THE ‘VERRUCARIA FUSCELLA GROUP’ IN POLAND
WITH SOME NOMENCLATORIAL REMARKS

BEATA KRZEWICKA

Laboratory of Lichenology, W. Szafer Institute of Botany
Polish Academy of Sciences
Lubicz 46, 31-512 Kraków, Poland
e-mail: b.krzewicka@botany.pl

(Received: March 2, 2009. Accepted: June 29, 2009)

ABSTRACT

The Verrucaria fuscella group in Poland is revised. Two species, Placopyrenium fuscellum and Verrucaria polyisticta, are confirmed for Poland, and Placopyrenium canellum is reported for the first time. Dermatocarpon subfuscellum var. serpentinii Servit is synonymized with P. fuscellum and V. fuscella f. subpruinosa Servit is synonymized with V. polyisticta.

KEY WORDS: Placopyrenium canellum, P. fuscellum, Verrucaria polyisticta, Poland, synonymization.

INTRODUCTION

The species of the V. fuscella group are characterized by a well-developed superficial thallus divided into small and separate areoles angular in outline, with distinct black sides and the upper surface marked by dark lines. They have at least a partially dark brown pigmented medulla. Perithecia are without an involucrum and are completely immersed in the thallus. Some species initially grow on thalli of members of the V. nigrescens group and on some species of the genus Aspicilia, later becoming independent and occurring mainly on calcareous rocks in sunny places or rarely on siliceous rocks in moist habitats (Orange 2009).

In a recent revision of the V. fuscella group in Great Britain and Ireland (Orange 2004), three species are accepted: V. canella (with its synonyms V. aspiciliicola R. Sant. and V. aspiciliae Zehetl.), V. fuscella (syn. V. glebulosa Nyl.) and V. polyisticta (with synonyms V. fuscella var. nigricans Nyl., V. nigricans, and V. subfuscella). However, recent molecular phylogenetic analyses and morphological studies have shown that it is necessary to revise the present morphology-based generic delineation of the lichen family Verucariaceae in order to account for evolutionary relatedness between species (Gueidan et al. 2007, 2009; Navarro-Rosinés et al. 2007). According to Navarro-Rosinés et al. (2007) molecular phylogenetic analyses have shown that two species from V. fuscella group, such as V. canella and V. fuscella belong to Placopyrenium (Breuss 2009), whereas V. polyisticta is nested in the Endocarpon group and is recognized as ‘Verrucaria’ polyisticta (Gueidan et al. 2007, 2009).

In Poland members of the V. fuscella group have been reported as species of the genera Verrucaria, Lithoioceae and Dermatocarpon. The first historical data on the species from Poland were published by Körber (1855), who reported V. fuscella (Turner) Winch as a frequent species in Silesia. In his lichen monograph of Silesia, Stein (1879) listed the typical Lithoioceae fuscella Turner together with the form glauicina Ach. No new records were added until 1927 when Motyka reported V. glauicina in the Tatra Mts (Motyka 1927).

The interest in the group in Central Europe intensified in this period. Zschack (1934) discussed as many as nine species: V. acrotelioiides A. Massal., V. altacea Wallr., V. canella Nyl., V. controversa A. Massal., V. fuscella, V. glauicina, V. nigricans (Nyl.) Zschacke, V. polyisticta Borrer and V. subfuscella Nyl. According to Servit, some of the species reported by Zschacke in fact belong to Dermatocarpon. He therefore changed their status and proposed new combinations, for example D. subfuscellum (Servit 1936), D. glaucinum (Servit 1952) and D. subpruinum (Servit 1946), for the form V. fuscella f. subpruinosa Servit (Servit 1936). However, at present the name V. glauicina (syn. D. glaucinum) is excluded from the V. fuscella group by Fröberg (1989) because the type material of V. glauicina in UPS and H-ACH was recognized as V. caerulea DC. As found in this study, some the specimens published under the name V. glauicina in Europe belong to the V. fuscella group.

