

***Cladonia metacorallifera*, a lichen species new to the Eastern Carpathians**

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A rare lichen *Cladonia metacorallifera* was found in the Bieszczady Mts. and this is the first report of the species from the Eastern Carpathians. In Poland, its occurrence is probably limited to small populations scattered in high mountain situations. The data of distribution of the species in Poland, ecological characterization of the new locality and some taxonomical remarks concerning the recorded specimen, as well as a photograph of its habit are provided.

Key words: lichens, section *Cocciferae*, distribution, ecology, Bieszczady Mts.

INTRODUCTION

Cladonia metacorallifera Asahina is a fruticose, cup-shaped and red-fruited member of the section *Cocciferae* (Delise) A. Evans (Fig. 1). The huge variability of the morphology of the species in this group causes many problems in their taxonomy and identification (e.g., Stenroos 1989a; Osyczka 2009). Generally, the podetia of *C. metacorallifera* are throughout densely covered by squamules, microsquamules and/or cortical granules, and furthermore decorticated parts are often blackened, especially towards the tips of podetia. The thallus contains usnic, didymic and squamatic (or thamnolic) acids and this chemical feature is diagnostically important because it differentiates the species from morphologically similar cup-shaped *Cladonia* from the section (e.g., *C. coccifera* (L.) Willd., *C. diversa* Asperges and *C. borealis* S. Stenroos). The significant morphological and chemical differences between *C. metacorallifera* and other scyphose lichens with red apothecia are discussed in several papers (e.g., Stenroos 1989b; see also Kowalewska, Kukwa 2004; Osyczka et al. 2006).

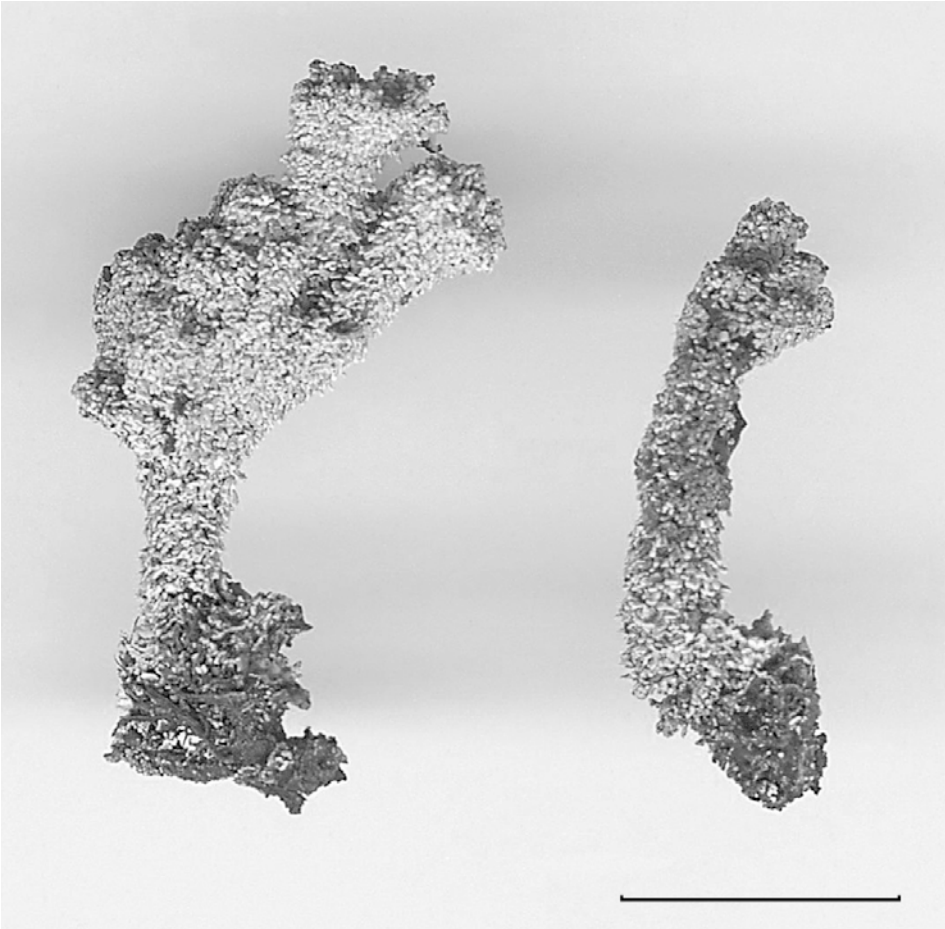


Fig. 1. Specimen of *Cladonia metacorallifera* from the Bieszczady Mts. (leg. J. Kiszka, R. Koscielniak, 13 July 2005, KRAP-L). Scale bar = 1 cm.

The Bieszczady Mts. are an important centre of lichen biodiversity in Poland (e.g., Czyżewska 2003; Kościelniak 2007, 2008). The intensive lichenological field research in this region carried out in the last decade still provides new information about the occurrence and distribution of lichens in Poland and the Carpathians. During a critical revision of lichen materials belonging to *Cladonia coccifera* s.l. deposited in Herbarium KRAP-L, one specimen from the Bieszczady National Park turned out to be *Cladonia metacorallifera*. This is the first report on the taxon in this mountain range, as well as in the whole area of the Eastern Carpathians.

