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MAIN PESTS OF THE PEAR TREE AND THEIR BIOECOLOGY

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Abstract: The article studies the main pests of the peach tree and their bioecology. The research was mainly conducted between 2023 and 2024.
Pear lace bug (*Stephanitis pyri* F.) The adult pear lace bug is 3-3.5 mm long, with a dark brown to black body. The forewings are reticulated (net-like), transparent like glass, with irregular dark spots and prominent venation. The hindwings are reduced. The tip of the female's abdomen is rounded. The eggs are elongated, about 0.4 mm long, dark gray to black in color. Nymphs are 0.6-2.3 mm long, flattened, and light brown. From the third instar onward, wing pads begin to develop.
Keywords: Pear, biocenosis, pest, bioecology, infestation, distribution, generation, population.

Introduction: In plant protection, the monitoring of fruit trees from the time seedlings are planted until they begin bearing fruit must be conducted continuously throughout the year. Our republic has highly favorable natural and climatic conditions for the development of horticulture. However, the relatively long vegetation period, along with abundant heat and light, also contribute to the rapid development of pests and diseases. Due to such favorable conditions, pests and diseases cause significant damage to orchard productivity. Therefore, the effective implementation of plant protection measures is of great importance.
Organizational and agronomic practices, as well as the selection of disease- and pest-resistant fruit tree varieties, play a crucial role. Biological control methods, along with the selective use of environmentally safer chemical agents, are also important.
The pear mite sometimes reproduces massively on pear leaves, severely damaging a significant portion of the foliage and, to some extent, the fruits, weakening the overall condition of the trees. As a result, the quantity of damaged fruits is substantially reduced sometimes by more than half. Many of the young fruits fall prematurely. In heavily infested trees, both leaves and fruits may fall off entirely well before ripening.
The gall-inducing pear mite (*Eriophyes pyri* Pagst) is extremely small and invisible to the naked eye (without a microscope). The body of the mite is elongated, worm-like, with transverse grooves on the abdomen and rows of small tubercles on the dorsal side. The rostrum (snout) is short, and it has only two pairs of legs. Its size reaches up to 230 microns. The presence of this pest on pear trees can be identified by characteristic changes occurring on the tree.

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Figure 1. Leaves and fruits infested with pear mites

The pear mite *(Eriophyes pyri* Pagst) overwinters in sheltered areas near the base of pear tree shoots, in front of buds, beneath bark layers and bud scales, and among fallen leaves. In spring, the mites crawl onto newly emerging leaves and begin feeding on their sap. As a result, galls (swellings) form slightly raised on the upper side of the leaf and flat on the underside. These galls are hollow inside and connected to the outside air through small openings on the inner side of the leaf. Initially, the galls are light green, but they later turn dark brown or black. The pests feed and reproduce inside the galls. As the galls merge, they form characteristic dark blotches. The pear mite produces several generations throughout the summer.

The pear psylla (*Psylla vasilievi* Suts), both adults and nymphs, feed on the sap of pear buds, leaves, flowers, and young shoots, causing the trees to become severely weakened. Severely infested leaves blacken and fall off. If no control measures are taken, trees may lose all their foliage as early as the beginning of July. The shoots of affected trees become twisted and deformed; the fruits remain small, hard, tasteless, and are often covered with sticky honeydew secreted by the pear psylla.

Figure 2. Shoots and leaves infested with pear aphids

Adult psylla reach up to 3 mm in length. Their body color ranges from yellowish to light green-brown, with transverse black stripes on the abdomen. The wings are transparent, with a dark spot at the rear edge; the hindwings are shorter than the forewings.

The adult female pear psylla (*Psylla vasilievi* Suts) is slightly larger than the male. Males have two transverse dark stripes on the underside of their abdominal segments, whereas females have two round dark spots. The tip of the female's abdomen points downward, while that of the male is slightly raised. Overwintering pear psylla are somewhat larger and darker than summer generations.

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The eggs are tiny, white, and barely visible to the naked eye. Shortly before hatching, they turn yellowish. One end of the egg is slightly enlarged and has a small stalk that helps it adhere to twigs; the other end tapers into a bristle-like projection. The nymphs are wingless, yellow (sometimes green), and flattened. In later instars, they become larger and develop wing buds.

