

Species Composition and Dominant Species of Leaf Beetles (Coleoptera: Chrysomelidae) In the Republic of Karakalpakstan

Asemenova Dilfuza Yakuppayevna

Independent Researcher, Department of General Biology, Faculty of Biology, Karakalpak State University, Uzbekistan

Received: 26 April 2026; **Accepted:** 21 May 2026; **Published:** 08 June 2026

Abstract: This article examines the species composition, dominant species, and host plant associations of leaf beetles (Coleoptera: Chrysomelidae) occurring in the Republic of Karakalpakstan. The investigations were conducted during 2020–2025 in the districts of Beruniy, To‘rtko‘l, Ellikqal‘a, Xo‘jayli, Nukus, Kegeyli, and Chimboy, as well as in the Lower Amu Darya State Biosphere Reserve. As a result, 6 subfamilies, 21 genera, and 40 species belonging to the family Chrysomelidae were identified. Among the recorded species, representatives of the subfamilies Alticinae, Chrysomelinae, and Galerucinae were predominant. The dominant species were identified as *Chrysomela populi*, *Galerucella luteola*, *Oulema melanopus*, *Gonioctena fornicata*, and *Haltica deserticola*. The study revealed that the distribution and dominance levels of leaf beetles are closely associated with host plant composition and the ecological characteristics of biotopes. The obtained results provide a scientific basis for the investigation of leaf beetle fauna, the organization of monitoring programs, and the assessment of economically important phytophagous species.

Keywords: Chrysomelidae, leaf beetles, fauna, dominant species, host plants, trophic associations, Republic of Karakalpakstan.

INTRODUCTION

The family Chrysomelidae is one of the largest groups of phytophagous insects within the order Coleoptera and is represented by more than 35,000 species worldwide. Species belonging to this family are widely distributed in natural and anthropogenically transformed ecosystems and maintain trophic relationships with various tree, shrub, and herbaceous plant species. The taxonomy, zoogeography, and ecological characteristics of leaf beetles have been extensively studied by numerous researchers [1–3,12]. Many species of leaf beetles are recognized as important pests of agricultural crops, forest plantations, and tugai vegetation. Some species negatively affect plant growth and development by feeding on leaf tissues, skeletonizing leaves, or causing defoliation. Therefore,

investigations of the species composition, bioecological characteristics, and distribution patterns of representatives of the family Chrysomelidae are of considerable scientific and practical importance [7,12]. Studies conducted in Central Asia have revealed numerous species belonging to this family and have clarified their taxonomic status and ecological characteristics [1–3,8]. In recent years, new information concerning the species composition, bioecology, and economic significance of leaf beetles inhabiting the Aral Sea region and adjacent agrocenoses has been published.

The Republic of Karakalpakstan is characterized by diverse agrocenoses, tugai ecosystems, desert, and semi-desert landscapes. The unique environmental conditions of the region play an important role in the

formation of leaf beetle fauna. However, information regarding the species composition, dominant species, distribution, and bioecological characteristics of representatives of the family Chrysomelidae remains insufficiently summarized. Therefore, the study of the species composition, distribution, and bioecological characteristics of leaf beetles occurring in the Republic of Karakalpakstan represents an important and relevant scientific issue.

Objective of the study. To determine the species composition, dominant species, and host plant associations of leaf beetles (Coleoptera: Chrysomelidae) occurring in the Republic of Karakalpakstan.

METHODS

The investigations were carried out during 2020–2025 in the districts of Beruniy, To'rtko'l, Ellikqal'a, Xo'jayli, Nukus, Kegeyli, and Chimboy of the Republic of Karakalpakstan, as well as in the Lower Amu Darya State Biosphere Reserve. Entomological materials were collected from agricultural agrocnoses, tugai phytocenoses, plantations, and semi-desert biotopes. The egg, larval, and adult stages of leaf beetles were studied using hand collection, sweep-net sampling, and visual observation methods [4–6]. During the investigations, observations were conducted on wheat (*Triticum aestivum* L.), alfalfa (*Medicago sativa* L.), potato (*Solanum tuberosum* L.), desert poplar (*Populus pruinosa* Schrenk.), poplar (*Populus* spp.), willow (*Salix* spp.), elm (*Ulmus* spp.), Russian olive (*Elaeagnus angustifolia* L.), and other host plants.

The collected entomological material was processed in the laboratory of the Department of General Biology, Ecology and Soil Science, Faculty of Biology, Karakalpak State University. Morphological and

taxonomic analyses were performed to identify the collected specimens. Species identification was conducted using classical taxonomic keys and modern literature on the family Chrysomelidae [1–3]. To evaluate species distribution, occurrence frequency, and ecological characteristics, route surveys and stationary observation methods were applied. The obtained data were statistically processed using generally accepted entomological and biometric methods [4–6].

