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TAXONOMY AND MORPHOLOGY OF SPECIES OF THE GENUS *HIPPODAMIA* (CHEVROLAT IN DEJEAN, 1837), COMMON IN THE KASHKADARYA REGION**ТАКСОНОМИЯ И МОРФОЛОГИЯ ВИДОВ РОДА *HIPPODAMIA* (CHEVROLAT IN DEJEAN, 1837), РАСПРОСТРАНЁННЫХ В КАШКАДАРЬИНСКОЙ ОБЛАСТИ****QASHQADARYO HUDUDIDA TARQALGAN *HIPPODAMIA* (CHEVROLAT IN DEJEAN, 1837) AVLODIGA MANSUB TURLARNING TAKSONOMIYASI VA MORFOLOGIYASI****Buriyeva Khurshida Parda qizi¹**¹Turon University, Associate Professor (PhD) of the Department of Natural Sciences**Mirzaeva Gulnara Saidarifovna²** ²Institute of Zoology of the Academy of Sciences of Uzbekistan, professor**Arabova Nodira Ziyodovna³** ³Alfraganus University, Associate Professor of the Department of Medicine (Candidate of Biological Sciences)**Abstract**

The article presents the taxonomy, morphology, and coordinates of species of the genus *Hippodamia* (Chevrolat in Dejean, 1837), common in the Kashkadarya region. As a result of practical research, the systematics, species composition, morphology, and global distribution of species of the genus *Hippodamia* (Chevrolat in Dejean, 1837), common in the mountainous, hilly, and cultivated desert areas of the Kashkadarya region, were studied. During the study and identification of the collected specimens, the following species were identified and recorded for the region: *H. variegata* (Goeze, 1777), *H. tredecimpunctata* (Linnaeus, 1758), *H. heydeni* (Weise, 1892). The occurrence of the identified species in all vertical zones indicates their ecological plasticity.

Аннотация

В статье представлены таксономия, морфология и координаты видов рода *Hippodamia* (Chevrolat in Dejean, 1837), распространённых в Кашкадарьинской области. В результате практических исследований изучены систематика, видовой состав, морфология и мировой ареал видов рода *Hippodamia* (Chevrolat in Dejean, 1837), распространённых в горных, холмистых и окультуренных пустынных районах Кашкадарьинской области. В ходе изучения и идентификации собранных коллекций для региона были выявлены и зарегистрированы следующие виды: *H. variegata* (Goeze, 1777), *H. tredecimpunctata* (Linnaeus, 1758), *H. heydeni* (Weise, 1892). Встречаемость выявленных видов во всех вертикальных зонах указывает на их экологическую пластичность.

Annotatsiya

Ushbu maqolada Qashqadaryo viloyatida tarqalgan *Hippodamia* (Chevrolat in Dejean, 1837) avlodiga mansub turlarning taksonomiyasi, morfologiyasi va uchrash koordinatalari keltirilgan. Amaliy tadqiqotlar natijasida Qashqadaryo viloyatining tog', adir va o'zlashtirilgan cho'l mintaqalarida tarqalgan *Hippodamia* (Chevrolat in Dejean, 1837) avlodi turlarining sistematikasi, tur tarkibi, morfologiyasi va global tarqalish areali o'rganildi. To'plangan kolleksiyalarni o'rganish va identifikatsiya qilish jarayonida *Hippodamia* (Chevrolat in Dejean, 1837) avlodiga mansub quyidagi turlar aniqlandi va hudud uchun qayd etildi: *H. variegata* (Goeze, 1777), *H. tredecimpunctata* (Linnaeus, 1758), *H. heydeni* (Weise, 1892). Aniqlangan turlarning barcha vertikal mintaqalarda uchrashi ularning ekologik plastik turlar ekanligidan dalolat beradi.

Key words: *Hippodamia* (Chevrolat in Dejean, 1837), coccinellids, *Hippodamia variegata*, *Hippodamia tredecimpunctata*, *Hippodamia heydeni*

Ключевые слова: *Hippodamia* (Chevrolat in Dejean, 1837), кокцинеллиды, *Hippodamia variegata*, *Hippodamia tredecimpunctata*, *Hippodamia heydeni*

Kalit so'zlar: *Hippodamia* (Chevrolat in Dejean, 1837), koksinnellidlar, *Hippodamia variegata*, *Hippodamia tredecimpunctata*, *Hippodamia heydeni*

INTRODUCTION

The Coccinellidae family includes 6,000 species belonging to 360 genera, and the genus *Hippodamia* (Chevrolat in Dejean, 1837) has about 9 species. The biology, ecology, systematics and geography of most species of this family have been studied by many foreign entomologists [5, 6, 7, 8, 9]. The bioecology and systematics of coccinellids common in Uzbekistan have also been studied by some scientists; 106 species and subspecies belonging to 25 genera have been identified in Uzbekistan [1, 2, 3]. As a result of scientific research, the systematics and species composition of species belonging to the genus *Hippodamia* (Chevrolat in Dejean, 1837), common in different areas of the Kashkadarya region, have been studied [4].

RESEARCH OBJECT AND METHODS

The genus *Hippodamia* (Chevrolat in Dejean, 1837) from the family Coccinellidae includes 9 species, of which it has been established that 3 species are distributed in the Kashkadarya region. Research on coccinellids in the Nishon, Kasbi, Kitab, Mirak, Karshi, and Beshkent districts of Kashkadarya region from 2020 to 2022 was conducted through both route and stationary practical studies, examining more than 100 collected samples of coccinellids in larval and imago stages from 10 coordinates. To determine the taxonomy and species composition of coccinellids, the following identifiers were used: "Key to Insects of the European Part of the USSR" (Vol. 2, Part 1) (1965) [5], "Insect Identifier" [6], and "Beetle Identifier" [7]. Additionally, an online identifier in the Internet system was utilized. The identified species were verified based on materials from the collections of the Institute of Zoology of the Uzbekistan Academy of Sciences.