Pear psylla overwinter as adults under the bark scales on pear branches and partially on the trunk. Shortly before bud break, they begin mating and laying eggs. Eggs are laid at the tips of shoots and near the buds. The first generation feeds on the sap of swollen buds, newly unfolded leaves, and especially flower calyxes. The pest develops rapidly, and by late April to early May, new winged adults of the first generation appear. In Central Asia, pear psylla produces 4-5 generations per season.

By the time the winged forms of the first generation emerge, the larger, darker overwintered individuals die off. Summer-generation females begin laying eggs 3-8 days after emerging, mainly along the veins on the upper surface of leaves. A single female can lay between 300 and 480 eggs during her lifetime.

An adult pear psylla lives approximately 2-3 months, so individuals from different generations can be observed simultaneously throughout the summer.

Adult psylla frequently fly from one tree to another, whereas the nymphs are relatively sedentary. Except for the first generation, nymphs from all subsequent generations excrete abundant sticky, sugary honeydew, which is the basis for the pest's common name. By the end of summer, honeydew production becomes especially intense. This honeydew drips onto leaves, shoots, the trunk, and fruits, causing contamination. Affected fruits develop light brown sticky spots.

During summer and autumn, adult psylla continue to move between trees and aggregate in large numbers to overwinter.

Pear sucker (*Psylla pyri* L.) The pear sucker and its nymphs feed on the sap of buds, leaves, shoots, and fruits of pear trees. While feeding, they excrete a sticky, sugary substance known as honeydew. As a result, vital physiological processes in the buds, leaves, and shoots are disrupted. During periods of mass reproduction, the trees become sticky, the leaves turn black and fall prematurely. The fruits harden, and the trees become weakened, which leads to a significant reduction in yield the following year.

Adult pear suckers are reddish-brown with reddish eyes. The nymphs are yellow with transverse stripes on their bodies. Overwintering individuals are dark gray in color.

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Figure 3. Leaf and stem infected with pear scab

The adult pear sucker (*Psylla pyri* L.) reaches a body length of about 3.7 mm. Its wings are small and pale yellowish-white. Nymphs are yellow during the first and second instars, and greenish-blue in the third instar.

The pear sucker is a monophagous pest that exclusively damages pear trees. It is widely distributed across Central Asia. Adults overwinter in bark crevices of pear trees. Females overwinter after mating and begin laying eggs on lower branches in early spring. After 5-7 days, the nymphs hatch and begin feeding on young shoots, leaves, and flowers of the pear tree. Within about a month, they develop into winged adults.

The pear sucker can produce up to five generations per season. A single female can lay up to 450 eggs, and adults live for up to two months. While feeding, nymphs secrete honeydew, which promotes the development of fungal infections and other leaf diseases in many areas.

Pear lace bug (*Stephanitis pyri* F.) The adult pear lace bug is 3-3.5 mm long, with a dark brown to black body. The forewings are reticulated (net-like), transparent like glass, with irregular dark spots and prominent venation. The hindwings are reduced. The tip of the female's abdomen is rounded. The eggs are elongated, about 0.4 mm long, dark gray to black in color. Nymphs are 0.6-2.3 mm long, flattened, and light brown. From the third instar onward, wing pads begin to develop.

Adults overwinter under fallen leaves, bark crevices, and other protected locations. They become active in early April and migrate to the trees. At the end of the pear flowering period, females begin oviposition, inserting 7-8 eggs per site into the underside of leaves. A female may lay up to 400 eggs. Eggs hatch in 20-30 days, and nymphs reach adulthood in 25-30 days.

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Figure 4. The appearance and damage of pear kandal

Both adult and nymph stages of the pear lace bug (*Stephanitis pyri* F.) feed on the underside of pear leaves by sucking plant sap. Severely affected leaves lose their coloration, and the underside becomes stained with excrement, leaving dark spots. The first generation of adults emerges in June, reproduces immediately, and starts laying eggs. The second generation, which is more numerous and causes greater damage, appears in August and enters diapause for overwintering. This pest produces two generations per year.

Case-bearing moth (*Coleophora hemerobiola* Fil.) The larvae of this species feed on the swelling and newly opening buds of quince, cherry plum, cherry, pear, and especially apple trees, leading to significant defoliation in early spring. As a result, the trees remain without foliage for an extended period. Later, the larvae feed on the leaf petioles and lamina. Severely damaged leaves turn brown and appear scorched.

