

DISTRIBUTION AND CONTROL METHODS OF PEST INSECTS IN THE SOUTHERN ARAL REGION

Sh.R.Madireymov

Berdaq nomidagi Qoraqalpoq davlat universiteti, Nukus
shinpolatmadireymov1080@gmail.com

Abstract

This article provides a comprehensive analysis of the main pest insect species found in the Southern Aral region, their impact on agrobiocenoses, and effective control measures against them. The Southern Aral region is one of Uzbekistan's ecologically sensitive and agriculturally important areas, where climatic conditions and land use practices have led to a sharp increase in insect biomass.

Keywords: Southern Aral region, pest insects, agrotechnical control, biological control, insecticide, monitoring.

Introduction

The Southern Aral region is one of the ecologically sensitive and agriculturally active areas of Uzbekistan, where insect pests that damage agricultural crops pose a serious threat to various farming and natural ecosystems. In recent years, climate change, irrational land use, and a reduction in agrotechnical practices have led to an increase in both the number and diversity of pest species. Global climate changes in recent years — particularly prolonged and dry summers and relatively mild winters — have facilitated pest survival through the winter and enabled them to produce multiple generations per year (FAO, 2021). Intensive land use by the population, along with large-scale monoculture cultivation of cotton and cereal crops, also contributes to the growth of pest insect populations. The most widespread pest species in this context include aphids (*Aphis* spp.), spider mites (*Tetranychus* spp.), root beetles (*Melolontha* spp.), and caterpillars (*Helicoverpa armigera*) (Grebennikov et al., 2020). In the Southern Aral region, it is essential to study the effectiveness of biochemical control methods, the potential use of entomophages, and the development of ecologically sustainable strategies. This article analyzes the species composition of these insects, their life cycles and population dynamics, and proposes measures aimed at reducing their impact on agrobiocenoses.

1. Key Pest Species:

- Cotton bollworm (*Helicoverpa armigera*) – A widespread species that damages cotton, tomatoes, and other vegetables.
- *Melolontha* spp. – Root-feeding scarab beetles, dangerous for vineyards and orchards.

- Two-spotted spider mite (*Tetranychus urticae*) – Damages the leaves of various crops, reducing photosynthesis efficiency.
 - Cotton aphid (*Aphis gossypii*) – A member of the aphid family, spreads viral diseases and slows down plant growth.
 - 2. Factors Contributing to Spread:
 - Rising temperatures and milder winters have made it easier for many insects to survive the winter.
 - Large-scale monoculture cultivation of cotton, cereals, and vegetables creates a favorable environment for pests.
 - Insufficient application of biological control methods.
 - 3. Control Measures:
 - Agrotechnical: Crop rotation, deep plowing, and removal of infested plant residues.
 - Biological: Use of *Trichogramma* and natural enemies such as lady beetles (*Coccinellidae*).
 - Chemical: Careful and regulated use of insecticides to avoid resistance development.
- Monitoring and Forecasting: Regular observation of pest populations and use of pheromone traps for control.[1-table]

1-Table: Major Pest Insects in the Southern Aral Region and Effective Control Methods

Nº	Pest Species	Affected Crops	Damage Symptoms	Generations (per year)	Agrotechnical Measures	Biological Control Methods	Chemical Control Methods
1	<i>Helicoverpa armigera</i>	Cotton, tomatoes, vegetables	Bores flowers and fruits, forms silk-lined tunnels	2–4	Crop rotation, removal of infested residues	<i>Trichogramma</i> spp., <i>Bacillus thuringiensis</i>	Pyrethroids, carbofuran
2	<i>Melolontha</i> spp.	Vineyards, orchards	Feeds on roots, stunts plant growth	1 (every 2–3 years)	Deep plowing, disrupting egg-laying sites	Birds (crows, starlings), parasitic insects	Organophosphates
3	<i>Tetranychus urticae</i>	Vegetables, fruit trees	Speckled leaf feeding, leaf discoloration and drying	8–10	Moderate irrigation, crop diversification	<i>Phytoseiulus persimilis</i> (predatory mite)	Acaricides (abamectin)
4	<i>Aphis gossypii</i>	Cotton, vegetables	Leaf curling, virus transmission	10–20	Mixed cropping, field sanitation	<i>Coccinella septempunctata</i> (lady beetle), silkworms	Neonicotinoids (imidacloprid)
5	<i>Tuta absoluta</i>	Tomatoes	Mines in leaves, fruits, and stems	10–12	Removal of damaged plant parts, crop residue control	<i>Nesidiocoris tenuis</i> , <i>Trichogramma achaeae</i>	Lufenuron, spinosad
6	<i>Spodoptera exigua</i>	Vegetables, cereals	Defoliation, reduced crop development	5–7	Burning of residues, planting time regulation	<i>Bacillus thuringiensis</i> , lady beetles	Pyrethroids, chlorpyrifos
7	<i>Frankliniella occidentalis</i>	Vegetables, flowers	Sucks plant sap, causes virus transmission	10+	Greenhouse control, sterilization	<i>Orius</i> spp. (predatory thrips), <i>Amblyseius swirskii</i>	Spinetoram, abamectin

