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TAXONOMIC RELATIONSHIP OF WIDE PESTS IN SUGAR BEET AGROCENOSIS

©Gazi S., *ORCID: 0000-0002-9378-4283 PhD., Institute of Zoology, Baku, Azerbaijan, seliqegazi08@gmail.com*
©Shahverdiyeva Z., *ORCID: 0009-0001-1057-242X, Institute of Zoology, Baku, Azerbaijan, pule1988@mail.ru*
©Rzayeva G., *Institute of Zoology, Baku, Azerbaijan, guntekinrzayeva86@gmail.com*
©Gubadova M., *Institute of Zoology, Baku, Azerbaijan, zoologiya@inbox.ru*

ТАКСОНОМИЧЕСКАЯ СТРУКТУРА ВРЕДИТЕЛЕЙ В АГРОЦЕНОЗАХ САХАРНОЙ СВЕКЛЫ

©Гази С. Г., *ORCID: 0000-0002-9378-4283, канд. биол. наук, Институт зоологии, г. Баку, Азербайджан, seliqegazi08@gmail.com*
©Шахвердиева З. Б., *ORCID: 0009-0001-1057-242X, Институт зоологии, г. Баку, Азербайджан, pule1988@mail.ru*
©Рзаева Г. З., *Институт зоологии, г. Баку, Азербайджан, Guntekinrzayeva86@gmail.com*
©Губадова М. О., *Институт зоологии, г. Баку, Азербайджан, Zoologiya@inbox.ru*

Abstract. Based on the conducted research, information on the species composition of pests that spread in the agricultural farms of Imishli and Agdash districts of the Republic, where sugar beet is grown, as well as in the private backyards of the population, was reflected in the article. During extensive research conducted in stationary areas and surrounding areas, it was determined that pests belonging to the groups of Coleoptera, Hemiptera, Orthoptera, Diptera and Lepidoptera are found in the agrocenosis of sugar beet.

Аннотация. На основе проведенных исследований, в статье отражены сведении о видовом составе вредителей, распространенных в фермерских и приусадебных хозяйствах Имишлинского и Агдашского районов республики, где выращивается сахарная свекла. В ходе обширных исследований, проведенных на стационарных участках и прилегающих территориях, установлено, что в агроценозе сахарной свеклы обнаружены вредители, относящиеся к группам Coleoptera, Hemiptera, Orthoptera, Diptera и Lepidoptera.

Keywords: agrocenosis, vegetative period, *Beta vulgaris*, Coleoptera.

Ключевые слова: агроценоз, вегетационный период, сахарная свекла, жесткокрылые.

In connection with the annual expansion of sugar beet crops in Azerbaijan, it is important to study the species composition of its pests in this agrocenosis. Thus, it is very important to study the species composition of pests in beet crops, to identify economically important species that cause serious crop loss and are widespread in the area, and to prepare effective control measures against them [8].

That is why in 2018-2022, expeditions were regularly organized to the farms of Imishli and Agdash districts of the Republic, where sugar beet is planted, and at the same time to private backyards of the population, and along with route observations, actual materials were also collected.

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The mass of sugar beet fruit roots continues to grow at all stages of vegetation, that is, until harvest. The development of the leaf mass stops after reaching a certain limit. Usually, this happens near the end of the growing season, that is, in early September. At the beginning of vegetation, the mass of leaves exceeds the mass of roots and fruits, and at the end, the opposite happens. Therefore, sugar beet is damaged by pests at all stages of its vegetation.

Materials and Methods

Research were conducted in field and laboratory conditions in 2018-2022. Laboratory experiments were carried out in the Center of Applied Zoology of the Institute of Zoology of the Ministry of Science and Education of the Republic of Azerbaijan in special thermostats controlled automatically and in room conditions. Field work was carried out in special stationary and private backyards where sugar beet is grown in Imishli and Aghdash [8].

Special entomological bags and traps were used during the collection of fast-moving insects. For this, stationary areas were selected in the fields and insects were collected in a bag by tapping on all the plants in the diagonal areas, and then they were placed in test bottles and special jars and brought to the laboratory for further experiments and determination. In order to determine the species composition of poorly mobile insects, the plants were inspected diagonally in the selected areas, and the encountered insects were collected in special containers and taken for research. Eggs, larvae and caterpillars encountered during the collection of insects were fed to the imago stage in laboratory conditions and species affiliation was determined. Bioecological indicators, phenological calendars, rates of damage, etc. of widespread and economically important pests. characteristics were investigated in detail both in stationary areas and, if necessary, in laboratory conditions.

