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BENEFICIAL INSECTS (ENCARSIA, KHANKIZI, PHYTOMYZA FLY)

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Abstract: This article discusses the biological and ecological characteristics of beneficial insects, their importance in agriculture, their habitat and role in natural control against natural enemies. Scientific information on pollinators (e.g. bees), natural enemies against biopests (parasites and predators), and their role in the food chain is analyzed. Measures for the protection and increase of their populations, as well as threats arising from human activities, are also considered.
Key phrases: Beneficial insects, Bioecological characteristics, Pollinating insects, Entomophages (predatory and parasitic insects), Role in the ecosystem, Biological balance, Agricultural benefits, Natural control factors, Anthropogenic impact, Biological control agent.

Beneficial insects are insects that reduce the number of plant pests and also provide direct or indirect benefits to humans. Beneficial insects

1. a pollinator of plant flowers,
2. a supplier of raw materials for food products and industry,
3. natural predators of crop pests and other harmful animals and weeds,
4. are divided into groups such as those involved in natural processes. The importance of insects, especially bees and honeybees, in pollinating plant flowers has long been known.

food and technical materials include bees (provide honey and wax), mulberry silkworms (cocoons), some chervets (produce varnish), and others.

Many beneficial insects are known to be beneficial to or parasitize pests. For example, goldflies, syrphids, ladybird beetles, leafhoppers, thrips, predatory spiders - orius, aphids , etc.

In biological methods of plant protection, parasitic entomophages are used: Trichogramma, Gabrabracon (against moth eggs and larvae). A local herbivore - phytomyza fly - is successfully used against smut [2].

Insects also participate in soil formation (for example, from primary wingless insects to arthropods). Many insects enrich the soil layer with organic matter (soil-dwelling ants, termites, earthworms , and some beetles).

1. Species – Encarsia formosa (Family – Aphelinidae. Order – Hymenoptera.)

Encarsia is a small insect with a body size of 6-7 mm, and the male is larger than the female. With the arrival of spring, local encarsia, which emerges from hibernation, first feeds on wild plants. It damages the larvae of the acacia moth, and from April-May it damages the larvae of the acacia moth on tomatoes and similar crops. In nature, the encarsia is most abundant in August-September and damages up to 40-45% of the acacia moth. However, this indicator is observed only by the end of summer. By this time, the acacia moth has already destroyed a significant part of the crop. Taking this into account and in order to obtain high yields, the encarsia moth is grown in greenhouses (Figure 1).

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An adult wasp on a nymph of the greenhouse whitefly Trialeurodes vaporariorum.	Greenhouse whitefly pupae: unparasitized (right), attacking a whitefly nymph, Encarsia formosa (center).	An adult female Encarsia formosa wasp is laying eggs on a whitefly nymph.	Parasitized pupae of the greenhouse whitefly.

Figure 1. Encarsia – (Encarsia formosa)[3].

Plants such as tobacco, eggplant, and tomato can be used as feed crops to increase encarsia. In greenhouses, encarsia develops more on tobacco aphids, and in open fields, it develops more on tomato and eggplant pests.

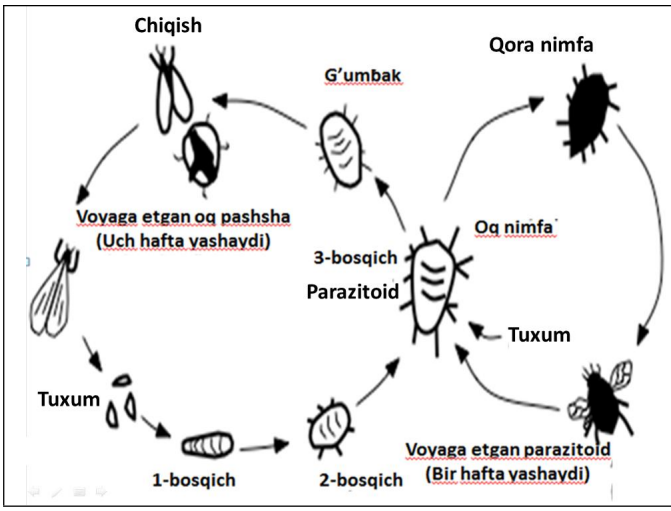
Encarzian many in cultivation step by step multiplication method effective - is.

