

## *Anthracoidea michelii* and *Thecaphora affinis* in Slovakia

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Two smut species (*Ustilaginales*) rare or new for Slovakia were detected in the mountains of Považský Inovec: *Anthracoidea michelii* Vánky on *Carex michelii* Host and *Thecaphora affinis* Schneider ex Fischer von Waldheim on *Astragalus glycyphyllos* L. The morphology of the fungi and a short characteristic of the locations of their occurrence are described in the paper.

**Key words:** *Anthracoidea michelii*, *Thecaphora affinis*, characteristic, Slovakia, Považský Inovec Mts., smut fungi.

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V pohorí Považský Inovec boli zistené dva pre Slovensko zriedkavé, prípadne nové druhy snetí (*Ustilaginales*): *Anthracoidea michelii* Vánky na *Carex michelii* Host a *Thecaphora affinis* Schneider ex Fischer von Waldheim na *Astragalus glycyphyllos* L. U oboch druhov je opísaná morfológia huby a stručná charakteristika lokalít ich výskytu.

### INTRODUCTION

During the study of phytopathogenous micromycetes of Slovakia oriented predominantly at distribution, host plants range and ecophysiology of the fungus *Tilletia controversa* Kühn (Paulech and Paulech 1995), the occurrence of some smut species (*Ustilaginales*) was established in the mountains of Považský Inovec. Two of these species were found to be rare or unknown to Slovakia: *Anthracoidea michelii* on sedges (*Carex michelii* Host) and *Thecaphora affinis* on wild liquorice (*Astragalus glycyphyllos* L.). A mycofloristic study of the investigated territory was made, including a geobotanical survey.

### MATERIAL AND METHODS

The mentioned smut species (*Ustilaginales*) were detected by field investigation of the central and south part of Považský Inovec Mts., which according to the present phytogeographic division of the Slovakian territory (Futák 1966) belongs to

the Praecarpaticum and to the West-Carpathian flora = Carpathicum occidentale, by study of literature and herbarium items from the Slovakian territory (herbarium BRA and SAV, Bratislava, TANAP, Tatranská Lomnica – Slovak Republic; BRNM, Brno, PRC and PRM, Prague – Czech Republic; W, Wien – Austria) and Vánky Ust. = exsiccata Vánky K. Ustilaginales (partly deposited in BRA). The identification of individual smut species was carried out according to Vánky (Vánky 1985, 1991). Biometric data of fungus spores were obtained from measuring of 25–100 spore files. Microphotography was realized with a Czechoslovak scanning electron microscope (Tesla BS 301). The nomenclature of higher vascular plants is according to Ehrendorfer (1973). On individual locations of the mentioned smut species a geobotanical investigation was carried out, relevies were made and the soil type was determined.

