

UDC 591.531.15  
AGRIS H10

<https://doi.org/10.33619/2414-2948/91/09>

## PHYTOPHAGOUS INSECTS OF *Malus* IN UZBEKISTAN

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## НАСЕКОМЫЕ-ФИТОФАГИ ЯБЛОНИ В УЗБЕКИСТАНЕ

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*Abstract.* The paper presents descriptions of some of the most common apple pests. In Uzbekistan, the apple tree is one of the most important fruit trees. Damage to the apple tree must be controlled, and for this, all types of pests must be studied. Horticultural products from Uzbekistan are in demand on the world market. Currently, the export of food, fruit and vegetable products totaled about 5 billion dollars. Over the past three years, the volume of exported agricultural products has more than tripled. On fruit crops, one of the most dangerous pests are mites. Biological control measures on these crops have not yet been developed to the perfection as against pests belonging to the class of insects. There are studies where effects on the number of spider mites on an apple tree are noticed, where varieties with weak and medium pubescence are especially affected by the mite, and varieties with felt pubescence are slightly damaged.

*Аннотация.* В работе представлены описания некоторых, наиболее часто встречаемых вредителей яблони. В Узбекистане яблоня является одним из важнейших плодовых деревьев. Поражения яблони должны контролироваться, а для этого необходимо изучать все виды вредителей. Продукция садоводства из Узбекистана востребована на мировом рынке. В настоящее время экспорт продовольственной, плодовоовощной продукции составил на общую сумму около 5 миллиардов долларов. За последние три года объем экспортированной сельхозпродукции вырос более чем в три раза. На плодовых культурах одним из наиболее опасных вредителей являются клещи. Биологические меры борьбы на этих культурах пока разработаны в меньшей степени, чем против других вредителей. Отмечается влияние на численность паутинового клеща на яблоне, где сорта со слабым и средним опушением особенно страдают от клеща, а сорта с войлочным опушением повреждаются слабо.

*Keywords:* pests, *Malus*, control, Uzbekistan.

*Ключевые слова:* вредители, яблоня, борьба, Узбекистан.

The appearance of the numerous apple-infesting species varies as follows: The brown mite: The adult female is a dull reddish brown with dark orange markings on a flattened body. The front legs are much longer than the other legs and reach forward from the torso. Adult European red mites are globular, reddish, and have white spines. Immatures resemble adults but are smaller. Red and globular eggs (Figure 1, 2). Adult females are pale yellow to white with two or three dark, rectangular marks on each side of the abdomen. Immatures resemble the two-spotted spider mite; however, they are more yellowish in color. Eggs are transparent and round. Spider mites cause leaf damage by puncturing cells and sucking the contents out. This causes little yellow-white dots to



appear on the upper leaf surface. In severe infestations, the dots merge and the leaf turn yellow or bronze. Resistance to clofentezine was identified in four populations of the European red mite, *Panonychus ulmi* (Koch), from apple orchards in Ontario after ca. 5 years use. Resistance was expressed at high levels (> 2000-fold at the LC 50) to clofentezine in a population selected in the laboratory. This population was resistant to hexythiazox and to the organotin compounds cyhexatin and fenbutatin-oxide. However, a population selected with fenbutatin-oxide did not show cross resistance to clofentezine. The clofentezine-resistant population was not resistant to pyridaben, propargite or dicofol [1].

Female yellow spider mites overwinter under bark or in soil debris as fertilized females. European red mites and brown mites overwinter as eggs in twig bark cracks and immature limbs. When the buds break in the spring, they travel to the young leaves and create several generations from spring until October. Females can lay up to ten eggs every day and over 200 eggs in their lifespan. During the summer, egg-to-adult development can take 7 to 10 days. They flourish in hot, dry climates. Webbing is produced by large mite colonies. Wind transport is the primary mode of dispersal [2].



Figure 1. European Red mite's egg



Figure 2 Codling moth (*Cydia pomonella* (Linnaeus, 1758) on apple

Green apple aphid is a widespread but minor apple pest that also infects pear. It is especially vital on young trees. It is brilliant green in color, as the name says, and easily recognized from other apple aphid infestations [3].

The life cycle begins in April when the aphid hatches from overwintered eggs on the bark, although the spring colonies that grow in shoot tips are unimportant. In the summer, winged forms emerge and move to the budding branches of other apple trees. In the summer, large, dense colonies form along the lengths of these migrants' branches, and it is these that are harmful. The colonies emit a strong, unique odor. Fruits near and beneath colonies are extensively polluted with honeydew, which is darkened by sooty mould and cast aphid skins. Black ants are commonly present in the colonies [4].