Damage to plants in the fields was calculated using the following formula [1]:

$$P = \frac{n \times 100}{N}$$

here, P is the percentage of plant damage in the field. N — the total number of samples viewed; n — the number of damaged plants. 100 is a percentage conversion factor.

In the laboratory part of the study, individuals were collected, multiplied in laboratory conditions and pure cultures were obtained for conducting various experiments.

Caterpillars collected from nature were collected in 0.1-liter glass jars and closed with air-permeable cloth. Adult caterpillars were placed in 1-liter jars with 5-7 cm thick wet sawdust and pomegranate soil on the bottom. Sawdust and soil were replaced every 5-10 days as needed. Juvenile caterpillars were placed in 0.5-liter glass jars without soil or sawdust, but in this case, circular cut filter paper was placed at the bottom of the jar. Caterpillars are fed with different plants.

Jars are regularly cleaned, food residues are removed.

Round-tipped tweezers were used to avoid damage to caterpillars and larvae while examining the research object. A soft brush was used for small caterpillars. In order to avoid overcrowding, 10-15 individuals are placed in each jar. Butterflies that emerged from the pupa were transferred to separate 0.5-liter glass jars, 1 female and 1 male each. They were regularly fed with 5% sugar solution. The mouth of the cans is closed with regulation to allow air to pass. Eggs laid by butterflies were regularly transferred to new, sterile jars. For the normal development of eggs, cotton soaked in water was placed at the bottom of the jars to create humidity.

The experiments were carried out in 4-5 replicates at a temperature of 25°C.

PRK lamps were used to study the flight dynamics of nocturnal insects. During the observations, the research methods carried out by the laboratory staff in cotton agrocenosis in previous years were used [2].

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When specifying the taxonomic affiliation of the species, various designation sources were used [3-5].

Mathematical processing of materials is based on Lakin and Plokhinski methods [6, 7].

Analysis of the obtained results

During the route observations, the species that harm the plant were investigated in the areas where sugar beet is planted, the species composition of pests common in agrocenosis and the species of serious economic importance were determined. 48 types of pests belonging to 5 groups, 15 families and 42 genera were found in the agrocenosis during the observations and research conducted on farms.

Table

COMMON PESTS IN BEET AGROCENOSIS

No.	*Order*	*Family*	*Genus*	*Species*	*Spread*
I	Coleoptera	Scarabaeidae	*Oxythyrea* Mulsant, 1842	*O. funesta* (Poda, 1761)	+
			Pentodon Hope, 1837	*P. idiota* (Herbst, 1789)	+
			Holochelus (Miltotrogus) subgen. *Miltotrogus* Reitter, 1902	*H. aequinoctialis* (Herbst, 1790)	+
			Epicometis Burmeister, 1842	*E. hirta* (Poda, 1761)	+
			Cetonia Fabricius, 1775	*C. aurata* (Linnaeus, 1758)	+
			Polyphylla Harris, 1841	*P. olivieri* (Castelnau, 1840)	+
			Amphimallon Latreille, 1825	*A. solstitiale* (Linnaeus, 1758)	++
			Rhizotrogus Latreille, 1825	*R. aestivus* (Olivier, 1789)	+
			Melolontha Fabricius, 1775	*M. melolontha* (Linnaeus, 1758)	++
			Anisoplia Fischer Von Waldheim, 1824	*A. austriaca* (Herbst, 1783)	+
				A. segetum (Herbst, 1783)	+
		Elateridae	*Agriotes* Eschscholtz, 1829	*A. sputator* (Linnaeus, 1758)	++
				A. lineatus (Linnaeus, 1767)	+
			Athous Eschscholtz, 1829	*A. hirtus* (Herbst, 1784)	+
				A. niger (Linnaeus, 1758)	+
		Curculionidae	*Tanymecus* Germar,1817	*T. palliatus* (Fabricius, 1787)	++
			Psalidium Illiger, 1802	*P. maxillosum* Schoenherr, 1826	+
			Bothynoderes C. J. Schoenherr, 1823	*B. punctiventris* Schoenherr, 1834	+++
		Chrysomelidae	*Chaetocnema* Stephens, 1831	*Ch. concinna* (Marsham, 1802)	+++
				Ch. breviuscula (Faldermann, 1837)	+++
			Phyllotreta Chevrolat, 1836	*Ph. atra* (Fabricius, 1775)	+
			Cassida Linnaeus, 1758	*C. nebulosa* Linnaeus, 1758	+

