, 1-septate (extremely rare 2–3-septate), pale brown. Thallus and medulla: C–, Pd–, KC– and K– (K± yellow).

Lichen new to Poland. It is a rare arctic-alpine species (Wirth 1995) known from Great Britain (Coppins 2002), Germany, Switzerland, Iceland (Nowak 1998a), Austria (Hafellner & Türk 2001), Slovakia (Pišút *et al*. 1996), Italy (Nimis 1993), Sweden, Norway (Santesson 1993), Mongolia (Cogt 1995), Canada, the U.S.A. (Esslinger 1997), Antarctica (Øvstedal & Smith 2001), Greenland, Spitzbergen, Alaska, Siberia, the Caucasus, Nepal and Taymyr (Nowak 1998a).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] below Przełęcz pod Chłopkiem pass, alt. 2200 m, N aspect, slope 80°, on humus and calcareous soil in moist place, mylonite area, *Flakus 1613* (KRAM-L).

Lecanactis dilleniana (Ach.) Körb.

Thallus orange-grey (greyish in herbarium) crustulose, thick, areolate to bullate, granules irregular. Apothecia to 1.0(–1.4) mm diam., ± dispersed, rounded to irregular, black with margin lifted. Disc and margin white-pruinose. Photobiont *Trentepohlia*. Ascospores 3.8–4.5 × 25.0–27.5 µm, 3-septate, colorless. Hymenium colorless, J–; hypothecium black. Thallus C–, KC–, Pd+ orange.

This species is very rare in Poland. It is known from Lower Silesia and the Sudety Mts (Stein 1879; Eitner 1911; Anders 1925), the Polish Carpathian Mts from the Beskid Mały Mts (Bielczyk 2003), Beskid Wyspowy Mts, Beskid Żywiecki Mts (Nowak 1998b) and Gorce Mts (Glanc 1960).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] Ciemnosmreczyńska Przełączka pass, alt. 2115 m, N aspect, slope 90°, on granite boulder, mylonite area, *Flakus 1787* (KRAM-L).

Lecanora varia (Hoffm.) Ach.

Thallus thick, green-grey, disc yellow-grey to black, often pruinose, margin green-grey to pale black. Apothecia to 1.0(–2.0) mm diam., numerous, concentrated, rounded to irregular. Ascospores 5.0 × (5.0–)7.5–10.0 µm, globose to ellipsoid, colorless. Margin and thallus: Pd+ yellow, KC+ yellow, K–, C–.

This lichen is widespread in Poland (Fałtynowicz 2003). It is known from many stations in the whole Polish Carpathian Mts (Bielczyk 2003; Kościelniak & Kiszka 2003). This is probably the first report of the species growing on another lichen.

SPECIMENS EXAMINED. HIGH TATRA MTS: [Ge–60] Czarny Mięguszowiecki Szczyt Mt., alt. 2409 m, W aspect, slope 90°, on thallus of *Umbilicaria cylindrica* on granite wall, *Flakus 788* (KRAM-L); [Ge–60] Pośredni Mięguszowiecki Szczyt Mt. (SE ridge), alt. 2360 m, SE aspect, slope 90°, on thallus of *Umbilicaria* sp. on granite wall, *Flakus 1231* (KRAM-L).

+***Melaspilea gibberulosa*** (Ach.) Zwackh

Thallus very thin, pale green-grey. Apothecia to 0.6 mm long and 0.2 mm wide, elongate with disc slit-like to ellipsoid, frequently crowded, black. Hymenium colorless. Photobiont *Trentepohlia*. True exciple black, discontinuous below

hymenium. Ascospores 5.0–6.0 × 15.0–16.0 µm, ovoid constricted, 1-septate, colorless.

New to the whole Tatra Mts range. The species is known from scattered localities in Poland, growing in old forests (Fałtynowicz 2003). It was found in the Polish Carpathian Mts from the Beskid Śląski Mts (Kiszka 1967), Beskid Żywiecki Mts (Nowak 1998b), Gorce Mts (Czarnota 2000), Beskid Sądecki Mts (Olech 1973; Śliwa 1998) and Beskid Niski Mts (Bielczyk 2003).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] Szpiglasowa Przełęcz pass, alt. 2107 m, NW aspect, slope 60°, on bark of rotting twig, *Flakus 923* (KRAM-L).

Micarea tuberculata (Sommerf.) R. A. Anderson

Thallus thin, minutely scurfy-granular, pale green. Apothecia to 0.5(–0.6) mm diam., convex, tuberculate, blackish. Hymenium 15–35(–40) µm tall, greenish in upper part, K+ intense bluish green. Hypothecium blackish, K+ bluish green. Ascospores narrowly ellipsoid, nonseptate, colorless, 5.0–7.5 × 1.5–2.0 µm.

In Poland the species is known from one station in the Karkonosze Mts (P. Czarnota, unpublished).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–50] Dolina Gąsienicowa valley by Czarny Potok stream near Czarny Staw Gąsienicowy lake, alt. 1600 m, on granite stone among scree in moist and shaded place, E slope, *Flakus 140* (KRAM-L).

