

Taxonomic Studies On Genus *Hedychrum* Latreille (Hymenoptera, Chrysididae, Chrysininae) In Egypt

ALAA DIN ABD EL AZIZ OSHIBAH⁽¹⁾, MAGDI MOHAMMED SALEM⁽²⁾, MOHAMMED TAHA HOSSNI⁽¹⁾,
AHMED MOHAMMED GALHOUM⁽¹⁾ AND AHMED MOUSTAFA SOLIMAN⁽¹⁾

1- Department of Zoology, Faculty of Science, Al-Azhar University

2- Plant Protection Research Institute, Ministry of Agriculture.

ahmadgalhoum@hotmail.com

Abstract: *The Chrysididae are a group of cleptoparasitic and parasitoid aculeate wasps. This study presents a comprehensive dichotomous key side by side with description and synonyms for five species belong to genus Hedychrum Latreille found in Egypt. The study based upon our own material which has been collected almost throughout the country, but also includes museum material and literature records. In addition, the diagnostic characters and a key for tribes of subfamily Chrysidinae are presented. Nomenclatorial changes were carried out for one species*

Keywords: Taxonomy, Key, Chrysididae, Wasps, Hedychrum

1. INTRODUCTION

The Chrysididae are brightly coloured aculeate Hymenoptera, which are commonly known as cuckoo-wasps. The females lay their eggs in host nests or prepupae, and the larvae develop and feed on the host, hence they are considered cleptoparasites (Paukkunen *et al.*, 2014).

A few information on the biology and hosts of cuckoo wasps have been published e.g. Kunz (1994), Rosa (2006) and Parn *et al.* (2014).

Strohm *et al.* (2008) observed the similarity of CHC profile of the digger wasp, *Philanthus triangulum* (Fabricius, 1775) (Hymenoptera: Apoidea: Crabronidae), and its cleptoparasite, the cuckoo wasp *Hedychrum rutilans* Dahlbom, 1854 (Hymenoptera: Chrysididae: Chrysididae) and concluded that the similarity is most probably the result of chemical mimicry. Studying CHC profile evolution in a complex host-cleptoparasite system could provide further insights into the significance of chemical mimicry for cleptoparasites.

Cuckoo-wasps of the genus *Hedychrum* are recorded in open areas and forest margins, on sand, clay and loess. The hosts are ground-nesting solitary wasps of the crabronid subfamily Philanthinae. The majority of species inhabit the Eastern Hemisphere, with the highest species diversity in the Palaearctic, Ethiopian and Oriental Regions (Wiśniowski, 2015).

The taxonomy of Chrysididae has long been confusing due to the similarity of species and extensive intraspecific variation (Paukkunen *et al.*, 2015).

Paukkunen *et al.* (2015) presented the diagnostic characters of the genus (i.e. consists of robust species with a body length ranging from 4 to 10 mm., the meso- and metatibial pits, the enlarged metafemur, the apically bifid tarsal claw). The authors stated that, many species show sexual dimorphism (i.e. the mesosoma is bicoloured in the female, green, blue or violet in the male.).

In Egypt, Chrysididae received a little attention Buysson (1908) is the first author outlined the basic characteristics and biology of chrysidid wasps of Egypt and constructed keys to more than 100 species and varieties (belonging to four subfamilies).

Storey *et al.* (1914) presented a list of chrysidid wasps of the collection of the Ministry of Agriculture "Egypt", with their distribution, including 24 species and subspecies belonging to seven genera.

Trautmann (1926) contributed in identification of 60 species and varieties of chrysidid wasps in the collection of Alfieri, Egypt.

Zimmermann (1940) recorded and described two new species of Chrysididae from Egypt.

This study aimed to present a useful contribution to enriching the taxonomic work on the Egyptian insect fauna

2. MATERIALS AND METHODS

Different Egyptian entomological collections surveyed for *Hedychrum* Latreille species and from which specimens are used for taxonomic studies. In addition specimens have been collected by sweeping net from different geographical region in Egypt. For every species, dry mounts were made, some specimens were used to make microscopic preparations.

