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**BIOLOGY OF DEVELOPMENT OF REPRESENTATIVES OF THE GENUS *LIXUS*
DISTRIBUTED IN THE FERGANA VALLEY****БИОЛОГИЯ РАЗВИТИЯ ПРЕДСТАВИТЕЛЕЙ РОДА *LIXUS*, РАСПРОСТРАНЕННЫХ В
ФЕРГАНСКОЙ ДОЛИНЕ****FARG‘ONA VODIYSIDA TARQALGAN *LIXUS* AVLODI VAKILLARINING RIVOJLANISH
BIOLOGIYASI****Akhmadjonova Mukhlisakhan Anvarjon qizi¹** ¹Fergana Medical Institute Of Public Health, teacher**Zokirova Gulnoraxon Mamajonovna²** ²Fergana State University, PhD, associate professor**Annotatsiya**

Farg‘ona vodiysida *Lixus* avlodi vakillarining tarqalishi, morfologiyasi, ozuqa spektrini va rivojlanish biologiyasini o‘rganish va tahlil qilish maqsadida tadqiqot olib borildi. Tadqiqotlar Farg‘ona vodiysining Vodil, Toshloq, Marg‘ilon, Qo‘shtepa, Bagdod, Buvayda, Beshariq tumanlarining qator hududlarida olib borildi. Uzunburunlarning sonini aniqlash va ularning namunalarini yig‘ish kuzatuv uslubi asosida mart oyidan boshlab o‘simliklar vegetatsiyasi davomida amalga oshirildi. Ushbu maqola *Lixus* avlodi vakillarining tarqalishi va biologiyasiga bag‘ishlangan. Tadqiqotlar natijasida, *Lixus* avlodi vakillarining Farg‘ona hududida tarqalish xususiyatlari, rivojlanish biologiyasi va morfologik tavsifi yoritib berilgan.

Аннотация

Проведено исследование с целью изучения и анализа распространения, морфологии, спектра питания и биологии развития представителей рода *Lixus* в Ферганской долине. Исследования проводились в ряде районов Ферганской долины: Вадильском, Тошлокском, Маргиланском, Коштепинском, Багдадском, Бувайдинском и Бешарикском. Определение численности длинноносов и сбор их образцов проводили методами наблюдения, начиная с марта, в течение вегетационного периода. Статья посвящена распространению и биологии представителей рода *Lixus*. В результате исследований выяснены особенности распространения, биологии развития и морфологические характеристики представителей рода *Lixus* в Ферганской области.

Abstract

A study was conducted to study and analyze the distribution, morphology, food spectrum and developmental biology of representatives of the genus *Lixus* in the Fergana Valley. The studies were conducted in a number of areas of the Vadil, Toshlok, Margilan, Qoshtepa, Bogdod, Buvayda, Beshariq districts of the Fergana Valley. Determining the number of long-nosed beetles and collecting their samples was carried out during the vegetation period of plants starting from March based on the observation method. This article is devoted to the distribution and biology of representatives of the genus *Lixus*. As a result of the studies, the distribution features, developmental biology and morphological description of representatives of the genus *Lixus* in the Fergana region were highlighted.

Kalit so‘zlar: *Lixus Bardanae* J.C. Fabricius, 1787, *Lixus subtilis* Boheman, 1835 dominat, fitofag, xortobiont, polifag.

Ключевые слова: *Lixus Bardanae* J.C. Fabricius, 1787, *Lixus subtilis* Boheman, 1835 доминируют, фитофаги, хортобионты, полифаги.

Key words: *Lixus Bardanae* J.C. Fabricius, 1787, *Lixus subtilis* Boheman, 1835 dominate, phytophagous, hortobiont, polyphagous.

INTRODUCTION

More than 83,000 species of long-nosed beetles distributed in various ecosystems (mountains and foothills, hills, deserts, forests, etc.) have been recorded on Earth, and special attention is paid to their faunal analysis, natural-geographical distribution, biology and life cycles, ecological characteristics, as well as to the implementation of scientific research on the fight against invasive and quarantine species and their prevention. In this regard, research aimed at

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ensuring the stability of ecosystems and ensuring an in-depth analysis of the fauna of long-nosed beetles in the Fergana Valley is of great scientific and practical importance.

LITERATURE REVIEW

An analysis of fundamental coleopterological research on the scale of Central Asia was conducted by V.V. Yakhontov (1962), the author paid special attention to the areas of combating harmful species of representatives of the family in agricultural crops.

At the beginning of the last century, research on the study of insects in various regions intensified somewhat. In this regard, the works of P.P. Arkhangelsky (1917), V.P. Nevsky (1929) are of particular importance. In parallel, a number of fundamental studies on entomofauna were carried out [9, 10, 11].

