

ECOLOGICAL CHARACTERISTICS OF POLICE INSECTS AND THEIR DAMAGE TO AGRICULTURE

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***Abstract:** The article describes the characteristics and degree of harmfulness of lepidopteran insect pests, their impact on the quality and volume of crop yields and their economic consequences. Based on the conducted research, it was established that of all 158 species of lepidopteran insects, 34 species (21.5%) are the main pest species. The degree of harmfulness of these species is explained at the level of 3 groups. In particular, 21 of the dominant species (61.8%) are particularly dangerous facultative pests that cause serious damage when favorable conditions arise. 9 (26.5%) species are dangerous pests that cause serious damage, and 4 (11.8%) species are among the extremely dangerous pests included in the quarantine list. Also, the features and degree of harmfulness of the main species are highlighted.*

***Key words:** Lepidoptera insects, Fergana Valley, agroecosystem, biodamage, dangerous facultative pests, dangerous pests, extremely dangerous pests.*

INTRODUCTION

Among the pinnipeds, there are unique specialized groups that prefer natural landscapes and anthropogenic ecosystems, as well as highly plastic eurybionts and broad polyphages, including serious pests of agricultural crops. Climate changes and anthropogenic factors observed in recent years are the reason for the rapid spread and expansion of the area of some phytophagous species. As a result, stable food chains in agro-ecosystems are disrupted and some leguminous insects become dominant species among serious pests. Based on this, the results of studies on determining the role and importance of agroecosystems in entomocenoses, monitoring pest species and improving measures to combat them are of great importance.

MATERIALS AND RESEARCH METHODS

Researches on the study of the winged insect were carried out in the agroecosystems of the Fergana Valley. Specimens were caught mainly at night by attracting different artificial light sources (DRL 200, DRL 250 lamps). A stationary nocturnal insect catcher device prepared by the authors was also used. Methods and recommendations developed by V.B.Golub (2012), M.I.Shapovalov (2021) were used during sample processing, collection preparation and their storage. The trophic relationships of the caterpillars with cultivated plants were carried out on the basis of the experiments and observations carried out in the research areas, as well as the research methods of the scientists who conducted scientific research in this direction and the information given in the scientific literature on the field. Based on the method proposed by I.I.Zokirov (2019), the dominant species of mite insects were divided into facultatively dangerous, dangerous and extremely dangerous groups according to the level of damage to agricultural crops [1].

RESULTS AND DISCUSSION

Aphids, which cause serious damage to agricultural crops, mainly belong to the dominant species. Based on this, according to the degree of damage, they were divided into the following groups:

- extremely dangerous pests (quarantine-listed or quarantine-prone species);
- dangerous pests (species causing serious damage);
- facultative dangerous pests (species that cause serious damage when favorable conditions arise).

Based on the conducted researches and the analysis of scientific literature, it was determined that 34 (21.5%) of the total 158 species of grain-winged insects distributed in the agro-ecosystems of the Fergana Valley are the main pest species. 21 of the dominant species (61.8%) are facultative dangerous pests that cause serious damage when favorable conditions arise. Also, 9 (26.5%) species are serious pests and 4 (11.8%) species are listed as extremely dangerous pests. Species belonging to the Noctuidae family in the agroecosystems of the study area (58, 36.7%) and species belonging to the Tortricidae family (23, 14.6%) are the most

common. Species belonging to these two families make up half of the total number of dominants (17, 50%). 7 species of night butterflies (*Agrotis exclamationis*, *A. epsilon*, *Heliopsis virescens*, *Spodoptera exigua*, *Leucania loreyi*, *Mythimna unipuncta*, *Apamea sordens*) are facultatively dangerous, 3 species (*A. segetum*, *Helicoverpa armigera*, *Autographa gamma*) are classified as dangerous pests [2].

