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Short Communication

Herbertiidae (Hymenoptera: Chalcidoidea): a family previously unrecorded in the Middle East

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Abstract. During a faunistic study of mangrove habitats conducted between 2015–2019 along the Makran coast (southeastern Iran), we collected specimens initially classified under the former Pteromalidae (Hymenoptera: Chalcidoidea). These were identified as *Herbertia wallacei* Burks, 1959 (Hymenoptera: Herbertiidae). This represents the first record of *H. wallacei* in Iran and the first documentation of the family Herbertiidae in the Middle East.

Keywords: *Herbertia*, Herbertiinae, mangrove forests, Makran coast, Iran

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The family Herbertiidae is a small group of chalcidoid wasps that was recently elevated to family rank (Burks et al., 2022). For a long time, its members were included in the family Pteromalidae *sensu lato*. Herbertiidae comprises 10 described species worldwide, classified into three genera: *Exolabrum* Burks, *Herbertia* Howard, and *Versolabrum* Burks and Krogmann (the latter is extinct). Among these, *Herbertia* is the largest genus, with eight known species (UCD Community, 2023). This genus has been documented from the West Palaearctic, but there are no reports from the Middle East (Rahmani et al., 2022). Burks et al. (2022) provided the diagnostic characters of the family. However, Herbertiidae has been treated as incertae sedis due to a lack of consistent phylogenetic resolution in both morphological and molecular studies (Burks et al., 2022).

Members of this family are commonly known as parasitoids or presumed parasitoids of leaf-mining flies (Diptera: Agromyzidae). This host association has been confirmed for two species, while the biology of the remaining species is unknown (Peck, 1963; Herting, 1978; Burks, 1979; Andriescu & Mitroiu, 2001). During the study of hymenopteran fauna in the mangrove forests along the Persian Gulf and Oman Sea coasts in southern Iran, ten species and nine genera from six families were reported (Ameri et al., 2024), but no records from the superfamily of Chalcidoidea. Our specimens were collected using a Malaise trap installed in the mangrove forests located on the Makran coast, the northern coast of the Oman Sea. The Makran region constitutes the southern part of Sistan and Baluchestan province and the eastern part of Hormozgan province. It is a semi-desert coastal region along the Oman Sea, located in southeastern Iran and southwestern Pakistan (Fig. 1).

The main objective of this study is to investigate and document the diversity and distribution of chalcidoid wasps, with a particular focus on the family Herbertiidae, in the mangrove habitats of the Makran coast, southeastern Iran. This research aims to provide the first record of *Herbertia wallacei* in Iran and contribute to the understanding of the faunistic composition of the Middle East region, where this family has not been previously reported. Additionally, the study seeks to clarify the taxonomic status and ecological role of Herbertiidae species in these unique coastal ecosystems.

Herbertiidae Bouček, 1988

Herbertiinae Bouček, 1988. Type genus: *Herbertia* Howard, 1894

Herbertia Howard, 1894

Herbertia Howard, 1894: 98. Type species: *Herbertia lucens* Howard, 1894, by original designation.

Herbertia wallacei Burks, 1959 (Figs 2A-I)

Material examined

Iran, Sistan & Baluchestan province, Chabahar, Bahu-Kalat village, 25°42'04"N & 61°25'25"E, 23m, 13.ix.2016-17.iv.2017, Malaise Trap, Ameri, A. & Nematian, M. leg, 2♀♀.

Diagnosis

Body length 1.3 mm; entirely black (Fig. 2A) with very faint metallic blue iridescence in some areas, antenna dark brown, tibiae and tarsi whitish-yellow; antenna (Fig. 2E) very short, with 10 antennal flagellomeres, antennal formula 11163; labrum rigidly sclerotized and exposed; mesopleuron entirely smooth (Fig. 2D); notauli complete, shallow (Fig. 2F); propodeum (Fig. 2H) smooth and shining medially, between submedian carinae; marginal vein very long, twice as long as postmarginal, stigmal vein very short, without an elongate uncus, postmarginal vein twice as long as stigmal vein (Fig. 2I); head, eyes, mesosoma, and fore wing densely pilose; hind coxa with a patch of hairs posteriorly; first gastral tergite very large and convex, covering about half of the metasoma (Fig. 2G), with a pattern of hair rows anteriorly, without a median basal lamina.

