First finding of *Spalangiopelta* Masi (Hymenoptera: Chalcidoidea, Ceidae), in the Middle East

Until recently, the genus *Spalangiopelta* Masi, 1922, together with *Bohpa* Darling, 1991 and *Cea* Walker, 1837, was classified in the subfamily Ceinae, a small subfamily of Pteromalidae. Burks et al. (2022) revised the taxonomy of Pteromalidae, Ceidae being raised to the family status. This new classification was supported by molecular evidence (Cruaud et al. 2022). Darling (1991) and Mitroiu (2016) diagnosed the genera, but the biology of the group remains largely unknown. The latest publications on the family Pteromalidae *s. lat.* (Lotfalizadeh & Gharali 2008, Rahmani et al. 2022) have not mentioned the presence of this group in Iran.

Currently, there are 15 described species of *Spalangiopelta* worldwide (Noyes 2020), and only eight are known from the Palaearctic region (Mitroiu 2016, Moser et al. 2021).

The genus *Spalangiopelta* is known from the upper Eocene (35 to 43 million years) (Moser et al. 2021) and has seven extant West Palaearctic species *Spalangiopelta alata* Bouček, 1953; *S. alboaculeata* Darling, 1995; *S. brachyptera* Masi, 1922; *S. dudichi* Erdős, 1955; *S. procera* Graham, 1966; *S. rameli* Mitroiu, 2016 and *S. viridis* Mitroiu, 2016 (Bouček 1953, Darling 1991, 1995, Erdős 1955, Graham 1966, Mitroiu 2016, Noyes 2020).

The genus *Spalangiopelta* is characterized by the following features: body color, usually with distinct metallic reflections; mesosoma with a short pronotum but moderately elongated mesoscutum, mesoscutellum, and propodeum, the latter not steep; posterior margin of mesopleuron expanded posteriorly, clearly overlapping metapleural/propodeal complex; macropterous or brachypterous female, macropterous male; fore wing broadly infumate or hyaline; male antenna with each funiculars bearing a whorl of long setae; metasoma distinctly petiolate, although usually transverse petiole (Bouček 1953, Darling 1991, 1995, Erdős 1955, Graham 1966, Mitroiu 2016, Moser et al. 2021).

As Rahmani et al. (2022) mentioned, the former family Pteromalidae fauna in the Middle East is poorly studied. As subsequent investigations of the soil-dwelling Chalcidoidea (Lotfalizadeh et al. 2019), this paper aims to provide the first record of the family Ceidae in Iran and the Middle East region.

The sampling was made in the Marmisho forest, in West-Azarbaijan province, northwestern Iran, in 2019. The samples were collected from the soil litter (20 cm of upper soil layer) and were transferred to the laboratory, where the litter was placed in a Berlese funnel.

The collected material, initially preserved in 70% alcohol, was later sorted and dry-mounted on cards using water-soluble glue according to the method outlined in Noyes (1982). The identification at the generic level was made using Graham (1969) and Bouček and Rasplus (1991) and at the specific level using Bouček (1953), Darling (1991, 1995), Mitroiu (2016), and Moser et al. (2021).

Illustrations were made using an Olympus™ SZH, equipped with a Canon™ A720 digital camera. The specimen was deposited in the Hayk Mirzayans Insect Museum (HMIM) insect collection, Iranian Institute of Plant Protection, Tehran, Iran.

We identified for the first time the family Ceidae (Hymenoptera: Chalcidoidea) and the genus *Spalangiopelta* Masi 1922 in Iran; this is also a new generic record for the Middle East.

***Spalangiopelta viridis* Mitroiu, 2016**

(Figure 1)

Material examined

Iran, West-Azarbaijan, Urmia, Marmisho (37°21′01″ N, 44°22′52″ E, 1775m), 2019.08.18, H. Taher leg., 1♂.

Morphological characters of the male correspond to the original description of Mitroiu (2016):

Body length: 1.05 mm (0.90–1.25 mm in original description).

Head and mesosoma mostly dark brown with faint green metallic reflections; antenna brownish yellow; legs mostly yellow (brownish yellow in original description), fore coxa usually darker; metasoma light brown, with brownish petiole. Fore wings slightly infumate (conspicuous in females), venation light brown.