The contemporary history of the species from V. fuscella group in Poland is quite complicated. Members of the group have often been confused and either oppositely named or incorrectly determined as V. glauicina. In their mono-
graph of lichens. Porosty Polskie, Nowak and Tobolewski (1975) correctly differentiated the taxa referred to as *V. fuscella* and *V. polyistica*. However, the authors used unspecific key characters for the taxa and misplaced figures showing both species (figure 19b named *V. fuscella* belongs to *V. polyistica*, while figure 33 named *Dermatocarpon subfuscellum* shows *P. fuscullum*). Additionally, the name *V. nigricans* was included as a synonym of *V. fuscella* in regional and national checklists following Wirth (1995) (Bielczyk 2003; Faltynowicz 2003). Faltynowicz (2003) mistakenly named the species *V. polyistica* as a synonym of *V. caerulea* in the Polish checklist of lichens. The synonymization was most likely unintended as may be concluded based on the synonyms quoted by the author.

A taxonomic revision of the species from *V. fuscella* group in Poland is urgently needed for the above reasons. Two species, *Placopyrenium fuscellum* and *Verrucaria polyistica*, are confirmed for Poland in this study, while one, *Placopyrenium canellum*, is reported for the first time.

**MATERIAL AND METHODS**

The study is based on the material from Polish herbaria (GPN, KRAM, KRAP, KTC, POZ, WRSL). The original collections as well as other reference specimens from KRAM, NMW, PRM were also studied. The material was examined using standard microscopic techniques. Thallus anatomy was investigated using handmade sections mounted in water. All measurements were made in water.

The distribution of species in Poland is discussed and mapped using exclusively documented data; other data are not considered in this paper. The ATPOL system was used to code the data on the maps using Gnomon 3.3.

**RESULTS AND DISCUSSION**

*Placopyrenium canellum* (Nyl.) Gueidan & Cl. Roux


Prothallus absent or indistinct, black. Thallus superficial, well developed, 260–600 μm thick, cracked, areoles separated by deep cracks, angular in outline, plane or slightly concave, pale grey to brownish, pruinose, 120–800(–1100) μm diam. Upper surface subdivided by dark lines. Margin thin, initially not broken into discrete areas, but very early divided by cracks. Medulla colourless to densely pigmented, often occupying half of thallus thickness. Algal layer continuous to dissected by brown pigmented medulla parts, algae up to 5–7 μm diam., arranged in well-defined columns. Perithecia 1-3(-5) per mature areole, immersed, ostiole visible as a small depression. Involucrellum absent. Exciele 150–280 μm wide, colourless to brown below. Ascii 8-spored. Ascospores colourless, simple, narrowly oblong-ellipsoid, (18–)20–23(–28) x 6.7(–10) μm, periapical present, sometimes difficult to distinguish from ascosporic wall. Conidiomata not detected in material examined.

Note. The species is distinguished from *P. fuscellum* and *V. polyistica* by the larger ascospores (20–23 x 6.7 μm) and the presence of a perispore. Young thalli of *P. canellum* are additionally parasitic on *Aspicilia sp*. *Placopyrenium canellum* may have spores growing up to 32 μm according to Zschacke (1934), Zschacke also distinguished this species by a whitish medulla using this feature as a key character. Orange (2004) observed a range of pigmentation, from colourless to densely pigmented, in *P. canellum* in Great Britain. A similar range was observed in the material from Poland.

**REMARKS.** Although *P. canellum* was described from Wales more than one hundred years ago as *V. canella* (Nylander 1883), the taxon was for a long time ignored and neglected by lichenologists. Only Zschacke (1934) mentioned the species as occurring in N. Wales and N. England in a monograph of Verrucarioideae from Central Europe. According to Orange (2004), the taxon was re-described by Zehetleitner (1978) from Croatia as *V. aspicilae Zehetl.*., a parasitic species on *Aspicilia calcarea* occurring in the eastern part of the European Mediterranean Basin and in England. Subsequently the name *V. aspicilae* was synonymised with *V. canella* (Orange 2004).

**ECOLOGY AND DISTRIBUTION.** In Poland *V. canella* was found on *Aspicilia calcarea* growing on unshaded calcareous in mountainous regions in Gorce Mts and Pieniny Mts (Fig. 1). This is the first report of the species from Poland. It has been reported in Europe from scattered localities in the Mediterranean Basin as well as in France, Hungary, Sweden, England and Wales (Zehetleitner1978; Orange 2004).

