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Stages of Development of Entomology Characteristics of Insects Information about Plant Juices and Some of Their Representatives

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Abstract Insects are a part of the nature around us and are closely connected with it. Insects are part of bios enosis, that is, a complex of living plant and animal organisms living in a territory. Organisms of bios enosis are strongly interconnected and have a great influence on each other. In addition, insects are affected by non-living (abiotic) nature. Humans also affect the life of insects (anthropogenic factor). Bios enosis is typical for any biotope of the territory with more or less the same soil and climatic conditions inhabited by a complex of plants and animals.

Keywords Insects, Biotic, Bios enosis, Entomology, Plant aphids, Aphidodea, Apple red blood aphid, Leaf nut aphid

1. Introduction

Entomology (Latin - insects and logia-science, teaching) is the science of insects. It studies the structure of insects, their lifestyle, their individual and historical development, diversity, distribution on the earth, their relationship with their habitat, etc.

According to the function, theoretical, that is, general entomology and applied entomology are distinguished. General Entomology - insect morphology, embryology, physiology, biochemistry, ethnology, entomogeography, paleontology, systematic and others are divided into disciplines. These subjects can be divided into smaller sections according to the object of study. For example, within systematics, coleopterology studies hard-winged birds, lepidopterology studies butterflies, and myrmecology studies ants.

The object of study of applied entomology is pests of agricultural plants and products, parasites of humans, animals and plants, as well as beneficial insects in the economy and nature. Applied Entomology is also concerned with forest pests (Forest Entomology), pests of agricultural crops (Agricultural Entomology), insects parasitic on domestic and wild animals (Veterinary Entomology), parasitic on humans (Medical Entomology), and mulberry and dub is divided into the sciences that study silkworms (sericulture), bees (beekeeping).

The science of entomology was introduced only in the 17th century by the Dutch scientist Ya. Swammerdam's anatomy and development of bees (1669), Italian scientists M. Malpigi's anatomy and development of silkworms (1686) and F. Buonanni's structure of insect mouthparts, German scientist I. Gedart's works on insect metamorphosis were formed. The Swedish Scientist K. Linnaeus founded the modern systematics of insects. He described1936 species of insects, divided them into 9 families based on the structure of their wings and established a binary nomenclature. In the 19th century, English entomologists W. Corby, J. Westwood and J. Lebbok described several more species. The French Entomologist P. Laterl proposed a class size systematics of insects.1831 Ch. With the emergence of Darwin's "On the Origin of Species" (1859), the systematics of insects began to be structured on a phylogenetic basis. In the second half of the 19th century, major works were appeared on the anatomy and metamorphosis of insects. Russian scientists N. P. Wagner discovered pedogenesis (1862), A. A. Tikhomirov discovered artificial parthenogenesis in silkworms (1886), A. O. Kovalevsky discovered a leaf in insects (1869-71), and P. Marshall discovered polyembryony (1898).

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2. Materials and Methods

During the 20th century, a huge amount of material was collected on the entomofauna of the world; many discoveries were made in the field of theoretical and practical entomology. By the end of the 20th century, more than 1 million species of insects were identified; the number of genera approached 40, insect taxonomy was revised and improved. In entomology, new and more precise methods (electron microscopy, karyosystematics) and computer technology, quantitative taxonomy and taxonomic analysis were used in systematics (American scientist R. Sokal, Russian scientist Ye. S. Smirnov, etc.). Physiology of insects,

respiration (Danish scientist A. Krogh), subtraction (English scientist V.B. Unglesworth), sensory organs, reception of polarized light and aiming at it (German scientist K. Frisch) and other issues began to be studied on a large scale. The release of hormones from the central nervous system of insects (Polish scientist S. Kopets, 1917), ecdysons (A. Butenand, 1954), the juvenile hormone that controls insect development (K. Williams, 1956) were discovered.

By the second half of the 20th century, the discovery of pheromones that distinguish insects and control their behavior (German scientist A. Butenand and others) increased interest in the study of insect behavior. In the middle of the 20th century, with the discovery of the language of bees (German zoologist K. Frisch), ethology became one of the leading branches of entomology.