Miriqudica leucophaea (Flörke *ex* Rabenh.) Hertel & Rambold

Thallus thick, to 1.8 mm tall, green-grey to brownish grey, areolate, glossy to matte. Areoles 0.2–1.3 mm diam., convex. Apothecia to 0.8 mm diam., ± globose to irregular, red-brown to brownish black, numerous. Disc flat to slightly convex. Margin distinct to absent. True excipule colorless to pale brownish. Hymenium 60 µm tall, colorless. Hypothecium colorless. Ascospores 3.75–5.0 × 10.0–12.5 µm, ellipsoid, simple, colorless, 8 in ascus. Thallus, cortex and medulla: J–, C–, K–, KC–.

This species is known in Poland from the Sudety Mts, Carpathian Mts and the Southern Baltic Lakeland in northern Poland (Fałtynowicz 2003). It was found in the Polish Carpathian Mts from the Beskid Mały Mts (Nowak 1974b), Beskid Makowski Mts (Bielczyk 2003), Beskid Wyspowy Mts (Nowak 1998b), Beskid Żywiecki Mts (Nowak 1998b), Gorce Mts (Czarnota 2000), Beskid Sądecki Mts (Olech 1972, 1973; Śliwa 1998), Pieniny Mts (Kiszka 1997, 2000) and Bieszczady Zachodnie Mts (Kiszka & Kościelniak 2003).

SPECIMENS EXAMINED. HIGH TATRA MTS: [Ge–50] Kobyła Mt. above Dolina Suchej Wody valley, alt. 1220 m, on granite boulder, 13 July 1971, *leg. J. Nowak* (KRAM-L 19238); [Ge–60] Cubryna Mt. (E ridge), alt. 2370 m, W aspect, slope 90°, on granite wall, *Flakus 1080* (KRAM-L).

Polysporina lapponica (Ach. *ex* Schaer.) Degel.

Thallus thin, dark brown to blackish brown, areolate to squamulose. Areoles (0.4–)0.6–1.0 mm diam. Apothecia to 0.2 mm diam., black, round to ± irregular. Disc granular to verrucose. Margin thick, slightly crenate. Epihymenium black, thick; hymenium colorless. Ascospores 1.5 × 4.0–4.5 µm, >100 in ascus, colorless, narrowly ellipsoid to oblong.

This lichen is widespread in Poland (Fałtynowicz 2003). It is known from many stations in the whole Polish Carpathian Mts (Bielczyk 2003; Kościelniak & Kiszka 2003).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] Pośredni Mięguszowiecki Szczyt Mt., alt. 2392 m, on granite, S aspect, slope 5°, *Flakus 1707* (KRAM-L). Associated with *Lecanora intricata*, *L. polytropa*, *Pseudephebe pubescens* and *Umbilicaria cylindrica*.

Ramalina intermedia (Delise *ex* Nyl.) Nyl.

Thallus to 0.5 cm, forming ± erect tufts. Branches 0.5–1.5(–2.0) mm wide, ± shiny, pale yellow-grey. Soralia on terminal part of branches and margins numerous, irregular. Medulla and thallus K–, Pd–.

This species is fairly rare in Poland. It is known from northern and central Poland and also from the Western Carpathians (southern Poland). It

was found in the Polish Carpathian Mts from the Pogórze Ciężkowickie foothills (Bielczyk 2003), Beskid Mały Mts (Nowak 1965), Beskid Wyspowy Mts and Beskid Żywiecki Mts (Nowak 1998b), Gorce Mts (Glanc & Tobolewski 1967; Czarnota 2000) and Pieniny Mts (Motyka 1962; Kiszka 1997, 2000).

SPECIMEN EXAMINED. WEST TATRA MTS: [Gd–59] Dolina Kościeliska valley, alt. 980 m, E aspect, slope 90°, on limestone wall, *Flakus 187* (KRAM-L).

Ramalina pollinaria (Westr.) Ach.

Thallus to 3 cm long and 5 mm wide, grey-green, shiny, much branched with numerous small branches. Soralia mainly laminal, rarely on branch margins. Medulla and soralia Pd–, K–, C–, KC–.

This lichen is widespread in Poland (Fałtynowicz 2003). It is known from many stations in the whole Polish Carpathian Mts (Bielczyk 2003; Kościelniak & Kiszka 2003).

SPECIMEN EXAMINED. WEST TATRA MTS: [Gd–59] Polana Stare Kościeliska glade, lower part of Dolina Kościeliska valley, alt. 960 m, corticolous on trunk of older *Tilia* sp., *Flakus 187* (KRAM-L). Associated with *Anaptychia ciliaris*, *Bacidia rubella* and *Ramalina farinacea*.

Rhizocarpon lavatum (Fr.) Hazsl.

Thallus pale brown-grey to pale ochraceous, rimose. Areoles 0.4–1.1 mm diam., angular, matte, flat to ± convex (or squamulose-like). Apothecia to 0.8 mm diam., black, not pruinose, round to ± irregular; true exciple thick, persistent. Hymenium 200 µm tall, colorless, hypothecium reddish brown to brownish black, epihymenium greenish brown to pale brown, K–. Ascospores (25.0–)35.0–37.5(–40.0) × (11.0–)15.0(–17.5) µm, muriform, colorless to pale brown with age. Thallus: K–, C–, KC–, Pd–, J–.