Biological association

We collected our studied specimens from mangrove forests on the southern coast of Iran. Burks (1959, 1979) reported this species as a parasitoid of *Phytomyza ilicicola* Loew, 1872 (Diptera: Agromyzidae).

Distribution

Kazakhstan (Dzhanokmen, 2005), Romania (Andriescu & Mitroiu, 2001), Mexico (De Santis, 1983), United States (Burks, 1959, 1979), Europe (Andriescu & Mitroiu, 2001; Dzhanokmen, 2005) and Iran (new record).

Fig. 1. Map of Iran including Makran coast and collection locality of *Herbertia wallacei* Burks, 1959.

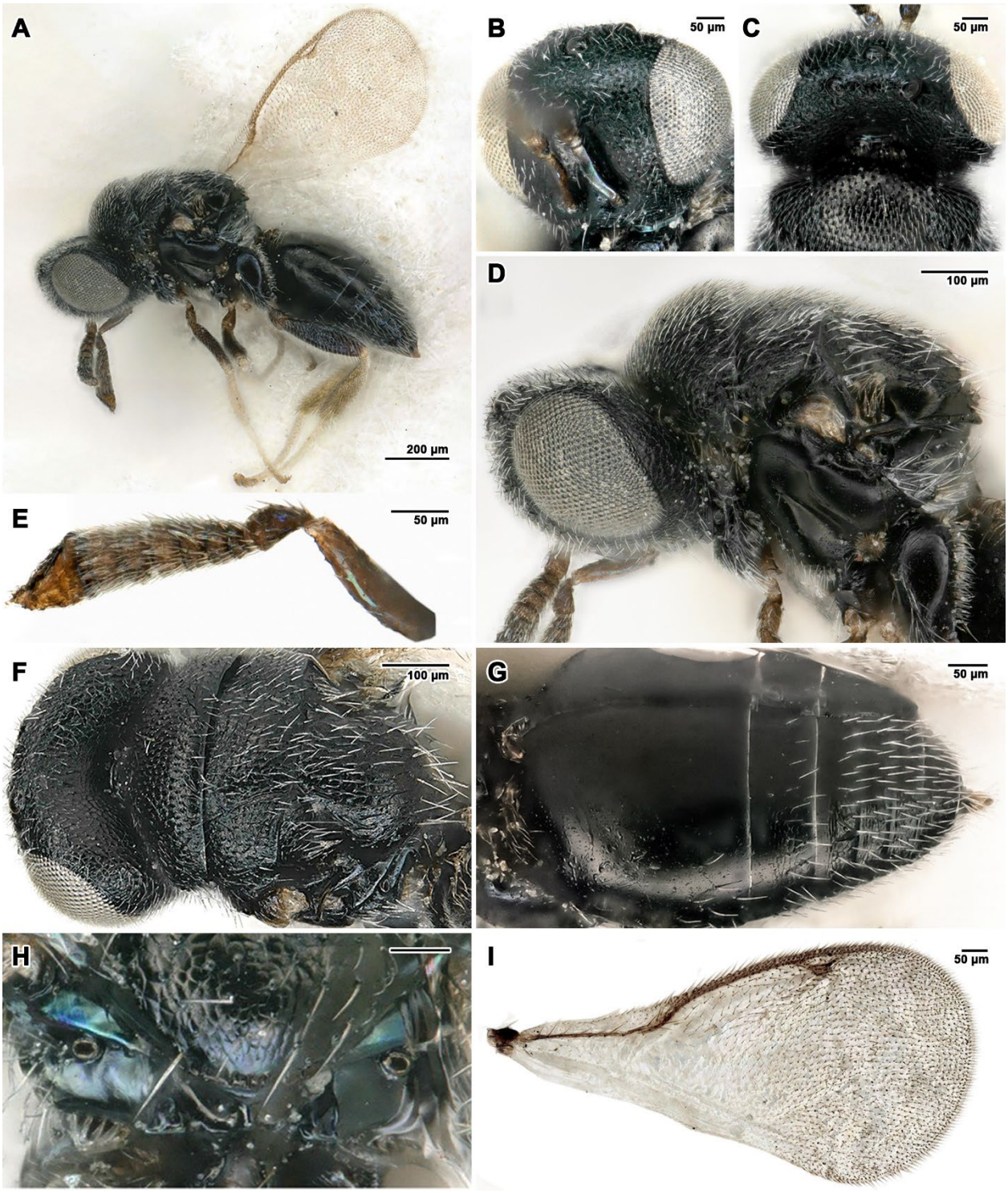

Fig. 2. *Herbertia wallacei,* female: A- Habitus lateral view; B- Head, frontal view; C- Head and pronotum dorsal view; D- Head and mesosma, lateral view; E- Antenna; F- Head and mesosoma, dorsal view; G- Metasoma, dorsal view; H- Propodeum, dorsal view; I- Fore wing.

The identification of *H. wallacei* in Iranian mangrove forests emphasizes the ecological significance of these habitats as reservoirs for parasitoid wasp diversity, many of which play critical roles in regulating populations of

leaf-mining flies (Diptera: Agromyzidae). Although the biology of most Herbertiidae species remains insufficiently understood, established parasitoid relationships with agromyzid flies suggest promising applications in sustainable pest management strategies.

Taxonomically, the family Herbertiidae remains somewhat enigmatic due to limited phylogenetic resolution, as recently documented by Burks et al. (2022). Our study highlights the need for further morphological and molecular investigations to clarify the evolutionary relationships within Chalcidoidea and to better understand the diversity and host associations of Herbertiidae. In conclusion, this research contributes valuable faunistic data to the Middle Eastern hymenopteran fauna and highlights the significance of ongoing biodiversity surveys in mangrove and coastal ecosystems. Future studies should aim to explore the life history traits, host specificity, and conservation status of Herbertiidae species to enhance our understanding of their ecological roles and to support the preservation of these vulnerable habitats.