The first major studies in the field of insect ecology are associated with American Scientists W. Shelford (1913) and R. Champen (1931). The German scientist G. Blunk (1922) studied the interaction of insects with their habitat and showed that their development is related to temperature. Norwegian biologist K. Fegri (1975) summarized the complex relationship between insects and entomophilous plants.

Research in the field of applied entomology began to develop at the border of the 19th and 20th centuries. The first major works were devoted to the study of pests of forest, field and field crops (German scientists Yu. Ratzeburg, 1837-1844; G. Nerdlinger, 1869; Kaltenkh, 1874; Russian scientist F. P. Keppen, 1881-1884).

The development medicine of entomology began with the study of the mosquito that spreaded malaria (Russian scientist V. Ya. Danilovsky, 1888; Italian scientist E. Martini, 1923-1941, etc.). Medicine and veterinary science Russian scientists V.N. Beklemishev's worked in the field of malaria mosquito study, Ye.N. Pavlovsky's teaching on the medical source of transmissible diseased (spread by insects and other arthropods) were of great importance in the development of entomology.

Research in the field of entomology in Central Asia, including Uzbekistan, was initiated by Russian naturalist A. B. Fedchenko. During his expeditions to Olay and Zarafshan (1868-1871), he collected about 2000 collections of insects. V.F. Oshanin (1844-1845 years) studied the insects distributed in the upper Amudarya. In his work "Zoogeofaphia of the Fauna of Turkistan Chala Hardwings" (1891), there were given about more than 700 insects. In 1898, the "Locust Committee" was established under the Turkistan Agricultural Society to study agricultural pests, and in 1911, the Turkistan Entomological Station was established in Tashkent, and in 1925, it was transformed into the Plant Protection Station of Uzbekistan. A number of studies were conducted at the station to study agricultural pests and developed measures to combat them (V.I. Plotnikov, V.V. Yakhontov, P.P. Arkhangelsky, V.V. Nikolsky). In 1929, a special station for the study of cotton pests was established, and in 1958, the Central Asian Plant Protection Research Institute was opened at its base.

Research in the field of medical and veterinary entomology in Uzbekistan began with the study of the causative agent of malaria. In 1913, in the report of the expedition conducted in Turkistan for the study of tropical diseases of humans and animals, information is given about mosquitoes that spread malaria (V.L. Yakimov). In the 20s and 30s of the 20th century, extensive research was carried out on the study of malaria and the malaria fly (N.I. Khodukin, L.M. Isayev); Several malaria research stations and the Institute of Tropical Diseases (now Medical Parasitology) were established in Samarkand. Since 1920, works in the field of entomology have been started under the departments of Turkistan State University (A.L. Brodsky). The studies of blood-sucking dipterans at the Institute of Zoology of the FA of Uzbekistan made it possible to determine their species composition, distribution, ecological characteristics and epidemiological significance (E.I. Gan, M.K. Kadirova).

Thanks to the research conducted in the field of entomology, a lot of information about cotton and other agricultural crops and warehouse pests has been collected (V.V. Yakhontov, A.G. Davleshina), methods of forecasting the rapid increase of the autumn and cotton moth have been developed (K.I. Larchenko, F.M. Uspensky, F.N. Stepanov, S.A. Juravskaya, A. Sh. Hamroyev and others); Insects damaging cotton lawns and roots (R.O. Olimzhanov), stocks of agricultural products (SM. Alimuhamedov), garden and forest pests (H.T. Nevsky, M.I. Kosobutsky, I.K. Makhnovsky) were studied.

Currently, in the field of entomology, the main focus is on the diversity of insects, the study of their rare and endangered species, the fight against harmful insects (including termites) and the scientific research works that cause less damage to the environment. For this purpose, methods of using various biologically active drugs, including attractants, pheromones and sex hormones, are being developed. In Orton, research in the field of E. was carried out by the Institute of Zoology of Uzbekistan FA, the Institute of Plant Protection, the Institute of Vegetables, Field Crops and Potatoes, the Scientific Production Center of Landscape Horticulture and Forestry, the Republican Quarantine Laboratory, the Veterinary Institute, and the departments of almost all higher educational institutions.

