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Research article/Araştırma makalesi

A new record for the Turkish Rust Mycobiota: *Puccinia alatavica* Nevod.

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Abstract

The rust fungi *Puccinia alatavica* Nevod. on *Ferula* sp. (*Apiaceae*) is reported for the first time from Turkey. The morphological and microscopical features with figures of this fungus sample are described based on the collected materials.

Key words: new record, *Pucciniales*, Turkey

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Türkiye Pas Mikobiyotası için yeni bir kayıt: *Puccinia alatavica* Nevod.

Özet

Ferula sp. (*Apiaceae*) üzerinde olan pas mantarı *Puccinia alatavica* Nevod. Türkiye'den ilk defa kaydedilmiştir. Bu mantar örneğinin şekilleri ile morfolojik ve mikroskobik özellikleri toplanan örneklere bağlı olarak tanımlanmıştır.

Anahtar kelimeler: yeni kayıt, *Pucciniales*, Türkiye

1. Introduction

Rust fungi are obligate parasites of plants from ferns to advanced monocotiledon and dicotiledons. Approximately, 168 genus and 7000 species of rust fungi are exist and the most of them belong to genus *Puccinia* (Kolmer et al., 2009).

Puccinia is the largest genus of family *Pucciniaceae* within the order *Pucciniales.* The genus contains about 4000 species that cause many serious diseases in some economically important plant species such as wheat, cereal, coffee and some trees (Kirk et al., 2008; Saba and Khalid, 2013**).**

Attention to determine the studies on Turkish rust fungi has greatly increased the last decade and some investigations are still in progress. According to current checklist (Bahcecioğlu and Kabaktepe, 2012) and the recent data on Turkish rust fungi (Kabaktepe and Bahcecioglu, 2012; Kabaktepe et al. 2014; Kırbağ et al. 2011), 212 *Puccinia* members have previously been reported from Turkey and but there is not any record of *Puccinia alatavica* from Turkey.

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

2. Materials and methods

Materials were collected in 2014 from Van Province 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 (Peşmen, 1974). Spores were scraped from dried host specimens and mounted in lactophenol. Analysis LS Starterwas software was used to measure. Identification was performed with the aid of literature (Gjaerum, 1986; Uliyaninifiev,

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1978). The current names of fungi are given according to www.indexfungorum.org. Names of host plants and families are given according to http://www.theplanlist.org. The identified samples are deposited in the Inönü University Herbarium (INU).

3. Results

Puccinia alatavica Nevod., (1950) (Figures 1).

Teleutosori amphigenous, on petiols, on stems, scattered, 0,2-0,3 mm, dark brown. Teleutospores 2, sometimes 3-4 celled, ellipsoid, oblong, sometimes fusiform to conical, rounded above and below or sometimes attenuate downwards, constricted on septa, chesnut brown, 32–70 × 15–28 µm, wall smooth, 2-4 µm, pore in upper cell apical or subapical, in lower near the septa, pedicels thin, hyaline, deciduous. Mesospores ellipsoid-globoid, 26-35 × 18-25 µm, wall brown, smooth, 2-4 µm thick.

Distribution: Kazakhstan, Iran and Russia (Gjaerum, 1986; Jorstad, 1960; Uliyaninifiev, 1978).

Specimen examined: On *Ferula* sp. (*Apiaceae*). Turkey: B9: Van, Gevaş, Artos Mountain, 38.266001, 43.107960, 2800m, 08.06.2014. M.KURŞAT 6071 (INU 1200).

Figure 1. *Puccinia alatavica* on *Ferula* sp. A– dried herbarium specimen; B– stereo microscope view of *Puccinia alatavica* on leaf surface; C– LM view of Teleutospores

4. Conclusions

Ferula L. is one of the largest genus in the family *Apiaceae*. It includes 180–185 species species in the world. The members of the genus are distributed mainly central and south-west Asia, and also reported North India. Tracing to the literatüre on Turkish *Ferula* (Elibol et al., 2012; Peşmen, 1974; Sağıroğlu & Duman, 2007;2010; 2014), 20 species of the genus has been recorded from Turkey and 12 of them are endemic.