MATERIAL AND METHODS

The revision of *Cladonia coccifera* s.l. specimens housed in KRAP-L (Pedagogical University of Kraków) was done using standard microscopic techniques supported by chemical analysis. Lichen substances were determined by TLC in solvent A and C (acc. to Orange et al. 2001). Metter-Toledo SevenEasy pH meter was employed for substratum pH determination. The analysis was made by suspending substrate matter in pure water. All known Polish localities of *Cladonia metacorallifera* are mapped according to the ATPOL grid square system (Zając 1978; modified by Cieśliński, Fałtynowicz 1993). The grid square 1 × 1 km was used for showing the precise locality in the Bieszczady National Park.

RESULTS AND DISCUSSION

Cladonia metacorallifera Asahina, J. Jap. Bot. 15: 612 (1939).

It is a new component of the epigeic biota of mountain pasture lichens in the Bieszczady Mts. (Fig. 2). It was recorded only on W slope of Rozsypaniec massif,

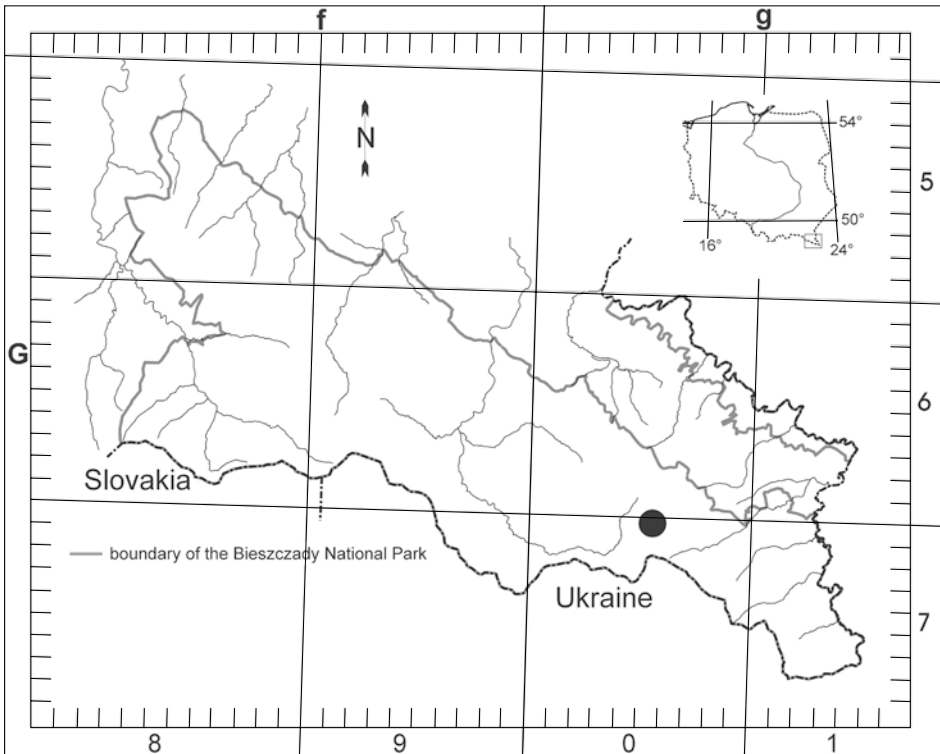


Fig. 2. Locality of *Cladonia metacorallifera* in the Bieszczady Mts.

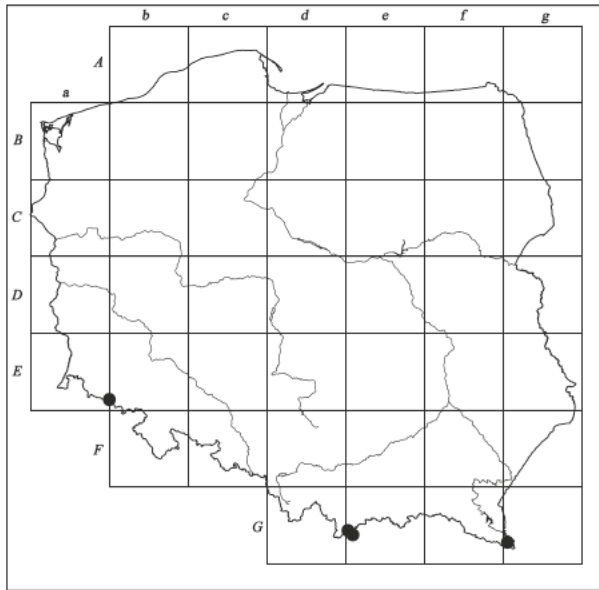


Fig. 3. General distribution of *Cladonia metacorallifera* in Poland.

rocky rubble above upper forest border, exposition SW, alt. 1153 m, 49°03'46.4"N, 22°45'52.0"E [Gg 7005].