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No.	Order	Family	Genus	Species	Spread
II	Hemiptera	Miridae	*Polymerus* Hahn, 1831	*P. cognatus* (Fieber, 1858)	+
			Orthotylus Fieber, 1858	*O. flavosparsus* (C. Sahlberg, 1841)	+
		Piesmatidae	*Piesma* Lepelitier & Serville, 1825	*P. quadratum* (Fieber, 1844)	+
		Aphididae	*Aphis* Linnaeus, 1758	*A. fabae* Scopoli, 1763	+++
			Pemphigus Hartig, 1839	*P. fuscicornis* (Koch, 1857)	+
III	Orthoptera	Gryllotalpidae	*Gryllotalpa* Latreille, 1802	*G. gryllotalpa* (Linnaeus, 1758)	+
			Gryllus Linnaeus, 1758	*G. desertus* Pallas, 1771	+++
		Tettigoniidae	*Tettigonia* Linnaeus, 1758	*T. caudata* (Charpentier, 1845)	+
				T. viridissima (Linnaeus, 1758)	+
		Acrididae	*Heteracris* Walker, 1870	*H. herbacea* (Serville, 1838)	+
			Calliptamus Serville, 1831	*C. italicus* (Linnaeus, 1758)	++
			Locusta Linnaeus, 1758	*L. migratoria* (Linnaeus, 1758)	+
			Dociostaurus Fieber, 1853	*D. maroccanus* (Thunberg, 1815)	+
IV	Diptera	Anthomyiidae	*Pegomya* Robineau-Desvoidy, 1830	*P. betae* (Curtis, 1847)	+
V	Lepidoptera	Noctuidae	*Phytometra* Haworth, 1809	*Ph. gamma* (Linnaeus, 1758)	+
			Helicoverpa Hardwick, 1965	*H. armigera* (Hübner, 1808)	+
			Lacanobia Billberg, 1820	*L. oleracea* Linnaeus, 1758	+
			Mamestra Ochsenheimer, 1816	*M. brassicae* Linnaeus, 1758	++
			Agrotis Ochsenheimer, 1816	*A. exclamationis* (Linnaeus, 1758)	+
				A. segetum (Denis & Schiffermüller) 1775	+++
			Xestia Hübner	*X. c-nigrum* (Linnaeus, 1758)	+
			Noctua Linnaeus, 1758	*N. pronuba* Linnaeus, 1758	+
		Pieridae	*Pieris* Hübner, 1819	*P. brassicae* (Linnaeus, 1758)	++
		Crambidae	*Haritalodes* Warren, 1890	*H. derogata* Fabricius, 1775	++
			Loxostege Hübner, 1825	*L. sticticalis* Linnaeus, 1761	+
		Gelechiidae	*Scrobipalpa* Janse, 1851	*S. ocellatella* (Boyd, 1858)	++

Note: + — single species; ++ — common species; +++ — widespread and serious pest species

During extensive research conducted in stationary areas and surrounding areas, it was determined that 22 species belonging to 18 genera of 4 families belonging to the Coleoptera order, 5 species belonging to 5 genera of 3 families belonging to the Hemiptera order, 8 species belonging to 7 genera of 3 families belonging to the Orthoptera order, 1 belonging to the Homoptera order

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2 species belonging to 2 genera of the family, 1 species belonging to 1 genus of 1 family belonging to the order of Diptera, 12 species belonging to 11 genera of 4 families belonging to the order Lepidoptera settle in beet agrocenosis in different periods and cause damage to farms to one degree or another.

As can be seen from the table, pests belonging to Coleoptera, Hemiptera, Orthoptera, Diptera and Lepidoptera groups are found in sugar beet agrocenosis.

Among these species, *Oxythyrea funesta*, *Pentodon idiota*, *Epicometis hirta*, *Cetonia aurata*, *Polyphylla olivieri*, *Rhizotrogus aestivus*, *Anisoplia austriaca* and *Anisoplia segetum*, which belong to the family of Scarabaeidae, are few in number, but their larvae slow down or completely stop their development by gnawing the roots of seedlings.

