ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 12| Issue: 4| April 2026|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2026: 8.753 || ISI Value: 1.188

УДК 595.76:591.5:574(575.172)

FAUNAL ANALYSIS OF CURCULIONIDAE IN THE SOUTHERN ARAL SEA REGION AND PREVENTIVE MEASURES

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ABSTRACT
The article presents a faunistic analysis of representatives of the family Curculionidae in the Southern Aral region under conditions of environmental transformation caused by the drying of the Aral Sea. The species composition of weevils was identified, including xerophilous, mesophilous, and agrophilous forms, which differ in ecological preferences and economic significance. The influence of agroecological factors on the distribution and abundance of phytophagous species was determined. Species damaging agricultural crops, as well as forms characteristic of natural ecosystems, were noted. A set of preventive measures based on the principles of sustainable agriculture is proposed, including crop rotation, irrigation optimization, and phytosanitary monitoring.
KEY WORDS: *Curculionidae, Weevils, Southern Aral Sea Region, Fauna, Phytophages, Agroecosystems, Prevention.*

INTRODUCTION

The Southern Aral Sea region, encompassing the southern Aral Sea region, is among the most transformed natural regions in Central Asia. Environmental changes caused by the shrinking Aral Sea have led to the formation of new landscapes, intensifying desertification, salinization, and dust and aerosol transport. Under these conditions, the study of entomofauna, particularly members of the Curculionidae family (weevils), which play a significant role in the region's agrocenoses and natural ecosystems, is particularly relevant.

The Curculionidae family is one of the largest among the Coleoptera and includes numerous species associated with both natural vegetation and agricultural crops. In the southern Aral Sea region, where irrigated agriculture and pasture management are actively developing, weevils act as phytophages, capable of significantly impacting the yield of cotton, grain, melons, and forage crops. At the same time, some species perform important functions in natural ecosystems, participating in the regulation of plant populations and the formation of food chains.

The aim of this study is to conduct a faunistic analysis of representatives of the Curculionidae family in the Southern Aral Sea region, identify their ecological associations and economic significance, and develop a set of preventive measures aimed at reducing the harmfulness of phytophages in the region's agroecosystems.

MATERIALS AND METHODS

The research was conducted in Uzbekistan, primarily within the Republic of Karakalpakstan, including irrigated agricultural landscapes, pasturelands, and areas of natural desert vegetation. The study focused on representatives of the family Curculionidae, inhabiting various ecotopes—from agricultural fields to saline and sandy areas. Material was collected during growing seasons using standard entomological methods: sweeping with an entomological net, soil traps, manual collection of adults and larvae from host plants, and sampling of plant substrate for subsequent laboratory processing. Species identification was based on morphological characteristics using field guides for beetles of Central Asia.

The faunistic analysis included a systematic classification of the identified species, an assessment of their biotopic distribution, trophic specialization, and economic importance. Species diversity, dominance, and frequency of occurrence were used to characterize the faunal structure. Agroecological conditions of the sites were also analyzed, including the degree of soil salinity, irrigation regime, cropland structure, and the level of anthropogenic pressure.

RESULTS AND DISCUSSION

The study found that the Curculionidae fauna of the Southern Aral Sea region is characterized by a relatively high species diversity, despite the region's extreme climatic conditions. The identified species can be roughly divided into three ecological groups: xerophilous, mesophilous, and agrophilous forms.

The fauna studied included a number of species of varying ecological and economic importance: Sitophilus granarius, Lixus iridis, Otiorhynchus rugosostriatus, Cleonus piger, Larinus onopordi, Hypera postica, Eurythynchus brandti, Coniocleonus nebulosus, Rhabdorrhynchus seriegranosus, Cleonis pigra, Otiorhynchus sulcatus, and Lixus juncii. Xerophilous species, such as Coniocleonus nebulosus, Rhabdorrhynchus seriegranosus, Cleonus piger, and Cleonis pigra, are primarily associated with desert and semi-desert biotopes, including areas formed on the dried bed of the Aral Sea. They are characterized by high tolerance to drought, soil salinity, and limited forage resources.

Mesophilic and agrophilic species include forms such as Hypera postica, Larinus onopordi, Lixus iridis, and Lixus juncii, which are associated with herbaceous vegetation and

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agricultural crops. These species can damage the vegetative and reproductive organs of plants, reducing the productivity of agrocenoses. Of particular economic importance are the polyphagous Otiorhynchus rugosostriatus and Otiorhynchus sulcatus, which damage plant roots, as well as the synanthropic species Sitophilus granarius, a dangerous pest of stored grain and an indicator of anthropogenic influence.

The species Eurythynchus brandti was found primarily in natural biotopes and can be considered a member of the natural fauna, less associated with agroecosystems. The analysis showed that the rate of spread of these species depends on irrigation regimes, salinity levels, and agricultural practices. In areas with poor crop rotation and insufficient phytosanitary control, an increase in the numbers of harmful species such as Hypera postica and Otiorhynchus sulcatus was observed. Meanwhile, agroecosystems with rational farming practices demonstrated a more balanced ratio of species.

CONCLUSION

The fauna of the Curculionidae family in the Southern Aral Sea region is shaped by extreme natural and climatic conditions and anthropogenic landscape transformation. The identified species demonstrate diverse adaptation strategies and varying degrees of economic significance. Effective prevention of weevil damage is possible with a comprehensive approach based on the principles of green farming, rational water use, and continuous phytosanitary monitoring. Implementation of these measures will preserve the biological balance of the region's agroecosystems, improve the sustainability of agricultural production, and ensure the environmental safety of crop products.

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