



A NEW RECORD FOR TÜRKİYE'S INVASIVE EXOTIC INSECT FAUNA *Aclees taiwanensis* Kôno, 1933 (COLEOPTERA: CURCULIONIDAE: MOLYTINAE)

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ABSTRACT: An insect species is considered invasive if it is non-native, introduced either intentionally or unintentionally, and poses or is likely to pose environmental, economic, or human-related harm. An invasion is completed in four steps. These are an introduction, establishment, spread, and naturalization. During the faunistic research in September 2024 in Bahçeköy-Sarıyer to determine insect species, a species belonging to the Curculionidae family, which attracted attention with its size, was seen on a fig tree. Ten adult beetles were caught, placed in plastic containers, and brought to the laboratory. Through laboratory examination and literature review, it was identified that the species is *Aclees taiwanensis* Kôno, 1933 (Coleoptera: Curculionidae: Molytinae). Although it prefers *Ficus carica* L. as its primary host, it also occurs on *F. benjamina* L., *F. microcarpa* L.f., *F. pandurata* Hance, and *F. retusa* L. species. *A. taiwanensis* native distribution area is Taiwan. It was introduced to France, Italy, Slovenia, and Poland. This study reports *A. taiwanensis* for the first time in Türkiye. It is not inside the List of Agricultural Quarantine Species, Republic of Türkiye, Ministry of Agriculture and Forestry. Since Türkiye ranks first in the world in fig production, it is necessary to investigate the distribution areas of this species and start eradication efforts.

Keywords: Agricultural quarantine species, *Ficus carica*, native distribution area, pest, Türkiye

TÜRKİYE İSTİLACI EGZOTİK BÖCEK FAUNASINA YENİ BİR KAYIT *Aclees taiwanensis* Kôno, 1933 (COLEOPTERA: CURCULIONIDAE: MOLYTINAE)

ÖZET: Bir böcek türünün istilacı olarak kabul edilebilmesi için yerli bilinen tür olmaması, kasıtlı yahut kazara alana getirilmiş olması, çevresel, ekonomik yada insan sağlığına yönelik zararlara yol açması veya verme ihtimalinin bulunması gerekir. Bir istila dört adımda gerçekleşir. Bunlar giriş, yerleşme, yayılma ve doğallaşmadır. Eylül 2024'te Bahçeköy-Sarıyer'de böcek türlerinin belirlenmesi amacıyla yapılan faunistik araştırma sırasında bir incir ağacında morfolojik olarak büyüklüğü ile dikkat çeken Curculionidae familyasına ait tür gözlemlenmiştir. İncelenen bitkiden 10 adet ergin böcek yakalanarak plastik kaplara konulmuş ve laboratuvara getirilmiştir. Laboratuvar incelemesi ve literatür taraması sonucunda türün *Aclees taiwanensis* Kôno, 1933 (Coleoptera: Curculionidae: Molytinae) olduğu tespit edilmiştir. Birincil konukçu olarak *Ficus carica*'yı tercih etmesine rağmen, *F. benjamina* L., *F. microcarpa* L.f., *F. pandurata* Hance ve *F. retusa* L. türlerinde de görüldüğü literatürde belirtilmektedir. *A. taiwanensis*'in doğal yayılış alanının Tayvan olduğu bilinmektedir. Fransa, İtalya, Slovenya ve Polonya'da da yayılış gösterdiği tespit edilmiştir. Bu çalışmada *A. taiwanensis* Türkiye'de ilk kez rapor edilmiştir. Bu tür Türkiye Cumhuriyeti Tarım ve Orman Bakanlığı Zirai Karantina Türleri Listesi'nde yer almamaktadır. Türkiye incir üretiminde dünyada ilk sırada yer aldığı için bu türün yayılış alanlarının araştırılması ve eradikasyon çalışmalarının başlatılması gerekmektedir.

Anahtar kelimeler: Tarımsal karantina türü, *Ficus carica*, doğal yayılış alanı, zararlı, Türkiye