Insects are a class of arthropod invertebrates. About 1.5 million species are known in the world. They occupy the first place in the biosphere in terms of the number of species and the diversity of their forms, they are divided into 34 families, such as arthropods, arthropods, beetles, centipedes, tarantulas, butterflies, fleas, termites, and cockroaches. The length of the body is 0.2 mm - 33 cm, usually covered with a dense cuticle that forms the outer skeleton. The body consists of head, chest and abdomen. On the head there is a pair of complex eyes and pupils, a pair of whiskers (organs of smell and sensation) and a mouth apparatus. The oral apparatus consists of the upper lip, upper and lower jaws. The oral apparatus of rodents is characteristic of all arthropods, beetles, ants and others. And sucking insects have proboscis.

The proboscis of bees feeding on flowers has preserved the main features of rodents, and in butterflies, the proboscis consists of a tube that twists spirally; in flies, it is adapted not only for sucking, but also for scraping solid food. Ticks, plant lice, trips, coccids, blood-sucking flies and other stinging insects feed on plant sap and animal blood. The breast is divided into front, middle and back breasts. Each skeletal ring consists of a shoulder (from above), chest (from below), pleura (from below). Each joint (segment) of the thorax has a pair of legs. Legs are made up of legs divided into pelvis, chest, thigh, calf and 2-claw joints; winged insects have a pair of wings on the middle and back thorax.

Females have 11-jointed ovipositors at the tip of their abdomen, and males have a pair of protuberances. The digestive tract consists of intestines that process food mechanically and chemically.

Individual development of insects goes through several stages (phases) with complete or partial change (metamorphosis). Development with metamorphosis takes place in 3 phases (stages): egg, larva (similar to imago) and adult insect - imago. In development with complete transformation, there is also a pupal period between the larva (usually worm-like) and the imago. Their life cycle is determined by the number of joints (generations), the specificity of seasonal dynamics (change) and the characteristics of diapause.

Insects are diverse and important in nature. They occupied the whole land; It is especially common in subtropical lands. Most of them live on land, a number of species live in water, some live in soil. They feed on various products and participate in the metabolism of substances in nature.

Many types of insects are plant pests; harms animals and people. Insects also play an important role in plant pollination, pest and weed control; bees, silkworms, lacquer provide valuable products from beneficial insects; some are a source of food for hunted animals. The diversity of insects and their world is studied by the science of entomology, and the science of agricultural entomology studies the practical use of beneficial insects and methods of combating pest insects.

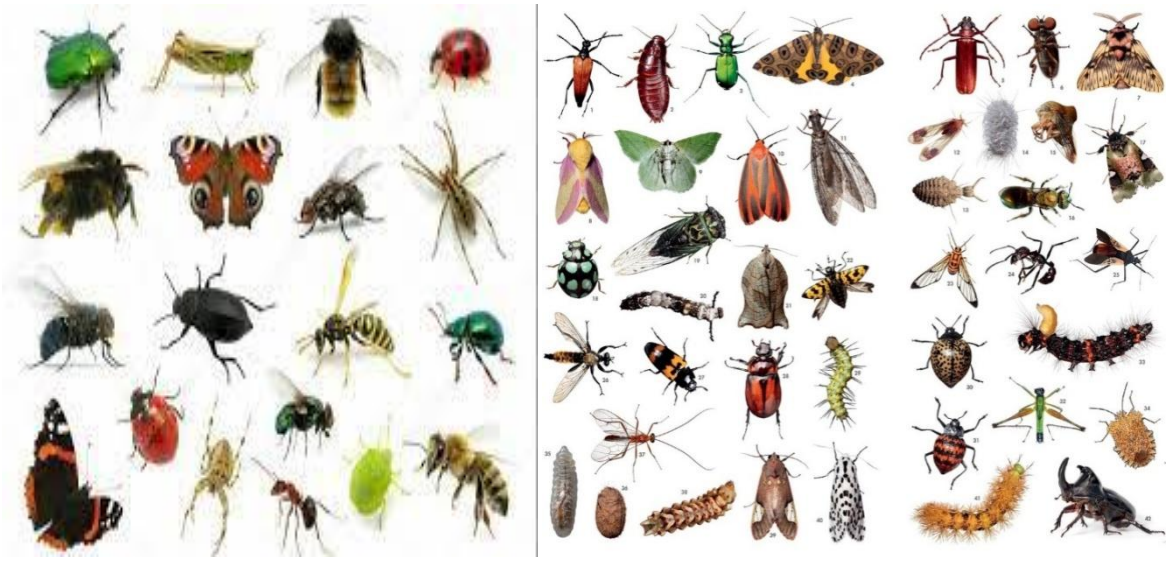

Figure 1. Insects

Figure 2. Bio ecological characteristics

Information about plant juices and some of their representatives.