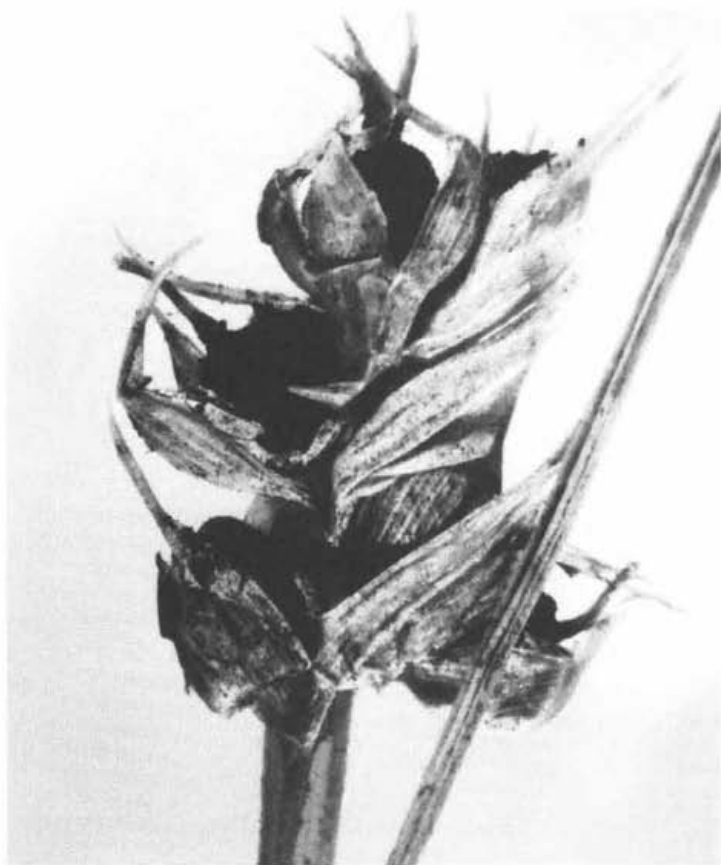


Fig. 1. Spike of *Carex michelii* infected by *Anthracoidea michelii*, detail.

## RESULTS AND DISCUSSION

*Anthracoidea michelii* Vánky, Bot. Not. 132: 223, 1979

Sori in ovaries of the sedge (*Carex michelii*), forming small, round, hard, black bodies consisting of spores (Fig. 1). Spores variable in form, irregularly shaped, moderately flattened, in face-view  $13-19 \times 15-26 \mu\text{m}$ , in side-view  $10-13 \mu\text{m}$  broad, usually conspicuously angular, rounded and sometimes at the end prolonged and narrowed. Spore wall  $1-3$  ( $-5$ )  $\mu\text{m}$  thick, usually thicker at angles and protuberances. Surface verrucose, covered with distinct warts (Fig. 2). Spore colour brown to dark reddish-brown.

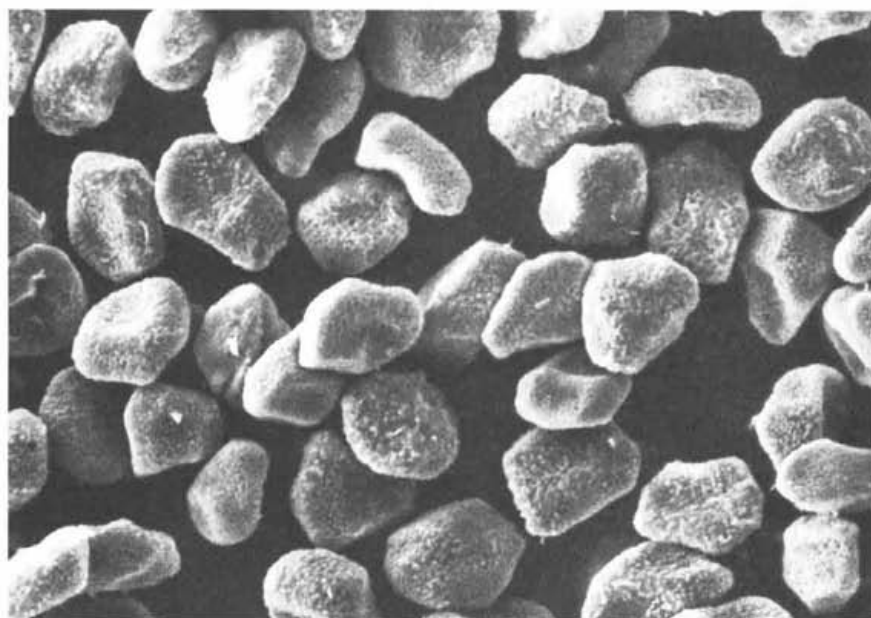


Fig. 2. Spores of *Anthracoidea michelii* on *Carex michelii* in SEM, magnif. 1000  $\times$ .

