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ORIGINAL ARTICLE

A NEW SPECIES OF LONG HORNED BEES: *EUCERA DIPLOTAXA* SP. NOV. (APIDAE, HYMENOPTERA) FROM IRAQ

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ABSTRACT

New species, *Eucera diplotaxa* sp. nov. belonging to the subfamily Apinae (Hymenoptera: Apidae), from Iraq has been described and illustrated. The diagnostic characters and differences from the closely related species previously documented in the Palearctic Region are provided.

Keywords: Apinae, *Eucera*, Fauna, Pollinators, Wild bees.

INTRODUCTION

Apidae are classified among the largest and most diverse bee families, containing about 5700 species; it encompasses both social bees such as honey bees, and solitary bees including genera like *Xylocopa* and *Osmia*. Additionally, the family contains various species of stingless bees and other wild bees. Many species within this family play a crucial role as pollinators of wild flora and cultivated plants (Michener, 2000; Shebl *et al*., 2016). Adult members of this family rely on floral resources, specifically nectar and pollen, to meet their nutritional and energetic requirements. (Delaplane and Mayer, 2000; Michener, 2007) categorize the Apidae into three primary subfamilies include Apinae, Nomadinae, and Xylocopinae.

Apinae is one of the largest subfamilies of Apidae, comprises several tribes such as Apini, Ancylini, Anthophorini, Eucerini, Meliponini, Melectini (Michener, 2007; Eardly *et al*., 2010). Species belonging to this subfamily vary in body length from 5-18mm; the marginal cell of the forewing is elongated; forewing contains three or two submarginal cells; stigma is small and narrow; the prestigma is reduced; hindwing has a jugal lobe or is absent; The vannal lobe is present and larger than jugal lobe; arolium is present or absent; The scopa is present or absent (Michener, 2007; Inoka *et al*., 2008; Eardly *et al*., 2010).

Eucera Scopli (1770) is distinguished by having two submarginal cells, male identification is often facilitated by their extended antennae, which frequently project beyond the base of the metasoma, occasionally spanning its entire length; clypeus protuberant to rather flattened, showing a conspicuous yellow maculation in the males, and is absent in females of most species. Females have thick scopa on the hind legs, particularly on the tibia and first tarsal segment. Scopal hairs are usually unbranched, with some branched hairs restricted to the posterior margin of the tibia, the genitalia and associated S7 and S8 of males are structurally complex, with variably modified projections or lobes (Risch,1997; Michener, 2007; Dorchin, 2023).

Some species of this genus build their nests underground in yellow sandy soils at a depth of approximately 85cm, forming a long tunnel that branches into multiple brood cells (Shebl *et al*., 2016).

In Iraq, the taxonomic and survey studies about Apidae are few, scattered insufficient and incomplete, for example, Ahmed (2017), Mawlood and Amin (2017), Augul (2018) and Sahood *et al*. (2023). Therefore, this study was conducted to provide new data on this family.

MATERIALS AND METHODS

Collection: To investigate the occurrence of Apidae in Iraq, field surveys were conducted to obtain study materials. Adult individuals were captured using sweep netting techniques and subsequently pinned for preservation. A series of five voucher specimens have been archived at the Iraq Natural History Research Center and Museum, University of Baghdad, under accession number HA15.23.

Morphology and Identification: The identification keys of Michener (2007) and Khodaparasat and Monfared (2013) were used to diagnose the new species. The morphological terms used to describe the new taxa were mostly taken from Michener (2007).

Photography: The specimens were observed and figured with the aid of a Huawei nova 7i mobile camera and a digital microscope on OPTIKA microscope, and a camera Lucida attached to a ZEISS microscope to illustrate antennae.

Terminology and Abbreviations: The morphological terms used for the descriptions of the new taxa were mostly taken from Michener (2007).

The following abbreviations are used in the current study as follows: 1st medial cell: first medial cell; 2nd medial cell: second medial cell; 2m-cu: second medio-cubital vein; 1r-m: first radio medial vein; Cl: clypeus; F: flagellum; INHRCM: Iraq Natural History Research Center and Museum University of Baghdad, Baghdad, Iraq; Jl: jugal lobe; La: labrum; M: marginal cell; SMC: submarginal cell; St: sternum; t: tarsomere; T: tergum; Vl: vannal lobe.

RESULTS AND DISCUSSION

Eucera diplotaxa sp. nov.