It should be noted that the trophic relations of aphids with plants, their biology and ecological characteristics correspond to this definition. Therefore, this problem was in the attention of some researchers (Shaposhnikov, 1955; Narzikulov, 1951; Narzikulov, 1952; Narzikulov, 1962; Pravdin, 1950; Shaposhnikov, 1951; 1956; 1959). For example, F. Pravdin (Pravdin, 1950) justified to some extent that phytophagous insects are parasites of plants. According to his interpretation, general similarities are observed in the relationship of plant and animal parasites with the host organism, including:

1. Both plants and animals are parasitized by representatives of improved orders of insects, taxonomically close families or species belonging to the same family.
2. Commonalities are observed in the distribution of parasites across plant and animal organs, their morphological adaptations, and the laws of interdependent evolution in the "parasite-host" system.
3. The biological forms of plant and animal parasites are similar, and they cause tissue reactions.

Let's get acquainted with the bio ecological characteristics of some widespread representatives of plant saps.

Aphids - Aphidodea are very small (1-7 mm), diverse and widespread plant pests. They feed on leaves, branches, roots and other organs of plants. Most species have wax glands on their bodies. The wax produced by these glands covers the body of the insect and protects it. Some ants feed on the sweet liquid produced by aphids. Tokka phylloxera - Phylloxera vastatrix, blood aphid - Eriosomalanigerum, apple aphid - Aphis rumi, cabbage aphid - Brevicorynebrassicae, large cotton aphids - Aphis gossipii and Acyrthosiphongossipii damage vegetable crops.

Tuberolachnussalignus, Pterochloroidespersicae, Anoeciacorni, Eriosomalanigerum, Pemphigusvesicarius, Tetraneuracaerulescens, T.ulmi, Panaphisjuglandis, Chromaphisjuglandicola, Aphis craccivora, A.gossypii, A.pomi, Hyalopteruspruni, Schizaphisgraminum, Rhopalosiphonmaidis, R.musae, R.nymphaceae, Myzuspersicae, Acyrthosiphon gossypii, A.pisum, Uroleuconjaceae, U.sonchi belong to the family of rare species of chiralsri, and their share in the fauna is 27.5% (22 species). These species, along with their numerous occurrences in various biogeocenoses, are distinguished by their constant high quantitative density. This group of aphids feeds on food plants in the spring and early summer months (for example, Pemphigus vesicarius, Rhopalosiphumnumphaceae, Hyalopteruspruni, Myzuspersicaeva, etc.) or throughout the season (Tuberolachnussalignus, Pterochloroidespersicae, Callaphisjuglandis, Aphispomiand a number of other species). Theycan cause serious damage. Most of the aphids of this group can be found in orchards and can drastically reduce productivity. In particular, Aphis pomi, Dysaphisaffinis, Brachycaudus cardio and other species are included in the group of such aphids.

Apple juice - (Aphis poi Deg.). Harm. It causes damage to apples, pears and quinces, twists leave, sometimes drops young branches, Apple juice without growing, it shrivels, reduces the yield, absorbs fruit juice and reduces its quality. It causes great damage to young fruit trees.

Description: The color is green, sometimes yellow-green, winged aphids are black. Adult aphids are 2mm long, the tip of the abdomen is black, the aphid tubes are black, and the body is pear-shaped.

Life cycle. It hibernates in young branches of trees. In the spring, before the buds are written, the larvae emerge and first suck the nectar from the swollen buds, then from the leaves and flowers. The first adult saps appear before the apple blossom blooms. Aphids give 15 joints throughout the summer.

Apple red bloodsucker - EriosomalanigerumHausm Harm. It sucks the sap of apple, pear and other fruit trees, trunks and branches, and weakens the trees. Lumps appear in the areas where the sap has been absorbed, which then crack and rot. Young trees affected by blood sap often wither, and older trees become weak and produce very little. Branches with a lot of sap dry up.