Credit of identification and confirmation of the most species within the scope of the present work due to the specialists of the Plant Protection Research Institute (Insect Identification Service); in addition the available recent identification keys and taxonomic investigations. Also, preliminary determination along with some materials were confirmed by Dr. Lynn Kimsey, Professor of Entomology, University of California at Davis (USA) and Dr. Franco Strumia, Università di Pisa, Centro Interdipartimentale, Museo di Storia Naturale e del Territorio, (Italia).

Examination and illustrations of the external features of the specimens were achieved using a stereo-binocular microscope. Drawings of all preparations were made with the

help of a square eyepiece, micrometer eyepiece and computer's Photoshop (version 7).

Abbreviations:

Ain Shams Univ. Coll.: Entomological Collection of Ain Shams University.

Al-Azhar Univ. Coll.: Entomological Collection of Al Azhar University.

Author Coll.: Specimens collected by the authors.

Cairo Univ. Coll.: Entomological Collection of Cairo University.

L/W: Length versus width.

F-I–II, etc.: Antennal articles (flagellomeres) following scape and pedicel.

Min. Agr. Coll.: Entomological Collection of Ministry of Agriculture.

MOD: Middle ocellus diameter.

PD: Puncture diameter.

S-I–III, etc.: Gastral sterna.

Soc. Coll.: Entomological Collection of Entomological Society of Egypt.

T-I–II, etc.: Gastral terga beginning at the base.

3. RESULTS

Genus *Hedychrum* Latreille, 1802

Hedychrum Latreille, 1802. Histoire naturelle, des Crustacés et des Insectes, 3, p.317.

Type species: *Chrysis lucidula* Fabricius, 1775. Systema entomologiae, p.358. Libraria Kortii, Flensburgi et Lipsiae. (= *Sphex nobilis* Scopoli, 1763. Entomologica Carniolica, p.792. Trattner, Vindobonae).

Cymura Dahlbom, 1845. Dispositio methodica specierum Hymenopterorum, secundum Insectorum naturals, p.4. Berlingianis, Lund.

Type species: *Cymura splendidula* Dahlbom, 1845. Dispositio methodica specierum Hymenopterorum, secundum Insectorum naturals, p.4. Berlingianis, Lund. (= *Hedychrum coelestinum* Spinola, 1838. Ann. Soc. Ent. France, 7, p.454).

Wollmania Mocsáry. 1909. Archiv. Zool., 1, p.2.

Type species: *Wollmania concinna* Mocsáry, 1909. Archiv. Zool., 1, p.2.

Generic diagnosis: Scapal basin deeply concave, with cross-ridging. Malar space less than 1 MOD. Base of oral fossa with sharp tooth. Pronotum with anteromedial pit. Notauli sulciform. Metanotum rounded or rarely mucronate. Propodeum without medial enclosure, but with medial carina. Mesopleuron rounded ventrally, with indistinct omaulus and short scrobal sulcus. Mid and hind tibiae with pit or depression on inner surface, rarely without; hind femur enlarged; tarsal claws with subsidiary subparallel tooth, appearing apically bifid. Fore wing medial vein slightly curved, arising at cu-a; stigma slender and apically acute. T-III usually swollen

subapically, with a pair of apicolateral teeth (rarely with four apical teeth). Female S-III with sub-basal sulcus extending toward mid-line and often with apicomедial tubercle.

Unlike most other elampines, sex determination in *Hedychrum* is relatively simple. Female S-III with sub-basal sulci. The outer surface of hind femur is reticulate and non-metallic brown in males, shiny green or blue in females.

Hosts: Few hosts have been reported for *Hedychrum*, all are Sphecidae in the subfamily philanthinae.

World distribution: The Eastern Hemisphere has the highest diversity of *Hedychrum*. The majority of species are restricted to the Palaearctic, Afrotropical and Oriental Regions. In the Western Hemisphere the majority of species are restricted to Nearctic Region.