When pest assessments are performed from late June to the end of August, the severity of infestation by green apple aphid should be determined in each orchard. If more than 10% of shoots have green apple aphid infestations producing leaf curling, an insecticide application should be considered. The codling moth This pest is as damaging to fruit trees as it is widespread it may be found anywhere apples are planted, with the exception of East Asia and Africa. Codling moth is not

a new pest; it was brought to America by European settlers more than 200 years ago. Its primary host is apples, although it can also infect other fruits such as pears. Not only does the fruit lose its flavor, but the damaged areas of the apple may contain aflatoxins, which are carcinogens generated by mould. Lepidopteran insects use sex pheromones to communicate for mating. Olfactory communication and mate-finding can be prevented by permeating the atmosphere with synthetic pheromone. Pheromone-mediated mating disruption has become a commercially viable pest management technique and is used to control the codling moth, *Cydia pomonella*, a key insect pest of apple, on 160,000 ha worldwide. The codling moth sex pheromone, codlemone, is species specific and nontoxic. Orchard treatments with up to 100 grams of synthetic codlemone per hectare effectively control codling moth populations over the entire growing season. Practical implementation of the mating disruption technique has been realized at an opportune time, as codling moth has become resistant to many insecticides. We review codling moth chemical ecology and factors underlying the behavioral mechanisms and practical implementation of mating disruption. Area-wide programs are the result of collaborative efforts between academic research institutions, extension, chemical industries, and grower organizations, and they demonstrate the environmental and economic relevance of pheromone research [5].

The codling moth goes through four stages of development: egg, larva, pupa, and adult. The number of generations per year grows as the climate and weather warm. It is not uncommon to have two, three, or even four generations per year. The developed larvae spend the winter in a thick cocoon under the bark scales and in plant detritus or soil around the base of host trees. The larvae pupate in early spring, and the adult moths emerge around the time the apples begin to bloom. Adult moths are only active when the temperature rises over 60 degrees Fahrenheit and in the hours before and after sunset. To mate, the moths require temperatures of at least 62 degrees Fahrenheit at sundown. A female lays solitary eggs on leaves, stems, or growing fruit at night, totaling 70 to 100 eggs. The eggs hatch in six to twenty days [6].

The emerging larvae dig deeply into the developing fruit's core to feed on the seeds for three to five weeks before exiting the fruit. They fall from the tree and crawl to a sheltered area, such as plant debris on the ground or bark cracks, where they spin a cocoon for their pupa. In mid-summer, the next generation of adult moths emerges, and the life cycle begins again. The larvae found in fall-harvested apples are usually from the second or third generation. Management-biological control. Cool, moist temperatures early in the season keep spider mite populations in check. Lady beetles (*Stethorus* spp.) and minute pirate bugs (*Orius* spp.) provide significant natural control. Predator mites like *Typhlodromus* spp. or *Neoseiulus fallacis* (Garman, 1948) (= *Amblyseius fallacis* (Garman, 1948)) are also helpful in controlling spider mite populations and can be purchased. To protect predators, avoid broad-spectrum insecticide spraying. Spider mite infections thrive in dry, dusty environments, so avoid generating these circumstances and stressing the plants. Cover crops also help to alleviate dust and mite concerns. Broadleaf weeds such as mallow, bindweed, white clover, and knotweed increase mite populations. Mite numbers may be reduced if these weeds are suppressed through cultivation or grasses. Mites can be removed off the tree by using a forceful stream of water. Trees that have been drought-stressed are more vulnerable. Excessive nitrogen applications promote mite growth. The suppression of this pest in the past relied on intensive insecticide application(s) which ultimately led to the development of resistance an Effective strategy should involve all available tools for pest control for their monitoring.

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Работа поступила  
в редакцию 19.05.2023 г.

Принята к публикации  
24.05.2023 г.

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#### Ссылка для цитирования:

Muminova R. Phytophagous Insects of *Malus* in Uzbekistan // Бюллетень науки и практики. 2023. Т. 9. №6. С. 86-89. <https://doi.org/10.33619/2414-2948/91/09>

#### Cite as (APA):

Muminova, R. (2023). Phytophagous Insects of *Malus* in Uzbekistan. *Bulletin of Science and Practice*, 9(6), 86-89. <https://doi.org/10.33619/2414-2948/91/09>