Conclusion

To effectively combat pest insects in the Southern Aral region, it is necessary not only to implement individual measures but also to adopt a comprehensive and scientifically-based approach. This approach should focus on preserving biological diversity, ensuring the sustainable development of agroecosystems, and restoring agroecological balance. Firstly, it is important to reconsider agrotechnical practices — adhering to crop rotation, destroying infested residues through deep plowing, improving soil quality, and shifting towards quality-based, rather than quantity-based, cultivation methods. These measures create an unfavorable environment for pests, thus limiting their population growth (Altieri, 1995; Karimov et al., 2018). Secondly, there is a need to expand the use of biological control methods. The widespread use of entomophages (such as *Coccinella septempunctata*, *Trichogramma* spp.), microbiological agents (e.g., *Bacillus thuringiensis*), and pheromone traps should be encouraged. These methods allow for natural pest population control without disrupting the natural balance in agroecosystems (Grebennikov et al., 2020; CABI, 2023). Thirdly, the principle of judicious use of chemical agents must be followed. Insecticides should only be applied when necessary, based on scientifically-supported monitoring results, in accordance with recommended doses, and in a rotation system to avoid the development of pest resistance (FAO, 2021).

Additionally, enhancing the monitoring and forecasting system, which involves regular observation of pest populations, analyzing the development stages of their generations, and implementing control measures based on phenophases, is critical for effective pest management (Djalalov et al., 2020). In conclusion, effective and long-term pest control in the Southern Aral region should be based on an Integrated Pest Management (IPM) strategy. This approach ensures ecosystem conservation, protection of human health, and increased agricultural productivity simultaneously. It is the key guarantee for the sustainable and environmentally safe development of the region's agro-industrial sector.

References

1. FAO (2021). Climate change: Unpacking the burden on agriculture and insect pests. Food and Agriculture Organization of the United Nations. Retrieved from: <https://www.fao.org>
2. Grebennikov, V.V., et al. (2020). Ecological adaptations and pest dynamics in arid agroecosystems of Central Asia. *Journal of Arid Environments*, 175, 104080. <https://doi.org/10.1016/j.jaridenv.2020.104080>
3. Бойматов, У., Раҳимов, А. (2019). Ўзбекистонда қишлоқ хўжалиги экинларига зарар етказувчи асосий ҳашаротлар. Тошкент: Фан нашриёти.
4. CABI (2023). *Helicoverpa armigera* datasheet. Centre for Agriculture and Bioscience International. <https://www.cabi.org>
5. Altieri, M.A. (1995). *Agroecology: The Science of Sustainable Agriculture*. CRC Press.
6. FAO (2021). Sustainable management of pests under climate change. Food and Agriculture Organization of the United Nations. Retrieved from: <https://www.fao.org>

7. Grebennikov, V.V., et al. (2020). Ecological adaptations and pest dynamics in arid agroecosystems of Central Asia. *Journal of Arid Environments*, 175, 104080. <https://doi.org/10.1016/j.jaridenv.2020.104080>
8. CABI (2023). *Helicoverpa armigera* datasheet. Centre for Agriculture and Bioscience International. <https://www.cabi.org>
9. Джалалов, Қ.А., Раҳимов, А.Р. (2020). Ўзбекистонда ҳашаротларни мониторинг қилиш ва прогнозлаш тизимини такомиллаштириш йўналишлари. Ўзбекистон аграр фанлари журнали, №4, 55-61.
10. Erjigitova K. K., Zhuginisov T. I., Duysengaliev E. S. BIOLOGICAL DIVERSITY OF LONGHORNED BEETLES (COLEOPTERA, CERAMBYCIDAE) //Eurasian Journal of Technology and Innovation. – 2024. – T. 2. – №. 6. – С. 218-221.
11. Juginisov T.I. Duysengaliev E.S.Qoraqalpog'istonda yangi invaziv tur Coleoptera, Cerambycidae aedesthes Sarta (Solsky,1871) muylovdor qong'izining bioekologiyasi ISSN 2091-573 X Muassis: O'zbekiston Respublikasi Fanlar akademiyasi mintaqaviy bo'limi – Xorazm Ma'mun akademiyasi.

