

Notes on two collections of *Puccinia caricina* s.l. on *Carex hordeistichos* from Austria

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Two collections of *Puccinia caricina* s.l. on *Carex hordeistichos* from eastern Austria show considerable differences to other *Puccinia* taxa known on *Carex*. Contrary to earlier collections on this host, the two recent ones also contain several leaves bearing teleutosori. The teleutospores are conspicuously larger than those of any other species known in the *P. caricina* group, 52–80 × 17–30 µm (68 ± 7.8 × 23.6 ± 3.4 µm).

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Introduction. The sedge *Carex hordeistichos* Vill. shows a rather scattered area of distribution from North Africa and Southwest Europe eastward to the Volga and into Transcaucasia, western Iran, and northern Iraq. The largest part of this disjunct area comprises the Pannonian region (MEUSEL et al. 1965). The first rust record on *Carex hordeistichos* was published from Hungary under the name *Puccinia caricis* (Schum.) Rebent. (MOESZ 1940). Further records on this host were published from Bulgaria (HINKOVA 1981), Austria (ZWETKO 1993, SCHEUER 2006, 2007), and Turkey (HENDERSON 1964, BAHCECIOGLU & GJÆRUM 2003).

According to BAHCECIOGLU & GJÆRUM (2003), their collection from Turkey corresponds well to the description given by ZWETKO (1993) for the only specimen known from Austria at that time. This specimen from the Pannonian lowland area in Austria and the specimens from Turkey contain only uredosori. In the two most recent collections from Austria (SCHEUER 2006, 2007), also teleutosori are present. It must be noted here that these teleutosori are not very abundant and have therefore been concentrated in the specimens kept in the herbarium GZU (Institute of Plant Sciences, Graz).

Material and methods. Dried herbarium specimens were studied using standard light microscopy (Zeiss Axioskop 20). Spores were examined and measured in tap water.

Puccinia caricina DC. s.l., on *Carex hordeistichos* Vill.

Fig. 1

Life-cycle unknown, probably a hemi-form. — **Uredosori** in yellow leaf spots, mostly hypophyllous, light rusty brown. Uredospores obovoid or ellipsoid, more rarely subglobose 26.5–36.5 × 21–32 µm (31.6 ± 2.4 × 26.6 ± 3.1 µm);

germ pores (2 -) 3 (- 4), equatorial, covered by a hyaline papilla; spore wall 2–2.5 µm thick, yellow-brown, echinulate, with colourless to yellowish contents. **Teleutosori** hardly larger than the uredosori, elongate, compact, blackish brown. Teleutospores 52–80 × 17–30 µm (68 ± 7.8 × 23.6 ± 3.4 µm), elongate-clavate, lower spore cell always much longer and narrower than the upper one, often twice as long, sometimes even longer; upper cell often subglobose(-globose); apex rounded or ± flattened, sometimes asymmetrical; spore wall smooth, chestnut-brown, c. 2 µm thick, at the apex up to 6–14 µm thick; germ pore of the upper cell close to the apex, but mostly somewhat lateral; pedicels firm and persistent, often not even half the length of the lower spore cell.

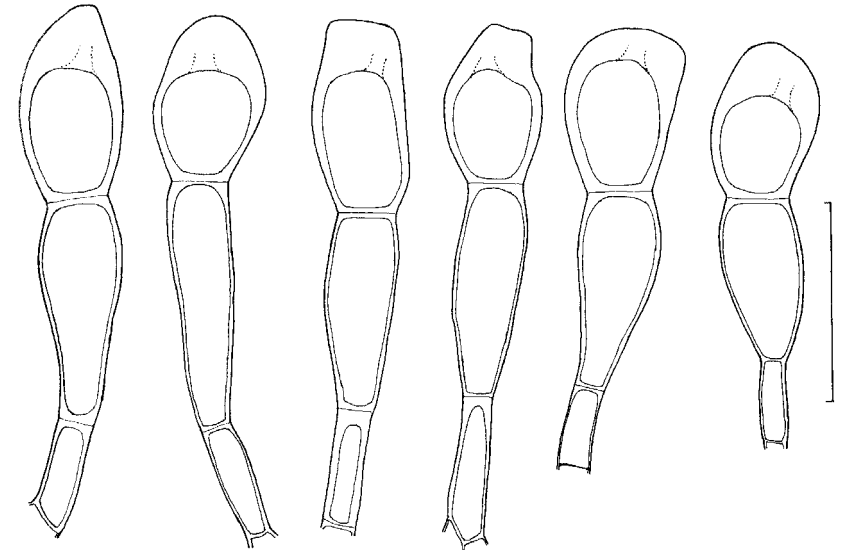


Fig. 1. Teleutospores of *Puccinia caricina* s.l. on *Carex hordeistichos*, Mycotheca Graecensis # 405, GZU (bar scale = 40 µm, C. Scheuer del.).

