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Distribution and Morphological Description of Eumenes Mediterraneus (Kriechbaumer, 1879) in the Southern Fergana Region

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Annotation: This article provides information on the distribution and morphological characteristics of the species Eumenes mediterraneus (Kriechbaumer, 1879) in the Southern Fergana region. This species is a solitary wasp. The research was conducted in various ecosystems of Southern Fergana during 2023-2024. The ecological and morphological features, as well as the habitats of E. mediterraneus, have not been studied in this region. Therefore, this article presents some information about the distribution, morphological characteristics, and ecological role of E. mediterraneus wasp in the Southern Fergana area.

Keywords: Eumenes mediterraneus, morphology, Southern Fergana, solitary wasp, distribution.

Introduction

Eumenes mediterraneus (Kriechbaumer, 1879) is a solitary wasp belonging to the family Vespidae, subfamily Eumeninae, and the genus Eumenes. This species plays an important role in local ecosystems, particularly in plant pollination and the control of plant pests [2].

In this species of wasps, there is no social structure, meaning they do not divide into the three main categories (male, worker, and queen wasps). Instead, only female wasps build nests and care for their larvae, while male wasps engage solely in reproduction and have a short lifespan.

The wasp inhabits mountainous and foothill areas, steppes, plains, and agrocenoses. It has not been recorded in urban areas or city surroundings.

Materials and methods

Study Area: The study was conducted in the southern part of the Fergana Valley, located in the eastern part of Uzbekistan. The climate of the region is continental, with relatively mild winters, although the temperature can drop significantly at times. The average temperature in January is -3.2°C, and in July, it is +28°C. The lowest recorded temperature is -27.9°C, and the highest is +42°C. The average annual temperature in the plains is +13-14°C, and in the mountains, it is +9-10°C. Southern Fergana is known for its diverse landscapes.

The research was carried out from April to October during 2023-2024 in natural ecosystems and agrocenoses in the Fergana districts of Bagdod, Rishton, and Oltiarik, as well as in the mountainous biotopes of Shokhimardon and Sokh. GPS coordinates of the study area were taken, and a map of the species' distribution was created (Figure 1).

Figure 1. Map of the study areas.

Sample Collection: The samples were collected using entomological nets and plastic traps, and were preserved in 70% ethanol. Additionally, collections were made using entomological pins, and the specimens were kept for morphological analysis.

Morphological Analysis: The morphological characteristics of the samples were examined using an USB digital microscope. The main measurements included body length, body color and patterns, wing shape, and the shape of the mandibles. Differences between male and female wasps were compared. The taxonomic classification of the specimens was carried out using identification keys related to the Eumenes genus [3].

Results and Discussion

Eumenes mediterraneus is widely distributed in the Southern Fergana region, primarily in areas with abundant flowering plants. During the observations, it was found that the population of this species is relatively low. The species prefers open areas rich in flowers as its habitat. They mainly lead a predatory lifestyle, actively searching for their prey. The feeding grounds are typically areas with widespread plants or caterpillars in agrocenoses.

Field observations indicated that *E. mediterraneus* is distributed in both natural ecosystems and rural areas of the Southern Fergana region. The wasp's nesting and feeding sites were observed, and a distribution diagram by habitat type was created (Figure 2).

Lowland area: This area includes four regions: Fergana city, Bagdod, Rishton, and Oltiarik districts. The species was found in the lowland and rural agrocenoses surrounding these areas, but it was not encountered around Fergana city. This suggests that the species prefers specific plant types or habitats linked to human activity.

Mountain and foothill area: Fergana district, Sokh district, Shokhimardon, and Yordon are part of this group. In this area, the species is more commonly found in mountain and foothill biotopes. Additionally, steppe areas also serve as habitats for this species. However, riparian biotopes in this region are less suitable for the existence of *E. mediterraneus*. The landscape diversity in this area contributes to a greater variety of habitats for the species.