In recent years, many studies have been conducted on the study of representatives of the Coleoptera order of the Fergana Valley. As a result of these studies, some representatives of the Cuculionidae family were recorded. In particular, G. Zokirova recorded 1 species occurring in pine forests, and Sh. Yusupova recorded 3 species occurring in the chickpea agrobiocenosis [6].

A.A. Legalov et al. studied the large family Curculionoidea in Iran, and in 2010, the families Anthribidae (3 species), Rhynchitidae (15 species), Attelabidae (2 species), Brentidae (76 species), Brachyceridae (2 species), Dryophthoridae (8 species) and Curculionidae (651 species) belonging to this large family, their distribution and food plants were described. At the same time, 757 species from 245 genera were listed for the Iranian fauna (Legalov A.A et al., 2010). Monika Vroblova conducted research on the occurrence and development of *Lixus subtilis* Boheman, 1835 on *Amaranthus retroflexus* L and *Amaranthus caudatus* L in Slovakia. Monika Vroblova found during her research that *Lixus subtilis* Boheman, 1835 is distributed in the warmer regions of Slovakia, whereas *Lixus subtilis* Boheman, 1835 is not distributed in the northern and central parts of Slovakia due to the cold climate [6].

Yu.V. Belyavsky studied the biology and distribution of *Lixus subtilis* Boheman, 1835 in sugar beet crops. As a result of the research, recommendations were made on the spread of the weevil and the forecast of possible epidemics of damage [15].

Research on the mitochondrial genome of *Lixus subtilis* Boheman, 1835 and its phylogenetic implications was carried out by Kun Xing et al., and the results strongly confirmed the close relationship of *L. subtilis* with Curculioninae and Molytinae [4].

MATERIAL AND RESEARCH METHODS

Study of the genus *Lixus* in 2024 across the Fergana Valley, Fergana district: Vadil (40°09'56.0"N 71°43'37.7"E), Toshlok (40°32'26"N 71°47'52"E), Margilan (40°28'22"N 71°46'13"E), Qoshtepa (40°32'10"N 71°38'30"E; 0°32'09"N 71°38'29"E), Bagdod (40°32'03"N 71°11'35"E), Buvayda (40°39'39"N 71°05'37"E; 40°38'42"N 70°59'46"E; 40°40'46"N 71°01'54"E), Beshariq (40°26'28"N 70°35'52"E; 40°26'50"N 70°34'24"E) districts. The studies used general entomological methods and recorded the name of the place, time of sampling, the number of longhorn beetles, the name of the plant, and the collected data were processed. The methods of M.H. Ahmedov, J. Qushakov, and I. Zokirov were used to observe, record, collect, identify the species of *Lixus subtilis* Boheman, 1835, prepare collections and permanent preparations [7; 12].

Collections were prepared from the collected longhorn beetles, and their morphology and developmental biology were studied. Herbariums were prepared from fodder plants.

RESULTS

More than 951 species of the genus *Lixus* J.C.Fabricius, 1802 were described. Researchers recorded 2 species in Uzbekistan (*Lixus turkestanicus* Desbrochers, 1898; *Lixus strangulatus* Faust, 1883). During our research, 2 species were identified that were not previously recorded in Uzbekistan.

During our observations in the Fergana district, Toshlok, Margilan, Qoshtepa, Bagdod, Buvayda, and Beshariq regions of Fergana, representatives of the genus *Lixus* were not recorded in Fergana and Tashlok districts. It is noteworthy that *Lixus subtilis* Boheman, 1835 was found to be widespread in the Buvayda district and its population density was higher than in the recorded areas.

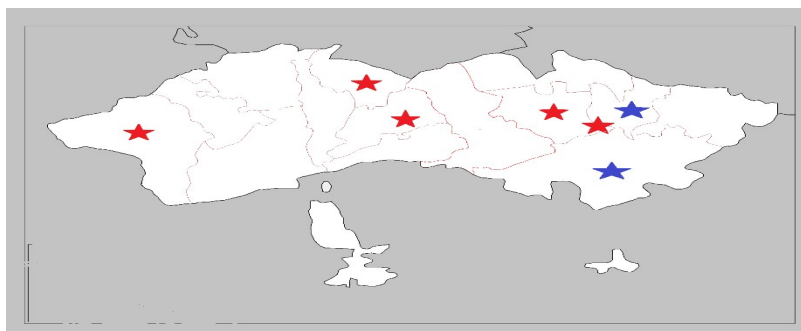


Figure 1.

Areas where the study was conducted.

Note

Red color - Areas where *Lixus* was detectedBlue color - Areas where *Lixus* was not detected.