Description. It is dark red without wings and covered with a waxy white powder. The body of the blood aphid is egg-shaped and the length of the wingless aphid reaches 2.1-2.6 mm when it reaches adulthood. The winged aphid has a white feather only at the tip of its abdomen. The body is cylindrical, 2.2 mm long.

Life cycle. Aphids of various ages, larvae and adults, overwinter in the roots, bark cracks, and at the base of thick branches of apple trees. It wakes up at the end of February, beginning of March, first starts feeding in the places where it wintered, then crawls out of the trees and settles in the places where the bark is thin or damaged. The galas of aphids are covered with wax feathers. Blood aphid gives 15-17 joints all summer. It is propagated by seedlings in new gardens.

Coordinated combat measures. In order to prevent the growth of blood sap and to protect the trees from diseases, a garden mixture with oil or muddy mud is applied to the cut and young areas of apple trees. It is not good to take seedlings from the garden and nurseries without fumigation. It is most effective to spray oil preparations against wintering pests at the time of budding.

According to V. V. Yakhontov's work "Agricultural pests of Central Asia", the homeland of apple red blood aphid (Eriosomalanigerium) is North America, and this insect came to Europe 200 years ago with tree seedlings. This pest entered Uzbekistan in 1905 as a result of the importation of seedlings. There are winged and wingless types of this pest. A winged aphid has a white feather on its abdomen. The body is in the form of a cylinder, and its length is about 2.2 mm. The rest of the body, the head, chest and legs are black, and the belly is dark brown.

The winged apple aphid (Eriosomalanigerium) is different in color from the wingless aphid. It can be seen that this wingless sweetie is completely covered with a waxy white powder. This aphid is also called the brilliant aphid. If we

pay attention to the biology of this aphid, we can see its uniqueness, that is, this species of aphids has different ages and adult insect stages during wintering. In both researched areas, apple red blood aphid was found in the roots of apple trees, between the bark and in the cracks of thicker branches in the winter season. V.V. According to Yakhontov, this aphid winters its egg stage in pine forests in its native North America. A temperature of +50 C is required for the hatching of the apple red bloodsucker or for the larvae to emerge from hibernation or to wake up from hibernation.

Like other species of aphids, the increase in population dynamics of this species occurs twice during one season. In summer, the heat of air temperature, dry air and the increase of beneficial insects prevent the reproduction of the aphid Eriosomalanigerium and the phenomenon of sudden decrease of aphids is observed.

The reasons for the initial increase in aphid populations are the fact that the first 3 generations of apple red blood aphids give birth to a large number of larvae, in combination with the vegetation period of the food plant, the abundance of food. There are different levels of damage to the food plant by red blood aphid populations.

Periods of reduction of the population dynamics of Eriosomalanigerium aphids fall to 80 cm2 in apple orchards in August. The second period of increase in the number of aphids in the population coincided with October. According to V.V. Yakhontov, apple red bloodworm (Eriosomalanigerium) sheds four times. The hatched larvae are active and crawl out of the tree where they fell. At this time, the larvae that have fallen from the tree penetrate into the soil and begin to feed by sucking sap from the roots. Wingless aphids cling to one place and can't pull their thin and fragile cord from the tree for almost their entire life. At the end of April and the beginning of May, some of the larvae develop their first wings and grow wings to form winged aphids.

Winged aphids are found at the end of May. There are only 1-2 winged aphids in a colony. By September, it can be observed that the number of such aphids has increased to 10-20. Two-sexed offspring grow from autumn generation aphids, and these aphids mate and lay eggs after molting 4 times. Eggs die under the influence of cold and snow in our conditions. The mother aphid dies after laying her eggs.

3. Results and Discussions

The red apple aphid (Eriosomalanigerium) in its native North America flies to the elm (Imus Americana) and lays eggs on it, and after wintering, the eggs hatch into larvae. Larvae fly to apple trees (V.V. Yakhontov, 1962). Ecological characteristics of red apple aphid (Eriosomalanigerium), despite the fact that this species of aphid moves from one place to another, it spreads only through seedlings. If the apples in the garden are close to each other, the larvae spilled on the ground can climb to the neighboring tree and form a colony.