The specimen grew on humus between mosses in an open and sunny area. The pH level 4.65 of substrate matter was determined and such substrate can be qualified as strongly acidic. *C. metacorallifera* was associated with other *Cladonia* species (e.g., *C. fimbriata* (L.) Fr., *C. gracilis* (L.) Willd., *C. rangiferina* (L.) Weber ex F. H. Wigg., *C. squamosa* Hoffm., *C. coniocraea* (Flörke) Spreng., *C. coccifera* (L.) Willd., *C. glauca* Flörke, *C. pleurota* (Flörke) Schaer.) and also *Cetraria islandica* (L.) Ach., *Lempholemma chalazanum* (Ach.) de Lesd., *Placynthiella oligotropha* (J. R. Laundon) Coppins & P. James and *Trapeliopsis granulosa* (Hoffm.) Lumbsch.

The specimen from the Bieszczady Mts. is modified by severe climate factors occurring on the locality (for example: long period of snow cover, strong wind, low temperature). It is squat and augmentative with swollen scyphi at the end of the podetia. Podetial surface is densely covered by squamules and microsquamules (Fig. 1). Such morphological modifications are frequently observed among *Cladonia* specimens growing in high mountains and polar regions (cf. Osyczka 2004; Osyczka 2006; Osyczka et al. 2007).

Cladonia metacorallifera was described by Asahina (1939) from Japan and at present it is also known from several countries in Europe, North and South America (see Osyczka et al. 2006 and literature cited therein). Generally, the species appears in the boreal and temperate zones, especially in high mountain and alpine belts (e.g. Wirth 1995). In the Carpathians the species has been found in the Tatra Mts. in Poland and Slovakia (Pišút 1997; Kowalewska, Kukwa 2004; Osyczka et al. 2006). It has not been noted in the Eastern Carpathians so far, and here the locality in the Polish part of the Bieszczady Mts. is added (Figs 2, 3). Polish records of *C. metacorallifera*

also include one situation in the Karkonosze Mts. (Kowalewska, Kukwa 2004 – Fig. 3). A taxonomical revision of *Cladonia coccifera* s.l. deposited in Polish herbaria did not provide any further *C. metacorallifera* localities. It seems that in Poland the lichen is a rare species and its occurrence is limited to small populations scattered in the highest mountainous areas along the southern country border.

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Cladonia metacorallifera, nowy porost dla Karpat Wschodnich

Streszczenie

Cladonia metacorallifera Asahina jest kieliszkowato zakończonym porostem należącym do sekcji *Cocciferae* (Delise) A. Evans. Duża zmienność morfologiczna taksonów z tej sekcji wciąż stwarza problemy taksonomiczne i utrudnia prawidłową identyfikację gatunków (por. Stenroos 1989a; Osyczka 2009). Cechą charakterystyczną *C. metacorallifera* są liczne łuseczki na ogół gęsto rozmieszczone na całej długości podecjów oraz czerniejące fragmenty plechy widoczne w miejscach pozbawionych kory i łuseczek. *Cladonia metacorallifera* wytwarza kwas usninowy, didymowy oraz skwamatowy (lub tamnoliowy). Ta właściwość chemiczna jest ważną cechą diagnostyczną gatunku. Istotne cechy taksonomiczne odróżniające *C. metacorallifera* od morfologicznie podobnych taksonów z sekcji *Cocciferae* (np. *C. coccifera* (L.) Willd., *C. diversa* Asperges lub *C. borealis* S. Stenroos) zawarte zostały w kilku publikacjach (np. Stenroos 1989b; zobacz również: Kowalewska, Kukwa 2004; Osyczka et al. 2006).

W Polsce po raz pierwszy *C. metacorallifera* znaleziono na jednym stanowisku w masywie Śnieżki w Karkonoszach (Kowalewska, Kukwa 2004), następnie podano go z dwóch stanowisk w polskiej części Tatr Wysokich (Osyczka et al. 2006). W wyniku rewizji materiałów zielnikowych porostów należących do *C. coccifera* s.l., zdeponowanych w zielniku lichenologicznym Uniwersytetu Pedagogicznego w Krakowie (KRAP-L), stwierdzono występowanie *C. metacorallifera* również w polskiej części Bieszczadów. Jest to pierwsze doniesienie o występowaniu tego gatunku w Karpatach Wschodnich.

Nowe stanowisko *C. metacorallifera* znajduje się w granicach Bieszczadzkiego Parku Narodowego, na zachodnim zboczu masywu Rozsypańca, na wysokości 1153 m n.p.m., ponad górną granicą lasu, w obrębie rumoszu skalnego. Stanowisko to charakteryzuje się wysokim nasłonecznieniem i ekspozycją południowo-zachodnią. Porost ten rósł wśród mchu na humusie (pH = 4.65).

Występowanie *C. metacorallifera* w Polsce prawdopodobnie ograniczone jest do niewielkich populacji rozproszonych w obszarach wysokogórskich wzdłuż południowej granicy kraju.