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# Pitfall trap collection of click beetles (Coleoptera: Elateridae) in Pistachio Orchards of Siirt, Turkey: New faunistic ınsights

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**Abstract**
The Elateridae fauna of Siirt Province, southeastern Turkey, was investigated using pitfall traps placed in pistachio (*Pistacia vera*) orchards between May and September 2008. This study aimed to document the diversity of click beetles in pistachio-growing ecosystems, a habitat where Elateridae species have been scarcely studied. A total of five species belonging to three genera were identified: *Aeoloderma crucifer* (Rossi, 1790), *Cardiophorus discicollis* (Herbst, 1806), *Cardiophorus nigerrimus* Erichson, 1840, *Cardiophorus vestigialis* Erichson, 1840, and *Drasterius bimaculatus* (Rossi, 1790). Among these, *A. crucifer, C. discicollis, C. nigerrimus*, and *C. vestigialis* were recorded for the first time in Siirt Province, contributing new locality records for the region. *D. bimaculatus* was found to be the most abundant species, suggesting its adaptability to pistachio orchard habitats. The use of pitfall traps proved to be an effective sampling method for capturing ground-dwelling Elateridae species, complementing previous studies in the region that utilized light traps. The findings of this research contribute to the growing knowledge of Elateridae biodiversity in agricultural landscapes and emphasize the need for further studies on their ecological roles, potential impact as agricultural pests, and interactions with pistachio cultivation. The results highlight the importance of continuous monitoring and integrated pest management strategies to sustain pistachio production while preserving insect diversity.

**Keywords:** Coleoptera, elateridae, turkey, siirt, pistachio, fauna, first record, pitfall traps, biodiversity

## Introduction

Pistachio (*Pistacia vera* Linnaeus, 1753) (Sapindales: Anacardiaceae) is an economically significant nut crop cultivated in various parts of the world, including Turkey, Iran, the United States, and Mediterranean countries. Turkey is one of the leading producers, with the Southeastern Anatolia region, particularly provinces like Gaziantep, Siirt, and Şanlıurfa, being major cultivation areas. Pistachios are primarily grown for snack production and are consumed in multiple forms, including fresh, dried, salted, and roasted. Additionally, they are used in confectionery, bakery products, and traditional desserts, making them a valuable agricultural commodity. Despite the economic importance of pistachio cultivation in Turkey, limited research has been conducted on the arthropod fauna, particularly click beetles (Coleoptera: Elateridae), that inhabit these orchards. The Elateridae family includes species that play diverse ecological roles, with some acting as agricultural pests due to their larval stages, commonly known as wireworms, which feed on plant roots and underground plant structures. Understanding the diversity and distribution of Elateridae in pistachio orchards is crucial for both biodiversity assessments and integrated pest management strategies. Several studies have previously documented Elateridae species in Turkey, but research specifically focused on pistachio orchards remains scarce. Among the available studies, Kabalak *et al*. (2013) [2] reported the presence of *Agriotes longipronotum*, a newly described species, collected from pistachio orchards in Siirt Province using light traps. Similarly, Gülperçin & Tezcan (2022) [1] recorded *Melanotus bajulus* (Erichson, 1841) in the same region using pitfall traps, further demonstrating the presence of click beetle species in pistachio-growing environments. Given the limited number of studies and the potential agricultural implications of Elateridae species, this study aims to contribute to the knowledge of click beetle diversity in pistachio orchards in Siirt Province, Turkey. The findings of this research will help in understanding the species composition of Elateridae in these agroecosystems, potentially identifying new records for the region and providing insights for future ecological and agricultural studies.

**Materıals and Methods**

In this study, which was conducted to increase the knowledge on this group of insects, was carried out with pitfall traps in pistachio orchards in Siirt (Figure 1), Southeastern Turkey, between May and September 2008.


**Fig 1:** Location of the study area on map of Turkey.

In this study, pitfall traps were deployed in pistachio orchards in Siirt Province, Southeastern Turkey, to survey the Elateridae fauna. Each pitfall trap consisted of:

a. A plastic container (Diameter: 8–12 cm, depth: 10–15 cm),
b. A preservative solution (70% ethanol or a mixture of water and detergent),
c. A rain cover (a plastic or metal plate positioned above the trap to prevent flooding).

**Results and Dıscussıon**

At the end of the study, five species were determined, namely *Aeoloderma crucifer* (Rossi, 1790) (May to september, 16 specimens), *Cardiophorus discicollis* (Herbst, 1806) (May, 1 specimen), *Cardiophorus nigerrimus* Erichson, 1840 (May, 1 specimen), *Cardiophorus vestigialis* Erichson, 1840 (May to july, 26 specimens) and *Drasterius bimaculatus* (Rossi, 1790) (May to september, 29 specimens) (Figure 2.)

