

Three overlooked *Cladonia* species in Slovakia

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Abstract: New findings of three overlooked species *Cladonia glauca*, *C. ramulosa* and *C. scabriuscula* (lichenized fungi) in Borská nížina lowland (SW Slovakia) are recorded. Their up till now known localities in Slovakia are presented and discussed. Their new localities and historical context are described in more details. The first species was considered as extinct (Ex), the second species was rare and the last species was not published in the literature from Slovakia yet.

Keywords: lichens, phytogeography, Borská nížina lowland (SW Slovakia).

Introduction

The research has been carried out by A. Dingová on the Aeolian sand in Borská nížina lowland from 2006 to 2009. Within the research realized in the secondary pine forest within the alliance *Dicrano-Pinion* (Libbert 1933) Matuszkiewicz 1962 (DRAŽIL 2002) were found many phytogeographically interesting and overlooked lichen species. New findings of three overlooked species *Cladonia glauca*, *C. ramulosa* and *C. scabriuscula* were recorded there.

I. Pišút revised all mentioned specimens and recorded their present distribution in Slovakia.

Material and methods

The specimens from Borská nížina lowland are preserved in the collection of the Institute of Botany, Slovak Academy of Sciences, Bratislava (SAV). Abbreviations of furthers quoted herbaria are according HOLMGREN et al. (1990). For macrochemical reactions was used 10% solution of KOH (K) and a solution

consisted of 1g paraphenyldiamine, 10g Na₂SO₃ and 1 ml detergent in 100 ml (P). All specimens of *C. glauca* were microchemically tested on squamatic acid (extraction by acetone, crystallisation in glycerin-acetic acid). Geographical coordinates were taken with GPS – WGS 84.

Results and discussion

Cladonia glauca Flörke

Basal squamules are small or elongated (1-3(5) mm), grey or brownish green above, white below. Podetia 10-80 mm tall, grey or greyish green, simple or ± branched, with pointed apices or rarely with small perforated cups. Cortex ± developed, granular soredia occur especially in upper part, small or larger squamules usually present. Macrochemical reactions negative, squamatic acid present. Podetia in UV light ashy grey or brownish, soredia white (Pišút 1958).

C. glauca is an boreal lichen, southwards reaching down to Central Europe, with an exclave to Patagonia in South America (TRASS 1978), occurring on acid sandy soils, peat bogs, decayed trunks, on mosses. In Slovakia it avoids calciferous substrata, and is lacking also in tertiary eruptive areas.

Specimens examined

Borská nížina lowland:

Lakšárská Nová Ves village, close to the National Nature Reserve Zelenka, on sandy soil in secondary pine forest (*Dicrano-Pinion*), alt. 219 m; N 48° 35' 39.4'', E 17° 09' 18.0''.

Husárske rybníky fish ponds, close to the Lakšárská Nová Ves village, on humus sandy soil between other mosses and lichens in secondary pine forest (*Dicrano-Pinion*), alt. 220 m; N 48° 33' 38.1'', E 17° 09' 46.0''.

Šajdíkové Humence village, on humus sandy soil between other mosses and lichens in secondary pine forest (*Dicrano-Pinion*), alt. 208 m; N 48° 39' 0.2'', E 17° 15' 19.0''.

Between Borský Mikuláš and Šaštín Stráže villages, on sandy soil among mosses in secondary pine forest (*Dicrano-Pinion*), alt. 200 m; N 48° 37' 38.0'', E 17° 11' 31.2''.

Borský Peter village, on mossy sandy ground in secondary pine forest (*Dicrano-Pinion*), alt. 195 m; N 48° 39' 09.4'', E 17° 15' 13.4''.

Between the Malacky town and Studienka village, ca. 4 km SW from Studienka, on sandy soil among mosses and lichens in secondary pine forest (*Dicrano-Pinion*), alt. 195 m; N 48° 39' 09.4''; E 17° 15' 13.4''.

Záhorie village, artillery preparative shooting range in military area Kotlina, on sandy soil, alt. 220 m; N 48° 38' 11.0'', E 17° 19' 22.6''.

So - far known occurrence in Slovakia:

Oravská kotlina basin: Suchá Hora village, Bor, alt. 760 m coll. Suza (PRC); ibid. coll. Suza (Sandst. Clad. exs. 1706), (PRM, PRC, BRNU); ibid., among heats in peat bog, ca 750 m, leg. Pišút 1955 (BRA).

