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ORIGINAL ARTICLE

NEW RECORDS OF SPHECIFORMES WASPS (INSECTA, HYMENOPTERA, APOIDEA) FOR DJERBA ISLAND, TUNISIA

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ABSTRACT

Four species of Spheciformes wasps belonging to two families and two genera Crabronidae Latreille, 1802 (one species to the genus *Tachysphex* Kohl, 1883) and Philanthidae Latreille, 1802 (three species to the genus *Cerceris* Latreille, 1802) are reported for the first time from Djerba Island in Tunisia. The distribution in Tunisia and morphological description for reported species are given and illustrated.

Keywords: Djerba Island, Digger wasps, Morphology, New record, Tunisia.

INTRODUCTION

Spheciformes are wasps belonging to hymenopteran aculeate insects and to the Apoidea superfamily. Worldwide, this group is composed of 10189 valid taxa distributing in 11 families and 273 genera (Hanson and Menke, 2006; Nemkov and Ohl, 2011; Sann *et al.*, 2018; Puławski, 2024).

In Tunisia, studies made by Ben Khedher *et al.* (2020a, b, c, d; 2021a, b, c, 2022) highly contributed to the knowledge of this group of wasp fauna in the country. According to previously cited studies, the fauna of spheciformes in Tunisia is estimated by at a total of 334 species and subspecies, which represents 3.90 % of the total fauna in the world.

Djerba Island belongs to Medenine Province and is located in the Gulf of Gabes, on the coast of Tunisia; it is qualified as the largest Island in North Africa. In this Island, faunistic studies are scarce, and only some records are reported in the framework of touristic trips. For example, in the Spheciformes wasps group, Mokrousov and Ben Khedher (2020) described a new species, *Dinetus tunisiensis* Khedher and Mokrousov, 2020, from the Island. This paper aims to report new records of digger wasps in Djerba Island and to contribute so to the knowledge of this local fauna.

New records of spheciformes wasps

MATERIALS AND METHODS

This study is based on identified materials of spheciformes wasps deposited in the private collection of Christian Schmid-Egger (CSE) (Berlin, Germany) and collected from Djerba Island in 1994. For each identified species, its distribution in Tunisia and a morphological description illustrated by digital photos are given. The morphological description is based on identified species deposited in the private collection of Hassib BEN KHEDHER (HBK) and used in the dissertation of Ben Khedher (2020). These materials were identified using Puławski (1971, 2007) for *Tachysphex* species and Schmidt (2000) and de Beaumont (1951) for *Cerceris* species. The identification results of *Cerceris* and *Tachysphex* species were confirmed then by Prof. Dr. Hermann DOLLFUSS (Austria) and Dr. Jakub STRAKA (Czech Republic) respectively. In the morphological description, the terminology and morphology of body parts and wings adopted by Bitsch and Leclercq (1993) were used. The classification of families follows Sann *et al.* (2018, 2021), within families only genera are cited and species are alphabetically arranged.

RESULTS AND DISCUSSION

In this study, four species of digger wasps belonging to two families and two genera are recorded here for the first time from Djerba Island, Tunisia, as follows:

Family, Crabronidae Latreille, 1802**Genus, *Tachysphex*** Kohl, 1883**Species, *Tachysphex albocinctus*** (Lucas, 1849)

Tachytes albo cincta Lucas, 1849. Exploration scientifique de l'Algérie pendant les années 1840, 1841 et 1842 publiée par ordre du gouvernement et avec le concours d'une commission académique, Sciences physiques, Zoologie, 3. Histoire naturelle des animaux articulés, 3. Insectes: 250.

Synonyms: *Tachytes ruficrus* Dufour, 1854

Tachysphex syriacus Kohl, 1888

Tachysphex peculator Nurse, 1909

Tachysphex mantiraptor Ferton, 1912

Tachysphex argyrius Gussakovskij, 1933

Tachysphex dusmeti Giner Marí, 1934

New provincial records: Medenine: Djerba, 10 km Southeast Houmt Souk, 20.vi.1994, 1 ♂ (CSE).

Distribution in Tunisia: Gabes, Jendouba, Kebili, and Tozeur (Puławski, 2007); Kairouan, Mahdia, and Tataouine (Ben Khedher *et al.*, 2020b).

