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ABOUT THE TURNIP BUTTERFLY (Pieris rapae) AND ITS ENTOMOPHAGES IN THE GUBA-KHACHMAZ REGION

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О БЕЛЯНКЕ РЕПНОЙ (*Pieris rapae*) И ЕЁ ЭНТОМОФАГЕ В ГУБА-ХАЧМАЗСКОЙ ОБЛАСТИ

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Abstract. The results of 2024–2025 research on the development of the cabbage white butterfly, a major plant pest, in the cabbage agrocenosis of the Guba-Khachmaz economic region, including the number of generations, damage caused, and duration of infestation stages, are presented. The objective is to thoroughly study its distribution in the region and cabbage agrocenoses. In the Guba-Khachmaz economic region of Azerbaijan, the cabbage white butterfly (Pieris rapae) produces three complete generations. In the cabbage agrocenosis, first- and second-generation larvae of the pest cause the greatest damage to agricultural crops. The obtained results can be used in integrated pest control measures.

Аннотация. Представлены результаты исследований в 2024-2025 гг. по изучению развития репной белянки – одного из основных вредителей растений, в агроценозе капусты Губа-Хачмазского экономического региона, количества поколений, наносимого ущерба, продолжительности стадий поражения. Цель — детальное изучение распространения в регионе и в агроценозах капусты. В Губа-Хачмазском экономическом регионе Азербайджана репная белянка (*Pieris rapae*) дает три полных поколения. В агроценозе капусты личинки первого и второго поколений вредителя наносят больший ущерб сельскохозяйственным культурам. Полученные результаты могут быть использованы при проведении комплексных мероприятий по борьбе с вредителями.

Keywords: Turnip butterfly, *Pieris rapae,* agrocenosis, egg, larva, pupa, cabbage, phenology.

Ключевые слова: репная белянка, *Pieris rapae*, агроценоз, яйцо, личинка, куколка, капуста, фенология.

The turnip butterfly is the most widespread species in the MBD area, and it breeds massively in the European part of Russia, in the Petersburg and Moscow regions, in the Lower Volga region, and in the Caucasus. The turnip butterfly causes extreme damage to cruciferous vegetable crops in the Krasnodar region. This pest is widespread in Tajikistan, causing massive damage to cabbage plants. The pest is widespread in Kazakhstan, especially in the Almaty region, and causes more

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damage to late-planted cabbage. Sometimes the damage reaches 80–90%. It has been shown that the turnip butterfly is widespread in the Baikal region and the damage rate is between 10–100% [1, 3, 6].

In addition, there are data from various authors on the damage of this species in different countries of the world. Thus, this pest is widespread in North America, the Palearctic, China, and Japan, originating from Great Britain and the Canary Islands, and in the South, in North Africa and Palestine. It has also been shown by a number of authors that this pest is also widespread in southern Iran, Afghanistan, Pakistan, Kashmir, and the northwestern Himalayas [5, 8, 10].

The widespread distribution of the butterfly in the eastern and western zones of Georgia, in Tbilisi, Gardabani, Salka, Akhalka, and Gori was shown by G. B. Dolidze, and it was noted that it causes massive damage to cruciferous vegetable plants [2].

The great damage to cabbage plants in Abkhazia was shown by E. S. Milyanovski [6].

The information about the spread of the turnip butterfly as a pest of cruciferous vegetable plants was given by N. H. Samedov in his questionnaire, while its distribution in the Ganja-Gazakh and other zones was described by H. A. Pishnamazov [9, 11].

Some information about the economic importance (damaging properties) of the pest in the Guba-Khachmaz zone is found in an article by M. B. Hasanov [4]. Considering that this species is a serious pest of cabbage plants, during the analysis of various literature sources, our main goal was to study its distribution in the region and its phenology in detail within the cabbage agrocenosis.

Materials and methods

Observation and reporting work was carried out regularly throughout the season. The percentage of pest infestation was calculated based on the number of infected larvae and pupae. In order to determine the species composition of predators, samples of beneficial fauna observed in the selected stationary areas were collected and their species were determined. The bioecological and morphological characteristics of some economically important parasites and predators were studied in laboratory and field conditions. In laboratory observations, mainly larvae and pupae of different ages of hosts, collected from cabbage agrocenoses and suspected of being infected with the parasite, were used. Observations were conducted in specially selected stationary areas to determine the seasonal activity of entomophages. During both field and laboratory observations, it was determined which flowering plants (black clover, ryegrass, and others) parasites and predators feed on. The degree of infection of pests with parasites was clarified. Observations and experiments were carried out in cabbage agrocenoses of the Guba region and in the biocenoses around it using methods accepted in entomology [13, 14].

