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Research Article  
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## Septoria Sacc. (Mycosphaerellales) Species Determined in Aladağlar and Bolkar Mountains (Turkey)

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**Abstract:** In the current study, nine *Septoria* species were determined in Aladağlar and Bolkar Mountains (Turkey) on the ten different host plants. Among them, *Septoria alnicola* Cooke on *Alnus glutinosa* (L.) Gaertn. (*Betulaceae*) and *Septoria antirrhini* Desm. on *Antirrhinum majus* L. (*Plantaginaceae*) are new records for Turkish mycobiota and also *Cyclamen cilicium* is the new host for *Septoria cyclaminis* Durieu & Mont. Short descriptions of the newly reported species were provided together with macro and microphotographs and discussed briefly.

**Key words:** *Septoria*, Aladağlar, Bolkar mountains, New records, Turkey

### Aladağlar ve Bolkar Dağları'ndan Belirlenen *Septoria* Sacc. (*Mycosphaerellales*) Türleri

**Öz:** Mevcut çalışmada, Aladağlar ve Bolkar Dağları'ndan (Türkiye) 10 farklı konakçı bitki üzerinden 9 *Septoria* türü belirlenmiştir. Bu türlerden *Alnus glutinosa* (L.) Gaertn. (*Betulaceae*) üzerinde *Septoria alnicola* Cooke ve *Antirrhinum majus* L. (*Plantaginaceae*) üzerinde *Septoria antirrhini* Desm. Türkiye mikobiyotası için yeni kayıttır ve ayrıca *Cyclamen cilicium* Boiss. & Heldr. *Septoria cyclaminis* Durieu & Mont. için yeni konakçısıdır. Yeni kayıt olarak verilen türlere ait kısa tanımlamalar ile makro ve mikrofotoğrafları verilerek kısaca tartışılmıştır.

**Anahtar kelimeler:** *Septoria*, Aladağlar, Bolkar Dağları, yeni kayıtlar, Türkiye

#### Introduction

Aladağlar and Bolkar Mountains are situated in the C5 grid square according to the system adopted by Davis (1965). The region is located in the eastern part of the Central Taurus Mountains complex in southern Anatolia and surrounded by Kayseri in the north east, Niğde and Ereğli in the north west, Karaman in the west, Mersin in the south and Adana in the south east (Figure 1). The southern slopes of the study area has the characteristics of Mediterranean climate features, while the northern slopes of the study area reflects the semi-arid climate (Akman, 1999; Gemici, 1994).

*Septoria* Sacc. is an anamorphic and very large genus of pycnidia-producing fungi causing a range of disease symptoms including leaf and fruit spots in many cultivated and wild plants. More than 3000 published names of species including many synonyms have been listed under the genus; however, some estimates of true

numbers of this genus range from 1000 to 2000 (Kirk et al., 2008; Seifbarghi et al., 2009; Verkley et al., 2013). Teleomorphs are known just for a small number of species which are classified in *Mycosphaerella* Johanson and *Sphaerulina* Sacc. (Priest, 2006).

According to literature (Hüseyin and Selçuk, 2002; Hüseyin et al., 2016; Selçuk et al., 2009; Ekici et al., 2012; Erdoğdu et al., 2017; Kabaktepe and Bahçecioğlu, 2006; Kabaktepe et al., 2013), there is not any record of *Septoria alnicola* Cooke and *Septoria antirrhini* Desm. in Turkey.

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

#### Materials and methods

Infected plant samples were collected from Aladağlar and Bolkar mountains (Kayseri, Niğde, Konya, Karaman, Mersin, Adana) in Turkey between 2013 and 2016. Host plants were identified using the Flora of Turkey and East

