

New *Puccinia* (*Pucciniales*, Basidiomycota) records for Turkey

Türkiye için Yeni *Puccinia* (*Pucciniales*, Basidiomycota) Kayıtları

Research Article

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ABSTRACT

Three rust fungi species, *Puccinia pulsatillae* Kalchbr. on *Pulsatilla violacea* Rupr. subsp. *armena* (Boiss.) Lufarov, *Puccinia tulipae* Schröt. on *Tulipa armena* Boiss. var. *armena* and *Puccinia coetanea* Bubák on *Asperula stricta* Boiss. subsp. *latibracteata* (Boiss.) Ehrend, are reported for the first time from Malatya province in Turkey. The morphological and microscopical features of these fungi are described with figures.

Key Words

Malatya, Microfungi, *Pucciniales*, Turkey.

ÖZET

Pulsatilla violacea Rupr. subsp. *armena* (Boiss.) Luferov üzerinde *Puccinia pulsatillae* Kalchbr., *Tulipa armena* Boiss. var. *armena*. üzerinde *Puccinia tulipae* Schröt. ve *Asperula stricta* Boiss. subsp. *latibracteata* (Boiss.) Ehrend üzerinde *Puccinia coetanea* Bubák olan 3 tane pas mantarı türü Türkiye'de Malatya ilinden ilk defa kaydedilmiştir. Bu fungusların şekilleri ile morfolojik ve mikroskopik özellikleri toplanan örneklerle ilgili olarak tanımlanmıştır

Anahtar Kelimeler

Malatya, Mikrofus, *Pucciniales*, Turkey.

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INTRODUCTION

Puccinia Pers. is the largest genus of rust fungi (*Pucciniales*), with about 4000 species [1]. It is widespread on world. Most groups of vascular plants are infected by different *Puccinia* species. There are many species in all land areas except the polar region. Teliospores typically 2 celled by transverse septum (but may have 1 celled and sometimes 3 or 4 celled spores in some species), born on pedicels, spores wall mostly pigmented, germ pore 1 in each cell, basidia external [2].

Based on recent fieldwork, 202 species (212 taxa) of *Puccinia* are now known from Turkey [3]. Nevertheless, numerous new records and new species can still be expected as a result of going on fieldwork in Turkey because of its high diversity of vascular plants (9996 species) in Turkey [4]. This paper presents rust species collected from Malatya province in Turkey.

MATERIALS AND METHODS

Plant species were collected in 2012 from Malatya Province in Turkey. The host specimens were prepared according to established herbarium techniques. Host plants identified according to "Flora of Turkey and the East Aegean Islands" [5-7]. Spores were scraped from dried host specimens and mounted in lactophenol. Analysis LS Starter software used to measure. The current names of fungi are given according to www.indexfungorum.org. Names of host plants and families are given according to <http://www.ipni.org> and <http://www.theplantlist.org>. The specimens are preserved in the İnönü University Herbarium (INU), Turkey.

RESULTS AND DISCUSSION

Puccinia pulsatillae Kalchbr. Mathem. Természettud. Közlem. 3: 307 (1865) (Figure 1A, D,G).

Telia amphigenous on stem, scattered or in groups, covered by epidermis, dark brown. Teliospores oblong or oblong-clavate, sometimes truncate above, mostly lower cell bigger than upper cell, 42-92 × 12-24 µm, constricted at the septum, pore of upper cell apical or supapical, in lower superior, wall at apex up to 12 µm, darker at apex, smooth, pedicel short, persistent.

Specimens examined - On *Pulsatilla violacea* (*Ranunculaceae*). **Turkey:** Malatya, Hekimhan, Zurbahan Mountain, 1900 m, 30.06.2012, Ş.Karakuş 2448 & B.Mutlu (INU 1195).

Remarks: Known from Asia, Europe and North America. *P. pulsatillae* is a new rust species for Turkey and also first rust fungi record on *Pulsatilla violacea* on the world.

P. pulsatillae is also the first *Puccinia* species on *Pulsatilla* species in Turkey.

Puccinia pulsatillae J.Schrot. In 53. Jahresb. Schles. Gesellsch. (1875) (Figure 1B, E, H).

Telia amphigenous on stem, scattered or in groups, pulverulent, covered by epidermis, brown. Teliospores elipsoid, oblong, rounded at the both end, 30-44 × 21-32 µm, slightly constricted at the septum, pore of upper cell apical or supapical, in lower near the septum, wall 1.5-3 µm, brown, faintly verrucose, pedicel as long as spores, deciduous, hyaline.

Specimens examined - On *Tulipa armena* Boiss. var. *armena* (*Liliaceae*). **Turkey:** Malatya, Hekimhan, Hasan Çelebi, Yaman Mountain, 2600 m, 09.06.2012, Ş.Karakuş 2077 & B.Mutlu (INU 1195).

Remarks: Known from Asia and Europe. North America. *P. tulipae* is a new rust species for Turkey.

