



Original article (Orijinal araştırma)

A new invasive species in Turkey: *Dacus ciliatus* Loew, 1862 (Diptera: Tephritidae)

Türkiye’de yeni bir istilacı tür: *Dacus ciliatus* Loew, 1862 (Diptera: Tephritidae)

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Abstract

In 2018, a problem that emerged in cucumber cultivation areas of southeastern Anatolia Region (Diyarbakır, Mardin, Siirt and Şırnak) was investigated. *Dacus ciliatus* Loew, 1862 (Diptera: Tephritidae) was found in the region causing damage to melons and watermelons. *Dacus ciliatus* is a polyphagous species, included on in the European quarantine list by the European and Mediterranean Plant Protection Organization, that causes economic losses in plants, especially in the Cucurbitaceae. This report of *D. ciliatus* is the first for agriculture and the fauna Tephritidae in Turkey.

Keywords: Cucurbitaceae, Lesser pumpkin fly, Tephritidae, Turkey

Öz

2018 yılında Güneydoğu Anadolu Bölgesi (Diyarbakır, Mardin, Siirt ve Şırnak) hıyar ekiliş alanlarında ortaya çıkan bir sorun üzerine ele alınmış olup, bölgede başta hıyar olmak üzere kavun ve karpuzlarda zarar yapan türün *Dacus ciliatus* Loew, 1862 (Diptera: Tephritidae) olduğu tespit edilmiştir. *Dacus ciliatus* Avrupa ve Akdeniz Bitki Koruma Organizasyonu tarafından A1 karantina listesinde bulunan ve özellikle Cucurbitaceae familyasındaki bitkilerde ekonomik önemde kayıplara neden olan polifag bir türdür. *D. ciliatus*'un bu raporu Türkiye tarım alanları ve Tephritidae faunası için ilk kayıttır.

Anahtar sözcükler: Cucurbitaceae, Küçük kabaksineği, Tephritidae, Türkiye

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Introduction

Tephritidae (Diptera) is the most economically important family in the world. The worldwide fauna of Tephritidae comprises nearly 4800 species in about 500 genera (Freidberg, 2006; Norrbom, 2010; Pape et al., 2011). According to Carroll et al. (2002), 190 species of fruit flies have economic impacts around the world. To date, 162 species of fruit flies have been recorded from Turkey (Yaran & Kütük, 2016; Yaran et al., 2018). Most species are phytophagous and many pest species have been studied extensively due to the damage they cause to plants of economic interest (Aluja & Norrbom, 1999; Aluja & Mangan, 2008). The family contains numerous fruit-infesting species of economic importance, such as *Ceratitis capitata* (Wiedemann, 1824), *Bactrocera oleae* (Rossi, 1790), *Bactrocera dorsalis* (Hendel, 1912), *Anastrepha fraterculus* (Wiedemann, 1830), *Toxotrypana curvicauda* Gerstaecker, 1860, *Rhagoletis cerasi* (Linnaeus, 1758) and *Rhagoletis pomonella* (Walsh, 1867), and many other noxious pests. A couple of species are profitable and efficaciously used in biological control of some weeds (White & Elson-Harris, 1994).

Fruit flies are one of the most important quarantine pests worldwide. The lesser pumpkin fly, *Dacus ciliatus* Loew, 1862 (Diptera: Tephritidae) is a serious invasive pest of cucurbits throughout Africa, being found from Egypt to South Africa (Hancock, 1989). This fly is also a pest in many parts of Asia. *Dacus ciliatus* has been recorded in Israel (Norrbom et al., 1999) and Oman (Azam et al., 2004). This fly is classified as an A1 quarantine pest by the European and Mediterranean Plant Protection Organization (2018). *Dacus ciliatus* is a brown-orange colored species with yellow spots at the anterior shoulders of the thorax and posteriorly near the abdomen. The wings have an expanded anterior dark-brown band. Fully-grown maggots are about 10 mm long (Azab et al., 1971).

Dacus ciliatus is a polyphagous fly, that damages crops in the Cucurbitaceae (Vayssières et al., 2002). Larvae of *D. ciliatus* develop in the fruits. Infected fruit commonly has oviposition pits around which necrosis can develop. In serious infestations the fruit may fall leaving just the skin (El-Nahal et al., 1971). According to Bhatia & Mahto (1968) and Viraktamath et al. (2003), this species mostly occurs in high population density in cultivated melons and to a lesser degree in wild cucurbits, and causes serious damage to crops India.

This study was conducted in southeastern Anatolia to determine the presence of *Dacus ciliatus*. In this paper, adult and wing figures material are described, and distribution and host plants of *D. ciliatus* are given.