RESULTS AND DISCUSSION

1. Taxonomic Composition of Representatives of the Family Chrysomelidae

As a result of investigations conducted in the Republic of Karakalpakstan during 2020–2025, 40 species of leaf beetles belonging to 21 genera and 6 subfamilies of the family Chrysomelidae were identified. The recorded species were found in agricultural agrocnoses, tugai phytocenoses, plantations, and desert and semi-desert biotopes.

Faunistic analyses revealed representatives of the subfamilies Alticinae, Chrysomelinae, Galerucinae, Criocerinae, Cryptocephalinae, and Clytrinae. Among them, Alticinae, Chrysomelinae, and Galerucinae were dominant in terms of species richness. The wide distribution of these subfamilies can be explained by their adaptation to diverse ecological conditions and the diversity of host plants available in the study area [1–3].

Among the genera, *Cryptocephalus*, *Phyllotreta*, *Haltica*, *Chaetocnema*, and *Chrysomela* were represented by a relatively higher number of species. Representatives of these genera were recorded in almost all investigated biotopes.

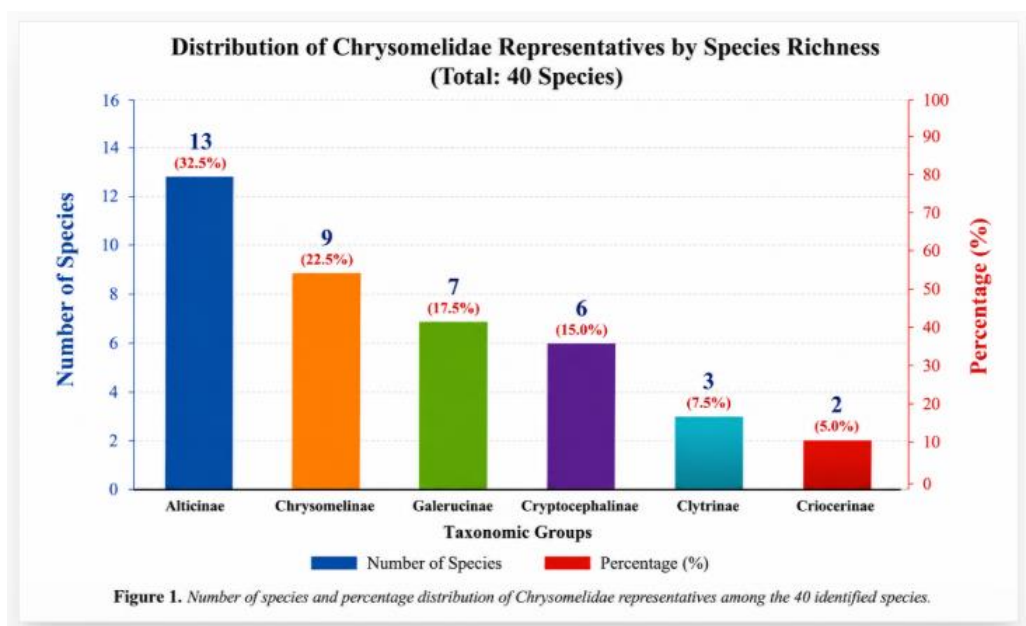


Figure 1. Species richness distribution of Chrysomelidae representatives

According to the obtained results, the subfamily Alticinae was the most species-rich group within Chrysomelidae, represented by 13 species (32.5%). The subfamilies Chrysomelinae and Galerucinae included 9 species (22.5%) and 7 species (17.5%), respectively, constituting a major part of the leaf beetle fauna. The subfamily Cryptocephalinae was represented by 6 species (15.0%), whereas the subfamilies Clytrinae and Criocerinae included 3 species (7.5%) and 2 species (5.0%), respectively. The results demonstrated that representatives of the subfamily Alticinae are widely distributed throughout the territory of the Republic of Karakalpakstan. Genera belonging to this subfamily, including *Haltica*, *Phyllotreta*, *Chaetocnema*, and *Longitarsus*, were frequently encountered in both agroecosystems and natural habitats. Representatives of the subfamilies Chrysomelinae and Galerucinae also occupied an important position in the regional leaf beetle fauna.

2. Dominant Species and Their Host Plants

Field observations revealed that several leaf beetle species occurring in the Republic of Karakalpakstan were characterized by relatively high occurrence frequency and population density. These species were widely distributed in both natural and anthropogenically transformed ecosystems and formed stable populations throughout the growing season. Dominant species were mainly associated with tugai phytocenoses, agricultural agroecosystems, and tree plantations. Most of them exhibited trophic specialization toward particular host plants, and in some cases caused significant damage to vegetative plant organs. The trophic relationships and ecological groups of dominant leaf beetle species were identified and summarized.