This species is very rare in Poland. It is known from the Central Polish Lowlands and Sudety Mts (Stein 1889; Eitner 1895; Migula 1931) as well as the Western Carpathian Mts: Beskid Mały Mts (Bielczyk 2003), Beskid Makowski Mts (Nowak 1968) and Beskid Żywiecki Mts (Nowak 1967, 1998b).

SPECIMENS EXAMINED. HIGH TATRA MTS: [Ge–60] Urwany Żleb gully on the trail to Szpiglasowa Przełęcz pass, alt. 1480 m, SE aspect, slope 80°, on granite in stream, associated with *Ionaspis lacustris*, *Flakus 878* (KRAM-L); [Ge–60] Dwoisty Żleb gully below Żabia Czuba Mt., alt. 1500 m, on granite block in moist place, *Flakus 80* (KRAM-L); [Ge–50] Dolina Gąsienicowa valley by Czarny Potok stream near Czarny Staw Gąsienicowy lake, alt. 1600 m, on granite stone among scree in moist place, E slope, *Flakus 139* (KRAM-L).

RARE AND NOTEWORTHY SPECIES

Arthrorhaphis alpina (Schaer.) R. Sant.

The species is known from a few localities in the Polish West Tatra Mts: Krzesanica Mt., alt. 2120 m, on soil among limestone rocks, and Piekło dale below Kopa Kondracka Mt., alt. 1650 m, on humus on limestone (Tobolewski 1955); Kopa Kondracka Mt., alt. 1950 m, S slope, on soil among limestone rocks (Tobolewski 1956); Pyszniańska Przełęcz pass, alt. 1780 m, between Łopata Mt. and Czerwony Wierch Mt., alt. 1880 m, Staroroboci ański Wierch Mt., alt. 1910 m, and Żabi Żleb gully, alt. 1650 m, on humus and dead mosses (Olech 1981); Ciemniak Mt., alt. 1850 m, and Przełęcz pod Kopą Kondracką pass, alt. 1920 m, on humus (Olech 1983). Only one station is reported in the Polish High Tatra Mts, from Szpiglasowa Przełęcz pass, alt. 2114 m, on soil, on mylonite (Tobolewski 1959).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] Ciemnosmreczyńska Przełączka pass, alt. 2115 m, W aspect, slope 5°, on calcareous soil and humus, mylonite area, *Flakus 1765* (KRAM-L).

Arthrorhaphis citrinella (Ach.) Poelt

The species is known in the Polish West Tatra Mts from the following locations: Jarząbczy Wierch Mt., alt. 1680 m, NW slope, on soil under overhanging rock (Tobolewski 1959); Dolina Suchej Wody valley, alt. 1450 m, on soil, on trail to Brzeziny, below the Murowaniec mountain shelter (Tobolewski 1960); Suche Czuby Mt., alt. 1750 m, on soil (Bielczyk 1999). In the Polish High Tatra Mts it is known from Kocioł Czarnego

Stawu pod Rysami cirque, alt. 1670 m, on the trail to Przełęcz pod Chłopkiem pass, and on the NE shore of Czarny Staw lake, alt. 1630 m, on humus and mosses on granite (Tobolewski 1969).

SPECIMENS EXAMINED. HIGH TATRA MTS: [Ge–60] Dolina za Mnichem valley, above Staw Staszica lake, on the trail to Szpiglasowa Przełęcz pass, alt. 1850 m, on soil, granite area, *Flakus 879* (KRAM-L); [Ge–60] below Przełęcz pod Chłopkiem pass, alt. 2300 m, NW aspect, slope 30°, on calcareous soil among mosses, mylonite area, *Flakus 1292* (KRAM-L).

Aspicilia aquatica Körb.

In the Polish West Tatra Mts the species is known from Dolina Kościeliska valley, alt. 1060 m, on granite in stream (Motyka 1924b), and in the Polish High Tatra Mts from below Dwoisty Stawek lake, below Gąsienicowy Staw lake, and between Zadni Staw and Długi Staw lakes, on granite in stream, upper part of Dolina Gąsienicowa valley (Motyka 1926, 1927), and Czarny Staw pod Rysami lake, on granite in stream (Motyka 1928; Bielczyk 1997).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] Rysy Mt., alt. 2140 m, NW aspect, slope 80°, on siliceous rock in stream. Associated with *Placynthium pannariellum*, *Flakus 1311 & 1309* (KRAM-L).

Bacidia trachona (Ach.) Lettau

This species is very rare in the Polish Tatra Mts. It is known from only one station from the West Tatra Mts: Mała Świstówka dale, alt. 1800 m, NW slope, on limestone (Alstrup & Olech 1990).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] Przełączka pod Zadnim Mnichem pass, alt. 2135 m, N aspect, slope 80°, on mylonite, *Flakus 1893* (KRAM-L).

Brodoa atrofusca (Schaer.) Goward

In the Polish Tatra Mts the species is known from one station: Czarne Ściany Mt., on Orla Perć trail, alt. 2220 m, W aspect, on granite (Krzewicka 2004b).