Holochelus (Miltotrogus) aequinoctialis, *Amphimallon solstitiale* and *Melolontha melolontha* species belonging to this family are observed in the beet agrocenosis almost throughout the growing season, and along with their larvae, their imagoes also cause serious damage to various organs of plants during mass growth.

Although *Agriotes lineatus*, *Athous hirtus* and *Athous niger* species from the representatives of the Elateridae family are rare, the species *Agriotes sputator* is found throughout the growing season both in beet fields, as well as on field edges and other cultivated areas and it is observed that it damages the plant in all phases from seed sowing to fruit root formation.

Bothynoderes punctiventris, belonging to the Curculionidae family, is one of the widespread pests in agricultural fields, causing considerable damage to plants. The second representative of this family, *Tanymecus palliatus*, is also found in agrocenosis and damages mainly the roots and fruits of the plant. It should be noted that the number of this pest is not so high compared to the *Psalidium maxillosum* is rarely found in the fields.

Starting from the first leafing period of the beet plant, leaf-eating insects, *Chaetocnema concinna, Ch. breviuscula, Phyllotreta atra* and root aphid *Cassida nebulose* begin to be active. Among them, the common beet weevil and the southern beet weevil spread more massively in the fields, destroying the leaves of the plant, resulting in the disruption of the photosynthesis process and the destruction of the plant.

Representatives of three families of the Hemiptera order are also found in beet fields. *P. cognatus* belonging to the genus *Polymerus* of the Miridae family, *Orthotylus flavosparsus* of the genus *Orthotylus*, and *P. quadratum* belonging to the *Piesma* genus of the family Piesmatidae are found on plants, although they are few in number in the agrocenosis. One of the encountered species was the *A. fabae* Scopoli, 1763 belonging to the Aphididae family, which causes considerable damage to plants by operating in the fields from the first sprouts of the plant until the leaf becomes rough. At the same time, *Pemphigus fuscicornis* (Koch, 1857) can be found in the fields.

In the agrocenosis, two species *Gryllotalpa gryllotalpa* and *Gryllus desertus* belonging to two genera: *Gryllotalpa* Latreille, 1802; and *Gryllus* Linnaeus, 1758 of the Orthoptera order of the Gryllotalpidae family, two species of the *Tettigonia* genus belonging to the Tettigoniidae family 4 species of four genera: *Heteracris*; *Calliptamus*; *Locusta* and *Dociostaurus* belonging to the family of grasshoppers *H. pterosticha* — melon grasshopper; *C. italicus* — Italian grasshopper; *L. migratoria* — Asian grasshopper; *D. maroccanus* — the Moroccan grasshopper is also found in varying numbers during the period when the leaves are newly developed and juicy — mainly in May.

Regarding the group of dipterans or flies, it should be noted that only one species of the *Pegomya* genus (*P. betae*) belonging to this group (Anthomyiidae) is found in the beet fly. Although its mass distribution in agrocenosis is not noted, its larvae and pupae are found in the fruit roots.

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Representatives of Lepidoptera order were the most common pests after insects in the areas and represented the majority in terms of the number of species.

Thus, 12 species of 11 genera belonging to 4 families of this group are activated at different times in agrocenosis and cause serious damage to both above-ground and underground organs of the plant.

The turnip moth (*Agrotis segetum*), which belongs to the *Agrotis* genus, occupies a special place among these species due to its harmfulness. Thus, the caterpillars of this species become active from the sowing of seeds and the period of formation of the first sprouts and destroy the underground organs of the plant by gnawing.

The species *Haritalodes derogata* (cotton leaf roller) belonging to the *Haritalodes* genus of the Crambidae family fireflies was recorded for the first time in the Republic in both cotton fields and beet fields. This species is polyphagous and feeds on various plants. It is a good thing that in recent years there has been a sharp decrease in the number of this pest. Probably, one of the reasons for this decrease was local entomophages, and another reason was the sharp increase in air temperature in recent years.

Cabbage moth (*Pieris brassicae*) and beetroot moth (*Scrobipalpa ocellatella*) are common species and can damage farms to some extent.

Thus, according to the results of the research, it was determined that 48 species of insects belonging to 5 groups, 15 families and 42 genera are spread in the sugar beet agrocenosis.

31 of these species are found individually and do not harm farms from an economic point of view.

11 species are species that are constantly found in agrocenosis but can cause serious damage during mass growth.

6 species are permanent residents of agrocenosis and cause serious damage to farm every year.

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