1. First, tobacco seedlings are planted. When they have 4-5 leaflets, they are infested with aphids. The mature aphids gather on the lower leaves of the plant and begin to lay eggs.

2. From there one week later, on the leaves larvae appearance to be with encarzia is damaged. This to time come every one tobacco 1000-2000 on the leaf first-year agave larvae will be collected.

3. Infestation of larvae with encarsia is carried out by placing leaves with encarsia tubers between the branches of the plant. During this period, the first-instar larvae of the agacanth develop and pass to the second instar. Encarsia is usually distributed in a ratio of 1:5.

4. The larvae of the agave moth form encarsia in 7-8 days. When the number of these encarsias on the tobacco leaf reaches 70%, the encarsia is harvested (Figure 2).



2 . Greenhouse whitefly (Trialeurodes vaporariorum) and its parasitoid wasp Life cycles of (Encarsia formosa)

To propagate encarsia in this way, the temperature should be 27 ° C and the day length should be 15-16 hours. To separate the encarsia fungi from the harvested tobacco leaves, you can use the "Malyutka" washing machine. In this to the car before warm water is poured and 15–20 pieces average large tobacco leaf small into pieces Cut and put in. Close the lid and cook for 2-3

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minutes. is converted. Then the car stop, leaves take In this case, the encarsia mushrooms separated from the leaves float on the surface of the water. The damaged agave larvae sink to the bottom of the water (Figures 3-4).

Figure 3. An image of the whitefly Encarsia formosa emerging from its pupa.

Figure 4. Adult Encarsia perplexa eggs and incubating nymphs of citrus black fly (Aleurocanthus woglumi)[4].

The mushrooms that have stuck to the walls of the machine and sank to the bottom of the machine are washed with cold water and caught in a sieve. In greenhouses seedlings for separated in sections, tobacco 40-50 days apart difference As a result, it is possible to grow encarsia continuously (Figures 5 - 6).

Figure 5. Greenhouse agave butterfly 1-2 mm and on the right nymph of the body length 1.3–1.8 mm .

6. Encarsia formosa on a tomato leaf, size 6-7 mm (black) .

In the summer months, it takes 65-80 days from planting the acacia seedlings to harvesting them. In the autumn and winter months, this period is slightly longer, reaching 75-95 days. In this method, every 1 m ^{2} Up to 200,000 encarsias can be grown in a field (Kimsanboev et al., 1999). Against Akkanot in the fight mainly in greenhouses seedling in the fields first agave mature breeds appearance to be with or 5-7 days after planting the seedling 10 m before every 1 m ^{2} , with a gap 3-5 pieces of Encarsia are scattered on the ground. In the CIS countries and abroad, the parasitic Encarsia formosa imported from Canada is increasingly being used to combat the acacia. In Uzbekistan, a local species belonging to the Encarsia genus is particularly noteworthy[5].

2. Species – Ladybird – (Coccinella septempunctata) (Family – Carnivorous beetles – Coccinellidae. Order – Coleoptera.) [6]

Ladybugs, the family Coccinellidae, are a family of mainly predatory beetles. Ladybugs have a body length of 3–7 mm, with a convex upper surface. Most species are brightly colored, usually with stripes and spots on the upper wings. Eggs are often orange, laid in clusters of 20–

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25. The larvae are active, live an open life on plants. Most ladybugs are predatory entomophagous. The beetles and their larvae feed on aphids, spider mites, coccids, leafhoppers, mites, etc. Only some species belonging to the subfamily Epilachninae and the genus Bulae Muls. are herbivorous and cause damage. About 2 thousand species of scutes are known; including about 40 species distributed in the irrigated agricultural regions of Uzbekistan. In the biocenosis of crops, the seven-spotted scutes (C.septempunctata L.); the two-spotted scutes (Adaliabipunctata L.) and another, also widespread acarifage - a spider mite - the spotted stethorus (Stethorus punctillum Ws.) are of great importance. One beetle eats 50-100, and its larva - up to 85, aphids per day. Khonkizi beetles are used as a biological method of protecting plants from pests. To do this, the beetles are collected and released into a colony of plant lice. It is possible to avoid using chemicals if the honkizi beetle is distributed at a ratio of 1:20 against sucking pests.