SPECIMENS EXAMINED. HIGH TATRA MTS: [Ge–60] Niżnie Rysy Mt., alt. 2430 m, on granite boulder, *Flakus 402* (KRAM-L); [Ge–60] Pośredni Mięguszowiecki Szczyt Mt., alt. 2392 m, on granite stone, *Flakus 1668* (KRAM-L); [Ge–60] Cubryna Mt., alt. 2375 m, SE aspect, slope 15°, on granite, *Flakus 2153* (KRAM-L).

Buellia griseovirens (Turner & Borrer *ex* Sm.) Almb.

In the Polish Tatra Mts the species is known from two localities: Dolina Białego valley, alt. 960 m, on bark of *Acer pseudoplatanus* (Bielczyk 1999); Zadni Upłaz Mt., alt. 1670 m, NW slope, on twigs of *Pinus mugo* (Krzewicka 2004b).

SPECIMENS EXAMINED. HIGH TATRA MTS: [Gd–59] Dolina Ku Dziurze valley, alt. 1000 m, on bark of *Alnus* sp., 12 April 1999, *leg. U. Bielczyk* (KRAM-L 44669); [Ge–51] Dolina Białki valley, alt. 1005 m, on bark on trunks of dead *Alnus incana*, *Flakus 63,1* (KRAM-L).

Caloplaca herbidella (Hue) H. Magn.

In the Polish Tatra Mts the species is known from three localities in the West Tatra Mts: lower part of Dolina Białego valley, alt. 950 m, corticolous on *Picea abies* and alt. 980 m, corticolous on *Acer pseudoplatanus* (Tobolewski 1960); Dolina Kościeliska valley by Kościeliski Potok stream, near Brama Kantaka gate, corticolous on *Picea abies* (Czarnota 2002).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–51] Dolina Białki valley, alt. 1005 m, on bark on trunks of dead *Alnus incana*, *Flakus 63* (KRAM-L).

Candelariella coralliza (Nyl.) H. Magn.

In the Polish Tatra Mts this species is known from two stations: Polana Chochołowska glade, upper part of Dolina Chochołowska valley, alt. 1140 m, on granite boulder (KRAM-L 42366); Rusinowa Polana glade, alt. 1250 m, on granite boulder (KRAM-L 34233) (Bielczyk 2003).

SPECIMEN EXAMINED. WEST TATRA MTS: [Gd–59] Suche Czuby Mt., alt. 1790 m, SE aspect, slope 90°, on granite wall, *Flakus 160* (KRAM-L).

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

This species is rare in the Polish Tatra Mts. It is known from a few localities: Kościelec Mt.,

alt. 1700 m, S aspect, in moist place (Motyka 1926); Twardy Upłaz Mt., Czuba Goryczkowa Mt. below Czarny Staw (Gąsienicowy) lake, on moist granite (Motyka 1927); below Mnich Mt. by Morskie Oko lake, alt. 1500 m, (Tobolewski 1955); Dolinka pod Kołem dale, upper part of Dolina Pięciu Stawów Polskich valley, alt. 1950 m, on vertical granite (Tobolewski 1956); Przełęcz Karb pass below Kościelec Mt., alt. 1800 m, on saxicolous mosses on granite in moist place (Nowak 1974a).

SPECIMENS EXAMINED. HIGH TATRA MTS: [Ge–50] Żleb Krzyżnego gully above Dolina Pańszczycy valley, alt. 1900 m, on saxicolous mosses, 10 July 1955, *leg. J. Nowak,* (KRAM-L 3238); [Ge–50] by Czarny Staw Gąsienicowy lake, alt. 1620 m, on vertical granite rocks, 24 July 1975, *leg. J. Nowak* (KRAM-L 21491); [Ge–60] Kazalnica Mięguszowiecka Mt., alt. 2050 m, NE aspect, slope 30°, on humus and mosses in moist place, granite area, *Flakus 86* (KRAM-L); [Ge–60] Szpiglasowy Wierch Mt. (W ridge), alt. 2170 m, E aspect, slope 90°, on granite, *Flakus 679* (KRAM-L); [Ge–60] Czarny Mięguszowiecki Szczyt Mt., alt. 2409 m, NW aspect, slope 0°, on mosses and rubble on rock ledge, granite area, *Flakus 770* (KRAM-L); [Ge–60] Pośredni Mięguszowiecki Szczyt Mt., alt. 2392 m, N aspect, on mosses and humus in horizontal crack, granite area, *Flakus 1633* (KRAM-L).

Cetrariella delisei (Bory *ex* Schaer.) Kärnefelt & Thell

This species is very rare in the Polish Tatra Mts, known from two localities: Ciemniak Mt., on mosses (Motyka 1924a); Rysy Mt., on soil in siliceous rock crack and granite rubble, in moist place (Motyka 1960; Bielczyk 1997).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] Mięguszowiecki Szczyt Mt., alt. 2438 m, aspect N, slope 0°, on humus among mosses on ledge, in moist place, granite area, *Flakus 1464* (KRAM-L).

Cladonia norvegica Tønsberg & Holien

The species is known from the Polish Tatra Mts (Alstrup & Olech 1992b), but the authors do not mention stations (specimen not seen).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] Dolina Rybiego Potoku valley, alt. 1250 m, on rotten wood, *Flakus 34* (KRAM-L).