Note: *C. glauca* was up till now known only from peat bog at Suchá Hora village. According PIŠŮT (1962) all other herbarium specimens determined as *C. glauca*, contained homosekikaic (= nemoxynic acid) and represented *Cladonia rei* (syn. *C. nemoxyna*). Because the last finding at Suchá Hora originate from the year 1955, this species was considered as extinct (Ex) in Red lists (PIŠŮT et al. 2001).

***Cladonia ramulosa* (With.) J. R. Laundon**

Basal squamules are small (1-2, most 3 mm) incised or lobed, grey or greyish green above, white below, often soresiate. Podetia 5-50 mm tall, grey, greyish green, sometime almost whitish, simple or ± branched, pointed or with narrow cups, corticate, ± areolate, often with small squamules, in the upper part often decorticate and ± with granular soresia. Macrochemical reactions: K - or K + yellowish or yellow, P + red. Contains fumarprotocetraric acid, podetia in UV light ochre or brownish (PIŠŮT 1958).

C. ramulosa is a widespread but uncommon temperate species (BRODO et al. 2001). NIMIS (1993) considered an oceanic-suboceanic range of this variable lichen in Europe, extending to the Southern Hemisphere.

It occurs on humus soil, rotting tree stumps, on peat bogs and heathy places.

Specimens examined

Borská nížina lowland:

Šajdíkové Humence village, on humus sandy soil among mosses in secondary pine forest (*Dicrano-Pinion*), alt. 208 m; N 48° 38' 54.5'', E 17° 14' 40.3''.

Borský Peter village, on mossy sandy ground in secondary pine forest (*Dicrano-Pinion*), 195 m; N 48° 39' 09.4'', E 17° 15' 13.4''.

Husárske rybníky fish ponds close to the Lakšárská Nová Ves village, on humus sandy soil among other mosses and lichens in secondary pine forest (*Dicrano-Pinion*), 220 m; N 48° 35' 16.0'', E 17° 10' 57.7''.

So - far known occurrence in Slovakia:

Prešov town in HAZSLINSZKY (1884) as *C. pityrea*; Hornádska kotlina basin: Spišské Vlachy village coll. Kalchbrenner according HAZSLINSZKY (1884) as *C. pityrea*. - Veľká Fatra Mts: Rakytov, Teplá dolina valley on rotting trunks, alt. 700-800 m coll. Suza 1930 as *C. fimbriata* f. *truncata* (PRC). Bukovské vrchy Mts: Šípková Mt, the ridge, *Fagus sylvatica* alt. 1000 m leg. Pišút 1992, SAV (PIŠŮT et al. 2007).

Very rare species in Slovakia and probably overlooked. In herbaria only 2 specimens, are preserved, one originated from the year 1930 the second from 1992. Therefore it is lacking in Red lists.

Note: In Mergl's collection (BRA) is preserved one specimen labeled as "*C. pityrea* Eperjes" (= Prešov) without the collector's name, but in fact it was *C. cariosa*.

***Cladonia scabriuscula* (Delise) Nyl.**

Basal squamules are usually small, disappearing. Podetia 30-100 mm tall, branched, with pointed apices, grey, greyish, usually corticate at the base, scabrid, with scattered squamules at the base, soredia- like microsquamules and scattered granular soredia. in the upper part. Macrochemical reactions: K-, P + orange or red. Contains fumarprotocetraric acid and small amount of ursolic acid. Podetia in UV light ashy grey to brown PIŠÚT (1958).

According Nimis (1993) *C. scabriuscula* had a clearly western distribution in Europe. According to NIMIS & MARTELOS (2008) is *C. scabriuscula* in Italy a mainly temperate, widespread but rare lichen, found on soil and among mosses in humid-sheltered situations, such as open woodlands. WIRTH (1995) considered areal of this rare species in Europe as boreal-central-european-subatlantic. It is a rare woodland species growing on sandy, sandy-clay soils on mossy rocks and on margins of roads.

Specimens examined:

Borská nížina lowland:

Šajdíkové Humence village, on humus sandy soil among mosses in secondary pine forest (*Dicrano-Pinion*), alt. 208 m; N 48° 38' 54.5'', E 17° 14' 40.3''.

Lakšárská Nová Ves village, close to the National Nature Reserve Zelenka, on humus sandy soil among mosses and lichens in secondary pine forest (*Dicrano-Pinion*), alt. 219 m; N 48° 35' 10.4'', E 17° 10' 23.9''.