Table 1

Dominant leaf beetle species identified in the Republic of Karakalpakstan and their host plants

No	Species	Main Host Plants	Trophic Group
1	<i>Chrysomela populi</i>	<i>Populus spp.</i> , <i>Salix spp.</i>	Oligophagous
2	<i>Galerucella luteola</i>	<i>Ulmus spp.</i>	Monophagous
3	<i>Oulema melanopus</i>	<i>Triticum spp.</i> , <i>Hordeum spp.</i>	Oligophagous

4	<i>Gonioctena fornicata</i>	<i>Medicago sativa</i> L.	Oligophagous
5	<i>Haltica deserticola</i>	<i>Populus</i> spp., <i>Glycyrrhiza</i> spp.	Polyphagous

The study revealed that *Chrysomela populi*, *Galerucella luteola*, *Oulema melanopus*, *Gonioctena fornicata*, and *Haltica deserticola* were the most dominant species. These species were characterized by high occurrence frequencies and the formation of stable populations in different habitats. Most of the dominant species belonged to the oligophagous ecological group and were associated with specific host plants. In particular, *Chrysomela populi* was widely distributed on poplar (*Populus* spp.) and willow (*Salix* spp.), whereas *Galerucella luteola* was commonly found on elm (*Ulmus* spp.). *Oulema melanopus* was frequently encountered in cereal crops, while *Gonioctena fornicata* was abundant in alfalfa agrocenoses. Among the dominant species, only *Haltica deserticola* exhibited polyphagous feeding behavior and was recorded on various host plants. This characteristic indicates a high level of ecological adaptability of the species. The obtained results demonstrate that the distribution and population stability of dominant leaf beetles are primarily determined by the availability of host plants and the ecological conditions of their habitats.

CONCLUSION

As a result of investigations conducted in the Republic of Karakalpakstan during 2020–2025, 40 species belonging to 21 genera and 6 subfamilies of the family Chrysomelidae were identified. Faunistic analyses revealed that the subfamilies Alticinae, Chrysomelinae, and Galerucinae were dominant in terms of species richness. Among the identified species, *Chrysomela populi*, *Galerucella luteola*, *Oulema melanopus*, *Gonioctena fornicata*, and *Haltica deserticola* were recognized as dominant species. These species were characterized by high occurrence frequencies and the formation of stable populations in various habitats. The study demonstrated that the distribution and dominance levels of leaf beetles are closely associated with host plant composition and the ecological characteristics

of biotopes. The obtained results provide a scientific basis for assessing the faunistic composition of representatives of the family Chrysomelidae in the Republic of Karakalpakstan, organizing monitoring programs, and developing measures for the control of economically important phytophagous species.

REFERENCES

1. Lopatin I.K. Leaf Beetles of Central Asia and Kazakhstan (Coleoptera, Chrysomelidae). Leningrad: Nauka, 1977. 257 p.
2. Lopatin I.K., Kulenova K.Z. Leaf Beetles of Kazakhstan (Coleoptera: Chrysomelidae). Alma-Ata: Nauka, 1986. 200 p.
3. Lopatin I.K., Aleksandrovich O.R., Konstantinov A.S. Check List of Leaf Beetles (Coleoptera, Chrysomelidae) of Eastern Europe and Northern Asia. Olsztyn: Wydawnictwo Mantis, 2004. 343 p.
4. Fasulati K.K. Field Study of Terrestrial Invertebrates. Moscow: Vysshaya Shkola, 1971. 424 p.
5. Zakharov A.A. Methods of Entomological Research. Moscow: Nauka, 1987. 185 p.
6. Vorontsov A.I. Forest Entomology. Moscow: Vysshaya Shkola, 1990. 384 p.
7. Kimsanboev H., Sulaimonov B.A., Anorbaev A.R., Rustamov A.A. Entomology and Phytopathology. Tashkent, 2017. 256 p.
8. Romantsova P.V., Rakhimov M.R. New data on leaf beetles (Coleoptera, Chrysomelidae) of Central Asia // Entomological Review. 2023. Vol. 103, No. 6. P. 639–646.
9. Matmuratova G.I., Begzhanov M.K., Kidirbaeva A.Yu. First information about leaf beetles common in agrocenoses of the Southern Aral Sea region and its environs // International Journal of Entomology Research. 2024. Vol. 9, Issue 1. P. 25–27.
10. Zohidova M.B. Distribution and bioecology of the poplar leaf beetle (*Chrysomela populi* Linnaeus, 1758) in the Fergana Valley // Current Problems

and Prospects for the Development of Modern Biology. 2024. P. 129–131.

- 11.** Jumaev R., Kuchboev A., Jumaeva N., Yakubov F., Esanbaev Sh. Molecular identification and polymerase chain reaction analysis of *Xanthogaleruca luteola* (Chrysomelidae) species // E3S Web of Conferences. 2024. Vol. 563. Article 03001.
- 12.** Jolivet P. Biology of Leaf Beetles. Cham: Springer International Publishing, 2015. 421 p.