Key to the species of genus *Hedychrum* Latreille

1- Head and thoracic dorsum vary from metallic brassy green to coppery red; abdominal tergites coppery red.....2

- Body wholly metallic dark green or blue.....3

2(1) About 8 mm in length; vertex, scapal basin, scape, fore and mid femora and all tibiae coppery red (remaining of head brassy green); metanotum mucronate; propodeal lateral angle triangular, acute apically; T-III apical margin slightly notched medially, with spine-like lateral tooth; female S-III with apicomедial tubercle.....

cirtanum Gribodo

- About 5.5 mm in length; head wholly brassy green; scape and fore and mid femora green; tibiae light brown; metanotum evenly convex; propodeal lateral angle digital-like, subtruncate apically; T-III apical margin not notched (evenly rounded or entire) medially and acutely angulate laterally; female S-III without apicomедial tubercle.....

rutilans Dahlbom
3(1) General colour blue with purplish tint; tegulae pale blue; fore wing evenly stained dark brown; T-III distal rim darkness; subantennal space about 1.25 MOD; metanotum distinctly mucronate; T-III apical margin slightly notched medially, with spine-like lateral tooth; S-II and S-III metallic green.....

coelestinum Spinola
- General colour dark green; tegulae iridescent brown; fore wing hyaline or at most stained pale brown distally; T-III distal rim translucent; subantennal space at most 1 MOD; metanotum evenly convex; T-III apical margin entire medially, with obtuse lateral angle; S-II and S-III dark brown..... 4

4(3) Pedicel green above; propodeal lateral angle digital-like, subtruncate apically; mid tibia with large pit occupying most of inner surface; fore wing stained pale brown distally.....

morosum Buysson
- Pedicel dark brown above; propodeal lateral angle triangular, acute apically; mid tibia with small subapical pit on

inner surface; fore wing hyaline distally
*chalybaeum* Dahlbom

***Hedychrum chalybaeum* Dahlbom, 1854**

(Pl. I)

Hedychrum chalybaeum Dahlbom, 1854. Hymenoptera
 Europea praecipue borealia, 2, p.64.

Hedychrum szaboi Mocsáry, 1889. Monographia
 Chrysididarum orbis terrestris universi, p.167.
 Hungarian Academy of Sciences, Budapest.

Hedychrum komarovi Semenov, 1967. Trans. Zool. Inst.
 Akad. Nauk SSSR, 43, p.138.

Hedychrum martynovi Semenov, 1967. Trans. Zool. Inst.
 Akad. Nauk SSSR, 43, p.138.

Diagnosis: (Male)

Body length: About 6.5 mm

Colouration: Body metallic dark green in general; tegulae iridescent brown; femora metallic green (outer surface of hind femur non-metallic dark brown), tibiae metallic pale green, tarsi light brown; scape metallic pale green, upper surface of pedicel and flagellum dark brown; mandible shining ochreous (yellowish brown), with dark brown apex and metallic green base; wings hyaline; S-II and S-III dark brown.

Head: Intercellular distance as long as ocellular distance. Vertex and brow moderately reticulate-punctate, both with short and erect silvery pubescence. Scapal basin deeply concave and strongly cross-ridging medially, the sides raised and finely reticulate-punctate. Subantennal space about 1 MOD. Malar space about 0.5 MOD. Clypeus finely subreticulate-punctate laterally, nearly smooth and slightly convex in the middle, with straight apical margin. Mandible edentate. F-I L/W about 1.5; F-I/F-II/F-III about 1.75/1.25/1.

Thorax: Thoracic dorsum largely reticulate-punctate; PD widest on metanotum (about 1 MOD), slightly narrower on scutellum and about 0.5 MOD on pronotum and scutum. Pronotum about 1.25 times as long as scutellum, with shallow and finely rugose lateral depression. Tegula ovoid and smooth. Metanotum evenly convex. Propodeal lateral angle triangular, acute apically and nearly straight posteriorly. Mesopleuron largely reticulate-punctate, rounded ventrally, with indistinct omalus and short scrobal sulcus. Mid and hind tibiae with small drop-like subapical pit on inner surface; tarsal claws with subsidiary subparallel tooth. Fore wing M vein gently curved and arising parallel with cu-a; outer veins of discoidal cell quite faint.