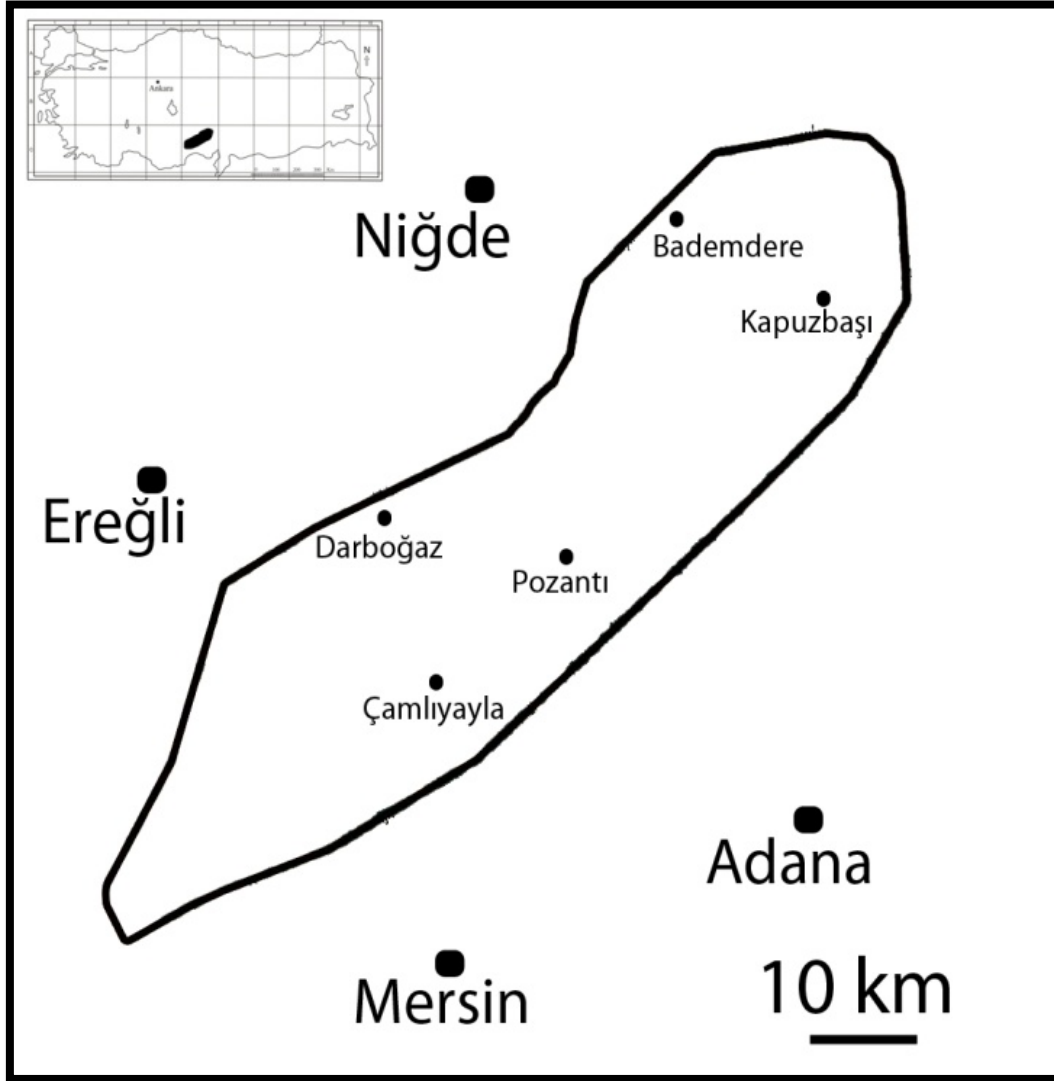


Figure 1. Map of study area

Aegean Islands (Davis, 1965-1988). The fungal specimens were examined microscopically. Spores were scraped from dried host specimens. Macro photographs were taken under a stereo microscope (Novex trinocular zoom stereo microscope RZT-SF). Micro photographs were taken under a light microscope (Noveks B series 1000). Analysis LS Starter software was used for sizing the spores and sporophores. The current names of fungi were given according to Ur1. Names of host plants and families were given according to Ur2. The microfungi were identified using the relevant literature (Saccardo 1884, Priest, 2006; Sutton, 1980). All specimens examined were kept in the İnönü University Herbarium (INU) in Malatya (Turkey).