Recorded species	Recorded area	Coordinates	Recorded date
<i>Lixus Bardanae</i> J.C. Fabricius, 1787	Fergana region, Buvayda	40°39'39"N 71°05'37"E	30.04.2024
<i>Lixus subtilis</i> Boheman, 1835	Fergana region, Margilon	40°28'22"N 71°46'13"E	26.04.2024
	Fergana region, Qoshtepa	40°32'10"N 71°38'30"E;	06.07.2024
	Fergana region, Qoshtepa	40°32'09"N 71°38'29"E	09.07.2024
	Fergana region, Bagdod	40°32'03"N 71°11'35"E	01.06.2024
	Fergana region, Buvayda	40°39'39"N 71°05'37"E	25.05.2024
	Fergana region, Buvayda	40°38'42"N 70°59'46"E	25.05.2024
	Fergana region, Buvayda	40°40'46"N 71°01'54"E	02.07.2024
	Fergana region, Beshariq	40°26'28"N 70°35'52"E	24.04.2024
	Fergana region, Beshariq	40°26'50"N 70°34'24"E	30.04.2024

Lixus Bardanae J.C. Fabricius, 1787. This species was discovered in 2003 from Kyrgyzstan. During our observations, it was found in Buvayda district of Fergana region (40°39'39"N 71°05'37"E, 30.04.2024).

Morphology: Length 7.5-10.8 mm. Beak bent. Head slightly compressed laterally. Elytra long, body black, underside and legs covered with small hairs. Legs thin and delicate (Figure 2).

Bioecology: Hortobiont. Polyphagous. Feeds on young shoots and green parts of plants.



Figure 2. *Lixus Bardanae* J.C. Fabricius, 1787. Original Image author: Akhmadjonova Mukhlisaxon, Fergana region, Buvayda (25.05.2024) 40°39'39"N 71°05'37"E

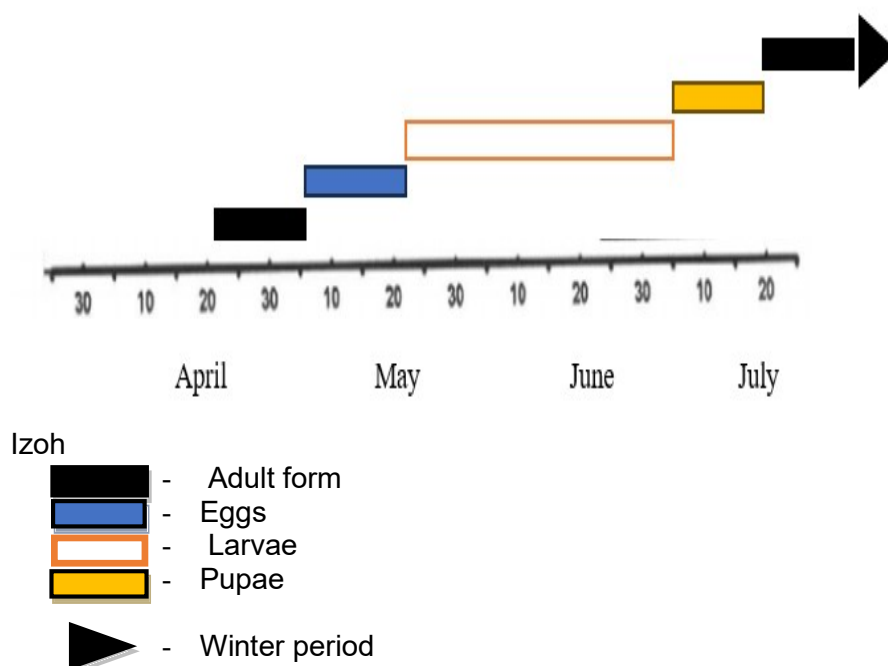
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Feed plants: *Sonchus asper* (Compositae), *Cirsium setosum* (Asteraceae), *Noaea* sp (Amaranthaceae), *Rheum rhaborbarum* (Polygonaceae), *Rumex confertus* (Polygonaceae) and other perennials.

According to the literature, it can also live on other large sorrels (*Rumex aquaticus*, *R. acetosa*, *R. hydrolapathum*, *R. crispus*) (Legalov A.A., 2017)

Adult *Lixus Bardanae* was first observed on April 30, 2024 in Buvayda district of Fergana region, after emerging from winter period, it feeds on plant leaves and makes holes. Females laid up to 20-100 eggs. Eggs developed from May 2-3, 2024 to May 20. Young larvae were first observed on May 22, 2024. The larval stage lasts 5-7 weeks. The larvae were observed from 4 July 2024. The adults were observed from 19-20 July. *Lixus Bardanae* completed only one generation per year in 2024 (Figure 1).