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

In the Polish Tatra Mts the species is known from only one station: Dolina Kościeliska valley, by Brama Kantaka gate, on rotting wood in forest (Motyka 1924a).

SPECIMENS EXAMINED. WEST TATRA MTS: [Gd–59] Ornak Mt., 07 July 1955, *leg. J. Nowak* (KRAM-L 5017); HIGH TATRA MTS: [Ge–51] Dolina Białki valley, alt. 1000 m, on sandy alluvial soil, *Flakus 65* (KRAM-L).

Cladonia trassii Ahti

Cladonia stricta auct.

From the Polish Tatra Mts *Cladonia stricta* s.l. was reported by Suza (1928 as *C. gracilescens*) from upper part of Dolina Kondratowa valley, alt. 1650–1700 m, on soil on granite (specimen not seen).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] Cubryna Mt., alt. 2375 m, N slope, on acidic humus on granite ledge among mosses, in moist place, *Flakus 2106* (KRAM-L).

Dibaeis baeomyces (L. fil.) Rambold & Hertel

The species is known from the Polish Tatra Mts (Alstrup & Olech 1992b), but the authors do not mention stations (specimen not seen).

SPECIMEN EXAMINED. WEST TATRA MTS: [Gd–69] Liliowe Turnie Mt., alt. 1950 m, on clay soil, *Flakus 2221* (KRAM-L).

Epilichen scabrosus (Ach.) Clem.

In the Polish Tatra Mts the species is known only in the West Tatra Mts: Dolina Suchej Wody valley, on trail to Brzeziny, below Murowaniec mountain shelter, alt. 1450 m, on thallus of *Baeomyces rufus* (Tobolewski 1960); Kopa Magury Mt. above Jaworzynka valley, alt. 1580 m, on thin soil over limestone, E slope, in subalpine belt (Nowak 1971); Kopieniec Wielki Mt., alt. 1320 m, on plant debris among limestone rocks (Bielczyk 1999).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] Szpiglasowa Przełęcz pass, alt. 2110 m, NE aspect, on

humus and mylonite rubble, on thallus of *Baeomyces* cf. *rufus*, *Flakus 568* (KRAM-L).

Lecanographa abscondita (Th. Fr.) Egea & Torrente

This species is very rare in the Polish Tatra Mts. It is known from only one station: Jarząbczy Wierch Mt. above Dolina Jarząbcza valley, alt. 1710 m, NW slope, on mylonite (Tobolewski 1962).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] Ciemnosmreczyńska Przełączka pass, alt. 2115 m, N aspect, on mylonite stone in horizontal crack, mylonite area, *Flakus 1767* (KRAM-L).

Lecanora carpinea (L.) Vain.

In the Polish Tatra Mts the species is known from one published station: Dolina Białego valley, alt. 980 m, on bark of *Acer pseudoplatanus* (Bielczyk 1999).

SPECIMENS EXAMINED. HIGH TATRA MTS: [Ge–50] Dolina Roztoki valley, alt. 1330 m, on bark of *Sorbus aucuparia* var. *glabrata*, 07 March 1992, *leg. J. Nowak,* (KRAM-L 26396); [Ge–51] Dolina Białki valley, alt. 1005 m, on rotting smooth bark of *Alnus incana*, *Flakus 55* (KRAM-L).

Lichenomphalia umbellifera (L.: Fr.) Redhead, Lutzoni, Moncalvo & Vilgalys

In the Polish Tatra Mts the species is known from one published station: Kopieniec Wielki Mt., alt. 1320 m, on plant debris (Bielczyk 1999).

SPECIMENS EXAMINED. HIGH TATRA MTS: [Ge–60] Kocioł pod Rysami cirque, alt. 2050 m, W aspect, slope 30°, on soil among mosses, granite area, *Flakus 472* (KRAM-L); [Ge–60] Szpiglasowa Przełęcz pass, alt. 2110 m, NE aspect, on calcareous soil, mylonite area, *Flakus 514* (KRAM-L); [Ge–60] Miedziane Mt., alt. 2220 m, N aspect, slope 5°, on mosses and humus, granite area, *Flakus 586* (KRAM-L).

Myxobilimbia microcarpa (Th. Fr.) Hafellner

In the Polish Tatra Mts the species is known from Kotlina Morskiego Oka dale, on SW shore of Morskie Oko lake, alt. 1450 m, on dead mosses (*Sphagnum* sp.) (Tobolewski 1969), and from Ciemniak Mt. SW slope (Rzędy), alt. 1800 m, on dead basophilous mosses (Olech 1985).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] Przełęcz pod Chłopkiem pass, alt. 2307 m, NW aspect, on mosses, mylonite area, *Flakus 868* (KRAM-L).

Opegrapha gyrocarpa Flot.

The species is known from the Polish Tatra Mts (Nowak 1983; Alstrup & Olech 1992b), but the authors do not mention stations (specimens not seen).