Material examined: AUSTRIA, Burgenland, SSW of Bruck an der Leitha, ENE of Kaisersteinbruch, NW of the landmark "Bäckerkreuz" (47°59'N/16°45'E), 160–180 m alt.; silty bank of a pool. 22 October 2005, leg. T. Barta, det. P. Zwetko, Mycotheca Graecensis # 405, GZU (SCHEUER 2006) [original label: Nordburgenland, Fuß des Leithagebirges: SSW von Bruck a. d. Leitha: schlammiges Ufer eines Tümpels NW vom Bäckerkreuz ENE von Kaisersteinbruch, 22. Oktober 2005, leg. T. Barta]. AUSTRIA, Lower Austria, Thermenlinie, c. 4 km SE of Berndorf, near St. Veit an der Triesting, along a forest path at the W foot of the hill "Pfarrkogel", MTB 8062/4, 47°55'N/16°09'E, 400–420 m alt.; wet clearing. 8 September 2002, leg. T. Barta, det. P. Zwetko, Dupla Graecensia Fungorum # 64, GZU (SCHEUER 2007) [original label: Niederösterreich, Thermenlinie: feuchte offene Stellen nahe einem Waldweg am W-Fuß des Pfarrkogels bei St. Veit a. d. Triesting, 8. September 2002, leg. T. Barta].

Discussion. The teleutospores of this rust on *Carex hordeistichos* differ considerably in size and shape from all other rusts united in the collective species *P. caricina*. The spores are quite similar to those of *P. paludosa*, especially because of the short pedicel and the conspicuous long lower spore cell. However, the teleutospores of the rust on *Carex hordeistichos* are still significantly longer. Not a single teleutospore shorter than 50 µm could be found in our two collections. On an average, the teleutospores on *Carex hordeistichos* are $68 \pm 7,8$ µm long, those of *P. paludosa* (on *Carex elata*) only 57.5 ± 7.5 µm ($n = 30$). According to GÄUMANN (1959), the microspecies *P. urticae-ripariae* Hasler has the largest teleutospores within *P. caricina* s.l., $36-78 \times 13-25$ µm ($57.6 \pm 7.3 \times 17.4 \pm 2.0$ µm). However, ZWETKO (1993) suspects that Hasler's measurements might be somewhat questionable, due to a possible mixed infection with *P. paludosa*.

Comparison of the measurements given for teleutospores of *P. caricina* s.l. in three examples from standard literature:

MAJEWSKI (1979)	30–70 × 12–25 µm
WANG & ZHUANG (1998)	35–70 × 12–25 µm
SAVILE (1964)	(20–)38–63(–70) × 12–24 µm

P. caricina sensu MAJEWSKI (1979) comprises species alternating between *Ribes* and *Carex*, *Pedicularis* and *Carex*, as well as *Urtica* and *Carex*, i.e., *P. caricina* DC. sensu ZWETKO (1993; Syn. *P. pringsheimiana* Kleb. sensu SAVILE 1973, *P. ribesii-caricis* Kleb.), *P. paludosa* Plowr., and *P. urticata* Kern (Syn. *P. urticae-caricis* Kleb.). WANG & ZHUANG (1998) also include *P. limosae* Magnus, a species alternating between *Lysimachia* and *Carex*. SAVILE (1964) took *P. caricina* in approximately the sense of ARTHUR (1934, as *P. caricis*), including all *Carex* rusts infecting *Ribes* and *Urtica*. However, as the aeciospore wall ornamentations differ substantially in these two groups, the same author later decided that they should be treated as two separate species (SAVILE 1973).

Which aecial host could be attacked by this rust on *Carex hordeistichos*, or whether the rust lost its heteroecious lifestyle, is still unknown.

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