Results and Discussion

As a result of the research, it was found that the turnip butterfly is widespread in the region and is one of the characteristic pests of cabbage plants. Literature data show that the reproductive capacity of the species varies depending on the area. Thus, in the Leningrad and Moscow regions, this pest gives 2 generations. In the Lower Volga region and in the Caucasus, this species is likely to give 4–5 generations. This butterfly gives 5 generations in Transcaucasia and in the subtropical zones of the Black Sea coast, and indicates that the pest gives 4 generations in Kazakhstan. In Tajikistan, the turnip butterfly gives 5–6 generations, and the 6th generation does not fully develop [6, 12].

As can be seen, the pest manifests itself differently in terms of phenology, depending on the area in which it lives. During our research, the overwintering, emergence, egg laying, and development of larvae, pupae, and adults of the turnip butterfly were regularly studied in the field and laboratory.

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As a result of our research, it was found that the turnip butterfly hibernates in the pupal stage. The first butterflies are observed in the Guba-Khachmaz region in the third decade of April, when the average air temperature is between 12-15°C and the relative humidity is between 60-70%.

The mass flight of the butterfly is observed in the second decade of May. The flight of the first generation of butterflies ends at the end of May. The egg-laying process of the first generation of butterflies coincides with the second decade of May, and this egg-laying process ends in the first decade of June. The first larvae hatching from the eggs is observed between 25-28 May and ends in the second half of June.

Thus, the period from the emergence of butterflies from overwintered pupae to the emergence of the second generation of butterflies lasts 40-45 days. The second generation of butterflies begin to fly in the second decade of June and continue until the end of the first decade of July. Butterflies of this generation begin to lay eggs in the third decade of June, and this process continues until the end of the second decade of July. Larvae hatch from eggs at the end of June, and mass emergence is observed in the first half of July. Pupation of larvae occurs in the second decade of July and can last until mid-August.

Butterflies of the third generation begin to appear at the beginning of the third decade of July. A mass flight of butterflies is observed in the first half of August. Butterflies lay eggs from the end of July to August 20–25. The emergence of larvae of the third generation is observed in the first decade of August, and this process continues until the end of August, and sometimes until the beginning of September. In late August and September, the larvae pupate and hibernate in the pupal stage. Thus, the development of the third generation ends in 30–35 days.

The results obtained from our studies show that the turnip butterfly gives three full generations per year in the Guba-Khachmaz region.

Parasites and predators of the turnip butterfly. During the research, it was found that the larvae of this pest are infected with Apanteles glomeratus (Hymenoptera: Braconidae), and the pupae with Pteromalus puparum (Hymenoptera: Pteromalidae). In order to study the degree of infestation of the turnip butterfly with Apanteles and Pteromalus parasites, samples of 100 larvae and 100 pupae were taken, and observations were made on them (Table).

Table

İNFECTION RATE OF TURNIP BUTTERFLY LARVAE
Apanteles glomeratus AND PUPAE WITH *Pteromalus puparum*

The consequences of Larvae by Apanteles wasps					*The consequences of pupa by Pteromalus wasps*			
Years	*2024*		*2025*		*2024*		*2025*	
Genaritons	*Number of Larvae*	*With infection %*	*Number of Larvae*	*With infection %*	*Number of Larvae*	*İnfection with %*	*Number of Larvae*	*İnfection with %*
I	100	2	100	2	100	6	100	5
	100	4	100	3	100	8	100	4
II	100	3	100	7	100	30	100	25
	100	7	100	9	100	37	100	24
III		4	100	7	100	28	100	14
	100	-	100	1	100	14	100	15

As can be seen from the table, the percentage of infection of the turnip butterfly larvae with Apanteles spp. in the first generation in 2024 was 2–4%, in the second generation 3–7%, and in the

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third generation 4%. In 2025, the percentage of infection of the first generation larvae was 2–3%, in the second generation 7–9%, and in the third generation 1–7%. The results of the two-year study show that the percentage of infection of turnip butterfly larvae with Apanteles spp. was a minimum of 1% and a maximum of 9%. The infection of the butterfly pupae with Pteromalus wasps was 6–8% in the first generation in 2024, 30–37% in the second generation, and 14–28% in the third generation. In 2025, the infection of the pupae was 4–5% in the first generation, 24–25% in the second generation, and 14–15% in the third generation, respectively.

Analysis of two-year data shows that the infection of pupae with Pteromalus wasps was 4–8% in the first generation, 24–37% in the second generation, and 14–28% in the third generation.

From the figures shown, it is clear that Pteromalus wasps massively destroy the pupae of the turnip butterfly and play a major role in regulating the population dynamics of this pest.

Other predators found include the Nabis pseudoferus beetle, which kills eggs and young larvae of the turnip butterfly, while the German wasp and Assilid flies feed on the butterfly larvae, destroying them.

Conclusion

1. In the Guba-Khachmaz economic regions of Azerbaijan, the turnip butterfly (Pieris rapae) produces three full generations.

2. In the cabbage agrocenosis, the first and second generation larvae of the pest cause more damage to farms.

3. Pteromalus puparum acts as the most effective entomophage in reducing the number of pests in the agrocenosis.

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