Description: Length: male, 8-12 mm. Body black with dense long pilosity (Pl. 1A, B); head behind eyes narrow; clypeal lamella regularly curved (Pl. 1D); apex of labrum with a median small notch (Pl. 1D); mandible medially ferruginous; frons and vertex mat (Pl. 1C); scape dorsally with pilosity; antennal segments cylindrical, longer than wide; propodeal dorsal area reticulated; basal part of propodeal posterior area longitudinally striated; legs black, tarsi

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more or less brownish; fore femur ventrally not very notched (Pl. 1F), notch covered with small hairs; apex of anal cell in hind wing very wide; postnervulus shorter than nervulus; jugal lobe distinctly large; abdomen black; posterior area of propodeum and first gastral tergum with dense wooly pilosity and the two or three following gastral terga with silvery pilosity forming bands posteriorly (Pl. 1A , E).

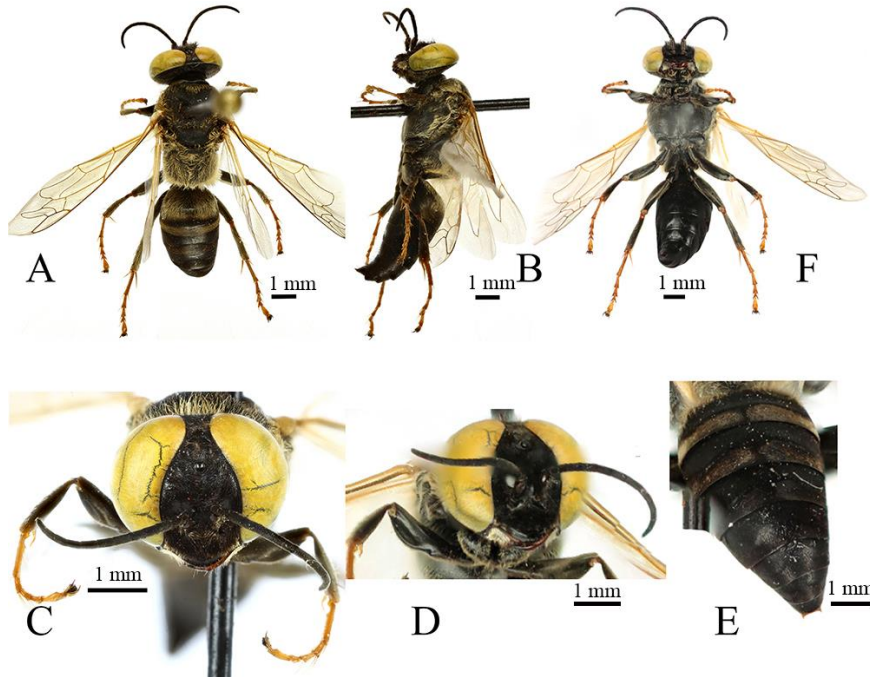


Plate (1): *Tachysphex albocinctus* (Lucas, 1849); ♂: (A) Dorsal habitus, (B) Lateral habitus, (C, D) Frontal view of head, (E) Abdomen, (F) Ventral habitus.

Family Philanthidae Latreille, 1802

Genus *Cerceris* Latreille, 1802

Species, *Cerceris bupresticida* Dufour, 1841

Cerceris bupresticida Dufour, 1841. Annales des Sciences Naturelles. Zoologie (Série 2). 15: 353.

Synonyms: *Cerceris cristata* Dufour, 1841

Cerceris argentifrons Lepeletier, 1845

Cerceris frontalis F. Smith, 1856

Cerceris brutia A. Costa, 1867

Cerceris mixta Radoszkowski, 1877

Cerceris quadripunctata Radoszkowski, 1877

Cerceris bupresticida var. *nigrina* Giner Marí, 1941

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New provincial records: Medenine: Djerba, 10 km Southeast Houmt Souk, 20.vi.1994, 1 ♂, 1 ♀.

Distribution in Tunisia: Kairouan (Giner Marí, 1941); Jendouba, Sfax, Sousse (Dollfuss, 2018); Beja, Jendouba, Kairouan, Kasserine, Kebili, Le Kef, Mahdia, Nabeul, Sousse, Sidi Bouzid, and Tataouine (Ben Khedher *et al.*, 2021b).