SPECIMENS EXAMINED. HIGH TATRA MTS: [Ge–60] Dolina za Mnichem valley, alt. 1950 m, on granite, *Flakus 107* (KRAM-L); [Ge–50] Dolina Gąsienicowa valley below Czarny Staw Gąsienicowy lake, alt. 1600 m, E aspect, on granite stone, scree, *Flakus 142* (KRAM-L); [Ge–60] Ciemnosmreczyńska Przełączka pass, alt. 2115 m, N aspect, slope 90°, on mylonite stone in vertical crack, mylonite area, *Flakus 1785* (KRAM-L).

Peltigera lepidophora (Nyl. *ex* Vain.) Bitter

In the Polish Tatra Mts this species is known from three localities: Giewont Mt., alt. 1100 m, S slope, on calcareous humus (Suza 1928); Mnichy Chochołowskie rocks (Bobrowiec Mt.), alt. 1400 m, S slope, on soil (Tobolewski 1959); Kopa Magury Mt., alt. 1680 m, on mosses and humus (Olech 1985).

SPECIMENS EXAMINED. WEST TATRA MTS: [Gd–59] Sarnia Skała Mt., alt. 1370 m, on calcareous humus among mosses in limestone crack, 09 April 1999, *leg. U. Bielczyk* (KRAM-L 44623); [Gd–59] upper part of Dolina Małej Łąki valley, alt. 1550 m, on humus and mosses in calcareous rock crack, *Flakus 2203* (KRAM-L); HIGH TATRA MTS: [Ge–60] Przełęcz pod Chłopkiem pass, alt. 2307 m, NW aspect, slope 0°, on calcareous soil and mosses, mylonite area, *Flakus 860,1* (KRAM-L).

Pertusaria melanochlora (DC. in Lam. & DC.) Nyl.

This species is very rare. In the Polish Tatra Mts it is known from only one station in the West Tatra Mts: Jarząbczy Wierch Mt., alt. 1710 m, NW slope, on mylonite (Tobolewski 1969).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] Szpiglasowa Przełęcz pass, alt. 2107 m, N aspect, slope 90°, on mylonite, *Flakus 974* (KRAM-L).

Pertusaria oculata (Dicks.) Th.Fr.

In the Polish Tatra Mts the species is known from only two stations in the West Tatra Mts: Smreczyński Wierch Mt., W slope, in subalpine belt, on *Parmelia omphalodes* (Motyka 1924a); Dolina Jarząbcza valley below NW slope Jarząbczy Wierch Mt., alt. 1600 m, on saxicolous mosses (Tobolewski 1959).

SPECIMENS EXAMINED. HIGH TATRA MTS: [Ge–60] Szpiglasowa Przełęcz pass, alt. 2110 m, NE aspect, slope 5°, on calcareous soil and mosses in mylonite crack, *Flakus 528,1* (KRAM-L); [Ge–60] Ciemnosmreczyńska Przełączka pass, 2115 m, N aspect, slope 0°, on calcareous soil and mosses, mylonite area, *Flakus 1820* (KRAM-L).

Pertusaria schaereri Hafellner

In the Polish Tatra Mts the species is known from only one station: Skrajna Turnia Mt., alt. 1890 m, N aspect, on granite (Alstrup & Olech 1990).

SPECIMENS EXAMINED. HIGH TATRA MTS: [Ge–60] Rysy Mt., alt. 2499 m, SW aspect, slope 90°, on granite, *Flakus 1408* (KRAM-L); [Ge–60] Ciemnosmreczyńska Przełączka pass, alt. 2115 m, N aspect, slope 90°, on mylonite, *Flakus 1831* (KRAM-L).

Placynthium pannariellum (Nyl.) H. Magn.

This species is extremely rare. In the Polish Tatra Mts it was known from only one station so far: Kocioł Morskiego Oka cirque, between Morskie Oko lake and Czarny Staw lake, on siliceous rock in splash zone of stream (Nowak & Tobolewski 1975).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] Rysy Mt., alt. 2140 m, N aspect, slope 80°, on siliceous rock in stream, *Flakus 1305* (KRAM-L). Associated with *Aspicilia aquatica*.

Pleopsidium chlorophanum (Wahlenb.) Zopf

From the Polish Tatra Mts the species was reported for the first time by J. Motyka (1927). In a later published work, however, the author mentioned that its presence in the Tatra Mts requires confirmation (Motyka 1964). In this paper the taxon is confirmed to occur in the study area based on a contemporary collection.

SPECIMENS EXAMINED. HIGH TATRA MTS: [Ge–60] Pośredni Mięguszowiecki Szczyt Mt. (SE ridge), alt. 2360 m, N aspect, on overhanging granite, *Flakus 1179* (KRAM-L); [Ge–60] Mnich Mt., alt. 2000 m, NE aspect, slope 100°, on overhanging granite, *Flakus 1296* (KRAM-L); [Ge–60] Rysy Mt. (N ridge), alt. 2400 m, NE aspect, slope 100°, on overhanging granite, *Flakus 1430* (KRAM-L); [Ge–60] Rysy Mt., alt. 2350 m, NW aspect, slope 110°, on overhanging granite, *Flakus 1437* (KRAM-L).