Species Diagnosis: Morphological characters of *Eucera diplotaxa* sp. nov. and closely related species are distributed in the Palearctic Region according to Michener (2007) and Khodaparast and Monfared (2013), as shown in Table (1).

Table (1): The different features between the new species *Eucera diplotaxa* and related closely species

Characters	***Eucera diplotaxa* Sp. nov.**	***Eucera dimidiata* Brullé, 1832**	***Eucera proxima* Morawitz, 1875**
Clypeus	Yellow, quadrate-trapezoidal	Yellow, slightly convex	Convex, black and the lower part yellow
S7	Apex is inverted V-shaped with acute margins	Apex arcuately undulate with broad margins	Apex nearly straight with pointed margins
S8	Base with slight constriction at center with sparse medium length hairs	Base with slight constriction at center with dense long hairs	Base straight, hairless
Penis	Elongated and expanding toward the apex	Elongated with an acute apex	Moderate in length with a straight apex
Spatha	A rectangular sclerite beneath the penis	A rectangular sclerite with the penis centrally positioned	A rectangular sclerite beneath the penis, with a sinuate apex

Etymology: The species name of the new taxon was given based on the name of the genus plant *Diplotaxis erucoides* (L.) DC., 1821 from which specimens were collected.

Materials examined: 10 specimens (6♂♂, 4♀♀) were collected from Salah Al-Din Province, Tikrit University Campus (34°40′51″N 43°39′17″E), from flowers of *Diplotaxis erucoides* (L.) on 4.iii. 2023.

Holotype:1 ♂ deposited in INHRCM.
Allotype: 1 ♀ deposited in INHRCM.
Paratypes: 5♂♂ and 3♀♀were preserved in the first author's collection. Holotype and paratypes were deposited in INHRCM under the museum number (HA15.23).

Male description

Body length 12-14mm. Black, with the exception of the clypeus, which is clypeus being yellow colour, compound and simple eyes are dark brown, tarsomeres and claws are brown, tibial spurs are white. Body is covered with whitish erect hairs, longer and denser on metathorax and propodeum (Pl.1A).

Head (Pl.2A): Subtriangular, black, densely punctured, vertex convex with long white erect hairs. Frons less convex with similar hairs covering the vertex, clypeus is yellow, convex, wider apically, finely punctured with erect white hairs; labrum triangular, black, with dense, medium-length white hairs directed downward; mandibles sickle-shaped, elongate, black, with a short subapical tooth (Pl.3A); antennae are black, scape cylindrical, apically wider; flagellum with 11 segments, F1 is the shortest, cup-shaped, F2 is cylindrical, three times longer than F1; F3-F10 are equal, F11 is rounded (Fig 1A).

Thorax: Pronotum is black, finely punctured, and covered with pale gray hairs densely punctured; scutellum convex, oval; metanotum narrow, convex; propodeum is dorsally covered with pale gray hairs; laterally with long white hairs; mesepisternum with dense anteriorly directed hairs (Pl.4).

Wings (Pl. 5)**:** The Forewing is hyaline, veins dark brown; stigma small, brown; marginal cell elongate and oval, two submarginal cells, SMC2 larger than SMC1; vein 1r-m strongly curved outward ;1m-cu enters SMC2 before middle; hindwing more transparent; jugal lobe more than half the length of the vannal lobe, with 14 hamuli.

Legs (Pl. 6): Black except tarsomeres t2-t5 brown; coxa triangular; femur cylindrical; tibia with white spur fitting in to the notch of basitarsus; basitarsus cylindrical; t2-t4 triangular and decreasing in size; dorsally with white hairs; t5 cylindrical, pale brown; mid tibial spur long, silvery; hind tibia with two white spurs; claws bifid, arolium present (Pl.8).

Abdomen: Black, finely punctured; T1-T2 with dense white hairs; T7 is rounded; T2 is the largest; T3 has short black hairs and an apical white tuft; T4-T7 has coarse black hairs (Pl.9A); S7 has small is rounded anterior lobes; posterior lobe irregular, bifid; pregradular furrow V shaped (Pl.10 A); S8 reduced, disc triangular, transparent, margin sinuate (Pl.10 B).

Male genitalia (Pl.1A, B)**:** Gonobase with oval-shaped; light brown; gonoforceps cup shaped; gonostyli tubular, slightly expanded with yellowish hairs; penis valves are triangular, sclerotized, broad basally, pale apically; spatha rectangular, elongated and expanding toward the apex, fleshy, yellowish white, expanded apically**.**

Female description

Body length is 13-15mm; black, but the eyes dark brown; tibial spurs white; is covered with pale whitish hairs (Pl.1B).