Abdomen: T-I and T-III finely subreticulate-punctate; T-II finely sparsely punctate. T-II apical half and T-III with short brownish pubescence. T-III with weak subapical swelling and translucent distal rim; T-III apical margin entire medially and obtusely angulate laterally.

Specimens examined: Kirdasa (Giza), May 1921-----**Al-Azhar Univ. Coll.**

World distribution: Palaearctic: widespread.

***Hedychrum cirtanum* Gribodo, 1879**

(Pl. II)

Hedychrum cirtanum Gribodo, 1879. Ann. Mus. Civ. Storia
 Nat., Genova, 14, p.338.

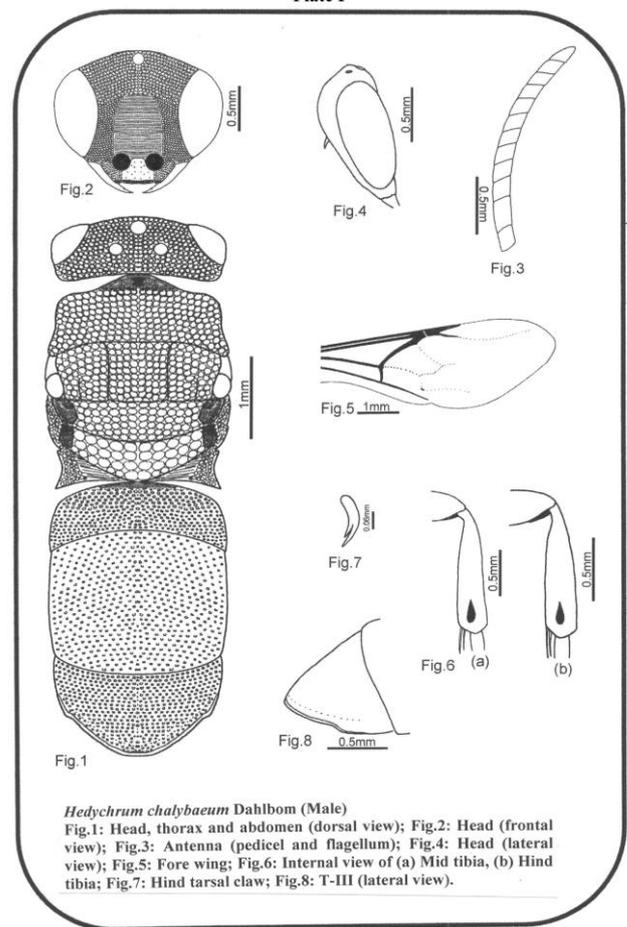
Hedychrum cirtanum var. *minusculum* Buysson, 1898a. Rev.
 Ent. (Cean), 17, p.128.

Diagnosis: (Female)

Body length: About 8 mm

Colouration: Vertex, scapal basin, propodeum and abdominal tergites metallic coppery red; brow, clypeus and remaining of thoracic dorsum metallic brassy green; tegulae iridescent brown; femora and tibiae metallic coppery red, tarsi light brown; scape coppery red, upper surface of pedicel and flagellum brown; fore wing hyaline basally and stained pale brown distally; S-II and S-III dark brown.

Plate I



Hedychrum chalybaeum Dahlbom (Male)

Fig.1: Head, thorax and abdomen (dorsal view); Fig.2: Head (frontal view); Fig.3: Antenna (pedicel and flagellum); Fig.4: Head (lateral view); Fig.5: Fore wing; Fig.6: Internal view of (a) Mid tibia, (b) Hind tibia; Fig.7: Hind tarsal claw; Fig.8: T-III (lateral view).

Head: Intercellular distance about 0.75 times as long as ocellular distance. Vertex moderately reticulate-punctate. Brow largely reticulate-punctate (PD about 0.5 MOD). Both vertex and brow with sparse and short silvery pubescence. Scapal basin deeply concave and strongly cross-ridged in the median, the sides slightly raised and moderately reticulate-punctate. Subantennal space about 1.25 MOD. Malar space about 0.5 MOD. Clypeus sparsely punctate and slightly convex in the middle, laterally becomes finely subreticulate-

punctate, with straight apical margin. Mandible edentate. F-I L/W about 2.25; F-I/F-II/F-III about 1.75/1.25/1.