Polyblastia cruenta (Körb.) P. James & Swinscow

The species is known from the Polish Tatra Mts (Nowak & Tobolewski 1975; Alstrup & Olech 1992b), but the authors do not mentioned stations (specimens not seen).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] Szeroki Żleb gully, by trail at Szpiglasowa Przełęcz pass, alt. 1510 m, on granite stone in stream, *Flakus 754* (KRAM-L).

Polyblastia terrestris Th. Fr.

In the Polish Tatra Mts the lichen is known from these stations: Szpiglasowa Przełęcz pass, alt. 2110 m, on soil of mylonite area (Tobolewski 1959); rocks between Małołączniak Mt. and Wielka Świstówka dale, by trail, alt. 1750 m, on thin soil in calcareous rock crack (Olech 1977); rock blocks below Kopa Kondracka Mt., alt. 1490 m, on soil in rock crack (Olech 1983); Rzędy slope below Ciemniak Mt., alt. 1810 m, on plant debris and mosses (Olech 1985); Małołączniak Mt., alt. 1900 m, on plant debris and mosses (Olech 1985).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] Ciemnosmreczyńska Przełączka pass, alt. 2115 m, NW aspect, on calcareous soil and mylonite rubble among *Solorina bispora*, *Flakus 1807,1* (KRAM-L).

Porina sudetica (Körb.) Lettau

In the Polish Tatra Mts the species is known from below Ciemniak Mt., on mosses (Motyka 1924a), and

below Kominiarski Wierch Mt. (Kominy Tylkowe Mt.), on mosses in rock cracks (Motyka 1927).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] Ciemnosmreczyńska Przełączka pass, alt. 2115 m, N slope, on terricolous mosses, on rock ledge in moist place, mylonite area, *Flakus 1754* (KRAM-L).

Protoblastenia siebenhaariana (Körb.) J. Steiner

The species is known from the Polish Tatra Mts (Alstrup & Olech 1992b), but the authors do not mention stations (specimen not seen).

SPECIMENS EXAMINED. HIGH TATRA MTS: [Ge–60] Szpiglasowa Przełęcz pass, alt. 2107 m, N aspect, slope 90°, on mylonite wall *Flakus 965* (KRAM-L); [Ge–60] Przełączka pod Zadnim Mnichem pass, alt. 2135 m, N aspect, on mylonite, *Flakus 1916* (KRAM-L).

Protothelenella sphinctrinoides (Nyl.) H. Mayrhofer & Poelt

In Polish Tatra Mts the lichen is known from one station: Przełęcz Zawrat pass, alt. 2010 m, on dead mosses and liverworts on soil among granite rocks (Nowak 1974a).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] Cubryna Mt., alt. 2375 m, N slope, on mosses in moist place, granite area, *Flakus 2073* (KRAM-L).

Pseudosagedia chlorotica (Ach.) Hafellner & Kalb

In the Polish Tatra Mts the species is known from one station: Wielki Piarg scree, by Morskie Oko lake, alt. 1525 m, N aspect, on granite rock (Alstrup & Olech 1992a).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] Szpiglasowa Przełęcz pass, alt. 2110 m, NE slope, on mylonite stone in moist place, *Flakus 500* (KRAM-L).

Ramalina farinacea (L.) Ach.

In the Polish Tatra Mts the species is known from one station: by mountain shelter on Hala Ornak glade, upper part of Dolina Kościeliska valley, corticolous on *Picea abies* (Motyka 1924a).

SPECIMENS EXAMINED. WEST TATRA MTS: [Gd–59] Dolina Kościeliska valley by Brama Kantaka gate near Potok Kościeliski stream, on *Picea abies*, 06 July 1955, *leg. J. Nowak* (KRAM-L 8279); [Gd–59] Polana Stare Kościeliska glade, lower part of Dolina Kościeliska valley, alt. 960 m, corticolous on trunk of older *Tilia* sp., *Flakus 194* (KRAM-L); associated with *Anaptychia ciliaris*, *Ramalina pollinaria* and *Bacidia rubella.*

Rhexophiale rhexoblephara (Nyl.) Hellb.

In the Polish Tatra Mts. the species is known from two stations: Rysy Mt. and Mięguszowiecka Przełęcz pod Chłopkiem pass, on dead mosses among siliceous rocks, in subnival belt (Nowak & Tobolewski 1975).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] Szpiglasowa Przełecz pass, alt. 2110 m, NE aspect, slope 30°, on calcareous soil among mosses, mylonite area, *Flakus 518* (KRAM-L).

Rhizocarpon polycarpum (Hepp) Th. Fr.

In the Polish Tatra Mts the species is known from Żółta Turnia Mt., on granite (Motyka 1924a); Kościelec Mt., alt. 1650 m, W aspect, slope 90°, on granite block (Motyka 1926); Kotlina Morskiego Oka dale, alt. 1450 m, on SW bank of Morskie Oko lake, on granite above stream (Tobolewski 1969).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] Dwoisty Żleb gully below Żabia Czuba Mt., alt. 1500 m, W slope, on granite block in moist place, *Flakus 81* (KRAM-L).

Sagiolechia protuberans (Ach.) A. Massal.