Diagram 1



Lixus subtilis Boheman, 1835 (Fig.3). Discovered in 2023 from the Karaganda region of Kazakhstan. During our research, we visited the Fergana region, Margilan city (40°28'22"N 71°46'13"E; 04/26/2024), Qoshtepa district (40°32'10"N 71°38'30"E, 40°32'09"N 71°38'29"E; 07/06/2024, 07/09/2024), Bagdad (40°32'03"N 71°11'35"E; 06/01/2024), Buvayda district (40°39'39"N 71°05'37"E, 40°38'42"N 70°59'46"E, 40°40'46"N 71°01'54"E; 25.05.2024, 25.05.2024, 02.07.2024), Beshariq district (40°26'28"N 70°35'52"E, 40°26'50"N 70°34'24"E; 24.04.2024, 30.04.2024).



Author of the picture: Akhmadjonova
Mukhlisaxon
Buvayda district
(40°39'39"N 71°05'37"E)
25.05.2024



Author of the picture: Akhmadjonova
Mukhlisaxon,
Qoshtepa district
(40°32'10"N 71°38'30"E)
06.07.2024

Figure 3. *Lixus subtilis* Boheman, 1835. Original.

During our observations in the Fergana region, Tashlok, Margilan, Qoshtepa, Bagdad, Buvayda, and Beshariq regions, *Lixus subtilis* Boheman, 1835 was not recorded in Fergana and Tashlok districts. It is noteworthy that *Lixus subtilis* Boheman, 1835 was found to be widespread in the Buvayda district and its population density was higher than in the recorded regions.

Morphology. *Lixus subtilis* Boheman, 1835 has a light brown, elongated body, with thick legs. (Figure 4-a). The beak is long and thick, with antennae located in the middle of the beak (Figure 4-b).

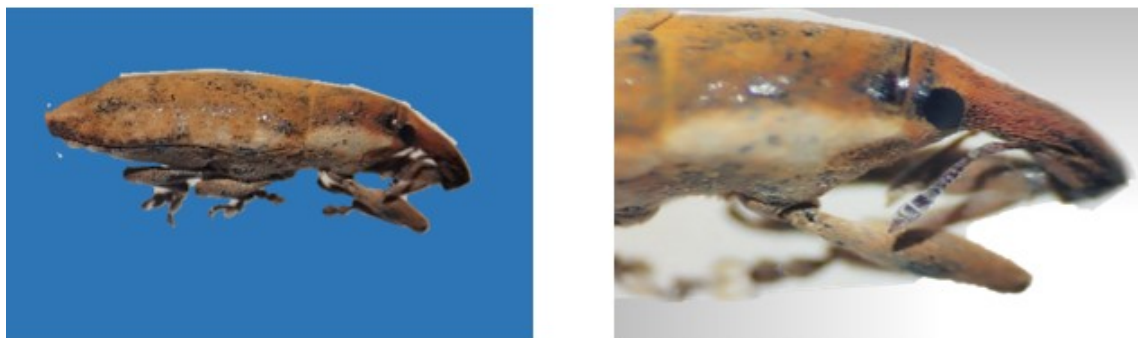


Figure 4. *Lixus subtilis* Boheman, 1835.

a) Body of *Lixus subtilis* Boheman, 1835

b) Beak of *Lixus subtilis* Boheman, 1835

Photo by: Akhmadjonova Mukhlisaxon.

In Fergana, *Lixus subtilis* Boheman, 1835 was found on Chenopodiaceae (Amaranthaceae) family *Chenopodium rubrum* L., *Beta vulgaris* L. and other wild plants and weeds.

Lixus subtilis belongs to the Curculionidae family and usually lays eggs in spring and early summer, when environmental conditions are favorable for the development of larvae and the availability of food. The female beetle lays from 50 to 100 eggs. These eggs are often laid in small clusters, and the larvae that hatch from them turn into pupae in 3-4 weeks.

SUMMARY

This study aims to study the distribution, morphology, food spectrum and developmental biology of the genus *Lixus* in the Fergana Valley. During the study, it was found that *Lixus subtilis* Boheman, 1835 and other species of *Lixus* are widespread and have high population densities in several districts of the Fergana region, in particular in the Buvayda district. The results of the study show that the egg-laying period of *L. subtilis* falls on spring and early summer, when there is vegetation on plants, and the larvae can pupate within 3-4 weeks.

Morphologically, the long-nosed beetles of *Lixus subtilis* are distinguished by their light brown body color and elongated shape. They are especially widespread on plants belonging to the Chenopodiaceae (Amaranthaceae) family, such as *Chenopodium rubrum* and *Beta vulgaris*. The data obtained during the study will serve to develop scientific and practical recommendations for monitoring and managing the biodiversity of the Fergana Valley ecosystems and these species.

In addition, the studies will promote new scientific approaches to a deeper analysis of the fauna of long-nosed beetles in the Fergana region and ensure ecological sustainability. Such studies play an important role, especially in combating harmful species in agricultural crops, maintaining the stability of ecosystems, and restoring the balance of ecosystems.

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