

## *Thecaphora pakistanica* sp. nov. (*Ustilaginomycetes*) on *Androsace* (*Primulaceae*)

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**Abstract.** A third *Thecaphora* species on *Androsace*, *T. pakistanica* on *A. rotundifolia* is described from Pakistan.

**Key words:** *Androsace*, new species, smut fungi, *Thecaphora*, *T. pakistanica*

### Introduction

The genus *Thecaphora* Fingerh. (*Ustilaginales*) is characterised by sori in various parts of dicotyledonous host plants filled with masses of spore balls of yellowish to dark reddish brown colour. Spore balls composed of few to many, loosely or firmly agglutinated spores. No sterile cells are present between the spore balls. Spores subpolyhedrally irregular, often wedge-shaped. Spore wall thin, smooth or nearly so on the contact sides, thick and ornamented on the free side (comp. also Vánky 2002: 148-149). There are 53 species of *Thecaphora* known on 15 host plant families: *Amaranthaceae* (5), *Apiaceae* (1), *Asteraceae* (17), *Boraginaceae* (1), *Brassicaceae* (1), *Caryophyllaceae* (5), *Chenopodiaceae* (2), *Convolvulaceae* (1), *Fabaceae* (11), *Molluginaceae* (1), *Nyctaginaceae* (1), *Polygonaceae* (1), *Primulaceae* (2), *Rubiaceae* (3), and *Solanaceae* (1). On the *Primulaceae*, both known *Thecaphora* species occur on *Androsace*: *T. androsacina* Vánky (type on *A. maxima* L., Hungary), and *T. oberwinkleri* Vánky (type on *A. fedtschenkoi* Ovcz., China). Recently, a *Thecaphora* species was collected in Pakistan on *Androsace rotundifolia*, which turned out to be a new species.

### Materials and Methods

Sorus structure, spore ball and spore characteristics were studied using dried herbarium specimens. For light microscopy (LM) spore balls were suspended in a small droplet of lactophenol,

covered with a cover glass, gently heated to boiling point to rehydrate the spores and to eliminate air bubbles from the preparation, and studied at 1000× magnification. For scanning electron microscopy (SEM), spores were placed on double-sided adhesive tape, mounted on a specimen stub, sputter-coated with gold-palladium, c. 20 nm, and examined in a SEM at 10 kV.

### Results

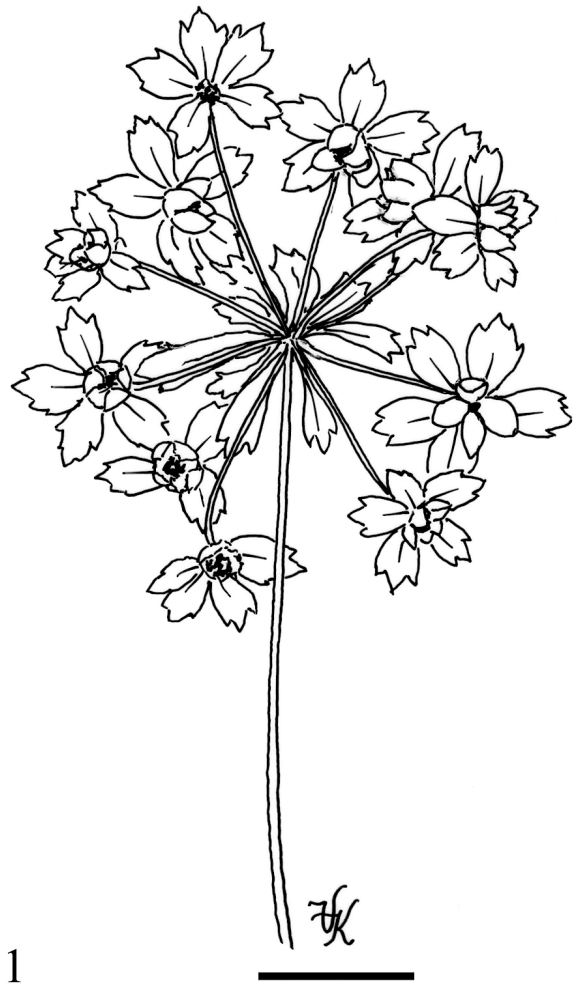
Comparative studies showed that the *Thecaphora* on *Androsace rotundifolia* represents an unknown species, which is described as:

***Thecaphora pakistanica*** Vánky, S.H. Iqbal & A.N. Khalid, sp. nov.

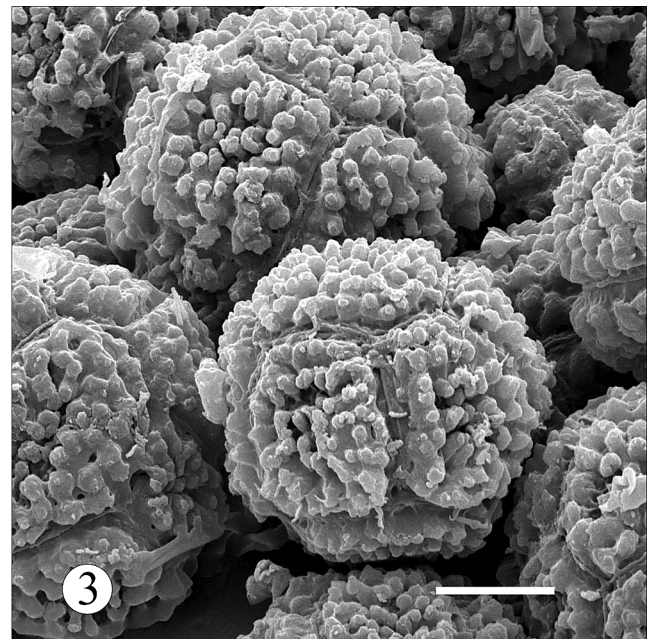
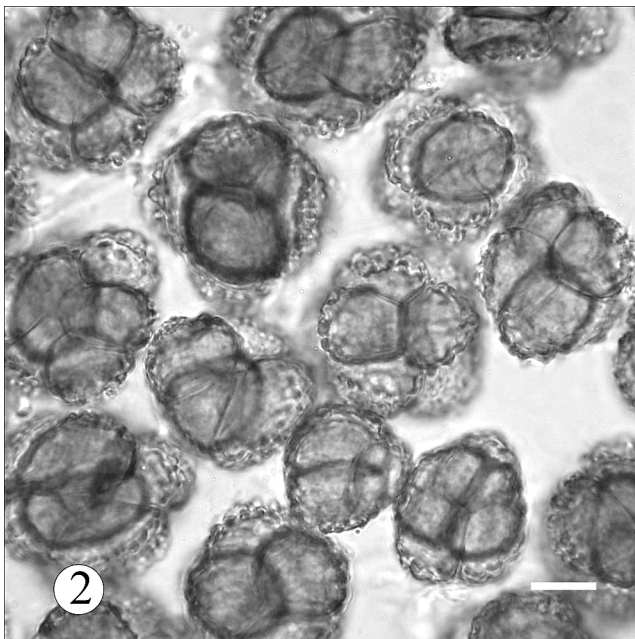
*Typus in matrice Androsace rotundifolia* Hardw. subsp. *rotundifolia*, Pakistan, North Western Frontier Province, cca. 60 km NW urbe Islamabad, Khanspur-Ayubia, 21.VIII.2006, leg. S.H. Iqbal. **Holotypus** in Herb. Ustil. Vánky (H.U.V) 21 416, *isotypus* in Herb. LAH 27 107.

*Sori semina destruentes, capsulas massa glomerulorum sporarum brunnea, granularia-pulverea implentes. Glomeruli sporarum permanentes, globosi, subglobosi, ovoidei vel late ellipsoidales, 16-35 × 18-40 μm, flavido- usque purpurascetes brunnei, ex 2-12 sporis pressu non separabilibus compositi. Sporae in visu superficiali subangulariter irregulares, 10-16 × 13,5-21,5 (-23) μm, in visu mediano subcuneiformes, cum lateribus*

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**Fig. 1.** Sori of *Thecaphora pakistanica* in some capsules of *Androsace rotundifolia* (type). Habit. Bar = 1 cm



**Figs 2-3.** Spore balls and spores of *Thecaphora pakistanica* on *Androsace rotundifolia* in LM and in SEM (type). Bars = 10 μm

*2 deplanatis, magis raro ellipticis vel circularibus, cum latere deplanato unico, radialiter 9,5-16 µm longo, flavidobrunneo; pariete in lateribus contactis cca. 0,5 µm crasso, levi, in superficie libere 2-3 µm crasso, verrucis irregularibus inclusis, quorum 2 vel 3 fortuite fuis.*

**Sori** (Fig. 1) destroying the seeds filling the capsules with a brown, granular-powdery mass of spore balls. **Spore balls** (Figs 2-3) permanent, globose, subglobose, ovoid or broadly ellipsoidal, 16-35 × 18-40 µm, yellowish to reddish brown, composed of 2-12 spores which do not separate by pressure. **Spores** (Figs 2-3) in surface view subangularly irregular, 10-16 × 13.5-21.5 (-23) µm, in median view subcuneiform, with two flattened sides, more rarely elliptic or circular, with one flattened side, radially 9.5-16 µm long, yellowish brown;

wall on the contact sides c. 0.5 µm thick, smooth, on the free surface 2-3 µm thick, including the irregular warts, of which two or three may fuse.

On *Primulaceae*: *Androsace rotundifolia* Hardw. subsp. *rotundifolia*.

Distribution: S. Asia (Pakistan). Known only from the type collection.

*Thecapora pakistanica* has permanent spore balls, like those in *T. oberwinkleri*, but differs from it especially by the number of the spores per spore balls. That in *T. oberwinkleri* is much higher, up to (?) one hundred. *T. pakistanica* differs also from *T. androsacina*, in which the spore balls have 2-15 (-25) spores which separate easily.

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#### Key to the *Thecapora* species on *Androsace*

- 1 Spore balls 28-77 µm long, composed of (10-) 20-(?)100 spores ..... *T. oberwinkleri*  
 1\* Spore balls smaller, composed of less spores ..... 2  
 2 Spore balls 20-45 (-52) µm long, composed of 2-15 (-25) spores which separate easily ..... *T. androsacina*  
 2\* Spore balls 18-40 µm long, composed of 2-12 spores, firmly united ..... *T. pakistanica*
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#### Reference

- Vánky, K. 2002. Illustrated genera of smut fungi. 2<sup>nd</sup> edn. APS Press, St. Paul, Minnesota, USA.