Description: Length: male 6.5-10 mm. Body black with yellow markings, noticeably punctate (Pl. 2A); clypeus yellow; median clypeal lobe densely punctate, quite convex, apex black and medially straight (Pl. 2B); mandible yellow, except apex dark; lateral sides of clypeus yellow; antennae dorsally black, ventrally ferruginous; antennal segments regularly thickened towards the apex and the last segment distinctly curved (Pl. 2A); pronotal collar with two lateral and large yellow spots; mesonotum densely punctate (Pl. 2D); propodeum black sometimes with two yellow spots, dorsal area not striated (Pl. 2D); legs partly yellow; forewings slightly smoky apically; basal lobe of hindwings reached half of anal cell; fourth and fifth terga with yellow bands; sixth tergum always yellow (Pl. 2E); sterna mostly black; posterior angles of the sixth tergum and sternum distinctly toothed laterally (Pl. 2E).

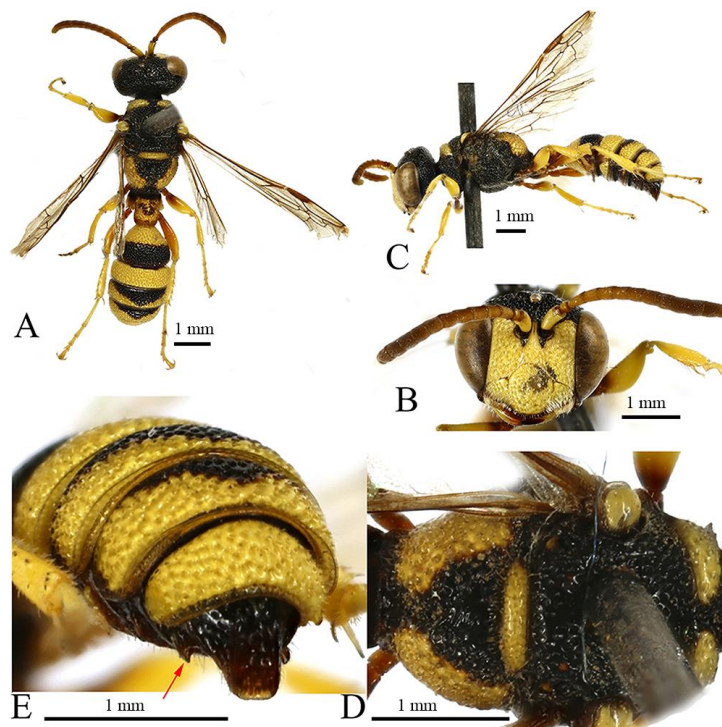


Plate (2): *Cerceris bupresticida* Dufour, 1841; ♂: (A) Dorsal habitus, (B) Frontal view of head, (C) Lateral habitus, (D) Dorsal view of thorax, (E) Dentate of the sixth sternum (red arrow).

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Species, *Cerceris circularis* (Fabricius, 1804)*Philanthus circularis* Fabricius, 1804. Systema Piezatorum secundum ordines, genera, species adiectis synonymis, locis, observationibus, descriptionibus. Carolus Reichard, Brunsvigae: 304.**Synonyms:** *Cerceris clitellata* Lepeletier, 1845*Cerceris elegans* Dufour, 1854*Cerceris dacia opulenta* Morice, 1911*Cerceris elegantula* Shestakov, 1918**New provincial records:** Medenine: Djerba, 10 km Southeast Houmt Souk, 20.vi.1994, 2 ♂♂, 2 ♀♀.**Distribution in Tunisia:** Kairouan (de Beaumont, 1951); Beja, Jendouba, Kebili, Le Kef, Mahdia, and Tataouine (Ben Khedher *et al.*, 2021b).**Description:** Length: female 10-12; male 7-11 mm. Body black with yellow markings (Pl. 3A, D); head densely punctate, with no interspaces between punctures; clypeus yellow except anterior side dark and slightly notched; male with clypeal brush formed by a dense fringe of brown bristles (Pl. 3E); clypeal midfield apically broadly, not deeply excised in female (Pl. 3B); mandible yellow except apex black, with a distinct tooth at the inner edge in female; vertex with white pilosity and two yellow spots that can extend to inner eye orbits; flagellum ferruginous ventrally and more darker dorsally, with tyli only in female; interantennal carina yellow extending to anterior ocellus (Pl. 3B, E); thorax black with yellow markings, covered with short white pilosity; pronotal collar yellow, rounded laterally, slightly notched medially (Pl. 3E); mesonotum quite densely punctate; mesopleural lower part carinated (Pl. 3C); propodeum yellow, dorsal area striated with a distinct median groove, the rest of propodeum densely punctate, with no interspaces between punctures (Pl. 3F); legs yellow, sometimes hind femora of male with dark brown markings on inner sides; hind coxa along its internal edge carinated; tegula yellow with big punctures; fore wings smoky apically (Pl. 3A); terga yellow with apical brown bands; sterna covered with white pilosity; second gastral sternum with a platform distinctly delimited posteriorly and without punctures (Pl. 3G); pygidial plate color varying from yellow to dark brown, matt and finely sculpted in female, bright and noticeably punctate in male.