Head and mesosoma finely imbricate, gaster mainly smooth. Mesosoma moderately robust, metasoma ovate. Malar sulcus indistinct; notauli distinct and complete. Antennal formula 11353, each funicular with a whorl of long setae, all funiculars distinctly longer than broad, the shortest (fu1) about three times longer than wide, the longest (fu2) about 3.2 times longer than broad; clava longer than fu4+fu5. Wings well developed, linear, about 4.3 times as long as wide (4 times in original description), with a parallel margin in the middle part. Marginal vein distinctly longer than post-marginal and stigmal veins, 1.8 and 4.7 times as long as post-marginal and stigmal veins, respectively; the marginal fringe

of the fore wing longer than the stigmal vein. Metasoma petiolate, with conical and smooth petiole. Gaster more than two times longer than broad, slightly widening apically (in dorsal view).

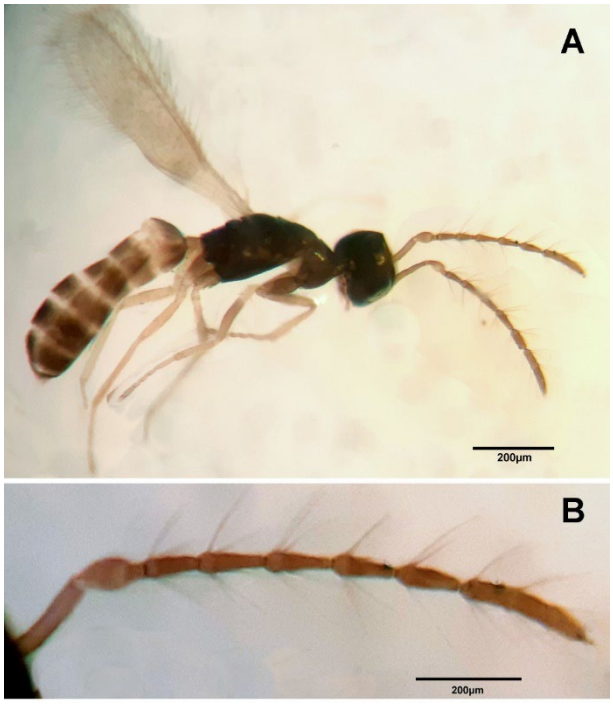

Figure 1. *Spalangiopelta viridis*: A- Lateral habitus of male, B- Antenna of male.

Distribution

This species was initially described from the Canary Islands (Mitroiu 2016), and this is a new record for Iran and the Middle East.

Biological association

Our specimen was obtained from the soil and litter of Marmisho, a forest ecosystem in northwest Iran, but its host is unknown. Darling (1991) asserted that the morphology of the mesosoma could indicate a preference for leaf litter and similar habitats, which was confirmed by our observations. The only two host records for Ceidae indicate that the hosts of these parasitoids are small Diptera living in confined habitats (Moser et al. 2021).

The phylogenetic study of Moser et al. (2021) revealed that the genus was monophyletic; *S. viridis* was placed in the basal part of the obtained trees, but its position relative to other basal species remained unresolved.

Different methods, such as Berlese extraction, Malaise, pan traps, flight interception traps, etc., proved efficient for collecting this genus (Darling 1991), but generally, it remained poorly represented in collections. This may be due to its extremely small size (about 1mm), cryptic habits, or poorly known biology and biological associations. Our recent findings confirm the preferred habitats of these wasps, so targeted collecting efforts along forest floors could raise the number of *Spalangiopelta* specimens in collections.

In the family Ceidae, only one species was reported from the Middle East, *Cea pulicaris* Walker, 1837, recorded in Algeria (Askew et al. 2001) and Turkey (Doğanlar 1985). Therefore, this is the second genus and species of the family in this area. Likewise, this is the first report of the family Ceidae from Iran. However, the Middle East includes a large area in Southwest Asia and North Africa with various environmental conditions. The presence of more species is expected in the Middle East as a transition corridor between the Palaearctic, Oriental, and Afrotropical regions, and further explorations will certainly yield new findings in this area.

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