INTRODUCTION

In recent years, a large number of invasive exotic insect species have been observed in Türkiye. The reason for the increase in the incidence of these species is the ease of international trade and the consequent disappearance of natural borders. For an insect species to be considered invasive, it must be non-native; be introduced intentionally or unintentionally; and cause or be likely to cause environmental and/or economic damage and/or harm to humans (Iannone et al., 2020). An invasion is completed in four steps. These are introduction, establishment, spread and naturalization (Öztemiz & Doğanlar, 2015). An example of a species that negatively affects park and garden plants and is likely to impact deciduous forest areas in Türkiye is *Anoplophora chinensis* (Forster). This species was first detected in Istanbul in 2014 (Hızal et al., 2015). It later spread within the country through plant transfers. Native to East Asia, this species entered the country through the plant trade. It is now observed in many provinces (Oğuzoğlu et al., 2024). Another invasive species introduced is the *Halyomorpha halys* (Stål). It was reported in Türkiye in 2017 in Istanbul and later in Artvin, on the border of Georgia (Çerçi & Koçak, 2017; Güncan & Gümüş, 2019). The pest has spread along the Black Sea coastline. It causes significant quality and yield losses in hazelnut, kiwi, persimmon and corn species (Ak et al., 2019, 2023; Özdemir & Tuncer, 2021).

Curculionidae is the most species-rich family of the Curculionoidea superfamily. Curculionidae exhibits significant variation in size and shape. The rostrum is well-developed in most species, with capitate antennae located at the center. Species in this family undergo complete metamorphosis. All members are phytophagous, and the group is of economic importance. The family contains numerous significant agricultural and forest pests. Typically,

larvae feed within plant tissues, while adults create holes in fruits, nuts, and other plant parts (Fuentes et al., 2017; Bolu et al., 2023)

The *Aclees* genus taxonomy is generally confused. The known species are morphologically very similar. It makes it difficult to identify them correctly. Species within the genus are distributed in Madagascar, Africa, East Asia and Australia (Meragalli et al., 2020a,b; Mazur et al., 2024).

This study reports to *Aclees taiwanensis* Kôno, 1933 (Coleoptera: Curculionidae) for the first time in Türkiye, where they were detected on fig trees and also review the latest literature on the occurrence of species in Europe.

MATERIAL AND METHOD

During the faunistic research carried out in September 2024 in Bahçeköy-Sarıyer to determine insect species, a species belonging to the Curculionidae family, which attracted attention with its size, was seen on a fig tree (*Ficus carica* L.)(Figure 1 / Location: At1). As a result of detailed examination of the tree, ten adult beetle individuals were caught, placed in plastic containers and brought to the laboratory. All adult beetles were examined under the Leica S8APO microscope and Leica DFC camera and identified from the literature (Meregalli et al., 2020 a,b; Valladares & Tamisier, 2023). Ten adult individuals were measured and turned into biological museum specimens. These specimens were preserved in the Collection of Istanbul University – Cerrahpaşa, Faculty of Forestry, Department of Forest Entomology and Protection.

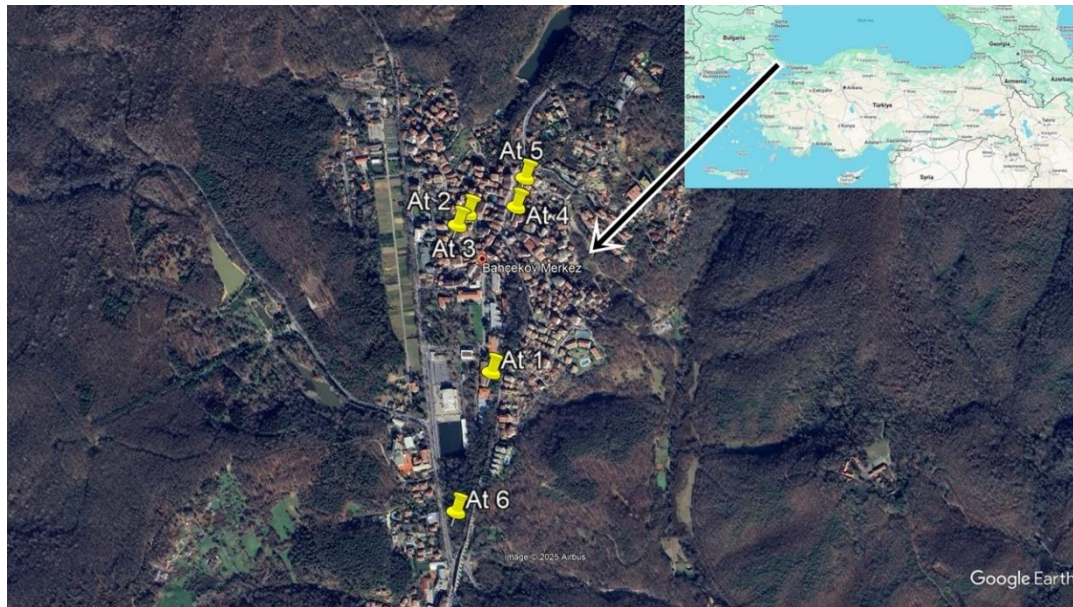


Figure 1. Study Locations (Bahçeköy-Sarıyer)

RESULTS AND DISCUSSION

As a result of this study, we determined that the insects on the fig trees were *Aclees taiwanensis* Kôno, 1933 (Coleoptera: Curculionidae: Molytinae) (Figure 2). Specimens were between 1.5 and 1.9 cm long. No significant size difference was found between the males and females.

