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Experiments On Pest Control Of Sesame (Sesamum Indicum L.) Crops Under The Conditions Of Karakalpakstan

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Abstract: This article highlights the effectiveness of agro-technical, biological, and chemical measures applied against sesame (Sesamum indicum L.) pests under the conditions of Karakalpakstan and presents conclusions on the formation of an integrated protection system.

Keywords: Sesamum indicum L, yield, major pests of sesamum indicum L, Antigastra catalaunalis, Thrips tabaci, Aphis gossypii, biological methods, use of entomophages, agro-technical measures.

Introduction: In recent years, the cultivation of sesame (Sesamum indicum L.) one of the important technical crops, has been expanding within the agricultural sector of the Republic of Karakalpakstan. Sesame (Sesamum indicum L.) seeds possess high nutritional value, and the oil derived from them is widely used in the food industry, pharmaceuticals, and other sectors. Therefore, increasing the efficiency of sesame cultivation is of great importance not only for agriculture but also for the economy as a whole.

However, one of the main factors negatively affecting yield and quality in sesame (Sesamum indicum L.) production is pests. They are active at various phenological stages of the crop, damaging leaves, stems, and seeds, which leads to significant yield losses. In particular, under the climatic conditions of Karakalpakstan, a rapid increase in the population of certain pests has been observed.

From this perspective, identifying sesame (Sesamum indicum L.) pests, studying their biological characteristics, and developing effective methods of control are urgent tasks. This article discusses the effectiveness of agro-technical, biological, and chemical measures applied against pests under the conditions of Karakalpakstan and provides conclusions on the formation of an integrated protection system.

LERATURE REVIEW

Sesame (Sesamum indicum L.) has been cultivated since ancient times as both a food and industrial crop. According to researchers, sesame (Sesamum indicum L.) seeds contain up to 50–60% oil, about 20% protein, as well as various vitamins and minerals, which makes them widely used in the food industry as well as in pharmaceuticals [1, p.151].

However, many scientific studies note that one of the main factors leading to yield reduction is pests. For example, under the conditions of Central Asia and Uzbekistan, the major pests of sesame include the sesame (Sesamum indicum L.) shoot webber (Antigastra catalaunalis), onion thrips (Thrips tabaci), cotton aphid (Aphis gossypii), and various beetles. These pests are active during the vegetation period, damaging leaves, stems, and seeds, and may cause average yield losses of 25–40% [2, p.87].

Foreign sources also attach particular importance to this issue. For instance, studies by Indian and Pakistani scientists emphasize Antigastra catalaunalis as the most dangerous pest of sesame, as it drastically reduces yield during flowering and seed formation stages [3, p.148]. Similarly, research conducted in China and Turkey highlights the importance of biological methods, including the use of entomophages and proper agro-technical practices, in naturally controlling pest populations [4, p.327].

In the scientific works of Uzbek and Karakalpak researchers, the urgency of implementing an integrated pest management system against sesame

pests is underlined. Specifically, agro-technical measures (optimization of sowing dates, weed control), biological methods (use of entomophages and bio-insecticides), and the rational application of chemical agents are proposed as effective strategies for pest control [5, p.120].

The above literature review demonstrates that the problem of sesame (Sesamum indicum L.) pests remains relevant not only globally but also under the conditions of Karakalpakstan. Therefore, identifying pest species, studying their biology, and developing comprehensive control measures are of both scientific and practical significance.

METHODOLOGY

The study employed methods of system analysis, historicism, and a comprehensive approach.

RESULTS

The analysis of literature and experimental studies shows that the productivity of sesame (Sesamum indicum L.) under the conditions of Karakalpakstan depends on many factors, the most harmful of which are pests. The main pests observed in this region are as follows:

Antigastra catalaunalis. In Uzbek, it is commonly referred to as “kunjut qurti” (Sesamum indicum L worm). The larvae of this insect damage the leaves, flowers, and young capsules of sesame (Sesamum indicum L). Studies indicate that under severe infestation, yield losses may reach 30–40%. In the experiences of India and Pakistan, this pest has been identified as the most dangerous enemy of sesame.

Thrips tabaci. In Uzbek, it is widely known as “trips.” This pest feeds on the underside of leaves, damaging the tissues, which causes the leaves to yellow and curl. Thrips are also dangerous as carriers of various viral diseases. Under the climatic conditions of Karakalpakstan, an increase in thrips populations is observed during hot and dry summer periods.

Aphis gossypii. In Uzbek, it is called “paxta shirasi” or simply “shira.” It feeds by sucking sap from the leaves, causing them to harden and significantly reducing the process of photosynthesis. When aphid populations grow, leaves are covered with sticky secretions, which create favorable conditions for fungal diseases.

Coleoptera. In some regions, they cause serious damage to the stems and leaves of sesame. Their population increase is especially noticeable during dry years.

Helicoverpa spp. These pests gnaw flowers and seed capsules, directly reducing the yield.

Field observations conducted under the conditions of Karakalpakstan revealed that pest populations follow a seasonal dynamic:

In spring, the number of thrips and aphids increases.

In June–July, the larvae of the sesame (Sesamum indicum L) shoot webber become active.

In August–September, aphids and bollworms become widespread.

In experimental fields, the application of agro-technical measures (optimization of sowing dates, crop rotation, weed control, and proper crop management) resulted in a 15–20% reduction in pest populations.

When applying biological methods, entomophages (for example, ladybirds — beetles belonging to the family Coccinellidae, locally known as “xonaqo‘ng‘iz”) naturally reduced aphid populations. In addition, the use of bio-insecticides (such as preparations based on Bacillus thuringiensis) demonstrated high effectiveness against the larvae of the sesame shoot webber.

Chemical agents, on the other hand, provided rapid and strong results in the short term. However, in the long term, they were found to cause ecological problems, reduce beneficial entomofauna, and negatively affect soil fertility. Therefore, scientists recommend the use of chemical agents only when necessary and strictly within prescribed limits.

CONCLUSION

The following conclusions can be drawn:

- ❖ Under the conditions of Karakalpakstan, the most harmful pests of sesame (Sesamum indicum L) have been identified as the sesame (Sesamum indicum L) shoot webber (Antigastra catalaunalis), onion thrips (Thrips tabaci), and cotton aphid (Aphis gossypii);
- ❖ Pests are active throughout all phenological stages of the crop and significantly reduce yield;
- ❖ Agro-technical measures play a crucial role in reducing pest populations;
- ❖ Biological methods are environmentally safe and effective;
- ❖ The use of chemical agents requires caution, as they may negatively affect long-term ecological balance;
- ❖ An integrated pest management system (agro-technical + biological + chemical methods) is proposed as the most optimal approach for protecting sesame crops.

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