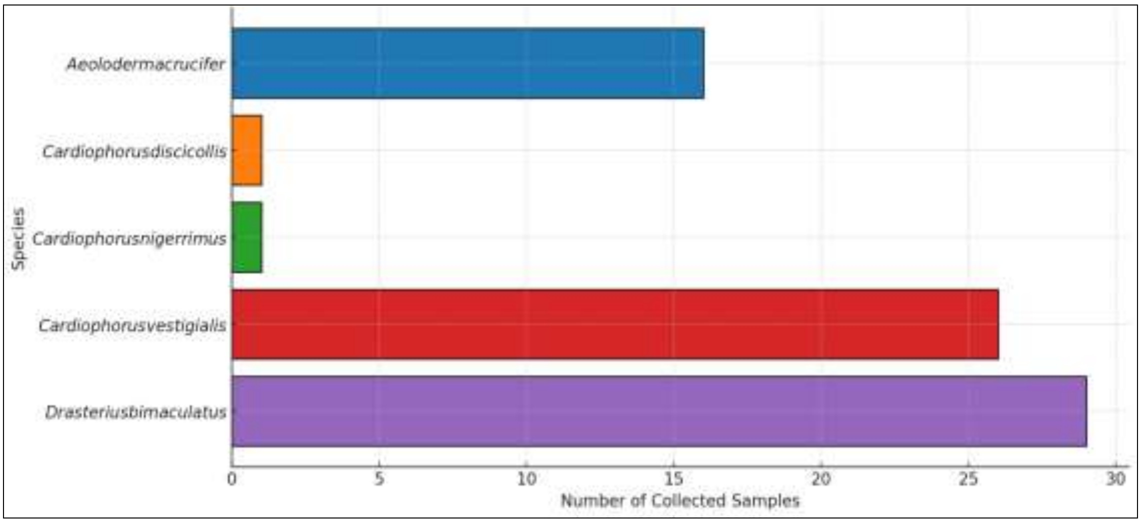


**Fig 1:** Collected Samples of Species

The results of this study contribute to the growing body of knowledge on the Elateridae fauna in pistachio orchards in Siirt Province. Among the five recorded species, four (*Aeoloderma crucifer*, *Cardiophorus discicollis*, *Cardiophorus nigerrimus*, and *Cardiophorus vestigialis*) represent first records for the region, suggesting that the local Elateridae diversity is richer than previously documented. The dominance of *Drasterius bimaculatus* aligns with findings from other agroecosystems, where species of this genus have been reported as abundant (Platia, 2010) [5]. This prevalence may be due to their ecological adaptability or the specific microhabitat conditions provided by pistachio orchards. Studies on Elateridae in different agricultural habitats have shown that species composition and abundance are influenced by soil type, vegetation cover, and agricultural management practices (Platia & Gudenzi, 2002; Özbek, 2011) [6, 4].

The use of pitfall traps proved effective in capturing these species, complementing previous studies that used light traps to sample Elateridae in the same region (Kabalak *et al*., 2013) [2]. The combination of both trapping methods has been widely recommended in insect biodiversity studies to obtain a more comprehensive representation of species richness (Lövei & Sunderland, 1996) [3]. Pitfall trapping, in particular, has been found to be highly effective for collecting ground-dwelling Elateridae species, while light trapping is better suited for capturing species with strong phototactic behavior.

Previous research has identified pistachio orchards as an important habitat for both pest and beneficial beetle species (Gülperçin & Tezcan, 2022) [1]. Wireworms, the larval stage of click beetles, can cause severe damage to pistachio seedlings by feeding on roots and underground stems, potentially reducing orchard productivity. Studies in similar agroecosystems have reported *Agriotes*, *Melanotus*, and *Cardiophorus* species as key agricultural pests (Özbek, 2011) [4]. However, some Elateridae species may play a role in natural ecosystems by contributing to soil aeration and organic matter decomposition (Traugott *et al*., 2008) [7].

With this study, the total number of Elateridae species recorded in pistachio orchards in Siirt Province has increased to seven, demonstrating the need for further surveys to document additional species that may be present but remain undetected. These findings highlight the importance of long-term monitoring to assess the potential impact of Elateridae species on pistachio cultivation.

**Future studies should focus on:**

- Seasonal population dynamics of these species, as seasonal fluctuations can influence pest outbreaks.
- Their potential role as pests or beneficial insects, particularly investigating their interactions with pistachio trees.
- The impact of agricultural practices such as irrigation, pesticide use, and soil management on Elateridae populations.

By expanding the knowledge of Elateridae diversity, researchers can better understand their ecological roles and devise strategies for sustainable pest management in pistachio orchards.

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