Leaf nut sap-PanaphisyuglandisGoeze. The leaf nut aphid lives on the upper part of the walnut leaf, forming linear-shaped galls around the central vein of the leaf.

Winged viviparous female aphids give birth to larvae mainly in the morning and midday. Large walnut aphid larvae molt mainly in the evening. The scorching hot air of summer does not fail to have its effect on the sap in the walnut leaves. At this time, the amount of juice in the nuts decreases significantly. Hot summer temperatures will cause depression in the central plains under leaf nut sap. However, the juice of a large nut does not completely disappear in the nut; A very small number of its individuals remain.

In the central plains, the beginning of the depression coincides with the middle of June. In the central plains, the 2nd wave of quantity density will peak in mid-September. At this time, the amount of aphids on the leaves increases slightly due to the winged aphids and the larvae they give birth to. One of the unique features of the development of leaf nut sap is that its development is influenced by environmental conditions, including temperature and relative humidity.

Adults of the leaf nut sap do not give birth when the air temperature is in the range of +2 +4 ℃. At these temperatures, their movements are slow. Their reactions to mechanical or other influences are not noticeable.

As the air temperature rises, the number of aphids' larval birth increases. It turns out that the most optimal temperatures for spawning larvae are in the range of +20 +25℃. When the air temperature rises above 30℃, the number of larvae of aphids is significantly reduced. The development of large walnut juice slows down or stops at low or high temperatures.

The optimal effect of air humidity on the reproduction and development of aphids is strong, including when there is enough light and heat, aphids begin to multiply actively at a humidity of 75-80%. Especially this type of reproduction is activated from the middle of spring, then the decrease in air humidity, despite the sufficient light and heat, leads to a decrease in the minor density of large walnut sap. Day-to-day changes in the nutritional level of walnut sap depend on the physiological state of the plant.

The most common sightings of Panaphisjuglandis on walnut leaves occur in early May in the central plains. Due to the warming of the weather and a sharp decrease in the relative humidity of the air, the amount of this species in walnuts decreases sharply from the end of May to June. Abiotic and biotic factors of the environment, such as temperature, light, relative humidity, wind blowing, the peculiarity of the terrain, the quality of vegetation, the presence of entomophagy's, directly or indirectly affect aphids. The unique distribution of these natural factors in different regions is reflected in the biological and ecological characteristics of the aphids found in these regions.

The under leaf walnut aphid (Chromaphisjuglandicola Kalt) lives on the underside of the walnut leaf, this aphid spreads thickly on young leaves and thinly on older leaves and sucks tissue fluid (Nevsky 1929; Narzikulov 1962; Muhamadiyev 1979). - year). Chromaphisjuglandicola sap has a negative effect on the development of walnut seedlings, reducing productivity. These lichens are widespread in the

central plains and foothills.

During hot summer days, the larval development period slows down. During the hot days, the number of their births also decreases. Nut sap under the leaf does not completely disappear in the summer, a small amount of it remains throughout the summer. From the middle of July, aphids begin to multiply in the walnut plant. At the beginning of August, the amount of aphids in the plant begins to reach a peak again. The larvae born during this period develop and become adults for 12-15 days. Larvae born in early September develop into egg-laying female and male aphids. Egg-laying female aphids are found in small numbers on the back side of the leaf. Male aphids live less than females.

Abiotic and biotic factors of the environment, movement, light, air humidity, wind blowing, the peculiarity of the relief, the presence of entomophagy's directly or indirectly affect the life of walnut sap under the leaf. The body temperature of insects varies depending on the temperature of the environment.

4. Conclusions

The eggs are small and white, turning yellow before the larvae hatch. At one end of the egg there is a hook, and at the other end there is a stem, which clings to the tree branch. The larva is wingless, yellow or green, leaf-shaped. A primary wing is visible in a large larva. Pear sap hibernates under the bark and on the branches of the pear when it is an adult. Before the tree buds, it leaves the village and mates and lays its eggs near the buds. Larvae and adults feed on pear buds, leaves, flowers and tender branches. It gives birth 4-5 times in Uzbekistan.

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