

A New *Anthracocystis* (Ustilaginales) Record for Turkey

Türkiye için Yeni Bir *Anthracocystis* (Ustilaginales) Kaydı.

Research Article

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ABSTRACT

A smut species, *Anthracocystis penniseti* (Rabenh.) McTaggart & R.G. Shivas (*Ustilaginaceae*) on *Pennisetum orientale* Rich. (*Poaceae*) is reported for the first time from Turkey. The morphological and microscopical features of this fungi are described with figures.

Key Words

Kayseri, Mersin, New records, Ustilaginales.

ÖZET

Bir rastık mantarı türü *Anthracocystis penniseti* (Rabenh.) McTaggart & R.G. Shivas (*Ustilaginaceae*) *Pennisetum orientale* Rich. (*Poaceae*) bitkisi üzerinde Türkiye'den ilk kez kaydedilmiştir. Bu mantarın şekilleri ile morfolojik ve mikroskobik özellikleri toplanan örneklerle ilgili olarak tanımlanmıştır.

Anahtar Kelimeler

Kayseri, Mersin, Yeni kayıt, Ustilaginales.

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INTRODUCTION

After the rust fungi (Uredinales), the smut fungi are the second most important group of plant parasitic Basidiomycota. There are approximately 1200 smut species known that together can infect more than 4000 different plant species. Most of the smut fungi are recognized by the black or brown spore masses or sori forming in the inflorescences, the leaves, or the stems of their hosts. They develop usually dark, powdery masses of teliospores ("spores") in sori. The teliospores are liberated, dispersed, and germinate with basidia. After a more or less prolonged saprophytic stage, dikaryotic hyphae infect susceptible host plants [1].

Anthracoystis is a large genus of family *Ustilaginaceae* within the order Uredinales. The genus contains about 126 species in the world. The members of the genus are characterized by sori replacing inflorescences, all of the racemes or localized in spikelets of an inflorescence. Peridium of vacuolated fungal cells surrounded by a single layer of host cells. Columella composed of vascular bundles surrounded by host parenchyma permeated by inter- and intracellular hyphae, often separated into several columellae each around a vascular bundle surrounded by parenchyma, filiform, flexuous, flattened. Sporogenous hyphae coiled. Spores compacted in spore balls, globose to subglobose, often outer spores darker than inner spores. Sterile cells few or absent [2].

In the last decade, reports of new records of smut fungi have greatly increased in Turkey. According to current literature [3-11] approximately 59 smut species belonging to 9 genera have so far been reported from Turkey, but there is not any record of *Anthracoystis penniseti* (Rabenh.) McTaggart & R.G. Shivas.

The purpose of the present study is to make a contribution to the Turkish smut mycobiota.

MATERIALS AND METHODS

Materials were collected in 2013 from Kayseri and Mersin provinces in Turkey. The host specimens were prepared according to established herbarium

techniques. Host plants identified use the Flora of Turkey and the East Aegean Islands [12]. Spores were scraped from dried host specimens and mounted in lactophenol. Microphotographs were taken under a light microscope (Noveks B series 1000). Analysis LS Starter was software was used to measure. Identification was performed with the aid of literature [1,2]. The identified samples are deposited in the İnönü University Herbarium (INU).

RESULTS AND DISCUSSION

Basidiomycota R.T. Moore

Ustilaginomycetes

Ustilaginales

Ustilaginaceae Tul. & C. Tul.

Anthracoystis Bref.

Key to species of *Anthracoystis* on *Pennisetum*

1. Sori restricted to the ovaries.....2
- 1.* Sori not restricted to the ovaries.....3
2. Columella one, short, spores smooth.....*A. tothii*
- 2.* Columella several, filiform, spores verruculose.....*A. ehrenbergii*
3. Sori destroying the whole inflorescence or on the top of the sterile shoot.....4
- 3.* Sori restricted to the spikelets.....*A. penniseti*
4. Sori destroying the whole inflorescence.....5
- 4.* Sori destroying on the top of the sterile shoot.....6
5. Spores dimorphic.....*A. cenchrina*
- 5.* Spores not dimorphic.....*A. pennisetina*
6. Spores irregular, wall even.....*A. penniseticola*
- 6.* Spores regular, wall uneven.....*A. sphaelata*

Anthracoystis penniseti (Rabenh.) McTaggart & R.G. Shivas (Figure 1).

Sori in all spikelets of an inflorescence, cylindrical, 1-1.5 × 2-7 mm, hidden by the outer floral envelopes, covered by a greyish brown peridium which flakes away exposing the semi-agglutinated to granular-powdery mass of spore balls and a central columella of the length of the sori, with a few, short, apical branches. Spore balls globose, ovoid to ellipsoidal, 40-110 µm long, dark reddish brown, composed of many spores that separate rather easily. Spores dimorphic. Outer spores globose to ellipsoidal, 9-15 × (9-)



Figure 1. *Anthracocystis penniseti* A. dried herbarium specimen, B. SM view of *Anthracocystis penniseti* on sori, C. LM view of Teleutospores.

10-13.5(-14.5) μm , medium reddish brown, finely and densely echinulate. Inner spores subpolyhedral, smaller (7-10 μm), paler coloured and finely punctate or apparently smooth. Spore germination results in 2-celled basidia, each cell producing a long, ramifying hypha.

Specimens examined-On *Pennisetum orientale* Rich. (*Poaceae*): TURKEY-Kayseri, Yahyalı, İlyaslı Village, 1250-1400 m, 26.06.2013, Ş. Kabaktepe 7185 (INU 1201); TURKEY-Mersin, Tarsus, Gulek village, 1240 m, 08.10.2013, Ş. Kabaktepe 7318 (1202).

Remarks: *Anthracocystis penniseti* is easily distinguished from other *Anthracocystis* species by its restricted to the spikelets, one columella and 9-15 μm long spores. It is a cosmopolite

species on *Cenchrus* L. and *Pennisetum* Rich. (*Poaceae*) host genera [1,2]. It is also reported on *Pennisetum orientale* from Iran and Israel [13,14].

According to literature [1,2], nine confirmed species on *Pennisetum* sp. (*A. cenchri* (Rabenh.) McTaggart & R.G. Shivas, *A. ehrenbergii* (Rabenh.) McTaggart & R.G. Shivas, *A. penniseti* (Rabenh.) McTaggart & R.G. Shivas, *A. penniseticola* (Vánky) McTaggart & R.G. Shivas, *A. pennisetina* (Vánky) McTaggart & R.G. Shivas, *A. sphacelata* (Vánky) McTaggart & R.G. Shivas, *A. tothii* (Vánky) McTaggart & R.G. Shivas) currently exist in the genus *Anthracocystis*. But only *Anthracocystis ehrenbergii* (J.G. Kühn) McTaggart & R.G. Shivas on *Sorghum bicolor* (L.) Moench has previously been reported from Turkey [9].

With the current study, *Anthracoystis penniseti* is reported for the first time from Turkey and the number of Turkish smut fungi species will increase approximately to 60.

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