Autumn nightshade (*A. segetum*) damages more than a hundred crops belonging to 34 families of plants. It can cause severe damage to corn and other plants, especially from evening crops. It was noted by I.Zokirov that *gamma* turlama (*A. gamma*) can cause 25% damage to beans. In our studies, it was observed that *Leucania tundra* (*L. loreyi*, *M. unipuncta*) damage more than 50% of corn stalks planted after wheat, penetrating the stem and seriously damaging it. 5 species of persistent (Tortricidae) butterflies (*Enarmonia formosana*, *Grapholita funebrana*, *Pandemis chondrillana*, *Archips crataegana*, *A. rosana*) are facultatively dangerous, 1 species (*Cydia pomonella*) is dangerous, and 1 species (*Grapholita molesta*) is dangerous. belongs to the group of dangerous pests. Among them, the green curved leaf beetle (*P. chondrillana*) is a dangerous pest of fruit trees. In the years when the spring season is favorable, first-generation worms seriously damage the leaves and buds of apple, peach, and apricot trees before the trees bloom. In particular, in the early spring season of 2023, more than 20% of leaves and buds were infected by *P. chondrillana* worms in the intensive apricot orchards in the Pakhtakor village of Yozyovon district. Adult caterpillars of the green crooked leaf borer also feed on fruits and damage them. The apple borer (*C. pomonella*) belonging to this family is a dangerous pest that seriously affects the yield of apple, pear, quince, peach and other fruit trees. As a result of damage to the fruit tissues by the worms of the apple fruit borer, most of the affected fruits fall to the ground. If systematic pest control measures are not carried out on time, early apple varieties will be affected by 25-30%, summer varieties by 40-50%, late varieties by up to 80%, and economic benefits from orchards will be reduced by half and more. It has been noted that it decreases by more than that amount [3].

Oriental fruit borer (*G. molesta*) is one of the most dangerous pests listed in

internal quarantine, causing serious damage to young branches and fruits of peaches, apricots, plums, apples, pears and other orchards. Especially, if timely countermeasures are not implemented, it can completely damage the tips of the peach branches and completely dry the young trees. During the 2019 season, in our research conducted in the orchards of Uchkoprik district of Fergana region, Eastern fruitworm worms actively migrate along the apple trees within a radius of up to 50 meters, and during hibernation, it is mostly late varieties and the level of nutrition is high. It was noted that he chooses the gardens. In our experiments, it was observed that butterflies can fly up to 200-300 meters across the garden area during the egg-laying period, and can spread up to 2-5 km in the direction of the wind. It was also found that more than 20 worms of the Eastern fruit-eater can feed on one apple. 2 species of the grooved-winged moths (Gelechiidae) family, which are listed among the dominant pests, also belong to the category of extremely dangerous pests. In particular, it was determined that potato moth (*P.operculella*) can damage up to 90% of potatoes, and tomato moth (*T.absoluta*) can damage up to 95% of tomatoes in the conditions of Central Fergana. It is also noted that the damage of the cabbage butterfly (*P. brassicae*) is higher than the butterflies (*Pieridae*), and it can cause 40-45% damage to cabbage.

The citrus moth (*P. citrella*) from *Gracillariidae* is the main internal quarantine pest of lemon plants in Uzbekistan. Among the citrus plants in the study area, it damages mainly lemons and partially mandarins. In the observations of 2021, it was noted that up to 50-70% of the leaves and fruits of the lemon plant were damaged in the greenhouses of the households of the residents of Chordana village (Mingbulok district) [4].

The mulberry moth (*G. pyralis*) is a monophagous pest belonging to the *Crambidae* family and feeds only on mulberry leaves. According to the results of our more than 20 years of observations related to the study of the mulberry moth, the 2nd and 5th generation butterflies are of primary importance in the expansion of the range of the pest. The rate of damage increases towards the end of the summer season, and in August-September, heavily infested mulberry trees appear defoliated.

If the damage is initially reflected in the yellowing of the leaves of mulberry trees over large areas, then this situation is manifested in the mulberry groves where the damage is strong. After October, extra leaves are written from wintering buds on the top 30-40 cm of severely damaged mulberry trees. Most of the last generation of worms feed on these leaves and cause damage. In the winter cold, this part of the branch dries up and causes the length of the branch to decrease to 30-40 cm in the following year. It should be noted that even if the leaves of the shotut tree are completely damaged, they do not have extra leaves. The additional energy consumption of mulberry trees grown for silkworms in the process of extra leaf formation causes their productivity to decrease from year to year [5].