According to literature (Gjaerum, 1986; Greuter et al., 1991; Henderson and Jorstad 1966; Jorstad, 1960; Petrak, 1966; Uliyaninifiev, 1978; Wei and Zhuang, 2001), nine confirmed species on *Ferula* sp. (*Puccinia alatavica* Nevod, *P. altimurica* Petr., *P. asperior* Ellis & Everh., *P. ferulae* F. Rudolphi, *P. ferulae-songoricae* Tranzschel & Erem,, *P. ferulae-turkestanicae* Korbonsk, *P. katajevii* Jørst. *P. litvinovii* Tranzschel & Erem and *P.sogdiana* Kom.) currently exist in the genus *Puccinia*. But only *P. ferulae* has previously been reported from Turkey on genus *Ferula* (Bahcecioglu and Kabaktepe, 2012; Kırbağ ve Civelek, 2010). (Table 1).

P. alatavica is characterized by its 3-4 celled and wide size range teleutospores (32-70 × 15-28 µm). Microscpic features of *Puccinia* species growing on *Ferula* spp.are given in Table 2 (Gjaerum, 1986; Saccardo, 1902, Uliyaninifiev, 1978).

With the present study, *Puccinia alatavica* is reported for the first time from Turkey and it will be the 213th species of genus *Puccinia* and the second *Puccinia* member growing on Turkish *Ferula* species.

Table 1**.** Distribution of *Puccinia* species growing on *Ferula* spp.

***Puccinia* species**	**Distribution**	**Host Plants**	**Investigations**
P. alatavica	Iran	*Ferula* sp.	Jorstad, 1960
	Iran	*Ferula* sp.	Gjaerum, 1986
	Russia	*F. kelleri* Koso-Pol.	Uliyaninifiev, 1978
	Kazakhstan	*F. alatavica* (Hack. ex St.-Yves) Roshev	Nevodovsky, 1950
P. altimurica	Afghanistan	*F. jaeschkeana* Vatke	Petrak, 1966
P. asperior	USA	*F. dissoluta* S.Watson	Cash, 1953
	USA	*Ferula* sp.	Ellis and Everhart, 1884.
P. ferulae	Italy	*F. communis* L.	Greuter et al., 1991
	Turkey	*F. orientalis* L.	Bahcecioglu and Kabaktepe, 2012
	Turkey	*F. orientalis* L.	Kırbağ ve Civelek, 2010
	Morocco	*F. communis* L.	Rieuf, 1970
	Italy	*F. nodiflora L.*	Rudolphi, 1829.
	Germany, Algeria	*Ferula* spp.	Saccardo, 1888
P. ferulae-songoricae	Russia	*F. songorica* Pall. exSchult.	Tranzschel and Eremejewa, 1939
	China	*F. songarica* Pall. exSchult.	Wei and Zhuang, 2001
	Afghanistan	*Ferula* sp.	Henderson and Jorstad 1966
	China	*F. songorica* Pall. exSchult.	Biao et al., 2013
P. ferulae-turkestanicae	Tajikistan	*F. clematidifolia* Koso-Pol	Uliyaninifiev, 1978
P. katajevii	Central Asia	*F. gumosa* Boiss	Uliyaninifiev, 1978
	Turkmenistan	*F. goldbaniflua* Boiss. & Buhse	Jorstad, 1958
P. litvinovii	Russia	*F. jaeschkeana*	Tranzschel and Eremejewa, 1939
	Afghanistan	*Ferula* sp.	Gjaerum, 1986
P. sogdiana	Tajikistan	*Ferula* spp.	Komarov, 1895
	Afghanistan	*F. jaeschkeana* Vatke	Henderson and Jorstad, 1966
	Uzbekistan	*Ferula foetidissima* Regel & Schmalh.	Saccardo, 1902

Table 2. Microscpic features of *Puccinia* species growing *Ferula* spp.

Puccinia* species growing on *Ferula	**Teleutospores size (µm)**	**Teleutospores cells**	**Teleutospores wall**	**Teleutospores wall thickness (µm)**	**Size of pedicels**	**Mes ospo res**
P. alatavica	32–70 × 15–28	2 (3-4)	Smooth	2-4	Short	+
P. altimurica	26–42 × 14–26	2	Smooth	1,5-3	Short	-
P. asperior	25–35 × 19–23	2	Verruculose	1,5-3	Short	-
P. ferulae	30–45 × 15–25	2	Smooth	2-4	Short	-
P. ferulae-songoricae	32–54 × 24–27	2	Smooth	1,5-3	Short	-
P. ferulae-turkestanicae	23–38 × 19–23	2	Smooth	1-1,5	Short	+
P. katajevii	34–55 × 17–28	2	Smooth	6-8 (at apex)	Long	+
P. litvinovii	29–57 × 17–30	2	Smooth	1,5-3	Short	-
P. sogdiana	22–42 × 12–22	2	Verruculose	1,5-3,5	Short	-

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