The adult seven-spotted ladybug can reach a body length of 7.6–12.7 mm. Their distinctive spots and conspicuous coloration warn of their toxicity, which protects them from predators. They can secrete a liquid from the joints on their legs, which gives them an unpleasant taste. The scarred ladybug can secrete an unpleasant substance to protect itself. The seven-spotted ladybug synthesizes toxic alkaloids, N-oxide coccinellin and its free base precoccinellin; depending on the sex and diet, the size and color of the spot can indicate how toxic each insect is to potential predators (Figure 7).

			
Coccinella septempunctata .	Mating.	Egg	Larva.

Figure 7. Coccinella septempunctata - (Coccinella septempunctata) . [7]

3. Species – Phytomiza fly – (Phytomiza orabanchia Kalt.) (Family – Leaf-mining flies – Agromyzidae. Category – Diptera – Dirtera.)

In biological protection of plants, arthropods that feed on plant generative organs are considered promising and important. A lot of scientific research has been conducted on the biology and ecology of arthropods - phytophagous, their role in biological control of the number of some weeds. For example, the shumg'iani fly phytomiza Phytomiza orobanchia Kalt, and other insects are highly effective phytophagous (Bondarenko, 1986; Koppel, 1980, Soutmen, 1964; Chernyshev, 2001, Hasanov, Eshmatov, 2002; Brovdi, Zerova, Protononova, 1983, Brovdi, Slobodyanyuk, 1983, Hamraev et al., 2003, 2013). Highly specialized arthropod species that do not harm cultivated plants are used to control weeds.

The genus Orobanchaceae is a genus of annual or perennial chlorophyll-free herbaceous plants belonging to the Orobanchaceae family . **More** than 150 species are distributed in temperate and subtropical regions. In Central Asia, more than 7 species - sunflower, sedge, cabbage, corn, etc. - grow in vegetable and melon crops, sunflower, potato, tomato, etc. fields. The stem is light brown, yellow-pink or bluish-green fleshy, up to 50 cm tall. The root is

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transformed into a short fleshy tissue (haustoria). The flowers are collected in a raceme-like inflorescence, pollinated from the outside, the fruit is a multi-seeded capsule. It is dispersed by wind and water and can germinate even after 15 years. Each species feeds on the same plant species. It causes great damage to melon crops, sunflowers, tomatoes, tobacco, and other plants. The weevil attaches to the roots of plants with its suckers and sucks water and nutrients from them. As a result, the plant weakens, the taste of its fruit deteriorates, productivity decreases by 50-70%, and even the plant dies.

The Shumghias - a flower parasite of technical, vegetable - melon, tobacco and many other fodder crops. In order to find the most effective way to combat this parasite, its natural enemies - herbivores - were studied. One of these, the phytomyza fly (Phytomyza orobanchia Kalt.), has been found to be the most effective (Bronshteyn, 1970). Its larvae feed on and damage the seeds of the sorghum, and their germination is lost.

Control measures: The seeds of the sedge are removed before they ripen, herbicides are sprayed, and the biological control method uses the phytomyza fly, whose larvae feed on the seeds of the sedge .[8]

Phytomiza flies (Phytomiza orabanchia Kalt.) are widely used as aboriginal phytophagous. Its larvae feed on immature seeds, flower tissues and stems of the shumgia, and therefore this fly effectively controls the reproduction of the parasite. Phytomiza gives 5-6 generations in Central Asia, and 1-2 in Europe. According to the well-known scientist in the field of biological protection of plants OV Kovalev, the high density of the parasite in the place where the colony of phytophagous appears, the increase in the natural population of phytomiza in the agrocenosis, and their infection with parasites are important factors (Fig. 8).

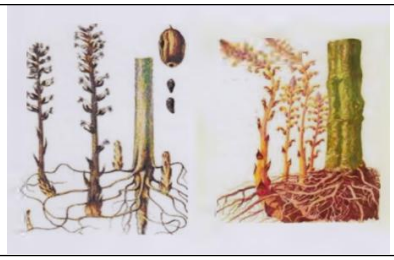	
Milkweed (Orobanchaceae family)	Phytomiza fly (Phytomiza orabanchia Kalt.)

Figure 8. Fungi and Phytomyza flies.

The only scientific work completed on the control of a fully parasitic weed, Phytomiza orobanchia Kalt, is used to control Phytomiza.

