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Research Article

BIOGEOGRAPHY OF POPULAR LEAF BEETLES (COLEOPTERA: CHRYSOMELIDAE)

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ABSTRACT

The article provides information on the fauna and ecology of the Poplar Leaf Beetle (Chrysomela populi) living and development.

KEYWORDS

Poplar Leaf-eating Beetle (Chrysomela populi) fauna, beetles, leaf-eating, ecology, zoology, vegetation, development.

INTRODUCTION

Interest in insects dates back to ancient times. Initially, they were regarded as a source of food, but with the development of livestock farming and agriculture, they began to be studied as pests. Over time, it became clear that among them, there were also beneficial insects.

As a result, branches of entomology such as sericulture and beekeeping emerged. However, the scientific study of insects began in the 17th century. The Italian scientist I. Malpighi (1628-1694) laid the foundation for the anatomy and classification of the silkworm, while the Dutch scientist J. Swammerdam (1637-1680) contributed to the study of insect anatomy and

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metamorphosis. In the second half of the 18th century, the development of entomology in Russia was greatly influenced by the works of G.I. Fisher-Valdheim (1771-1853), particularly his "Entomography of the Russian Empire," Professor E.K. Brandt (1839-1891), who wrote on the nervous system of insects, and F.P. Keppen (1833-1908), whose three-volume work "Pest Insects" was instrumental. Their works, along with those of A.O. Kovalevsky (1840-1901) and I.I. Mechnikov (1843-1916), made significant contributions to the field. During this period, researchers were especially drawn to the biology and behavior of insects. The works of French naturalist J.A. Fabre (1823-1915), particularly "Instinct and Behavior of Insects" and "The Life of Insects," are of universal importance in this field.

In the 19th and 20th centuries, practical entomology fields emerged, primarily agricultural and forestry entomology. In our country, the Entomology Bureau was established in 1894, and it was led by the great scientist and entomologist I.A. Porchinskiy (1848-1916). Professor H.A. Kholodkovskiy (1858-1921) made significant contributions to the development of practical entomology.

I.Ya. Shevirev (1859-1920) studied forestry entomology and parasitic insects. In the 20th century, the field of entomology, particularly its branches, developed into an independent science. From this century onward, the classification, physiology, and ecology of insects began to be studied in-depth, and chemical and biological control measures against pest insects were developed.

Among insects, the order Coleoptera (beetles) occupies a special place. Beetles, or Coleoptera, have hardened forewings, called elytra, made of chitin, which protect the thin, membranous hindwings tucked underneath. Their mouthparts are adapted for chewing. Many beetles have glands that release foul-smelling or toxic substances.

Many species of beetles are considered serious pests of agricultural crops.

Leaf beetles (Chrysomelidae) comprise several tens of thousands of species. The beetle entered Western Europe at the beginning of the 20th century and from there spread to Russia. Over time, it also spread to Central Asia, and today these species are found in the territories of Uzbekistan.

Chrysomela populi (poplar leaf beetle) is a very widespread species. It can be found in areas where poplar and aspen grow, from April to October. It is distributed in Europe, the Caucasus, Pakistan, Siberia, Kazakhstan, Central Asia, the Russian Far East, Ukraine, Korea, China, and Japan. This leaf beetle can develop two generations in a single year.

Morphology and Biology

The adult insect has a length of 12 mm. Its body color is yellowish or light red. The forewings are yellow-brown or red. This species has the following characteristic features: The forewings are ribbed, and their corners have small black spots. The top of the wings is dark red to yellow-brown, with a dark, claw-like tip at the junction. The wings are covered with small spots. The

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head and shield are metallic black. The eggs are elongated-oval, yellow to dark red, and about 1.5 mm in size. One-year-old larvae are light gray-white, with a dark brown shield, head, and legs. The mature larva is light gray-white or pale green, with small shiny spots, a black shield, and dark spots on the back. On the second and third segments of the body, there are sharp, pointed protrusions on the sides. The cocoon is free, short, symmetrically dotted, and light gray-white, with a sharply pointed end. Its length is 11 mm. The poplar leaf beetle (Chrysomela populi) emerges from its wintering place under the bark of trees at the end of April or early May when the air temperature is between 12-13°C. The beetles feed on the leaves of poplar and aspen, chewing on young leaves and buds, causing damage.

Reproduction

The beetles live on the leaves and mate there. The fertilized female beetle lays 20-60 eggs in a cluster on the underside of the leaves. Older females, after emerging from hibernation, can lay between 220 and 500 eggs. The larvae that emerge from the eggs feed together in clusters. The larvae hatch 10-12 days after the eggs are laid. The larvae chew through the veins of the leaves. After 7-8 days, second-instar larvae feed individually on the leaf tissue, creating holes in the leaves and leaving behind their exoskeletons. The larvae feed for 16-20 days before reaching maturity. The length of the mature larvae is 13 mm. Once the larvae have finished feeding, they suspend themselves head-down on the leaf and wrap themselves in a dark orange cocoon during the first week of June. The pupal

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stage lasts 10-14 days. In the second half of June, the beetles emerge from the cocoon and begin feeding on poplar bark. During the first week of July, these young beetles lay eggs in clusters on the undersides of leaves for the new generation. The embryo develops in the eggs, and the larvae hatch on the 10th day. The larvae continue to grow for 20-22 days, reaching maturity by the first half of August. In the second half of August, the larvae turn into pupae. By the first week of September, the young beetles emerge from the cocoon. If conditions are favorable, a third generation may develop by the end of October. The young and older beetles drop to the ground beneath the bark to enter a resting phase and hibernate.

Melassoma tremulae Fabr - Red-winged Aspen Leaf Beetle

The adult beetle is 8-10 mm long, with yellow-red forewings and a black thorax. It is commonly found on aspen and poplar trees. The beetles chew through the leaves, creating holes. It is an oligophagous leaf beetle. The eggs are elongated-oval, yellow to dark yellow, and about 1.5 mm in size. They are laid in clusters on the leaves. The young larvae are dark-colored and feed in groups. They consume the leaf tissue without damaging the veins. As they mature, the larvae move individually and can sometimes be found in large numbers, making them easy to spot. When disturbed, the larvae release a sharply scented, toxic liquid. In hot weather, this liquid evaporates quickly. Touching branches with larvae causes toxic vapors to appear in the air.

Both of these species are common, dominant pests in the Zarafshan Reserve, especially in the aspen and poplar tree associations where these plants grow, and in the grasslands.

CONCLUSION

As a result of studying and analyzing the collected material, it was determined that the beetles can be found on poplar and aspen leaves. The beetles chew through the leaves, creating holes. They are oligophagous leaf beetles. The eggs are elongated-oval, yellow to dark yellow, and about 1.5 mm in size. They are laid in clusters on the leaves. The young larvae are dark-colored and feed in groups. Information about the reproduction, feeding habits, and common locations of the poplar leaf beetle (Chrysomela populi) was collected.

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