Order: Coleoptera

Family: Curculionidae

Subfamily: Molytinae

Genus: *Aclees*

Species: *Aclees taiwanensis* Kôno, 1933

Material examined: Bahçeköy-Sarıyer/ISTANBUL, 41°10'30.23"N, 28°59'31.49"E, 25.09.2024, 3 ♀ 7♂.

Host plant: *Ficus carica* L.

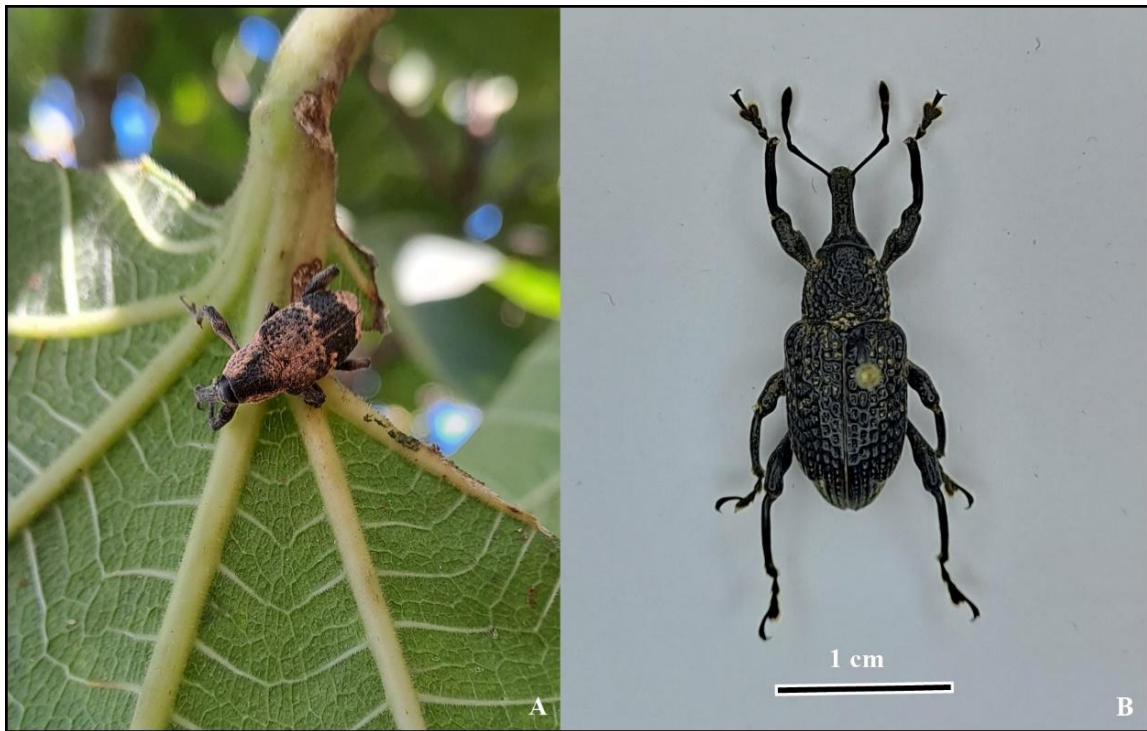


Figure 2. A) *Aclees taiwanensis* Kôno, 1933; Freshly Emerged Specimen Covered With Exudate, B) Collection Specimen

Freshly emerged specimens are covered by an exudate of undetermined composition, possibly a wax coating, lacking the white zigzag pattern (Figure 2A) that is lost in older specimens (with the influence of environmental conditions) and in those preserved in collections (Figure 2B). Body glossy black, antennae and tarsi dark brown. The elytra are wider than the pronotum, with a prominent shoulder hump; the punctures in the stripes are pit-like, more or less triangular; the interspaces are arched, finely wrinkled transversely and very sparsely punctuated, scattered with granules near the base, and the fourth interspace has a prominent tubercle at the end (Figure 3A). The rostrum is parallel-sided, slightly widened and curved at the tip, with a weak groove between the antennae bases, finely wrinkled at the tip, widely coarsely punctuated behind the antennae base, and a deep lateral groove on each side. The antennae flagellum is noticeably shorter than the scape, with the two basal flagellum segments almost equal in length, twice as long as wide; the third segment is slightly shorter than long, the following segments even shorter. The 7th segment is part of the club, tomentose (Figure

3B). The pronotum is almost as long as it is wide, parallel-sided in the last two-thirds, with a rim at the base; the eye lobes are indistinct; the sculpture consists of coarse, strongly wrinkled punctures, weakly punctuated at the front edge. The scutellum is triangular, sparsely finely punctuated.