The occurrence of *Anthracoidea michelii* was detected in the east part of the cadastral territory of Modrová village, district of Trenčín, Považský Inovec Mts. (part Tematínske kopce – Tematín hills), western Slovakia. This location is situated on a sunny south-western slope ( $25-30^\circ$ ) in a xerothermic forest (*Quercion pubescentis - petraeae*), above a gamekeeper's cottage at Modrová village in an altitude of 370 m a. s. l., on rendzina soil on dolomite. It is situated only

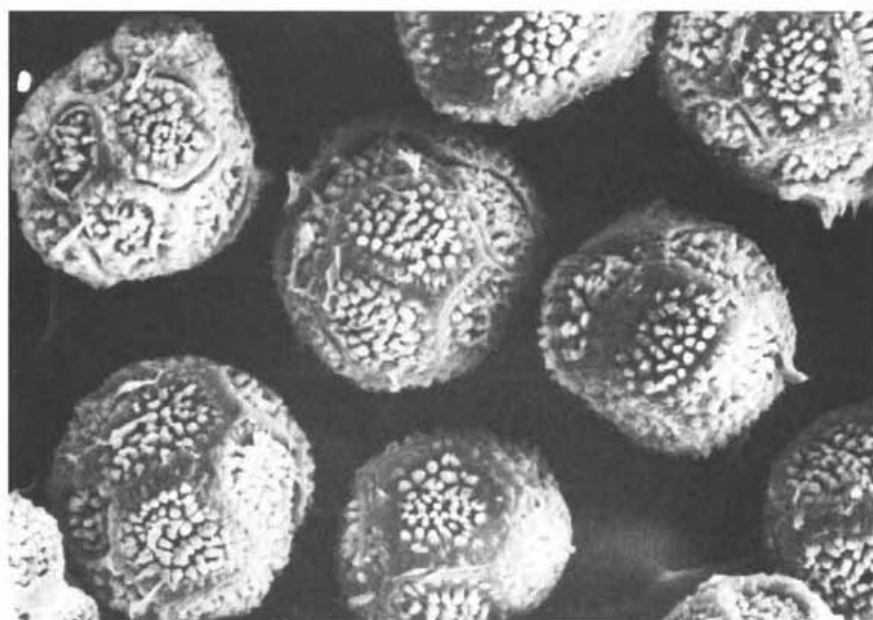


Fig. 3. Spore balls and spores of *Thecaphora affinis* on *Astragalus glycyphyllos* in SEM, magnif. 1000 ×.

a few meters above a forest road, closely after its turn to the east. The fungus *Anthracoidea michelii* was detected there on 11th June, 1993. It was confirmed at this location in the following years, too.

The first herbarium item of *Anthracoidea michelii* from our territory was collected by Vánky (Vánky Ust. No. 554) in the year 1986 (29th May) near the town of Hlohovec. The species spectrum of the genus *Anthracoidea* Bref. on our territory has mainly been studied by Součková (Tomková). In her papers she ranged them under the genus name *Cintractia* Cornu (Součková 1952, 1953, 1954, 1955; Součková-Tomková 1960; Tomková 1962). A report on the occurrence of species of this genus as well as data on the occurrence of numerous other species of phytopathogenous micromycetes in Slovakia was given also by Hruby (1932). In this and last century several other mycologists collected species of the genus *Anthracoidea* on the territory of today's Slovakia as well (E. Hazslinszky, A. Kmet', J. A. Bäumlér, R. Picbauer, I. Györfy, G. Szépligeti, K. Vánky). According to the present knowledge the occurrence of 10 *Anthracoidea* species was established in the area of Slovakia. The real number of species is probably higher. This can be



Fig. 4 Pods of *Astragalus glycyphyllos* infected by *Thecaphora affinis*, detail.

presumed from the rich occurrence of host plants of this genus in the Slovakian flora and from the fact that insufficient attention has been paid to mycological investigation of our territory up to now. Vánky (1985) has described more than 30 species of this genus in his monograph of the Carpathian *Ustilaginales*.