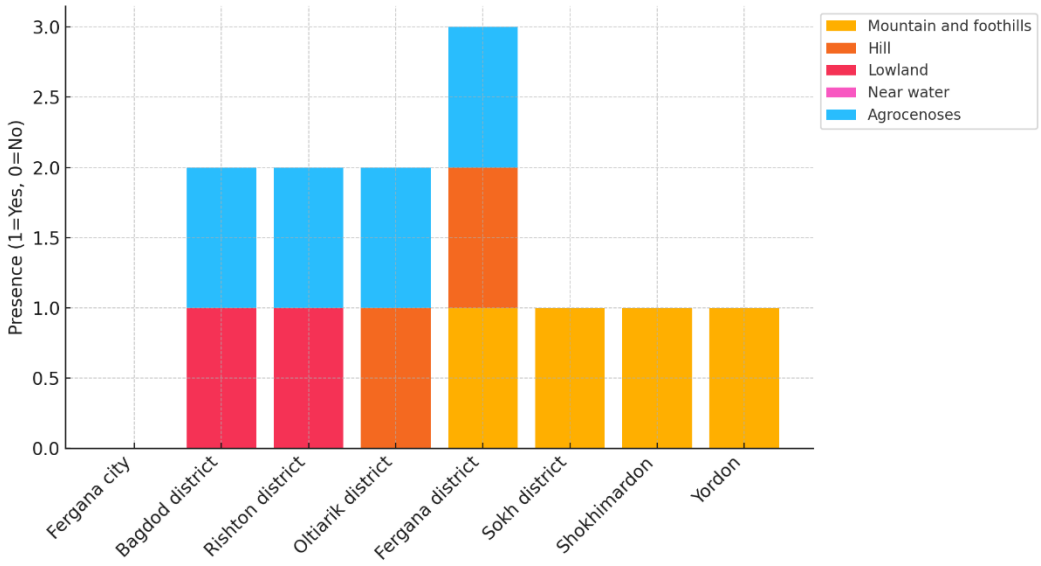

Figure 2. Occurrence of *E. mediterraneus* in the area and its biotopes

Morphological Characteristics: The average body length of *Eumenes mediterraneus* is 12-15 mm, with males being smaller than females. Males are 12-13 mm long, with narrower and longer mandibles, which are typically used for mating and territory defense. Females are 13-15 mm long, with broader and stronger mandibles, which are used for nest construction and preparing food stores [1].

The coloration of *E. mediterraneus* consists of black and yellow stripes, with dense hairs on the thorax. Its wings are smooth and have minimal venation, which is a characteristic of solitary wasps [2]. The body is black with yellow markings. The clypeus is mostly yellow, and there are two large spots on the scutellum. The tergite I has a wide yellow stripe on the upper part. Tergite II is distinguished by large yellow stripes on both sides and a transparent apical lamella. Tergites V and VI also have a yellow stripe on the upper part. Males have curled antennae at the tips. In females, the segment between the compound eyes is yellow, with black spots on the lower part.

Figure 3. *Eumenes mediterraneus* wasp

The general distribution of *Eumenes mediterraneus* includes the Afrotropical (Oman, Saudi Arabia, UAE, Yemen), Oceanic (Tahiti – exotic), Eastern (Afghanistan, China, Iran, Kazakhstan, Korea, Kyrgyzstan, Mongolia, Pakistan, Uzbekistan), and Western (Caucasus, Cyprus, Europe, Iraq, Israel, Jordan, Lebanon, North Africa, Russia, Syria, Turkey) Palearctic regions [4].

Nest. The *Eumenes mediterraneus* wasp species has unique characteristics during the nest-building process. They primarily use soil or clay to construct their nests. Their nests are often located on tree and shrub branches, plant stems, rocks, or structures associated with human activity. In each nest, they create one or several individual chambers - one for egg-laying and the other for food storage. They use specific geometric shapes when constructing their nests, which helps them organize efficient living spaces. Their construction style changes depending on environmental conditions, demonstrating their adaptability.

Conclusion. *Eumenes mediterraneus* is widely distributed in the Southern Fergana region, but its population is relatively low. It is more commonly found in the mountainous and foothill areas. They are primarily observed in open, flower-rich regions in the lowlands and foothill areas, but were not observed around Fergana city. Morphologically, male *E. mediterraneus* individuals are smaller than females. Males have narrower and longer mandibles, which they use to defend their territory. Females have broader and stronger mandibles, which are used for nest construction and food storage. Their nests are often located on tree and shrub branches, plant stems, rocks, or structures associated with human activity. They use specific geometric shapes when constructing their nests, which helps organize efficient living spaces.

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