Use of Phytomyza against powdery mildew. Phytomyza is a family of flies of the Agromyzidae family, called **leaf-mining flies according to the feeding habits of their larvae, many of which are leaf-mining on various plants.** It includes about 2,500 species, which are small, some with a wingspan of 1 mm. Maximum size - 6.5 mm. Most species are 2 - 3 mm. Phytomyza - Phytomyza orabanchia Kalt. (Diptera, family Agromyzidae) overwinter inside the seed pods of mushrooms. When the average daily temperature is above 20 °C, phytomyza fly out of the overwintered fungus. After several days of feeding, they mate and the female phytomyza lays her eggs in the opened flower of the sampa. One female phytomyza lays about 20 eggs, and after 1.5-2 days, the larvae hatch from the eggs, enter the sampa flower nodes and begin to eat its raw seeds. Some of the larvae complete their development in the flower bud and turn into a

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fungus there; they gnaw through the wall of the bud, leaving a thin membrane. The phytomyza easily tears this membrane and flies out (Figure 9) .[8]

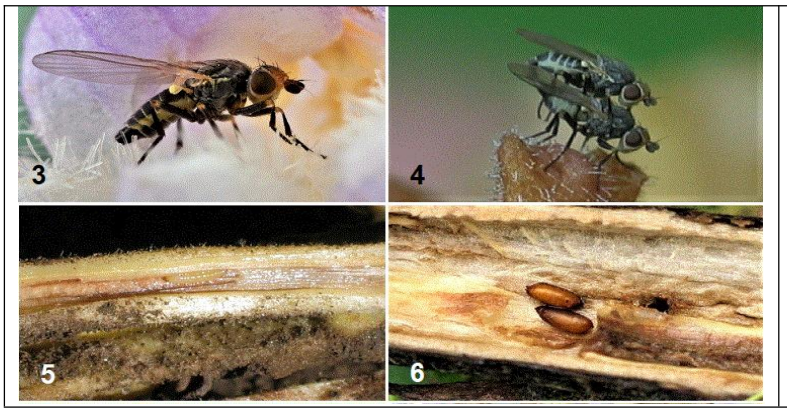

Figure 9. Phytomyza fly.[9] 3 - Phytomyza female on broomrape; 4 - Phytomyza mating on yellow broomrape (Orobanche flava); 5 - Phytomyza larva on broomrape shoots; 6 - Phytomyza fungus on the shoots of a sambucus.

The worms move along the stem and eat away at the base of the shoot node. Having completed its development, it tears off the epidermis. A stem severely damaged by phytomyza becomes hollow. The larval period lasts 14-20 days , depending on climatic conditions ; the pupal period lasts 7-9 days; the full development period of phytomyza lasts 20-36 days. The adult phytomyza is an insect 3-4 mm in size and lives up to 6 weeks. Phytomyces influences the spread of fungi in many ways in natural conditions. The entire development period of phytomyces occurs only in plants belonging to the sedge family. The development of fungi and phytomyces is synchronous. Phytomyza can leave up to 5-6 generations in Central Asia.

In order to increase the importance of phytomiza in eliminating mold, its natural resources are used. In addition, herbivores are also propagated in laboratory conditions. In late September or early October, it is necessary to start collecting natural phytomiza before preparing the field for plowing.

In this case, it is necessary to collect dry stems and seed pods of the mushroom, which are filled with larvae that have begun to hibernate, as well as late-growing mushroom inflorescences, which contain not only mushrooms, but also phytomyza larvae of different ages. At low autumn temperatures and the first freezing of the ground, these larvae die, but if artificially good conditions are created, they complete their development and turn into mushrooms. The diapause process continues throughout the winter , and this situation has a seasonal and annual character. The period of emergence of an adult insect is extended. Therefore, in the first part of the imago emergence period, 35 %, then 20, 15, 10, and 5% of imagoes emerge from the phytomyza mushroom.

Conclusion

Beneficial insects play an important role not only in maintaining biological balance in nature, but also in pollination of agricultural crops and natural pest control. It is necessary to study their bioecological characteristics in depth, protect them taking into account their living conditions, and support their activity in agroecosystems. As analyzed in the article, human activity, especially the improper use of pesticides, is leading to a decrease in the number of these beneficial organisms. Therefore, the development of sustainable strategies for the protection of beneficial insects and their use in biological control is an urgent issue.

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