## Results

*Ascomycota*

*Dothideomycetes*

*Mycosphaerellales*

*Mycosphaerellaceae*

*Septoria* Sacc.

1. ***Septoria alnicola*** Cooke, Handb. Brit. Fungi 1: 451 (1871). Figure 2.

Spots amphigenous, rounded, 5–7 mm long, light brown-black. Pycnidia minute, 40-70  $\mu$ m in diameter, scattered over the spots, semi-innate, black, pierced at the apex. Conidia oblong, attenuate both ends, straight to curved, 18–50  $\times$  2–3.5  $\mu$ m, 1–3-septate, usually 2-septate, hyaline.



**Specimen examined:** On *Alnus glutinosa* (L.) Gaertn. (*Betulaceae*), Mersin: Tarsus, Söğütlü Village, 575 m, 08.10.2013, Ş. Kabaktepe & I. Akata 7335; Mersin: Sebil, 980 m, 26.04.2014, Ş. Kabaktepe & I. Akata 7388; Mersin: Çamlıyayla, between Olukkaya-Fakılar, 560 m,

22.05.2014, Ş. Kabaktepe & I. Akata 7482; Mersin: Çamlıyayla, Kadıncık valley, Kuzbağı located, 1300-1350 m, 26.06.2015, Ş. Kabaktepe & I. Akata 8140; Mersin: Çamlıyayla, Fakılar, Kadıncık valley 9. km, 680-700 m, 26.08.2015, Ş. Kabaktepe & I. Akata 8194.



Figure 2. *S. alnicola* on *Alnus glutinosa* A- dried herbarium specimen; B- infected plant leaves; C- LM view of Pycnidium; D- LM view of Conidiospores.





2. *S. antirrhini* Desm., Notul. Pl. Crypt.: 3, no. 2175 (1825). Figure 3.

Spots amphigenous, rounded to oblong, 2–3 mm long, light brown. Pycnidia amphigenous, 45–90  $\mu\text{m}$  in diameter, common, immersed, brown. Conidia cylindrical to oblong, attenuate or acute both ends,

straight to slightly curved, 15–30  $\times$  2–2.5  $\mu\text{m}$ , 4–7-septate, hyaline.

**Specimen examined:** On *Antirrhinum majus* L. (*Plantaginaceae*), Niğde: Ulukışla, 8–10 km south Emirler village, 1800–1900 m, 13.07.2014, Ş. Kabaktepe & I. Akata 7528.



Figure 3. *S. antirrhini* on *Antirrhinum majus* A- dried herbarium specimen; B- infected plant; C- LM view of Pycnidium; D- LM view of Conidia



3. *S. convolvuli* Desm., Annls Sci. Nat., Bot., sér. 2 17: 108 (1842).

**Specimen examined:** On *Convolvulus arvensis* L. (*Convolvulaceae*), Mersin: Çamlıyayla, Kadıncık valley, Papazın bahçesi located, 820-850 m, 26.06.2015, Ş. Kabaktepe & I. Akata 8155. Mersin: Tarsus, 2 km from Gülek to Karboğazı, 1300-1350 m, 22.05.2014, Ş. Kabaktepe & I. Akata 7496; On *Convolvulus sepium* L. Adana, Pozantı, Akçatekir plateau, 920-1000 m, 22.05.2014, Ş. Kabaktepe & I. Akata 7502.

4. *S. cyclaminis* Durieu & Mont., in Montagne, Syll. gen. sp. crypt. (Paris): 279 (1856).

**Specimen examined:** On *Cyclamen cilicium* Boiss. & Heldr. (*Primulaceae*) Kayseri: Yahyalı, Kapuzbaşı waterfall, 650-700 m, 18.09.2014, Ş. Kabaktepe & I. Akata 7494.

5. *S. dimera* Sacc., Michelia 2 (no. 6): 102 (1880).

**Specimen examined:** On *Silene* sp. (*Caryophyllaceae*) Kayseri: Yahyalı, Derebağ village, 1200-1400 m, 25.09.2013, Ş. Kabaktepe & I. Akata 7165; Adana: Aladağ, Gerdibi village, 27.09.2013 Ş. Kabaktepe & I. Akata 7239.