*Thecaphora affinis* Schneider ex Fischer von Waldheim, *Appecu systématique des Ustilaginées*, 37, 1877

*T. affinis* was detected in seeds of wild liquorice (*Astragalus glycyphyllos* L.). All seeds of the infected plants were destroyed and transformed into a reddish-brown, granular-powdery mass of spore balls composed of usually 4–13 moderately firmly connected spores. The shape of the spore balls was globose, ovoid or

sometimes slightly irregular, (22–) 28–46 × (25–) 32–56 (–62)  $\mu\text{m}$  large (Fig. 3). The colour ranged from yellowish-brown to reddish-brown. The individual spores were rounded, subcuneiform or irregularly polyhedral, 13–21  $\mu\text{m}$  long, smooth on surfaces with mutual contact, on free surfaces verrucose with distinct warts. The pods of the infected plants were moderately deformed, usually shorter and thicker (as if swollen) than healthy ones. The degree of deformation depended on the ontogenetic stage of the infected plants (Fig. 4).

The occurrence of *T. affinis* was established in the north part of the cadastral territory of Stará Lehota village, district of Trenčín, on 16th October, 1993. This location is situated on the edge of the forest road to Bezovec (hill) at an altitude of 350 m a. s. l. The growth on the location consisted mainly of species of fringe communities of the order *Origanetalia* and *Prunetalia* on brown rendzina soil on dolomite. The occurrence of *T. affinis* on *Astragalus glycyphyllos* at this location was detected also in the following years.

The occurrence of this species had earlier not been established on the area of Slovakia. At total of 35 species parasitizing on different host plants from 15 families were described in the genus *Thecaphora*. Four of them occur on Carpathian territory (Vánky 1985). A previous study by Vánky (1991) dealing with *Thecaphora* species parasitizing on *Leguminosae*, revealed 11 species parasitizing on this group of plants.

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#### REFERENCES

- EHRENDORFER T. (1973): List der Gefäßpflanzen Mitteleuropas. Gustav Fischer Verl. Stuttgart, 318 pp.
- FISCHER VON WALDHEIM A. (1877): Aperçu systématique des Ustilagineés, leurs plants nourricières et la localisation de leurs spores. – Paris, Lahre. 51 pp.
- FUTÁK J. (1966): Fytogeografické členenie Slovenska. – In: DOSTÁL J., FUTÁK J. and NOVÁK A. (eds.) Flóra Slovenska I. Vyd. SAV Veda, Bratislava, pp. 532–538.
- HRUBY J. (1932): Beitrag zur Pilzflora der West-Karpathen. – Folia Cryptog. 1: 1073–1106.
- PAULECH P. and PAULECH C. (1995): Distribution and ecophysiological characteristic of the fungus *Tilletia controversa* Kühn in Slovakia. – Czech Mycol. 48: 207–216.
- SOUČKOVÁ M. (1952): Příspěvek k poznání rží a snětí v Československu. II. – Čas. Morav. Mus. v Brně 37: 88–107.
- SOUČKOVÁ M. (1953): Příspěvek k poznání rží a snětí v Československu. III. – Čas. Morav. Mus. v Brně 38: 139–159.
- SOUČKOVÁ M. (1954): Příspěvek k poznání rží a snětí v Československu. IV. – Čas. Morav. Mus. v Brně 39: 93–117.

- SOUČKOVÁ M. (1955): Příspěvek k poznání rzi a snětí v Československu. V. – Čas. Morav. Mus. v Brně 40: 108–113.
- SOUČKOVÁ–TOMKOVÁ M. (1960): K poznání snětí rodu *Cintractia* Cornu na ostřicích v Československu. – Čas. Morav. Mus. v Brně 45: 137–164.
- TOMKOVÁ M. (1962): Rzi a snětí nové pro Československo. – Čas. Morav. Mus. v Brně 47: 65–68.
- VÁNKY K. (1979): Species concept in Anthracoidea (Ustilaginales) and some new species. – Bot. Not. 132: 221–231.
- VÁNKY K. (1985): Carpathian Ustilaginales. – Acta Univ. Ups. Symb. Bot. Upsal. 24:2, Uppsala, 309 pp.
- VÁNKY K. (1991): Thecaphora (Ustilaginales) on Leguminosae. – Trans. Mycol. Soc. Japan 32: 145–159.