Specimens examined: Poland: EG-22 – Gorce Mts, Ochotnica Dolna Borysiówka village, S slope of the Twarogów hill, 520 m, 5 Aug. 1999, E. Czarnota (GPN 2255) as *V. fuscellum*; EG-33 – Pieniny Mts, Wąwóz Sobczanński, on calcareous rocks 680 m, 1 Sept. 1981, J. Pyrek & Z. Toborowicz (KTC) as *V. subfuscella*.

Additional specimens examined. France: Côte d’Or, Fleurey-sur-Ouche, 01.1959, ? (KRAM-L 18567); Great Britain: Wales: V.C. 49, Caerarvonshire, Great Ormes Head, 23/7.8, 1927, D. A. Jones (NMW 44.64.1352).

*Placopyrenium fuscellum* (Turner) Gueidan & Cl. Roux


Prothallus absent or indistinct. Thallus superficial, well developed, 250-800 μm thick, cracked, young areoles angular elongate, 100-200 x 300-600, mature areoles separated by deep cracks, angular in outline, (300-)500-1000 x 700-1000(-2000) μm diam. Upper surface of mature areoles divided into smaller angular units by dark lines, pruinose. Medulla densely pigmented. Algal layer dissected by brown pigmented medulla parts, algae up to 7-10 μm diam., arranged in well-defined columns; photosynthetic units with perithecia often 3-4 times thicker than units without perithecia. Perithecia 0.2-0.3 mm, a few present in the same photosynthetic unit; ostiole appearing at thallus surface as brownish spot 20-50(-80) μm wide. Involutrulum absent. Exciple colourless to dilute brown below, 150-290 μm wide, immersed in photosynthetic units, occasionally flanked by dark pigmented medulla. Asci 8-spored. Ascospores colourless, simple, oblong-ellipsoid 12-15 x 5.5-7.0 μm, perispore absent. Conidiomata not detected in material examined.

Note. *Placopyrenium fuscellum* differs from *V. polysticta* in angular, elongate areoles with the upper surface usually sparsely marked by dark lines, perithecia not flanked by dark medulla arising in the photosynthetic units with ostioles appearing at the thallus surface as spots up to 20-50(-80) μm wide. It differs from *P. canellum* in smaller ascospores without a perispore.

REMARKS. Servit (1936) distinguished *Dermatocarpon subfuscellum* var. *serpentinii* by areoles uniformly pruinose and distinctly black-bordered but it is treated here as a synonym of *P. fuscellum*. The type collection of the variety (PRM 858284) has a well-developed thallus, up to 250-800 μm thick and cracked with areoles separated by deep cracks and angular in outline. Areoles are marked by dark lines in outline and on the upper surface. Exciples of perithecia are colourless except ostioles appearing at the thallus surface as brownish to blackish spots. Ascospores are without a perispore and are 12-15 x 5.5-7.0 μm. Morphological and analytical analyses show that the taxon is conspecific with *P. fuscellum*.

ECOLOGY AND DISTRIBUTION IN POLAND. This species occurs on exposed, sunny natural calcareous rocks. Young individuals of the species are parasitic on thalli of *V. nigrescens* while mature ones become independent. Recorded from the Sudety Mts (Pogórze Izerskie Foithills and Góry Kazczawskie Mts) and the Carpathian Mts (Beskid Średni Mts, Gorce Mts, Pieniny Mts, Beskid Ślądecki Mts Beskid Niski Mts and Bieszczady Mts) in the south. It was also found in the Góry Świętokrzyskie Mts, the Wyżyna Wieluńska Upland and the Wyżyna Krakowsko-Częstochowska Upland in central Poland (Fig. 2).

In Poland, the name *V. fuscella* has been reported in many publications (see Faltynowicz 2003). Some records of *P. fuscellum* are confirmed for the following: Sudety Mts (Kossowska 2008), Jura Krakowsko-Częstochowska Upland (Nowak 1961), Pieniny Mts (Kisza 1997, 2001) and Bieszczady Mts (Glanc and Tobolewski 1960) [see specimens examined]. However, some other records represent *V. polysticta* [see under the species]. The species distribution presented here on a map (Fig. 2) is discussed exclusively on documented data.