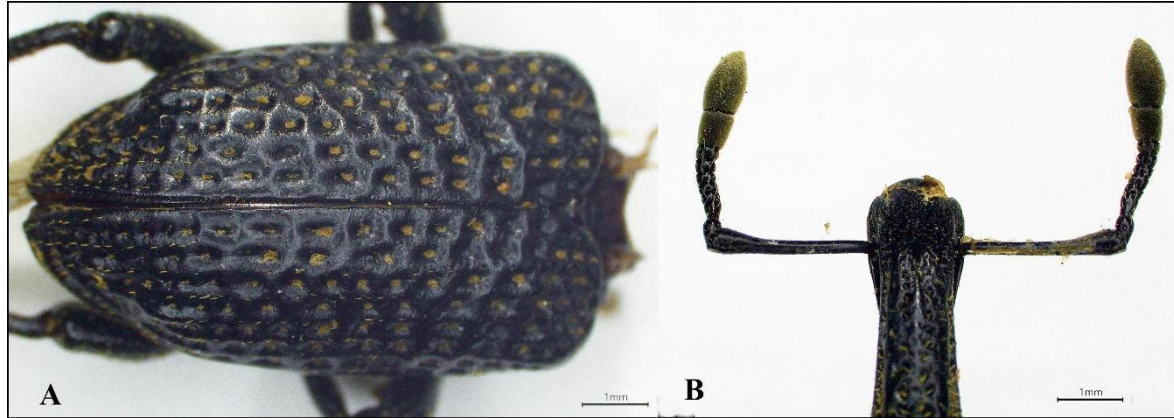


Figure 3. *Aclees taiwanensis* Kôno, 1933, Elytra (A), Antenna (B)

Aclees taiwanensis native distribution area is Taiwan. Introduced to France (Perrin 1997, as *Aclees cribratus*), Italy (Ciampolini et al., 2005 as *Aclees* sp. cf. *foveatus* Voss, 1932), Poland (Mazur et al., 2024), Slovenia (URL-1).

As a result of the research conducted in Bahçeköy, it was found that the insect had spread to numerous fig trees (Figure 1 / At 1-6). Although it prefers *Ficus carica* as its primary host, it also occurs on *F. benjamina* L., *F. microcarpa* L.f., *F. pandurata* Hance and *F. retusa* L. species (Priscilla et al., 2021; Tani et al., 2023; Mazur et al., 2024). It causes significant damage to these species. In epidemic cases, this damage can lead to the death of the tree. The main damage is caused by the larvae of the insect that feeds on the roots and trunk. Adult individuals increase the damage by feeding on the buds, leaves and fruits.

Batocera rufomaculata (DeGeer) (Coleoptera: Cerambycidae) was first identified as an invasive fig pest in Türkiye in the 1970s (Tozlu & Özbek, 2000). This species causes damage similar to *A. taiwanensis*. The provinces where it has been observed in Türkiye are Adana, Antalya, Hatay, and Mersin (Öztürk, 2023). *A. taiwanensis* was second identified invasive exotic fig pest in Türkiye.

The research is limited to Bahçeköy. The fact that it has been detected on trees at different locations suggests that this species arrived in the area a few years ago. Fig trees are found in the parks, gardens, and areas the forested regions of Istanbul. *A. taiwanensis* is not on the Agricultural Quarantine Species List of the Ministry of Agriculture and Forestry of the Republic of Türkiye (URL- 2). Figs are cultivated in many countries, especially in Türkiye, Egypt, Morocco, Algeria and Iran. Türkiye's fig production is 350.000 tons and ranks 1st globally (Kaplan & Dilmen, 2024). Since Türkiye ranks first in the world in fig production, it is necessary to investigate the distribution areas of this species and start eradication efforts.

AUTHOR CONTRIBUTIONS

Only one author contributed to this study.

FUNDING STATEMENT

The author received no specific funding for this work.

CONFLICT OF INTEREST STATEMENT

The author declare no conflict of interest.

ETHICS COMMITTEE APPROVAL

This study does not require any ethics committee approval.

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