

BIOLOGY AND ECOLOGY OF THE MAIN PESTS OCCURRING IN APRICOT (*Prunus armeniaca*) FRUIT TREES

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Abstract

This study presents a comprehensive investigation of the bioecological characteristics of major insect pests occurring in the biocenosis of apricot (*Prunus armeniaca*) fruit trees. The research focuses on economically important pest species, including case-bearing moths, scale insects, the apricot weevil (*Rhynchites auratus*), and the apricot seed wasp. Their morphology, developmental stages, phenology, population dynamics, and interactions with the host plant were analyzed.

The results showed that larvae of case-bearing moths damage buds, leaves, and young shoots of apricot trees, disrupting photosynthetic processes and weakening plant development. Scale insects feed on plant sap, leading to physiological weakening of trees and a decrease in productivity. The species *Rhynchites auratus* was found to lay eggs inside apricot fruits, where larvae develop internally, causing premature fruit drop and deterioration of fruit quality. This pest can damage a significant number of fruits within a single growing season, resulting in considerable yield losses. Natural enemies of these pests were also recorded within the biocenosis; however, their effectiveness in fully regulating pest populations was found to be limited. Therefore, the implementation of integrated pest management strategies, combining biological and agrotechnical measures, is essential for sustainable control.

Keywords. *Rhynchites auratus*, *Prunus armeniaca*, apricot, biocenosis, agroecosystem, bioecology, insect pests, population dynamics, phenology, integrated pest management, case-bearing moth, scale insects, phytophagous insects, yield, environmental factors

Introduction

Apricot (*Prunus armeniaca*) is one of the most important fruit crops cultivated in Central Asia since ancient times and has high economic value. This

plant is not only rich in nutritional and dietary properties but also serves as an important raw material for the processing industry. Apricot fruits contain sugars, organic acids, vitamins (especially C and PP), carotenoids, and pectin substances, all of which are beneficial for human health. Therefore, the development of apricot cultivation and increasing its productivity remain priority tasks in agriculture.

However, the widespread occurrence of various insect pests in apricot agroecosystems leads to significant yield reduction, deterioration of fruit quality, and economic losses. In particular, case-bearing moths, scale insects, fruit pests, and coleopteran phytophagous insects cause serious damage in apricot orchards. These pests affect different plant organs, including roots, stems, leaves, flowers, and fruits, disrupting physiological processes and negatively impacting overall plant development.

Among these pests, *Rhynchites auratus* is of particular importance as a dangerous phytophagous species that directly damages apricot fruits. Adult insects become active in spring, feeding on buds, flowers, and young fruits, while females lay eggs inside the fruits. The larvae develop within the fruit, feeding on internal tissues, which leads to premature fruit drop and a significant reduction in yield. This is especially harmful under intensive orchard management conditions, where economic losses can be substantial.

In recent years, studying the interactions between pests and host plants in agrobiocenoses, as well as determining their population dynamics and distribution patterns, has become one of the most актуал research направлениялар. Understanding the bioecological characteristics of insect pests is essential for developing effective and environmentally safe control measures. In particular, assessing the influence of environmental factors such as temperature, humidity, and phenological stages on pest development allows for more accurate population forecasting.

From this perspective, comprehensive investigation of the bioecological characteristics of major pests in apricot biocenosis, especially *Rhynchites auratus*, evaluation of their harmfulness, and development of scientifically

grounded management strategies represent urgent scientific *задачлар*. The aim of this study is to analyze the bioecology of key pest species in apricot agroecosystems, identify their developmental patterns, and provide a scientific basis for effective pest control measures.

Results and Discussion. Larvae of case-bearing moths are widely distributed pests that damage apricot, almond, quince, cherry, sour cherry, pear, and especially apple trees. They feed on swelling and newly emerging buds, causing severe damage that may result in delayed leaf formation and prolonged defoliation. Later, larvae feed on leaf tissues, and heavily damaged leaves turn brown and appear burnt. The larvae also damage young apricot fruits.

The adult moth has a wingspan of about 12 mm, with a body length of approximately 5 mm. Its wings are narrow and pointed; the forewings are gray with slightly darker tips, while the hindwings are lighter gray. Both pairs of wings, especially the hindwings, are covered with long scales forming a characteristic fringe. The pupa of the case-bearing moth reaches up to 5 mm in length, is brown in color, and has two distinct projections at the end of the abdomen. It develops inside an elongated, light yellow-brown case attached to the bark of trees. The anterior part of the case is widened like a funnel and firmly attached to the bark, while the posterior end is pyramidal with three radiating slits. The larva reaches 5-6 mm in length before pupation and is light brown in color. It possesses characteristic shield-like structures on the thoracic segments. The larva lives inside a protective case, which enlarges as it grows. This feature is the reason for the name “case-bearing moth.” While moving, the larva carries its case and protrudes its anterior body part through the funnel-like opening. The larval case differs from the pupal case by its slightly flattened shape and absence of a pyramidal end.



Figure 1. Damaged apricot fruits caused by *Rhynchites auratus*.