During our observations, in the seasons of 2001, 2002, 2004, 2005, 2006, 2007, 2010, 2011, 2018, 2019, 2020, the spread of the mulberry moth in the Fergana Valley was the most dangerous. In a number of districts in the central and western regions of the valley, there have been cases of damage to the tops of tutus trees. For example, in the season of 2002, the rate of damage reached 100% in Yozhiovan district, located in the Central Fergana region.

Corn moth (*O. nubilalis*) belonging to Crambidae family is widespread in the study area. According to the conclusions of researchers from different countries where the pest is spread, the corn moth can feed on more than 200 plants belonging to 131 genera of 40 families of natural and cultivated plants. According to the scientists of the "Maize Research Institute" of Serbia, *O. nubilalis* is one of the most dangerous pests of corn in Eastern Europe, causing up to 25% loss of grain yield. In the United States in 2010, the economic damage of the corn borer exceeded 1 billion dollars. In 2015, in our research on the biology and damage properties of *O. nubilalis* in the agrocenoses of the Chimyon region of the Fergana Valley (Fergana District), young caterpillars of this butterfly were found in corn leaves, and when they were older, in the feeding inside the stem was observed. When we calculate the degree of damage caused by the corn moth in the research area (according to Sh. Khojayev, 2014), when the corn moth infects the lower part of the corn stalk below the place where the first ear is formed, the yield of grain and stem is 70-85%, it was noted

that it was reduced by 30-40% when it was damaged above the place where it appeared [6].

Two species (*E. punicaella*, *H. nebullella*) of the family of moths (Pyralidae) listed as dominant pests are widespread in the study area. Among them, the pomegranate fruit-eater is a relatively dangerous pest, which poses a serious threat to the quality and weight of the pomegranate harvest in the following years. As a carpophagous pest, the pomegranate fruit-eater lives mainly by feeding on the fruit of the pomegranate. Worms of the second and third generation of pomegranate fruit borer damage more bitter pomegranate varieties. From the fourth generation, worms are found and fed on fruits of bitter and sweet pomegranate at all levels. After the end of the vegetation period, the worms feed and cause damage in the warehouses where the fruit is stored until it gets very cold. Pomegranate worm, after feeding on the pulp of the fruit, pierces the seed and feeds on the endosperm. Fruit flies infested with worms and cracked fruits make the pomegranate even worse. In particular, in 2022, it was observed that 70-80% of the harvest of heavily damaged pomegranate bushes died in the houses of residents in the village of Akbilol of Fergana district and Chek Shura neighborhood of Fergana city (October 23-27, 2022).

The sunflower moth (*H. nebullella*), belonging to the family of moths (Pyralidae), is a facultative dangerous pest. This pest is found in all regions of Uzbekistan where sunflowers are grown, and in favorable seasons it seriously damages the yield of the plant. The sunflower moth is considered a serious economic pest in countries such as Russia, France, Hungary, Spain, Turkey, China, and Pakistan. In particular, the pest that appeared in the Chinese city of Bayannur in 2006 spread over 94,000 hectares or 70% of the total sunflower fields, causing economic damage of 168 million dollars. In 2007, the sunflower moth spread in the city of Linhe of the Autonomous Region of Mongolia, and about 18,300 hectares of land were damaged, of which 1,730 hectares were completely unharvested. In the remaining 16.5 thousand hectares, the level of damage is 20-60%. In the following years, the damage of this species is increasing significantly in the sunflower fields of the Fergana Valley [7].

CONCLUSION

It was found that 34 (21.5%) of the total 158 species of grain-winged insects distributed in the agro-ecosystems of the Fergana Valley are the main pest species. The degree of damage caused by these species was explained in 3 groups. In particular, 21 of the dominant species (61.8%) are facultative dangerous pests that cause serious damage when favorable conditions arise. Also, 9 (26.5%) species are serious pests and 4 (11.8%) species are listed as extremely dangerous pests. In the agro-ecosystems of the study area, the species belonging to the family Noctuidae (58 species, 36.7%) and the species belonging to the family Tortricidae (23 species, 14.6%) are found the most. Species belonging to these two families make up half of the total number of dominants (17, 50%). The characteristics and levels of damage of the main species, as well as the effect on the quality and weight of agricultural crops, as well as its economic consequences, were explained.

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