So - far known occurrence in Slovakia:

Levočské vrchy Mts: Levoča, Gehol, coll. Greschik 1913 as *C. furcata* a *pinnata* f. *foliosa* (SLO) (PIŠÚT 1958). - Štiavnické vrchy Mts: Banská Štiavnica, Mt. Sytiencie coll. A. Kmeť 1882 as *C. pyxidata* v. *symphicarpia* != *C. scabriuscula* + *C. fimbriata* 1959 rev. Pišút (BRA). - Malé Karpaty Mts: forest above Lošonec village, *Quercus* sp. coll. Lackovičová 1971 (BRA).

Note: Although this species was covered in checklists from Slovakia (PIŠÚT et al. 1996, PIŠÚT et al. 2001, BIELCZYK et al. 2004) in fact it was mentioned only in a manuscript (PIŠÚT 1958).

Conclusions

Three overlooked species *Cladonia glauca*, *C. ramulosa* and *C. scabriuscula* were discussed. *Cladonia glauca* so far one historical locality was known, was considered as extinct (Ex) in literature. In 2009, seven new localities in Borská nížina lowland were found.

Cladonia ramulosa is a rare species so far known only from two finding places in Slovakia. In 2009, three new localities in Borská nížina lowland were found.

Cladonia scabriuscula was not up to present time published from Slovakia. In 2009 two new localities were found.

Almost all species were found in open old pine plantations established to perform protective function on sandy soils. These habitats are considerably influenced by forest management and many of them have changed their nature or completely disappeared in the last years. Those species should be therefore included within the National Red List of Lichens with categories of protection (*C. glauca* - CR, *C. ramulosa* - VU, *C. scabriuscula* - EN).

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References

- BIELCZYK U., LACKOVIČOVÁ A., FARKAS E. E., LÖKÖS L., LIŠKA J., BREUSS O. & KONDRITYUK S. Y. (2004): Checklist of lichens of the Western Carpathians. W. Szafer Inst. of Botany, Polish Academy of Sciences, Kraków. 181 pp.
- BRODO I. M., SHARNOFF S. D. & SHARNOFF S. (2001): Lichens of North America. Ed. Yale University Press, New Haven and London, 796 pp.
- DRAŽIL T. (2002): Ls6 Suchomilné borovicové a borovicové zmiešané lesy, p. 103. – In: STANOVÁ V. & VALACHOVIČ M. (eds.), Katalóg biotopov Slovenska, DAPHNE – Inštitút aplikovanej ekológie, Bratislava.
- HAZSLINSZKY F. (1884): A Magyar birodalom zuzmó-flórája. Kir. Magyar Term. Társ. Évk. Budapest, 304 pp.
- HOLMGREN P.K., HOLMGREN N. H. & BARNETT L. C. (1990): Index herbariorum Part I: The Herbaria of the World Eight Edition. New York Bot. Garden, 693 pp.
- NIMIS P. L. (1993): The lichens of Italy. An annotated catalogue. Museo regionale di scienze naturali Torino, 897 pp.
- NIMIS P. L. & MARTELLI S. (2008): *ITALIC* – The Information System on Italian Lichens. Version 4.0. University of Trieste, Dept. Of Biology, IN4.0/1 (<http://dbiodbs.univ.trieste.it/>).
- PIŠÚT I. (1958): Lišajníky rodu *Cladonia* na Slovensku. Dipl. práca. Katedra botaniky PFUK Praha, 261 pp. Mnsr.
- PIŠÚT I. (1962): Bemerkungen über einige interessante Arten der Flechtengattung *Cladonia* in der Slowakei. – Acta F. R. N. Univ. Comen. **7 (6-7)**: p. 423-434.
- PIŠÚT I., LACKOVIČOVÁ A. & LISICKÁ E. (1996): A Second Checklist and Bibliography of Slovak Lichens. – *Biologia* **51 (3)**: p. 1-79.
- PIŠÚT I., GUTTOVÁ A., LACKOVIČOVÁ A. & LISICKÁ E. (2001): Červený zoznam lišajníkov Slovenska (december 2001). – *Ochrana prírody* **20**: p. 23-30.
- PIŠÚT I., LACKOVIČOVÁ A. GUTTOVÁ A. & PALICE Z. (2007): New lichen records from Bukovské vrchy Mts (NE Slovakia). – *Acta Mycologica* **42 (2)**: 267-280.

TRASS H. H. (1978): Sem. Cladoniaceae, pp 7-79. – In: GOLUBKOVA N. S., SAVIČ V. P. & TRASS H. H. (eds.), *opredelitel' lišajnikov SSSR., Vyp. 5 Kladonievyye – Akarosporovyje*, Ed. Nauka, Leningrad.

WIRTH V. (1995): *Flechtenflora*. Verlag Eugen Ulmer, Stuttgart, 661 pp.

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