The global distribution of these species was analyzed using the international database Global Biodiversity Information Facility (GBIF) [10]. Taxonomy and nomenclature of coccinellids were conducted based on data from the Integrated Taxonomic Information System (ITIS) [11].

Order: Coleoptera (Linnaeus, 1758)

Suborder: Polyphaga (Emery, 1886)

Infraorder: Sucujiformia (Lameere, 1938)

Superfamily: Coccinelloidea (Latreille, 1807)

Family: Coccinellidae (Latreille, 1807)

Subfamily: Coccinellinae (Latreille, 1807)

Genus: *Hippodamia* (Chevrolat in Dejean, 1837)

1. *Hippodamia variegata* (Goeze, 1777) (fig. 1).

2. *Hippodamia tredecimpunctata* (Linnaeus, 1758) (fig. 2).

3. *Hippodamia heydeni* (Weise, 1892) (fig. 3).

1. *Hippodamia variegata* (Goeze, 1777).

Location and Discovery Period: Samples were found throughout our study area. In the Kashkadarya region, Nishon district from licorice (*Glycyrrhiza glabra*), 11 males, 9 females, 10 larvae, 357 m, N 38°36'50.10", E 65°42'08.09". In the Karshi district from peanuts (*Arachis hypogaea*), 5 males, 6 females, 8 larvae, 552 m, N 38°51'13.13", E 65°38'18.24". From poplar (*Populus alba*), 14 females, 9 males, 135 m, N 38°50'07", E 65°27'54". In the Guzgor district from apricot (*Armeniaca vulgaris*), 5 females, 12 males, 588 m, N 38°36'51", E 65°14'02", coordinates (August 20, 2020).

Range of Distribution: North Africa, Europe, Russia (approximate parts close to Europe, Siberia, Far East), United Arab Emirates, China, Japan, Afghanistan, Iraq, Israel, Jordan, Pakistan, Syria, Central Asian republics, India, Mongolia, North and South Korea, Turkey [10, 11].

Identification Key: The body is elongated-oval, slightly convex, with linear tips, hairless surface, and a length of 3-5.5 mm. The upper wing is elongated, red, with a yellow single spot at the base of the scutellum and from 6-7 to 13 black spots along the upper wings, which may disappear or merge in some imagos. The shape of the spots resembles a crown (see Fig. 1).

Research Significance: Understanding the distribution, morphology, and ecology of *Hippodamia variegata* is essential for biodiversity assessments and ecological studies. The findings could also inform pest management practices, as many ladybirds are natural predators of aphids and other pest insects.



Figure 1. *Hippodamia variegata* (Goeze, 1777).

2. *Hippodamia tredecimpunctata* (Linnaeus, 1758).

Location and Discovery Period: In the Kashkadarya region, Kitab district from corn (*Zea mays*), 5 males, 6 females, 429 m, N 39°05'53", E 66°54'39". In the Kamashi district from poplar (*Populus alba*), 3 males, 4 females, identified by coordinates 824 m, N 38°48'38", E 66°28'54" (August 15, 2021).

Range of Distribution: This species is found in the territories of the USA, Canada, Colombia, Europe, Uzbekistan, Tajikistan, and Kyrgyzstan [10, 11].

Identification Key: There are 13 black spots along the upper wings. Sometimes, the spots may disappear completely. The wings are yellow, the abdomen is black, and the body length is 10-12 mm (see Fig. 2). This species is commonly found on plants growing near water.



Figure 2. *Hippodamia tredecimpunctata* (Linnaeus, 1758).

3. *Hippodamia heydeni* (Weise, 1892)

Location and Discovery Period: 2 males from alfalfa (*Medicago sativa*), Kashkadarya region, Beshkent district, 387 m, N 38°55'12", E 65°45'17" (June 15, 2021).

Range of Distribution: Kyzylkum, Angren, Kashkadarya.

Identification Key: This variable species is one of the types. The body length is 2 – 5 mm, elongated-oval, slightly convex, with punctures, and a hairless upper surface. The upper wing is elongated, red, with a more yellow base of the scutellum, having one spot, and on each wing tip, there are 6-7 black spots. At the tip, there is one hook and two spots at the junction of the two wings. The upper part of the head is black, while the lower part has yellow patterns, which may disappear or merge in some individuals. The spots have a crown shape (see Fig. 3).



Figure 3. *Hippodamia heydeni* (Weise, 1892).

Ecological Context: The association with alfalfa indicates potential interactions with crops, which could have implications for pest management or conservation strategies in agricultural settings. The detailed description of patterns may also suggest variation within populations, which could affect their ecological roles.

Research Significance: Documenting the morphology and distribution of this species is important for understanding biodiversity in Central Asia. The findings can contribute to conservation efforts and inform agricultural practices, particularly in regions where this species interacts with crops.

CONCLUSION

The genus *Hippodamia* (Chevrolat in Dejean, 1837), belonging to the family Coccinellidae, has been studied for the first time in the Kashkadarya region. As a result of examining biological materials collected during the research and identifying them with specimens from the "Zoological Collection" of the Academy of Sciences of the Republic of Uzbekistan, the following species of the genus *Hippodamia* (Chevrolat in Dejean, 1837) were identified: *H. variegata*, *H. tredecimpunctata* and *H. heydeni*. An analysis of the identified species based on the coordinates of their occurrence showed that they are ecologically plastic species, found across all vertical regions.

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