Thorax: Thoracic dorsum largely reticulate-punctate; PD widest on metanotum (about 1 MOD), slightly narrower on scutellum and about 0.5 MOD on pronotum and scutum. Pronotum about 1.25 times as long as scutellum, with shallow and rugose lateral depression. Tegula ovoid and smooth. Metanotum slightly mucronate. Propodeal lateral angle triangular, acute apically and slightly concave posteriorly. Mesopleuron coarsely and largely reticulate-punctate, rounded ventrally, with indistinct omaulus and scrobal sulcus. Mid and hind tibiae with small drop-like subapical pit on inner surface; tarsal claws with subsidiary subparallel tooth. Fore wing M vein gently curved and arising parallel with cu-a; discoidal cell outer veins quite faint.

Abdomen: Tergites finely subreticulate-punctate. T-II apical half with short silvery pubescence, such pubescence longer on T-III. T-III with weak subapical swelling, darkness distal rim and a pair of apicolateral acute teeth; T-III apical margin slightly notched medially. S-III with sub-basal sulcus extending toward mid-line, also with small apicomedial tubercle.

Specimens examined: W. Um Mitla (N. Sinai), March 1937; Saqqara (Giza), April; Maryut (Alexandria), May 1925-----
-----**Al-Azhar Univ. Coll. World distribution:**
Palaeartic: Algeria.

Hedychrum coelestinum Spinola, 1838

(Pl. III)

Hedychrum coelestinum Spinola, 1838. Ann. Soc. Ent. France, 7, p.454.

Cymura splendidulum Dahlbom, 1845. Dispositio Methodica specierum Hymenopterorum, secundum Isectorum naturals, p.4. Berlingianis, Lund.

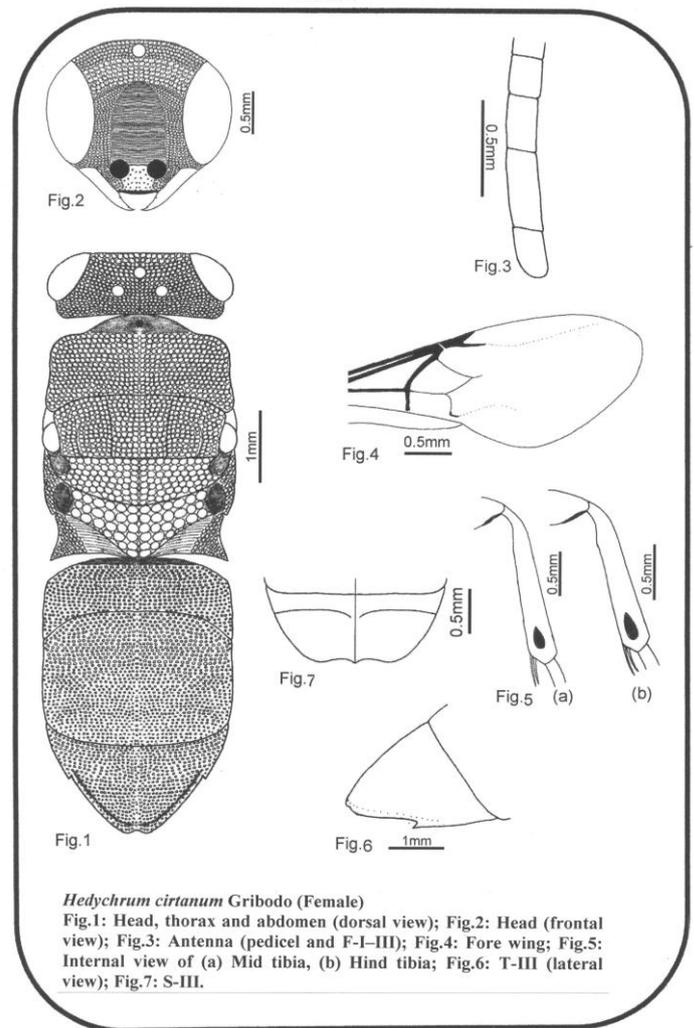
Hedychrum stilboides Walker, 1871. List of Hymenoptera collected by J. K. Lord, 827 Esq., in the neighbourhood of thr red sea and in Arabia, E. W. Janson, London, p9.