Head: Triangular, black, densely punctured; vertex convex with yellowish bronze hairs; frons with pale yellowish hairs; eyes are oval and dark brown; ocelli circular, pale brown; clypeus rectangular, convex, finely punctured, covered with dense white hairs; labrum triangular, black with downward white hairs (Pl.2B); mandibles subtriangular in shape, black without subapical tooth with pale hairs (Pl.3B); antennae are black, and the antennomeres increase toward apex (Fig. 1B).

Thorax (Pl. 4): Pronotum black, finely punctured, with pale gray hairs densely punctured; scutellum convex, oval; metanotum narrow, convex; propodeum dorsally with pale gray hairs; laterally with long white hairs; mesepisternum with dense anteriorly directed hairs.
Abdomen (Pl. 9 B): Black, T1-T2 densely covered with yellow hairs: apical margins of T2-T4 with white tufts; T5-T6 densely covered with brown hairs; T6 is triangular, with a pygidial plate, apically rounded covered with brown hairs.

Plate (1): Dorsal view of *Eucera diplotaxa* sp. nov.; (A) Male, (B) Female.

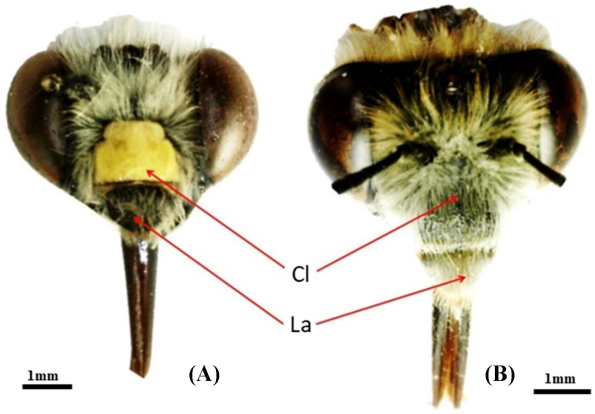

Plate (2): Head of *E. diplotaxa;* (A) Male, (B) Female.

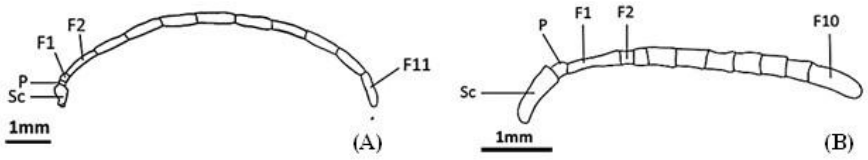

Figure (1): Antenna of *E. diplotaxa*; (A) Male, (B) Female

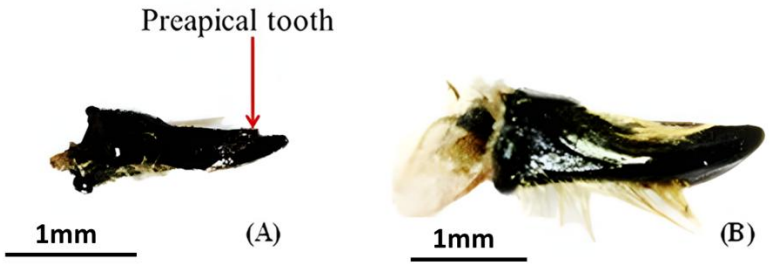

Plate (3): Mandibles of *E. diplotaxa*; (A) Male, (B) Female.

Plate (4): Thorax of Male *E. diplotaxa* (dorsal view).