In the Polish Tatra Mts the species is known from the West Tatra Mts: Gładkie Jaworzyńskie slope (below Jaworzyńska Przełęcz pass), on limestone boulders (Motyka 1927); Kalacka Turnia Mt., alt. 1400 m, (Nowak 1961); Dolina Białego valley by stream, alt. 940 m, on limestone (Nowak 1974a); Kalacka Turnia Mt. above Hala Kalatówki glade, alt. 1350 m, on vertical limestone (Nowak 1974a); Polana Kopieniec glade above Cyrhla, alt. 1210 m, on limestone rocks (Nowak 1974a). One station is reported in the High Tatra Mts, from Mała Koszysta Mt., alt. 1560 m, in gully above Polana Waksmundzka glade, on limestone rocks (Nowak 1974a).

SPECIMENS EXAMINED. WEST TATRA MTS: [Gd–59] Dolina Chochołowska valley, alt. 1000 m, S aspect, on vertical limestone rocks, 11 October 1987, *leg.*

J. Nowak (KRAM-L 22177); [Ge–50] Dolina Suchej Wody Gąsienicowej valley, alt. 1330 m, on limestone boulder, *Flakus 136* (KRAM-L); associated with *Gyalecta jenensis*.

Trapelia involuta (Taylor) Hertel

In the Polish Tatra Mts the species is known from these stations: Wyżnia Dudowa Rówień glade, alt. 1170 m, pioneer on pebbles along path (Alstrup & Olech 1990); Dolina Suchej Wody valley, alt. 1150 m, on small silicate stones along road (Alstrup & Olech 1990); Skupniów Upłaz Mt., alt. 1480 m (Alstrup & Olech 1990).

SPECIMENS EXAMINED. HIGH TATRA MTS: [Ge–60] Hińczowa Przełęcz pass, alt. 2323 m, W slope, on mylonite stone in moist place, *Flakus 1146* (KRAM-L); [Ge–60] Ciemnosmreczyńska Przełączka pass, alt. 2110 m, NW aspect, slope 60°, on small mylonite stone in moist place, *Flakus 1852,1* (KRAM-L).

Umbilicaria aprina Nyl.

In the Polish Tatra Mts the species is known on vertical granite from these sites: Orla Baszta Mt. near Granaty Mt., alt. 2140 m (Krzewicka & Osyczka 2002; Krzewicka 2004a); Pośredni Mięguszowiecki Szczyt Mt., alt. 2390 m (Krzewicka & Osyczka 2002; Krzewicka 2004a); Przełęcz pod Chłopkiem pass, S slope, alt. 2320 m (Krzewicka & Osyczka 2002; Krzewicka 2004a).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] Rysy Mt., alt. 2499 m, NNE aspect, slope 90°, on granite wall, *Flakus 1321* (KRAM-L).

Umbilicaria cinereorufescens (Schaer.) Frey

This species is rare in the Polish Tatra Mts. It is known from scattered localities in the High Tatra Mts on siliceous rock: Mały Kościelec Mt., alt. 1760 m, N slope; near Czarny Staw Gąsienicowy lake; Żółta Turnia Mt., NW slope, SW slope and alt. 1770 m, W slope; Kozi Wierch Mt., alt. 2291 m; Dolina Buczynowa valley, alt. 1770 m; Dolina Pusta valley, alt. 1920 m; Szpiglasowe Kopki Mt., alt. 1920 m; Kotelnica Mt., alt. 1800 m, E slope; Mnich Mt., alt. 1780 m, NE slope; Wrota Chałubińskiego pass, alt. 1550 m (Krzewicka 2004a).

SPECIMEN EXAMINED. HIGH TATRA MTS: [Ge–60] Rysy Mt., alt. 2499 m, NNE aspect, slope 90°, on granite wall, *Flakus 1317* (KRAM-L).

Umbilicaria decussata (Vill.) Zahlbr.

This species is fairly rare in the Polish Tatra Mts. It is known from scattered localities in the High Tatra Mts on siliceous rock: Mały Kościelec Mt., near Dwoisty Staw lake, alt. 1690 m; Żółta Turnia Mt.; Orla Baszta Mt., alt. 2140 m; Cubryna Mt., N slope; Kotelnica Mt., alt. 1800 m, E slope; Szpiglasowa Przełęcz pass, alt. 1920 m; Szpiglasowy Wierch Mt., alt. 2170 m; Kazalnica Mt., alt. 2040 m; Przełęcz pod Chłopkiem pass, alt. 2320 m, S slope; Mięguszowiecki Szczyt Mt.; Żabi Niżni Szczyt Mt., alt. 2180 m, W slope; Żabi Szczyt Mt. (Krzewicka 2004a).

SPECIMENS EXAMINED. HIGH TATRA MTS: [Ge–60] Niżnie Rysy Mt., alt. 2430 m, on granite block, *Flakus 463* (KRAM-L); [Ge–60] Czarny Mięguszowiecki Szczyt Mt., alt. 2409 m, W aspect, slope 90°, on granite wall, *Flakus 785* (KRAM-L); [Ge–60] Pośredni Mięguszowiecki Szczyt Mt. (SE ridge), alt. 2360 m, E aspect, slope 90°, on granite wall, *Flakus 1218* (KRAM-L).

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