6. *S. elaeagni* (Chevall.) Desm., Annls Sci. Nat., Bot., sér. 3 21: 4 (1853).

**Specimen examined:** On *Elaeagnus angustifolia* L. (*Elaeagnaceae*) Mersin: Çamlıyayla, Kadıncık valley, Kozpınar located, 900-950 m, 26.06.2015, Ş. Kabaktepe & I. Akata 8136.

7. *S. ornithogali* Pass., in Thümen, Flora, Regensburg 60: 207 (1877).

**Specimen examined:** On *Ornithogalum montanum* Cirillo (*Asparagaceae*) Kayseri, Yahyalı, Derebağ waterfall, 1270 m, 17.09.2014, Ş. Kabaktepe & I. Akata 7758; Mersin:

Çamlıyayla, Sebil, Cehennem Deresi, Pınarlıbük located, 720-780 m, 01.11.2014, Ş. Kabaktepe & I. Akata 7975.

8. *S. rubiae* (Pat.) Bubák & Ranoj., Annls mycol. 8(3): 390 (1910).

**Specimen examined:** On *Rubia tinctorum* L. (*Rubiaceae*), Kayseri: Yahyalı, Kirazlı village, 1220 m, 05.10.2013, Ş. Kabaktepe & I. Akata 7271; Konya: Halkapınar, 5 km from Kayasaray to Çakıllar, 1350-1400 m, 14.07.2014, Ş. Kabaktepe & I. Akata 7564; Kayseri, Yahyalı, Derebağ waterfall, 1270 m, 17.09.2014, Ş. Kabaktepe & I. Akata 7759.

9. *S. verbenae* Roberge ex Desm., Annls Sci. Nat., Bot., sér. 3 8: 19 (1847).

**Specimen examined:** On *Verbena officinalis* L. (*Verbenaceae*), Mersin: Çamlıyayla, Kadıncık valley, Kozpınar located, 900-950 m, 26.06.2015, Ş. Kabaktepe & I. Akata 8135.

### Discussion

As a result of the present study, 9 *Septoria* species on 10 different host plant species were determined. Among them, *S. alnicola* (on *Alnus glutinosa*), and *S. antirrhini* (on *Antirrhinum majus*) were reported for the first time from Turkey (Table 1).

Tracing to literature on Turkish *Septoria* (Hüseyin and Selçuk, 2002; Hüseyin et al., 2016; Selçuk et al., 2009; Ekici et al., 2012; Erdoğan et al., 2017; Kabaktepe and Bahçecioğlu, 2006; Kabaktepe et al., 2013) 85 species on 78 host plants have previously been reported from Turkey.

With the present study, *S. alnicola* and *S. antirrhini* are recorded for Turkish *Septoria* for the first time and *Cyclamen cilicium* was determined as a new host for *S. cyclaminis*. So the number of Turkish *Septoria* species and host plants increased to 87 and 81 respectively.

Table1. *Septoria* species and their host plants determined in the study area

|    | Species               | Host species                  |
|----|-----------------------|-------------------------------|
| 1. | <i>S. alnicola</i>    | <i>Alnus glutinosa</i>        |
| 2. | <i>S. antirrhini</i>  | <i>Antirrhinum majus</i>      |
| 3. | <i>S. convolvuli</i>  | <i>Convolvulus arvensis</i>   |
|    |                       | <i>Convolvulus sepium</i>     |
| 4. | <i>S. cyclaminis</i>  | <i>Cyclamen cilicium</i>      |
| 5. | <i>S. dimera</i>      | <i>Silene</i> sp.             |
| 6. | <i>S. elaeagni</i>    | <i>Elaeagnus angustifolia</i> |
| 7. | <i>S. ornithogali</i> | <i>Ornithogalum montanum</i>  |
| 8. | <i>S. rubiae</i>      | <i>Rubia tinctorum</i>        |
| 9. | <i>S. verbenae</i>    | <i>Verbena officinalis</i>    |

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