At the end of May and during June, adult moths lay eggs on the underside of leaves, mainly along the central vein. A female moth lays approximately 50–70 eggs during its lifetime.

The pest overwinters in the larval stage inside protective cases attached to the bark near buds on branches. In spring, larvae become active and begin feeding on buds and young leaves. Later, they feed on the flowers and leaves of apple, apricot (*Prunus armeniaca*), almond, pear, cherry, and sour cherry trees. Heavily damaged buds dry out completely, while slightly damaged buds develop into deformed leaves. In affected plants, assimilation processes are disrupted, buds fail to accumulate sufficient nutrients, resulting in poor development, drying, and reduced yield. The harmful activity of the case-bearing moth ends when white acacia begins to bloom, as larvae then enter the pupation stage. During June–July, larvae move from leaves to branches, attach their cases to the bark, and enter diapause, remaining inactive and not feeding until the following spring. In June of the next year, larvae pupate within their cases, and in July, adult moths emerge, mate, and lay eggs for the next generation.

After hatching, larvae feed on the leaf epidermis and penetrate into the leaf tissue, forming characteristic star-shaped mines where they remain for up to one month. Subsequently, they construct a curved case by cutting leaf tissue and

fastening it with silk. Within these cases, larvae continue feeding, moving from one leaf to another. In autumn, larvae migrate toward buds on branches and prepare for overwintering. In years of heavy infestation, case-bearing moths can significantly reduce yield and weaken trees to such an extent that they become susceptible to secondary pests, including stem-boring insects. Natural enemies of this pest are relatively limited, as the larval stage is protected within the case for an extended period. Nevertheless, at all developmental stages eggs, larvae, pupae, and adults the pest can be attacked by various arthropod and vertebrate predators. Among scale insects (Coccidae), several species cause serious damage to stone fruit trees. The purple scale (*Parlatoria oleae*) infests peach, apricot, cherry, sweet cherry, and plum. The comma scale (*Lepidosaphes ulmi*) damages apricot, cherry, and sour cherry. The California red scale (*Diaspidiotus perniciosus*) affects nearly all stone fruit trees. In addition, the mealybug (*Phenacoccus mespili*) occasionally damages apricot trees.



Figure 2. Field inspection of apricot (*Prunus armeniaca*) plants for pest occurrence and bioecological assessment.

The Turan false scale, *Rhodococcus turanicus*, is a widespread pest of stone fruit trees, particularly apricot (*Prunus armeniaca*). This insect is characterized by a round, brown, and shiny scale with scattered spots, measuring 2.5-4.0 mm in diameter. Males of both the Turan false scale and related soft scale species are winged, brown in color, and possess two white filaments at the end of the abdomen. Young larvae are pinkish

with similar white tail filaments. The Turan false scale typically forms large colonies on branches; however, individuals are less densely aggregated compared to other related scale insect species. Another economically important pest is the apricot weevil, *Rhynchites auratus*. The body length of the adult without the rostrum is 9.5-11.4 mm, while the rostrum measures 2.0-2.8 mm. Eggs, larvae, and pupae differ from those of the cherry weevil mainly in size. The life cycle of the apricot weevil is generally similar to that of the cherry weevil; however, unlike the latter, it feeds not only on apricot but also on cherry and sweet cherry. Overwintered beetles begin to emerge from the soil in mid-March, before the swelling of apricot buds, and continue emerging until May. Mass emergence coincides with the period of petal fall in apricot trees. Adult beetles damage buds, flowers, and young fruits, often causing their premature drop. They feed on floral ovaries, significantly reducing fruit set. Under unfavorable weather conditions such as low temperature, wind, or rainfall, beetles temporarily stop feeding and either fall to the ground or hide under bark crevices.

Damaged fruits exhibit irregular feeding holes, which may resemble injury caused by other pests, although the holes are typically larger and more rounded. A single pair of beetles can damage up to 182 fruits during their lifetime, consuming approximately 10 cm³ of fruit pulp. The damaged areas are often covered by cork tissue, and in some apricot varieties, gum exudation is observed.

Oviposition occurs from late April to early May. The apricot seed wasp is another serious pest, particularly in regions such as the Fergana Valley and parts of Tajikistan, where it can destroy up to 30% of apricot yield, and in some years up to 75% in heavily infested orchards. This pest is distributed in mountainous areas of the Fergana Valley, the Babatag and Turkestan ranges, and northern India. The larvae overwinter inside fallen apricot and partially peach seeds. During the flowering period of apricot, larvae pupate, and adult insects emerge approximately two weeks later. Females lay eggs inside young fruits of apricot, peach, and almond, inserting them into the pulp and soft kernel tissue, usually depositing one egg per fruit. The oviposition period lasts about one month, and a female can lay up to 120 eggs during her lifetime. Larval feeding causes premature fruit drop before the seed hardens. After completing development, larvae remain inside fallen fruits, where they overwinter. Effective pest control measures must

be implemented annually, as some individuals may remain in the pupal stage for an extended period and emerge only in the following year. Timely protection measures significantly contribute to increasing apricot yield and maintaining orchard health.

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