Author's Contributions

Hossein Lotfalizadeh: Identification, imaging the specimens, preparing the diagnostic characters, preparation of the draft, corrections on the final contents of the manuscript; **Ali Ameri**: collection of specimens; **Mohammadreza Nematian**: sorting and preparation of specimens. The authors read and approved the final version of the manuscript

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Data Availability Statement

The specimens listed in this study are deposited in the Hak Mirzayans Insect Museum (Insect Taxonomy Research Department of the Iranian Research Institute of Plant Protection, Tehran), and are available upon request.

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Ethics Approval

Insects and mites were used in this study. All applicable international, national, and institutional guidelines for the care and use of animals were followed. This article does not contain any studies with human participants performed by any of the authors.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

Generative AI statement

The authors declare that no Gen AI was used in the creation of this manuscript.

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Herbertiidae (Hymenoptera: Chalcidoidea) خانواده‌ای که تاکنون از خاورمیانه گزارش نشده است

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چکیده: طی بررسی فونستیک جنگل‌های حرا در منطقه مکران در سواحل جنوب شرق ایران طی سال‌های ۱۳۹۴ تا ۱۳۹۸، نمونه‌هایی از خانواده‌ای که در گذشته تحت عنوان Pteromalidae (Hymenoptera: Chalcidoidea) شناخته می‌شد، جمع‌آوری شد. این نمونه‌ها با نام *Herbertia wallacei* Burks, 1959 از خانواده Herbertiidae شناسایی گردید. این نخستین گزارش *H. wallacei* از ایران بوده، همچنین حضور خانواده Herbertiidae در خاورمیانه برای اولین بار مستند می‌گردد.

کلمات کلیدی: پارازیتوئیدهای شته، تغییرات زمانی، ترجیح، تخصص

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