Puccinia prostii Duby on *Tulipa armena* [8]. (Tamer et al.1990), on *Tulipa hayatii* O.Schwarz [9]. and *Puccinia liliacearum* Duby on *Tulipa sintenisii* Bakerv [10] have been reported from Turkey. *P. tulipae* differs from *P. prostii* by not having spiny on teliospores and from *P. liliacearum* by verruculose teliospores.

Puccinia coetanea Bubák, Annls mycol. 3 (3): 218 (1905) (Figure 1C, F, I, J).

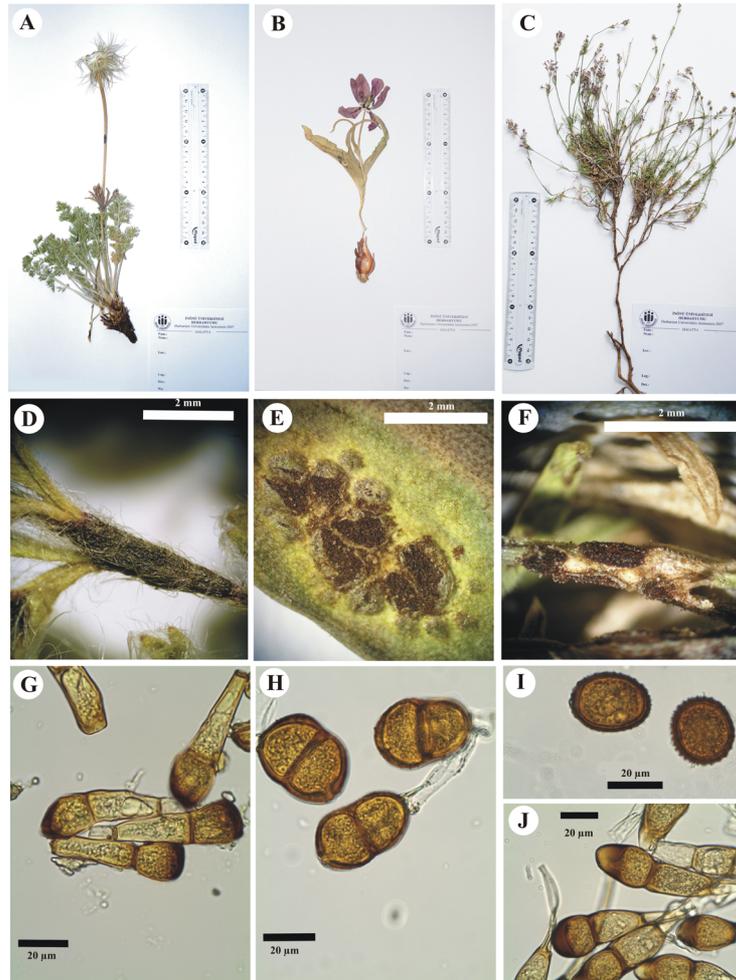


Figure 1. Herbarium specimens (A, Ş.Karakuş 2448; B, Ş.Karakuş 2077; C, Ş.Karakuş 3039), stereomicroscope image of infected area on the leaves tissue (D-F) and lightmicroscope image of teliospores (G-I) and urediniospores (J) of *Pulsatilla violacea* Rupr. subsp. *armena* (Boiss.) Lufarov (A, D), *Tulipa armena* Boiss. var. *armena* (B, E), *Asperula stricta* Boiss. subsp. *latibracteata* (Boiss.) Ehrend (C, F), *Puccinia pulsatillae* Kalchbr. (G), *Puccinia tulipae* J.Schröt (H) and *Puccinia coetanea* Bubák (I, J).

Uredinia amphigenous on stem, scattered or in groups, elongate on stem, pulverulent, brown. Urediniospores globoid, elipsoid, $17-36 \times 16-30 \mu\text{m}$, brown, echinulate, with 2-3 pores, Telia similar to uredinia but darker. Teliospores ellipsoid, oblong, rounded above and below or sometimes attenuate at the both end, $35-66 \times 17-28 \mu\text{m}$, slightly constricted at the septum, pore of upper cell apical or subapical, in lower near the septa, wall $1-2 \mu\text{m}$, at apex up to $18 \mu\text{m}$, darker at apex, smooth, pedicel as long as spores, persistent, hyaline.

Specimens examined - On *Asperula stricta* Boiss. subsp. *latibracteata* (Boiss.) Ehrend, (*Rubiaceae*). Turkey: Malatya, Akçadağ, Kartal Hill, 2300 m, 14.07.2012, Ş.Karakuş 3039 & B.Mutlu (INU 1196).

Remarks: Known from Europe, *P. coetanea* is a new rust species for Turkey and also first rust fungus record on *Asperula stricta* on the world.

Puccinia asperulae-aporinis Picb. on *Asperula L.* and *Asperula pestalozzae* Boiss. have been reported from Turkey [11]. *P. coetanea* differs from *P. asperulae-aporinis* by hyaline pedicels, in *P. asperulae-aporinis* teliospores pedicels are coloured.

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