Diagnosis: (Male)

Body length: 7.5–12 mm

Colouration: Body metallic blue in general, with slightly purplish tint particularly on median part of scutum and on T-III; tegulae metallic pale blue; femora and tibiae metallic green (outer surface of hind femur non-metallic blackish), tarsi brown; scape and upper surface of pedicel metallic green, flagellum black; mandible shining dark brown apically, light brown in the middle and metallic green at the base; fore wings stained dark brown, hind wings hyaline. S-II and S-III metallic green.

Plate II



Hedychrum cirtanum Gribodo (Female)

Fig.1: Head, thorax and abdomen (dorsal view); Fig.2: Head (frontal view); Fig.3: Antenna (pedicel and F-I-III); Fig.4: Fore wing; Fig.5: Internal view of (a) Mid tibia, (b) Hind tibia; Fig.6: T-III (lateral view); Fig.7: S-III.

Head: Interocellar distance as long as ocellular distance. Vertex and brow moderately reticulate-punctate, both with sparse and short silvery pubescence. Scapal basin deeply concave and strongly cross-ridged in the median, the sides raised and moderately to finely reticulate-punctate. Subantennal space about 1.25 MOD. Malar space about 0.5 MOD. Clypeus finely sparsely punctate and slightly convex in the middle, laterally becomes coarsely striated, with slightly convex apical margin. Mandible edentate. F-I L/W about 2; F-I/F-II/F-III about 1.5/1.25/1.

Thorax: Pronotum and scutum moderately subreticulate-punctate (punctures on scutal medial part reticulate posteriorly); scutellum varies from subreticulate-punctate in the middle to reticulate-punctate laterally (PD about 0.5 MOD); metanotum reticulate-punctate (PD about 0.75 MOD). Pronotum about 1.25 times as long as scutellum, with shallow and rugose lateral depression. Tegula ovoid and smooth. Metanotum mucronate. Propodeal lateral angle digital-like, subtruncate apically and slightly concave posteriorly. Mesopleuron largely reticulate-punctate, rounded ventrally, with distinct omaulus and short scrobal sulcus. Mid tibia with pit extending for more than half length of inner surface, hind tibia with shorter pit on inner surface; tarsal

claws with subsidiary subparallel tooth. Fore wing M vein gently curved and arising parallel with cu-a; outer veins of discoidal cell weakly sclerotized.

Abdomen: Tergites finely subreticulate-punctate, with sparse and erect silvery pubescence (T-I anteromedially with subtriangular smooth area). T-III with weak subapical swelling, darkness distal rim and a pair of apicolateral sharp teeth; T-III apical margin slightly notched medially.

Female: As male except, the outer surface of hind femur metallic green; S-III with sub-basal sulcus extending toward mid-line; mid tibial pit shorter.

Specimens examined: Maadi (Cairo), June 1912; Shubra (Qalyubiya), Oct. 1913; El-Zeitoun (Cairo), March 1914; Mazghuna (Giza), Oct. 1914; Faiyum, Nov. 1915-----

Min. Agr. Coll.

Marg (Cairo), May, July, Nov.; Ezbet El-Nakhle (Cairo), April 1916; El-Matariya (Cairo), March 1911; Ain Shams (Cairo), Feb. 1917; Cairo, June; El-Hawamdia (Giza), March, May, June; Tarfaia (?), April; Saqqara (Giza), April-----

Soc. Coll.

Maadi (Cairo), May 1912, March 1923; El-Hawamdia (Giza), June; Gabal Asfar (Qalyubiya), Oct. 1924, May 1931, April 1933-----

Al-Azhar Univ. Coll.

Gabal Asfar (Qalyubiya), Jan. 1953; Barragel (Giza), July 1953; Maadi (Cairo), May 1953; Pyramids (Giza), May 1953---

Ain Shams Univ. Coll.