Verrucaria polysticta Borrer


Prothallus present, blackish, non-fimbriate. Primary areoles arising on prothallus. Thallus superficial, well developed, 280-700(-1000) mm thick, cracked, areoles separated by deep cracks, mature areoles 300-1100 diam., multigular in outline, plane or slightly concave. Upper surface grey or light brown to brown, pruinose or not, usually marked by dark lines. Medulla densely pigmented, often occupying half or more of thallus thickness (50)-100-200 mm. Algal layer dissected by brown pigmented parts of medulla, algae up to 7-10 mm diam., arranged in well-defined columns. Perithecia immersed, 1-6(-9) per areole, arising between the photosynthetic units, rarely within one of the units; ostiole appearing at thallus surface as brownish to black, slightly concave disc 100-260 mm wide. Involuticulum absent. Exciple dark brown, usually flanked by dark medulla, 150-290 mm wide. Ascii 8-spored. Ascospores colourless, simple, oblong-ellipsoid or ellipsoid, 12-15 × 5.5-7.0 mm, perispore absent. Conidiomata not detected in material examined.

NOTE. The species is distinguished from P. canellum by smaller ascospores without perispores. It differs from P. fuscellum in multi-angular areoles with the upper surface usually richly marked by dark lines, perithecia flanked by dark medulla, mostly arising between photosynthetic units, ostioles appearing at the thallus surface as disc-shaped up to 100-260 mm wide.

REMARKS. Servit (1936) distinguished V. fuscella f. subpruinosa by the ash-grey to whitish, +/- pruinose upper surface of the thallus. The description in the protologue was rather vague and emphasized misleading characters. The type collection of the form subpruinosa (PRM 645359) is characterised by a well-developed thallus growing up to 500-700 mm, with the upper surface marked by dark lines, and mature areoles having 3-4 perithecia flanked by dark medulla with ostioles appearing at the thallus surface as brownish to blackish discs 100-150 mm wide and by ascospores 12-15 × 5.5-7.0 mm. Both V. fuscella f. subpruinosa and V. polysticta are characterized by the same features. Therefore the name Verrucaria fuscella f. subpruinosa is proposed here to be synonymized with V. polysticta.

Some recent checklists (e.g. Vezda and Liska 1999, Faltynowicz 2003) have used the name V. subpruinosa Servit, but this apparently not validated published.

ECOLOGY AND DISTRIBUTION IN POLAND. This species grows on calcareous rocks in sunny places. In Poland V. polysticta occurs in areas with large natural limestone outcrops, i.e. in the Wyżyna Krakowsko-Częstochowska Upland, the Pieniny Mts and the Western Tatra Mts. It grows at scattered localities on calcareous sandstones in the Bieszczady Mts and Beskidy Zachodnie Mts within the Polish Carpathians. It was recorded in the Góry Świętokrzyskie Mts outside the Carpathians (Fig 3). Verrucaria polysticta has been published in Poland mainly under the name V. fuscella and V. nigricans or mistaken as V. fuscella (see Tobolewski 1965; Faltynowicz 2003), and the occurrence of the species is confirmed here for the following regions: Jura Krakowsko-Częstochowska Upland (Nowak 1961), Gorze Mts (Czarnota 2000), Pieniny Mts (Kiszka 1997, 2001). However, it is worth noting that V. polysticta has also been mistaken with P. fuscellum.

**ACKNOWLEDGMENTS**

I am grateful to Dr. hab. Lucyna Śliwa (Kraków) for her valuable advice, to Dr. Joanna Kazik (Łódź) for her useful remarks on the manuscript and help with the English. Thanks are also due to the curators of the lichen herbaria NMW, PRM and GPN, LBL, LOD, KRAM, KRAP, KTC, OLC, POZ and WRSL for their help.

**LITERATURE CITED**


KÖRBER G.W. 1855. Systema Lichenum Germaniae. Die Fliechten Deutschlands mikroskopisch geprüft, kritisch gesichtet,
characteristisch beschrieben und systematisch geordnet. Verlag von Trewendt & Granier, Breslau, pp. 460.


