UMBILICARIA APRINA NYL.
– A NEW LICHEN SPECIES FROM CENTRAL EUROPE

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(Received: September 19, 2001. Accepted: March 22, 2002)

ABSTRACT

During field studies carried out in the Tatra Mountains (Western Carpathians, Poland) three localities of *Umbilicaria aprina* Nyl. were found. This is the first note about this taxon in Central Europe.

KEY WORDS: lichen, *Umbilicaria aprina* Nyl., Carpathians, Tatra Mts.

INTRODUCTION

In 1999/2000 during field studies dealing with the *Umbilicaria* Hoffm. genus, carried out in the Tatra Mountains (Western Carpathians), some new interesting specimens of lichen were found. A detailed examination of the collected material has revealed that this is *Umbilicaria aprina* Nyl. This species has not been recorded in the Tatra Mountains in Poland (Alstrup & Olech 1992) and in Slovakia (Lisická 1980; Pišut et al. 1996) so far. The lichens grow on the almost vertical, smooth surfaces of the south and south-west facing rocks. On all these locations this species appears on the sunlit, large granite blocks, in places where the snow cover does not last long. This taxon was found only in the highest, alpine and subnival belt of the mountains. It is possible that *U. aprina* appears more frequently in the Tatra Mts. and whole Europe than it was hitherto presumed.

MATERIAL AND METHODS

The collections of *Umbilicaria aprina* from the Tatra Mts. consist of seven specimens. This material was compared to specimens from Naturhistorisches Museum Wien (W) and with the Antarctic collection in Herbarium of Jagiellonian University (KRA-L).

The material was examined and photographed in a Jeol JSM 5410 scanning electron microscope, mostly at 20 kV. Scanning electron microscopy was used to study the shape, size, conidium surface ornamentation and distribution of thalloconidia.

The samples were analysed by the standardised thin-layer chromatography method (Culbertson 1972; Culbertson et al.

1981) using three solvent systems A, B and C and control lanes of atranorin and norstictic acid. The solvent diethyl-ether : acetic acid (100:1) was also used. Lichen substances was extracted in acetone employing Soxhlet system.

RESULTS AND DISCUSSION

Five specimens of *Umbilicaria aprina* were collected from the Orla Baszta Mt. at the altitude of 2140 m., 20°02'09" E, 49°13'40" N, another one on the hillside Pośredni Mięguszowiecki Mt. at the altitude 2370 m., 20°03'57" E, 49°11'02" N and the last one on the hillside of the Chłopek pass at the altitude 2320 m., 20°04'00" E, 49°11'03" N (Fig. 1).

The specimens of *Umbilicaria aprina* had a foliose, thick, leathery, monophyllous thallus, except one, which was polyphyllous, up to 1 (1.5) cm diam. The upper side pale to medium brown, dull, pruinose or sometimes covered with a thick necrotic layer, only softly wrinkled in the central part and paler above the umbo, fading to the margins, margins flexuose (Fig. 2).

Medulla white. Lower surface sooty black or mottled, smooth, rhizinomorphs absent around the umbilicus (Fig. 3). Rhizinomorphs simple to sparingly branched, occasionally fasciculate, cylindrical to strap-like, pale grey to ivory white, sometimes with base blackened by thalloconidia, mostly lighter than the lower surface of the thallus.

Thalloconidia (5.7) – 7.6 – (9.4) × (7.4) – 8.8 – (10.2) µm, mainly single-celled, rarely 1-septate, brown to dark brown in black patches on the lower cortex (Figs 4, 5). Thalloconidia cover the lower side nearly completely, except the marginal zone and the rhizinomorphs. Occasionally thalloconidia

Fig. 1. Localities of *Umbilicaria aprina* Nyl. in the Tatra Mts.

Fig. 2. Upper surface of specimen *Umbilicaria aprina* Nyl. from the Tatra Mts. Size of thallus 1 cm.

Fig. 3. Lower surface of specimen *Umbilicaria aprina* Nyl. from the Tatra Mts. Size of thallus 1 cm.

Fig. 4. Lower surface of specimen *Umbilicaria aprina* Nyl. with $\pm$ spherical, single thalloconidium. Scale 5 µm.

Fig. 5. Lower surface of specimen *Umbilicaria aprina* with thalloconidia. Scale 10 µm.

cover the basal part of rhizinomorphs. Soredia and isidia absent. Apothecia were not observed in the Tatra Mts. material.