Maadi (Cairo), Dec. 1912; El-Zeitoun (May), 1914; Tisfa (?), Sep. 1945; Gabal Elba (Red Sea), Sep. 1945-----

Cairo Univ. Coll.

Ismailia, Aug. 2000; Shubra (Qalyubiya), July 2002-----

Author Coll.

World distribution: Afrotropical: widespread; palaearctic: North Africa.

***Hedychrum morosum* Buysson, 1900**

(Pl. IV)

Hedychrum morosum Buysson, 1900. Rev. Ent. France, (4) 19, p.130. Holotype male.

Diagnosis: (Male)

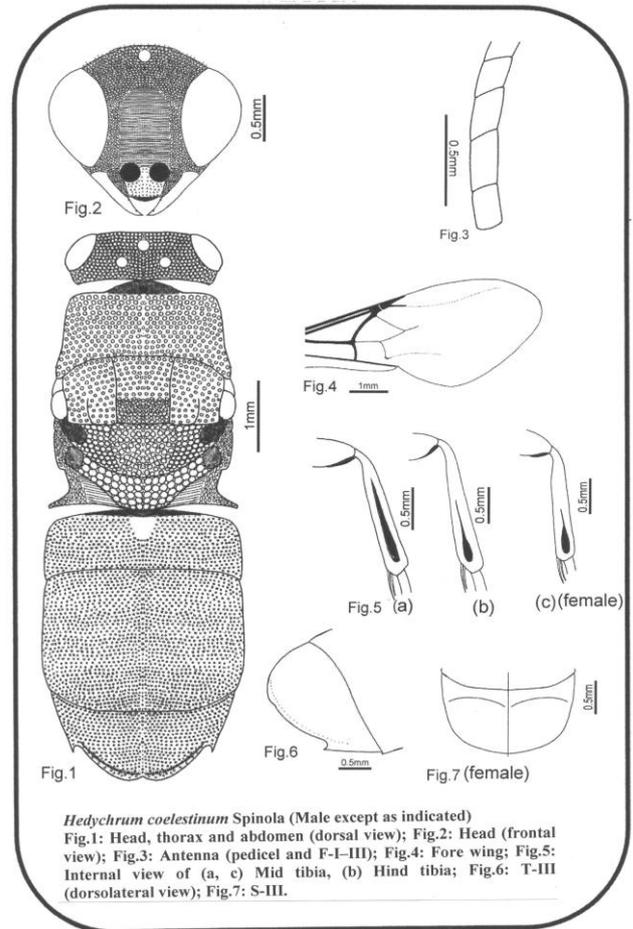
Body length: About 6.5 mm

Colouration: Body metallic dark green in general, scutal medial part more darker than elsewhere; tegulae iridescent brown; femora and tibiae metallic green (the outer surface of hind femur non-metallic dark brown), tarsi brown; scape and upper surface of pedicel metallic green, flagellum dark brown; mandible shining dark brown apically, yellowish brown in the middle and metallic green at the base; fore wing stained pale brown distally; S-II and S-III dark brown.

Head: Intercellular distance slightly shorter than ocellular distance. Vertex and brow moderately reticulate-punctate, both with short and erect silvery pubescence. Scapal basin deeply concave and strongly cross-ridged in the middle,

the sides raised and finely reticulate-punctate. Subantennal space about 0.75 MOD. Malar space about 0.5 MOD. Clypeus nearly smooth and slightly convex in the middle, finely reticulate-punctate laterally, with straight apical margin. Mandible edentate. F-I L/W about 1.5; F-I/F-II/F-III about 1.75/1.25/1.

Plate III



Hedychrum coelestinum Spinola (Male except as indicated)
Fig.1: Head, thorax and abdomen (dorsal view); Fig.2: Head (frontal view); Fig.3: Antenna (pedicel and F-I-III); Fig.4: Fore wing; Fig.5: Internal view of (a, c) Mid tibia, (b) Hind tibia; Fig.6: T-III (dorsolateral view); Fig.7: S-III.