New records of spheciformes wasps

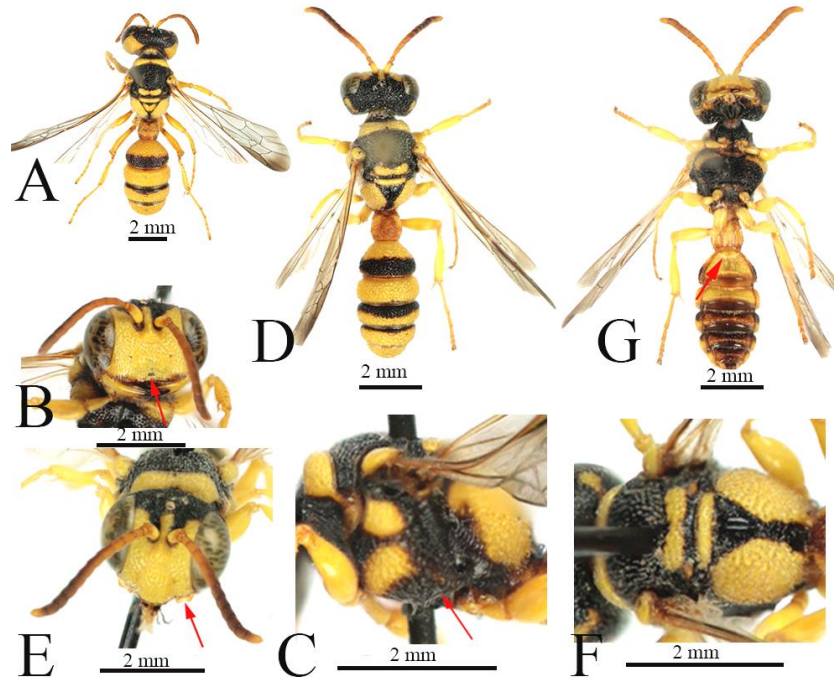


Plate (3): *Cerceris circularis* (Fabricius, 1804); ♀: (A) Dorsal habitus, (B) Frontal view of head, (C) Carina at lower part of mesopleuron (red arrow). ♂: (D) Dorsal habitus, (E) Frontal view of head with clypeal brush (red arrow), (F) Dorsal view of thorax, (G) Platform of second gastral sternum (red arrow).

Species, *Cerceris pulchella* Klug, 1845

Cerceris pulchella Klug, 1845. Symbolae physicae seu icones et descriptiones Insectorum quae ex itinere per Africam borealem et Asiam occidentalem Frederici Guilelmi Hemprich et Christiani Godofredi Ehrenberg medicinae et chirurgiae doctorum studio novae aut illustratae redierunt: 30.

Synonyms: *Cerceris alferii* Mochi, 1939

Cerceris alferii var. *picta* Mochi, 1939

Cerceris pulchella scabra de Beaumont, 1959

Cerceris pulchella Judaea de Beaumont, 1970

New provincial records: Medenine: Djerba, 10 km Southeast Houmt Souk, 20.VI.1994, 1 ♂ (CSE).

Distribution in Tunisia: Kairouan, Kasserine, Kebili, Mahdia, Sidi Bouzid, and Tataouine (Ben Khedher *et al.*, 2021b).

Description: Length: male: 8-8,5 mm. Body yellow; head with erect setae; clypeus sparsely punctate, median lobe convex above and flat below in male (Pl. 4F), flat above and toothed at

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lateral sides below in female (Pl. 4B), male clypeal brush with dense fringe of brown bristles; mandibula yellow except apex black, with two teeth in female; frons bright, sparsely punctate; scape yellow; flagellum ferruginous, more darker dorsally, last flagellomere conical (Pl. 4A); interantennal carina yellow, distinct and not reaching anterior ocellus (Pl. 4B); thorax with very sparse setae; pronotal collar rounded laterally; space between anterior and posterior areas of mesopleuron very thin carinated (Pl. 4E); propodeum mostly yellow, dorsal area smooth, with distinct carina medially, shortly striated laterally and basally (Pl. 4C); the rest of propodeum punctate; legs yellow except ventral of hind femur and base of mid femur black; tegula yellow, with big punctures; abdomen yellow with black or ferruginous bands; sterna with white pilosity; second gastral sternum with a platform well delimited basally (Pl. 4I); pygidial area sculpturing narrower in male than in female.

