The OSCAR PUBLISHING Services
American Journal Of Agriculture And Horticulture Innovations

VOLUME Vol.05 Issue07 2025
PAGE NO. 20-23
DOI 10.37547/ajahi/Volume05Issue07-05

Bioecological Characteristics of Bronze Beetles (Cetoniinae) In Fruit Orchards

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Received: 21 May 2025; **Accepted:** 17 June 2025; **Published:** 19 July 2025

Abstract: This article presents research conducted on the bioecology and occurrence levels of bronze-colored beetles in pome fruit orchards under the conditions of Tashkent and Samarkand regions. The study analyzes the occurrence of bronze beetles during the flowering and fruit set periods of different varieties of apple, pear, and quince trees, comparing results across both regions. Based on the obtained data, practical suggestions and recommendations for production have been developed.

Keywords: Pome fruit orchards, flower, bronze beetle, damage, species composition, apple, pear, quince, vegetation, occurrence level.

Introduction: Bronze beetles belong to the order Coleoptera, family Scarabaeidae, subfamily Cetoniinae, tribe Cetoniini. There are over 1,000 species of bronze beetles, with 390 species found in the Ethiopian region, 298 in Indo-China, 149 in the Palearctic, 49 in the Nearctic, 31 in the Neotropics, and 20 in the Australian region. Although many species of this tribe occur in the Ethiopian and Indo-Chinese regions, the Palearctic region also offers a favorable environment for the development and distribution of Cetoniini beetles, covering a large area [2; pp. 27–28].

According to other sources, there are around 2,700 species of bronze beetles globally, with more than two-thirds distributed in Africa and tropical Asia. In the CIS countries, approximately 50 species have been recorded [3; pp. 328–330].

In agrobiocenoses of fruit orchards, bronze beetles are among the chewing pests that damage flowers and fruits of crops belonging to 15 different plant families and about 50 crop species [3; pp. 328–330; 9; pp. 104–107]. Based on their feeding behavior, they are phytophagous insects, and within this group, anthophagous species cause harm by feeding on flowers and reproductive organs of living plants [1; pp. 1–3].

METHODS

To identify bronze beetle species in fruit orchards, standard entomological methods were used, including identification keys by T.Ye. Osmolovsky and others, as well as literature by S.I. Medvedev [1964].

For collecting beetles from orchards, 10 model fruit trees were selected on a 1-hectare area, marked with tags, and monitored. Beetles were collected by shaking the branches of sample trees during early morning or cloudy weather when the temperature ranged between 8–12°C. The sampling began two weeks after bud burst. The average number of beetles was calculated mathematically from collected samples. Additionally, seasonal field observations were conducted in spring and summer [4; pp. 206–210; 5; pp. 509–510].

To assess the damage caused by bronze beetles, during the vegetation period, 10 model trees per hectare were selected. On each tree, 40 clusters of flowers, young

fruits, and mature fruits from four directions were examined for pest damage. The data were summarized and the average damage level calculated [4; pp. 206–210; 5; pp. 509–510].

RESULTS

During the research, comparative observations were conducted in apple, pear, and quince orchards to assess the spread, damage, and bioecological characteristics of bronze beetles and their infestation levels. Results are presented in tabular form.

It was found that in Tashkent region, Epicometis turanica (Turan bronze beetle) was not observed in apple orchards, whereas in Samarkand region, it was the dominant species. In pear orchards, E. turanica was absent in Tashkent but present at moderate levels in Samarkand. In quince orchards, the species was not found in Tashkent and appeared in small numbers in Samarkand.

Subsequent observations showed that Oxythyrea cinctella (Pied bronze beetle) was a dominant species in apple orchards in Tashkent, and widely present in Samarkand as well. In pear orchards, it was moderately present in both regions. In quince orchards, O. cinctella was also moderately found in both regions.

Regarding Protaetia marginicollis (Green bronze beetle), it was found at moderate levels in apple orchards in both Tashkent and Samarkand. In pear orchards, it was dominant in Tashkent and moderately present in Samarkand. In quince orchards, its occurrence was moderate in both regions.

As for Stalagmosoma allbellum (Spotted bronze beetle), it was rarely found in apple and pear orchards in Tashkent, and not detected in quince orchards. Similarly, in Samarkand, it was found in low numbers in apple and pear orchards and was absent in quince orchards.

In particular, studies on bronze beetles revealed that under the conditions of Tashkent region, the Turkestan bronze beetle (Protaetia turkestanica) was rarely encountered in apple and pear orchards, while it was completely absent in quince orchards. In the Samarkand region, Protaetia turkestanica was also found in low numbers in apple and pear orchards and was not observed at all in quince orchards.

Similarly, field observations on bronze beetles showed that in the Tashkent region, the dark-colored bronze beetle (Protaetia agglomerata) was rarely found in apple and pear orchards, and not observed in quince orchards. In the Samarkand region, Protaetia agglomerata was not detected in apple, pear, or quince orchards (Table 1).

Table 1

Damage and Occurrence Level of Bronze Beetle Pests in Pome Fruit Orchards

(Field Observations, Tashkent and Samarkand Regions, 2023–2024)

№	Pest Beetle Species	Observed Regions					
		Tashkent			Samarkand		
		Types of Pome Fruit Orchards					
		apple	**pear**	**quince**	**apple**	**pear**	**quince**
1.	Turan bronze beetle *Epicometis turanica* (Reitter, 1889)	-	-	-	++++	++	+
2.	Pied bronze beetle *Oxythyrea cinctella* (Schaum, 1841)	++++	++	++	+++	++	++
3.	**Green bronze beetle** *Protaetia marginicollis* **(Ballion, 1870)**	++	++++	++	++	++	+

4.	**Spotted bronze beetle** *Stalagmosoma allbellum* **(Pallas, 1771)**	+	+	-	+	+	-
5.	**Turkestan bronze beetle** *Protaetia turkestanica* **(Kraatz, 1886)**	+	+	-	+	+	-
6.	**Dark bronze beetle** *Protaetia agglomerata* **(Solsky, 1876)**	+	+	-	-	-	-

Note: The data were obtained by observing all four sides of 10 model trees per 1-hectare plot

++++ - very frequently observed, +++ - frequently observed, ++ - observed, + - rarely observed, - not observed

CONCLUSIONS

In conclusion, it can be stated that during the 2023–2024 vegetation seasons in pome fruit orchards of Tashkent and Samarkand regions, six species of bronze beetles were studied, including Epicometis turanica (Turan bronze beetle), Oxythyrea cinctella (Pied bronze beetle), Protaetia marginicollis (Green bronze beetle), Stalagmosoma allbellum (Spotted bronze beetle), Protaetia turkestanica (Turkestan bronze beetle), and Protaetia agglomerata (Dark bronze beetle), focusing on their species composition and occurrence levels.

The damage and occurrence level of dominant bronze beetle species in pome fruit orchards (apple, pear, and quince) were identified. Specifically, Oxythyrea cinctella (Pied bronze beetle) was found to be the dominant species in apple orchards of Tashkent region, while Epicometis turanica (Turan bronze beetle) was identified as the dominant species in pear orchards of Samarkand region.

Within different apple varieties, three dominant bronze beetle species — Epicometis turanica, Oxythyrea cinctella, and Protaetia marginicollis — were observed in terms of their distribution and damage.

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