Chemical reactions: medula K-, C+ (red), KC+ (red), PD- (contain products characteristic of *Umbilicaria*): gyro-

TABLE 1. Main differences between *Umbilicaria aprina*, *U. crustulosa* and *U. vellea*.

	<i>U. aprina</i>	<i>U. crustulosa</i>	<i>U. vellea</i>
Apothecia	Absent	Usually present	Absent
Thallus, upper surface	Pale to medium brown colour	Pale brown or grey-beige colour	Pale brown or grey-beige colour
Thallus, lower surface	Black or pale brown colour with black patches	Pale brown colour	Black colour
Rhizinomorphs	Pale grey to white, simple, cylindrical, rare dichotomic branched	Numerous, cylindrical and irregular branched	Long, brown, simple, cylindrical and black, short ball-tipped
Thalloconidia	Non-septate, rare 1-, 2-septate, 8.8 × 7.6 µm, covered lower surface of thallus	Absent	Multi-septate, 31.4 × 21.6 µm, covered lower surface of thallus and short rhizinae

phoric acid and lecanoric acid; the same products are published by Hestmark (1991).

It seems that so far this species was not found in the Tatra Mountains because of its small thallus and its similarity to other taxa of this genus. In this region *U. aprina* thallus is very like to juvenile *Umbilicaria vellea* (L.) Ach. thallus (Table 1). In both taxa the upper surface of the thallus is of grey-beige colour, irregular cracks, whereas the lower surface is of black colour with many threaded rhizinomorphs. *U. vellea* may have rhizinomorphs with or without thalloconidia. Rhizinomorphs without thalloconidia are of bright brown colour, which is similar to *U. aprina* rhizinomorphs' colour. However, the detailed analysis excluded the possibility of confusing these taxa. The lower surface of *U. vellea* is verrucose, covered by many multi-cells thalloconidia (Hestmark 1990), which also occur on the rhizinomorphs. On the other hand, the lower surface of *U. aprina* is smooth and covered by single-cells thalloconidia (Hestmark 1990), which can appear only on lower part of rhizinomorphs. Both taxa exist in slightly different habitats. *U. aprina* in the Tatra Mountains prefers sunlit places and almost vertical smooth rocky blocks. *U. vellea* prefers slightly shaded places with water seepage. During field study this taxon can be mistaken for *Umbilicaria crustulosa* (Ach.) Frey because they grow in the same habitats and have a similar upper side of the thallus (Table 1).

Considering the species variability within its geographical range – specimens from the Tatra Mts. are smaller and have a less wrinkled upper surface in comparison, for example, with materials from the Antarctic, Norway and Afghanistan. At present only several localities of *U. aprina* are known in Europe. It is possible that this taxon appears more frequently in the Tatra Mountains and in the whole Europe than it was hitherto presumed. This species was recorded in the Western Alps (Hasenhüttl and Poelt 1978) and in the Ötztaler Alps (Nimis 1993; Codogno 1995). It was not recorded in the Italian Alps (Nimis 1993), but the author suggests that it can be expected in this region. This taxon was also recorded in Scandinavia (Santesson 1993). *U. aprina* is widely spread in the Arctic (Ryvarden 1968; Santesson 1993; Elvebakk and Hertel 1996) and Antarctic regions (Filson 1975, 1987; Olech 1989; Kappen 2000; Øvstedal and Lewis Smith 2001) and in some higher mountains of the world, for example: Peruvian Andes (Crespo and Sancho 1982), Kilimanjaro and Semien Mts. in the East Africa (Krog and Swinscow 1986) and also on Canary Islands (Tavares 1952 after Hafellner 1995).

ACKNOWLEDGEMENTS

We are grateful to Mrs E. Lisicka for fruitful discussions. We would like to thank Mr L.G. Sancho for confirmation of specimen *U. aprina*. We are indebted to the directors and curators of the following herbaria: Naturhistorisches Museum Wien and Herbarium of Jagiellonian University in Cracov.

LITERATURE CITED

ALSTRUP V., OLECH M. 1992. Checklist of the lichens of the Tatra National Park, Poland. Zesz. Nauk. UJ Prac. Bot. 24: 185-206.

CODOGNO M. 1995. The problem of geographic disjunctions in the *Umbilicariaceae* (lichens). Nova Hedwigia 60 (3-4): 479-486.

CRESPO A., SANCHO L.G. 1982. *Umbilicaria aprina* Nyl. en el Hemisferico Sur (Andes peruano). Lazaroa 4: 357-360.