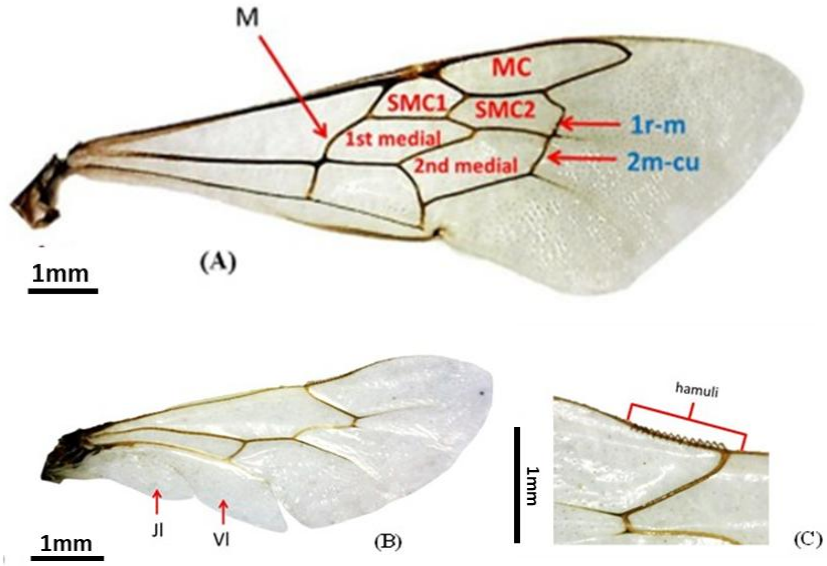

Plate (5): Wings of *E. diplotaxa*; (A) Fore wing, (B) Hind wing, (C) Hamuli of hind wing.

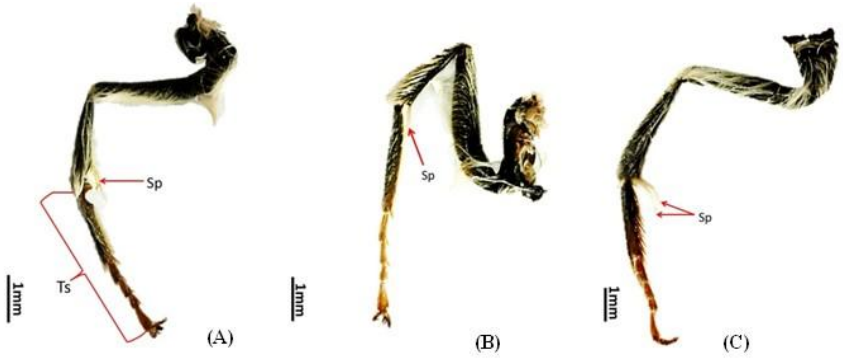

Plate (6): Legs of male *E. diplotaxa*; (A) Fore, (B) Mid, and (C) Hind leg.

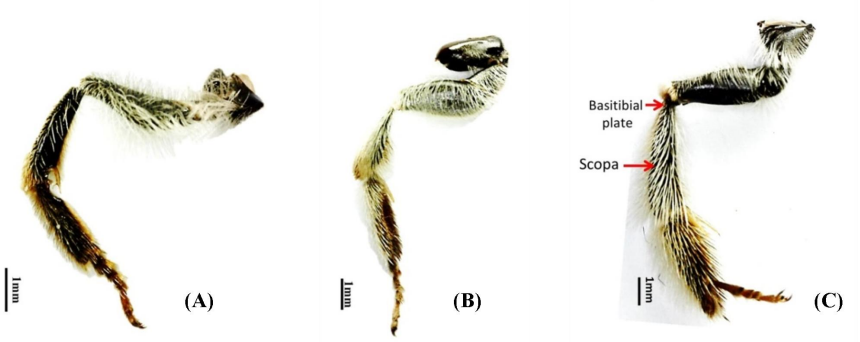

Plate (7): Legs of female *E. diplotaxa*; (A) Fore leg, (B) Mid leg, (C) Hind leg.

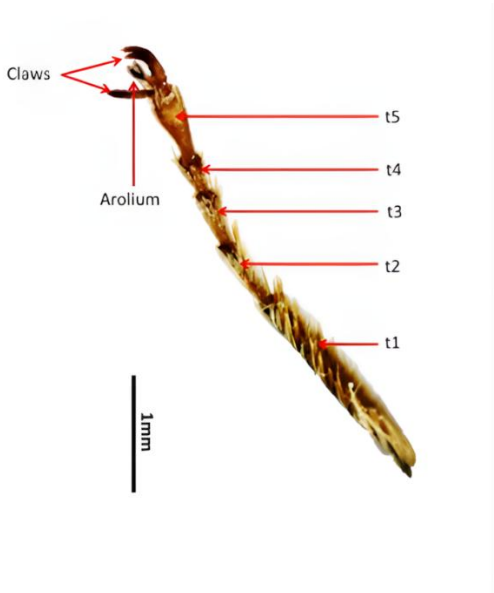

Plate (8): Fore leg; tarsomeres, claws and arolium of *E. diplotaxa* (male).