The adult moth has a wingspan of approximately 12 mm, with a body length of around 5 mm. The wings are narrow and pointed at the tips. The forewings are grayish with darker tips, while the hindwings are a lighter shade of gray. Both fore- and especially hindwings bear long fringes composed of elongated scales.

Figure 5. Sheath moth, caterpillar appearance and damage

The case-bearing moth (*Coleophora hemerobiola* Fil.) The mature larva reaches up to 5 mm in length and is liver-colored, with two forked projections at the posterior end of the abdomen. The larva lives inside an elongated, light brown case. The anterior end of the case is trumpet-shaped and attaches to the tree bark via this widened part. A silk thread emerges from the trumpet-like opening. The posterior end of the case is shaped like a three-sided pyramid, with a radial slit in the tip.

Before pupation, the larva reaches a length of 5-6 mm and is light brown with a darker head. The dorsal sides of the first and second thoracic segments feature a pair of forked black shields. The larva resides inside the case, which enlarges as the larva grows. The species derives its name from this behavior. When the larva moves, it drags the case along and protrudes the anterior part of its body from the trumpet-shaped opening.

The larval case is distinguishable from the pupal case by its slightly flattened shape and lack of a pyramidal end. The egg is short, oval-shaped, approximately 1–3 mm long, with one end blunt.

Larvae overwinter in the mid-instar stage on branches of host fruit trees and awaken in early spring before bud swelling. By the time black locust (Robinia pseudoacacia) begins to bloom, the larvae cease feeding and descend to the tree trunks, hiding under bark scales or in bark crevices. They attach themselves using silk, seal the front of the case, bend their heads toward the posterior end, and remain motionless. After some time, pupation occurs.

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About one month later, adult moths emerge. In late May or June, females lay 50–70 eggs on the underside of leaves, mainly along the midrib. Nine to ten days later, larvae hatch, penetrate the leaf mesophyll between the upper and lower epidermis, and feed internally. Afterward, they exit and construct a case on the leaf surface. There, they continue feeding throughout summer, creating nearly circular cavities.

The larva attaches itself to the leaf via the trumpet-like end of the case, extends part of its body into the leaf, feeds, and then re-enters the case to relocate. Growth is slow, and by September-October, feeding ceases. Larvae overwinter on the same twigs.

The blotch leafminer moth (*Cemiostoma scitella* Zell.) This moth mines the leaves of apple trees and, occasionally, pear trees, forming rounded blotches. In cases of heavy infestation, the damaged areas merge, occupying a large portion of the leaf blade. Adults have a wingspan of 5-8 mm. The wings are silvery-white with a shiny, pale bluish hue, and the tips of the wings are marked with small dark spots.

Figure 6. Spiny moth, appearance and damage of the worm

The blotch leafminer moth (*Cemiostoma scitella* Zell.) The egg is oval-shaped and white. The larva reaches up to 5 mm in length, is pale yellowish-white, and has a liver-colored head. The larvae develop legs only after the fourth instar. The pupa is dark yellow and resides inside a white, rhomboid-shaped cocoon. The blotch leafminer overwinters in the pupal stage beneath soil particles around the tree, among dry fallen leaves, and partially in bark crevices.

In the first half of April, adult moths emerge from the pupae. Female moths lay single eggs on the lower side of apple and sometimes pear leaves. During its lifespan, a female lays 40-80 eggs. The most favorable temperature for the moth's activity is 23-24°C. Larvae hatch 8-12 days after oviposition.

The larvae feed on the mesophyll of the leaf, creating rounded blotches. By early May, numerous blotches appear on leaves, which continue to increase gradually throughout the summer. Larval development takes about two weeks, after which the larvae emerge onto the leaf surface and pupate in place without descending. The pupal stage lasts 9-16 days. In summer, C. scitella completes a generation in just over a month. The species produces four generations per year. The larvae of the final generation spin a silk thread and descend to the ground to pupate. In Central Asia, natural enemies particularly parasitoids developing in the larval and pupal stages suppress population outbreaks of the blotch leafminer. However, the species composition of these parasitoids is not yet fully identified.

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