CULBERSON C.F. 1972. Improved conditions and new data for the thin layer chromatographic method. Journal of Chromatography 92: 113-125.

CULBERSON C.F., CULBERSON W.L., JOHNSON A. 1981. A standardised TLC analysis of β -orcinol depsidones. The Bryologist 84: 16-29.

ELVEBAKK A., HERTEL H. 1996. Part 6. *Lichens*. In: Elvebakk A. & Prestrud P. (eds): 271-359. A catalogue of Svalbard plants, fungi, algae and cynobacteria. Norsk Polarinstitut Skrifter 198.

FILSON R.B. 1975. Studies in Antarctic lichens 4: Notes on *Umbilicaria aprina* Nyl. Muelleria 3 (2): 130-140.

FILSON R.B. 1987. Studies in Antarctic lichens 6: further notes on *Umbilicaria*. Muelleria 6 (5): 335-347.

HAFELLNER J. 1995. A new checklist of lichens and lichenicolous fungi of insular Laurimacaronesia including a lichenological bibliography for the area. Fritschiana 5: 1-132.

HASENHÜTTL G., POELT J. 1978. Über die Brutkörner bei der Flechtengattung *Umbilicaria*. Ber. Deutsch. Bot. Ges. Bd. 91: 275-296.

HESTMARK G. 1990. Thalloconidia in the genus *Umbilicaria*. Nordic Journal of Botany 9 (5): 547-574.

HESTMARK G. 1991. Telemorph-anamorph relationships in *Umbilicaria* I. Making the connections. Lichenologist 23 (4):343-359.

KAPPEN L. 2000. Some aspects of the great success of lichens in Antarctica. Antarctica Science 12 (3): 314-324.

KROG H., SWINSCOW T.D.V. 1986. The lichen genera *Lasallia* and *Umbilicaria* in East Africa. Nordic Journal of Botany 6 (1): 75-85.

LISICKÁ E. 1980. Flechtenfamilie *Umbilicariaceae* Fee in der Tschechoslowakei. Biologické práce 26 (4): 1-254.

- NIMIS P.L. 1993. The Lichens of Italy. An annotated catalogue. Museo Regionale di Scienze Naturali, Monografie 12: 714-722.
- OLECH M. 1989. Preliminary botanical studies at Bunge Oasis, East Antarctica. Polish polar Research 10 (4): 605-609.
- ØVSTEDAL D.O., LEWIS SMITH R.I. 2001. Lichenes of Antarctica and South Georgia. A Guide to the Identification and Ecology. Cambridge. University Press. pp. 411.
- PIŠUT I., LACKOVIČOVA A., LISICKÁ E. 1996. A second checklist and bibliography of Slovak lichens. Biologia, Bratislava, 51/ Suppl. 3: 1-79.
- RYVARDEN L. 1968. *Umbilicaria aprina* Nyl., a rare lichen. The Bryologist 71 (4): 366-368.
- SANTESSON R. 1993. The lichens and lichenicolous fungi of Sweden and Norway. Lund: SBT.

UMBILICARIA APRINA NYL.

– NOWY GATUNEK POROSTU DLA ŚRODKOWEJ EUROPY

STRESZCZENIE

Podczas prac terenowych 1999/2000 odnaleziono nowy dla flory Tatr gatunek porostu *Umbilicaria aprina* Nyl. Stanowiska tego gatunku znajdują się na Orlej Perci i zboczach Pośredniego Mięguszowieckiego Szczytu. Jest to pierwsze doniesienie o występowaniu tego taksonu w Tatrach jak również w Karpatach i Europie Środkowej. Dotychczas gatunek notowany był głównie z Arktyki i Antarktyki. Porost ten charakteryzuje się jednolistkową plechą dorastającą do 2 (3) cm średnicy. Górna strona plechy jest barwy jasno beżowej, w centralnej części pomarszczona i spękana. Dolna strona plechy z licznymi, jasnymi, nitkowatymi chwytnikami, gładka, barwy czarnej, pokryta tallokonidiami. W terenie prawdopodobnie porost ten był pomijany w wyniku podobieństwa górnej strony plechy *U. aprina* i *U. crustulosa* (Ach.) Frey, występujących w podobnych siedliskach. Może być również mylony z młodymi okazami *U. vellea* (L.) Ach.

SŁOWA KLUCZOWE: porosty, *Umbilicaria aprina* Nyl., Karpaty, Tatry.