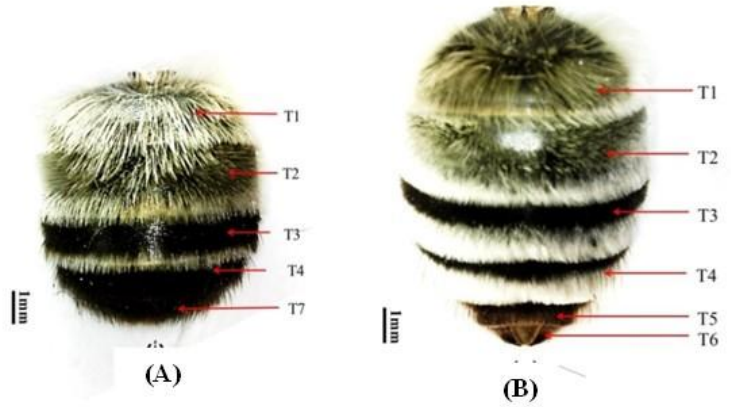

Plate (9): Abdomen of *E. diplotaxa*; (A) Male, (B) Female.

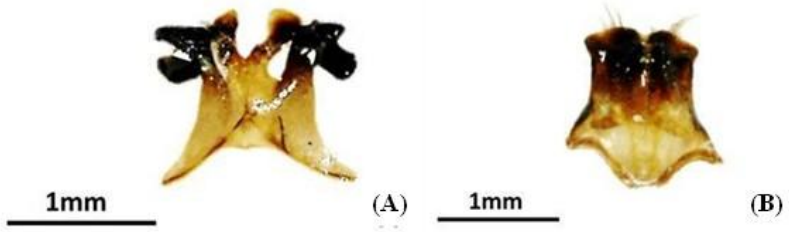

Plate (10): Sternites of *E. diplotaxa*; (A) Sternite (S7), (B) Sternite (S8).

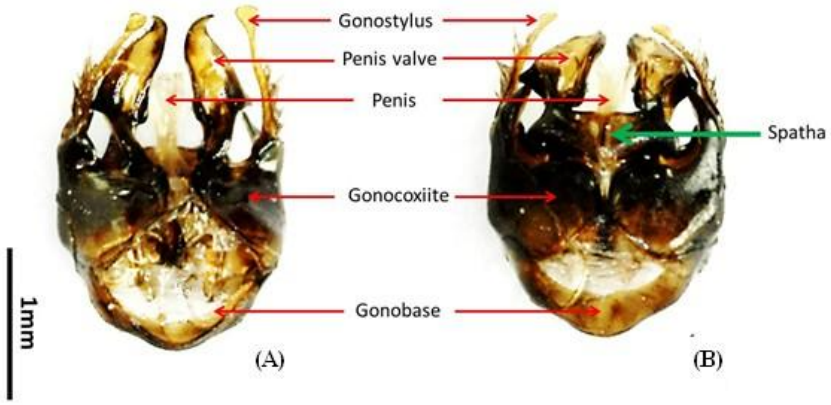

Plate (11): Male genitalia of *E. diplotaxa*; (A) Ventral view; (B) Dorsal view.

CONCLUSIONS

This study describes *Eucera diplotaxa* sp. nov. as a new addition to the list of species recorded in Iraq. This new species is distinguished from its two close relatives, *E. dimidiata* and *E. proxima*, by a yellow, trapezoidal, square-shaped anterior shield, unique male reproductive organs, specifically an inverted V-shaped apex on the seventh genital segment (S7), moderately dense, sparse hairs on the eighth genital segment (S8), and an expanded at the apex. The specimens were collected from *Diplotaxis erucoides* (L.) DC., indicating an association with flowers. “Further comprehensive surveys are recommended to document the diversity of this genus within Iraq.

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CONFLICT OF INTEREST STATEMENT

"The author has no conflicts of interest to declare".

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تسجيل نوعاً جديداً للعلم ***Eucera diplotaxa*** **sp. nov من النحل ذو القرون الطويلة (Apidae, Hymenoptera) من العراق**

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الاستلام: 2025/10/20، المراجعة: 2026/2/13، القبول: 2026/2/17، النشر: 2026/6/20

الخلاصة

وصف النوع *Eucera diplotaxa* جديدا للعلم من العراق، الذي يعود الى عويلة Apinae وعائلة نحل العسل Apidae ورتبة غشائية الأجنحةHymenoptera . وعُرِضتْ الصفات التشخيصية لهذا النوع والفروقات التي تميزه عن الأنواع القريبة منه والمنتشرة والمسجلة للمنطقة القطبية القديمة.