Material and Methods

Fruit infested with larvae were collected from *C. sativus* crops and adults caught by sweep net in Diyarbakır, Mardin, Siirt and Şırnak Provinces of Turkey in 2018 (Figure 1). Samples with larvae were placed in paper bags, examined in the laboratory and placed in the plastic boxes for the emergence of adult flies. The adult flies from traps and containers were placed in 70% ethyl alcohol for identification. Specimens were lodged in the museum collection of the Biological Control Laboratory in Plant Protection Department of Agriculture Faculty, Çukurova University, Adana, Turkey. Photos were taken with a Nikon SMZ 745 T microscope. Species identification was made using the keys and descriptions of Drew et al. (1998) and White (2006).



Figure 1. Locations sampled for *Dacus ciliatus* (satellite image from Anonymous, 2018).

Result and Discussion

Dacus ciliatus Loew, 1862 (Figures 2-4)

Material examined. Diyarbakır (37°55'33" N, 40°12'38" E, 701 m), 08.IX.2018, 3♀♀; Mardin, Midyat, (37°25'22" N, 41°22'18" E, 988 m) 08.IX.2018, 5♀♀; Mardin, Ömerli (37°24'30" N, 40°57'16" E, 1.172 m), 08.IX.2018, 3♀♀; Siirt (37°56'03" N, 41°56'32" E, 917 m), 09.IX.2018, 4♀♀; Şırnak, Cizre (37°20'35" N, 42°11'01" E, 460 m), 06.IX.2018, 2♀♀.

Host. Cucurbits, including cucumber, gourd, melon, pumpkin, water melon and others (CABI/EPPO, 2018).

Distribution. Africa, Indian Ocean islands, East Asia and West Asia (including Iran, Israel, Jordan and Oman) (Hancock, 1989; White & Elson-Harris, 1994; Norrbom et al., 1999; Maklakov et al., 2001; Azam et al., 2004; Vayssières et al., 2008).

Remarks. In Turkey this pest was first observed in September 2018 in cucumber in Şırnak. *Dacus ciliatus* is an important pest of Cucurbitaceae and it is an EPPO A1 quarantine pest causing fruit damage and yield losses. Damage due to infestations of *D. ciliatus* was detected in the southeastern Anatolia (including Diyarbakır, Mardin, Siirt and Şırnak).

Dacus ciliatus is smaller than *Bactrocera cucurbitae* (Coquillett, 1849), scutum preponderantly red-brown. Costal band in the wing is thin, before wing apex; enlarged a small spot at apex. Abdomen has two black spots especially in females (White & Elson-Harris, 1994). *Dacus ciliatus* was first reported in India in 1914 (Kandakoor et al., 2013). This species is significant and widespread pest of Cucurbitaceae in Africa and Asia (CABI/EPPO, 2018). Adults flying and shipment of fruit are chief mechanisms of spread. Establishment within a country can have negative economic impacts for exports. *Dacus ciliatus* is considered a phytosanitary hazard in countries with suitable climates and host crops. Future studies on the geographical distribution and impact of this pest in cucurbits in Turkey, as well as in other commercial and native fruit species, should be considered a priority. In addition, natural enemies of *D. ciliatus* should be determined as these could help reduce the rate of spread of this species.

In this paper, we report the occurrence of *D. ciliatus* on *Cucumis sativus* L. (Cucurbitaceae), an important invasive agricultural pest, in Turkey.

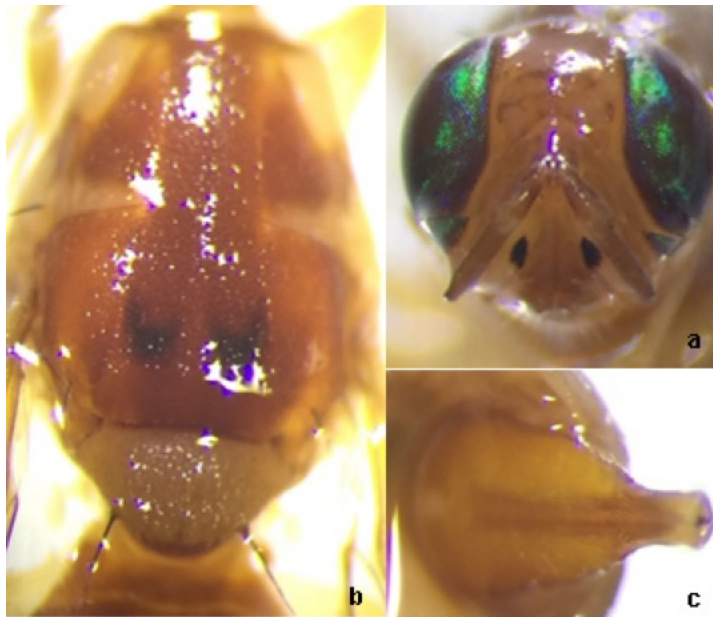


Figure 2. *Dacus ciliatus*: a) female head, b) female thorax and c) ovipositor (Photo: A. F. Çalışkan Keçe).



Figure 3. *Dacus ciliatus*: a) wing and b) adult (Photo: A. F. Çalışkan Keçe).



Figure 4. *Dacus ciliatus*: a) larvae and b, c) damage on cucumber (Photo: A. F. Çalışkan Keçe).

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