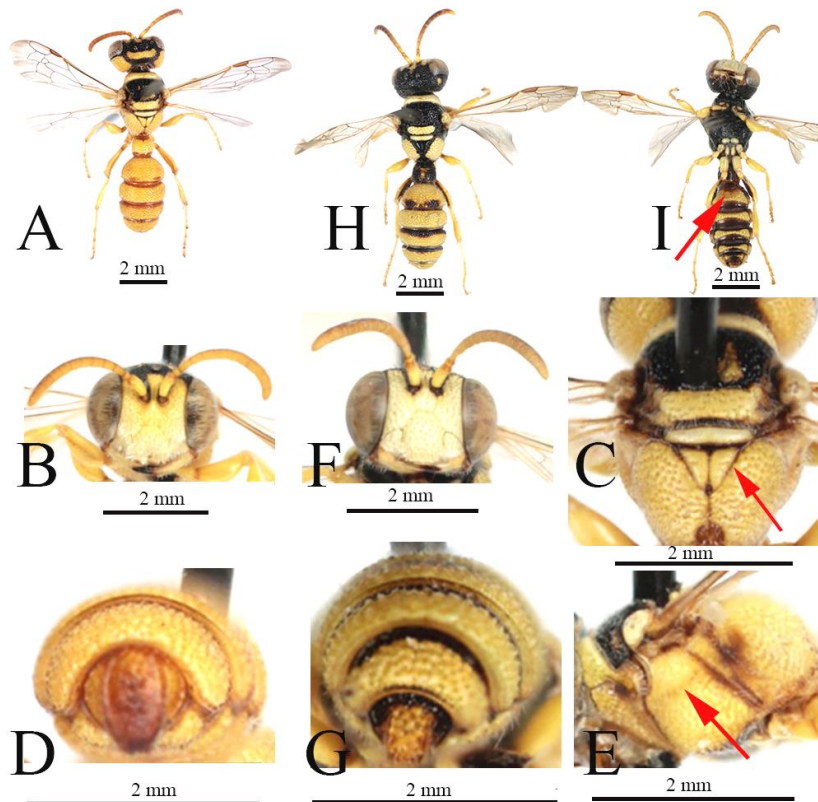


Plate (4): *Cerceris pulchella* Klug, 1845; ♀: (A) Dorsal habitus, (B) Frontal view of head, (C) Dorsal view of thorax, (D) Pygidial plate, (E) Carina between anterior and posterior areas of mesopleuron. ♂: (F) Frontal view of head, (G) Pygidial plate, (H) Dorsal habitus, (I) Platform of second gastral sternum (red arrow).

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CONCLUSIONS

This study represents a new contribution to the local fauna of Djerba Island in Tunisia. Four species of digger wasps are registered for the first time on the Island. The morphology of the recorded species is described, and the morphological characters having taxonomic importance are illustrated. Due to their important role as bioindicators of biodiversity, many faunistic studies on spheciform wasps are required to take all necessary measurements for the conservation and the maintenance of biodiversity and ecosystem equilibrium.

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We would like to thank Christian Schmid-Egger (Berlin, Germany) for sending us the results of his identification of materials deposited in his private collection and originated from Tunisia. Sincere appreciation is also expressed to the Regional Research Center on Horticulture and Organic Agriculture at Chott Meriem- Sousse, Tunisia, specifically to Professor Dr. Mohamed Braham for his kind support.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest related to the work in the manuscript. We "the authors" have followed and signed the scientific research ethics announced by the journal.

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تسجيلات جديدة لدبابير الخصر في جزيرة جربة، تونس
(Insecta, Hymenoptera, Apoidea)

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الاستلام: 2024/1/4، المراجعة: 2024/3/31، القبول: 2024/4/2، النشر: 2024/6/20

الخلاصة

سُجِّلت أربعة أنواع لأول مرة من دبابير الخصر في جزيرة جربة، تونس،
تعود الى عائلتين و جنسين: Crabronidae Latreille, 1802 (نوع واحد من جنس
Philanthidae Latreille, 1802 (ثلاثة أنواع من جنس
Cerceris Latreille, 1802). حُدِّدت أماكن توزع الأنواع الجديدة المسجلة في
تونس وتم وصفها مظهرياً و توثيقها.