Thorax: Thoracic dorsum largely reticulate-punctate; PD widest on metanotum (about 0.75 MOD), slightly narrower on pronotum, scutum and scutellum. Pronotum about 1.5 times as long as metanotum, with shallow and finely rugose lateral depression. Tegula ovoid and smooth. Metanotum evenly convex. Propodeal lateral angle digital-like, subtruncate apically and slightly concave posteriorly. Mesopleuron rounded ventrally, largely reticulate-punctate, with indistinct omaulus and short scrobal sulcus. Mid tibia with large pit occupying most of inner surface; inner surface of hind tibia with small drop-like subapical pit; tarsal claws with subsidiary subparallel tooth. Fore wing M vein gently curved and arising parallel with cu-a; outer veins of discoidal cell quite faint.

Abdomen: Tergites moderately subreticulate-punctate (T-I finely reticulate-punctate apicomediaally, T-II basal half a little more sparsely punctate), with short and sparse silvery pubescence. T-III with weak subapical swelling and

translucent distal rim; T-III apical margin entire medially and obtusely angulate laterally.

Specimens examined: Saqqara (Giza), April-----Soc.

Coll. Abu Rauwash (Giza), March 1922-----

-----Al-Azhar Univ. Coll.

World distribution: Palaearctic: Egypt.

Hedychrum rutilans Dahlbom, 1854

(Pl. V)

Hedychrum rutilans Dahlbom, 1854. Hymenoptera Europea praecipue borealia etc., 2, p.76. Lundbergiana, Lund.

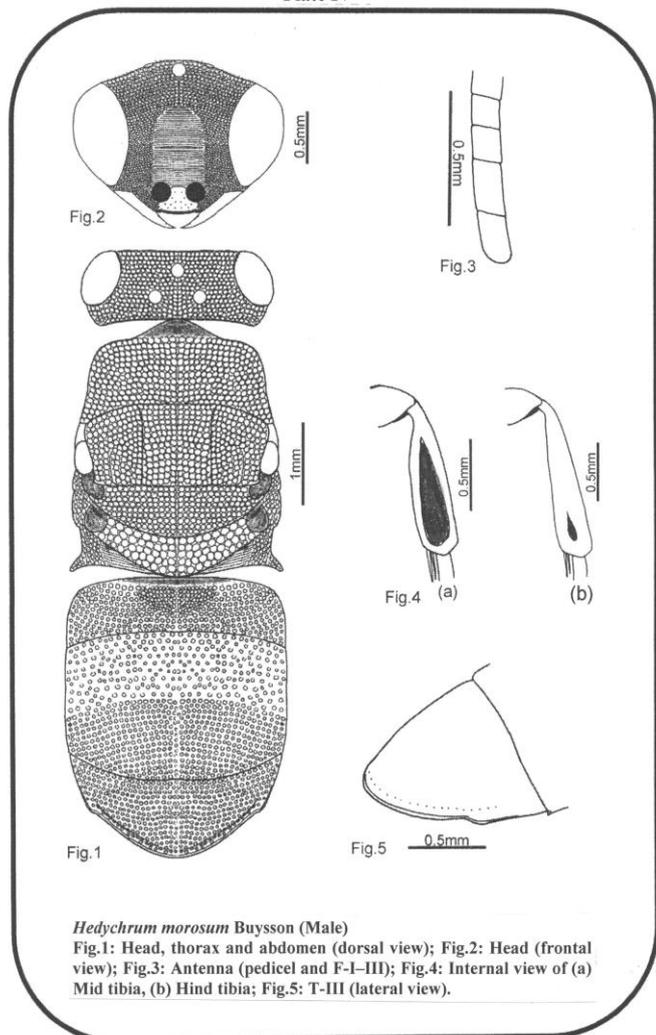
Hedychrum viridiaureum Tournier, 1877. Petites Nouv. Ent., 165, p.106.

Hedychrum rutilans var. *veterrinum* Mocsáry, 1914. Ann. Mus. Natl. Hung., 12, p.11. Lectotype male.

Hedychrum rutilans var. *persicum* Mocsáry, 1914. Ann. Mus. Natl. Hung., 12, p.11.

Hedychrum rutilans var. *micans* Trautmann and Trautmann, 1919. Zs. Wiss. Inseki. Berlin, 15, p.32.

Plate IV



Hedychrum morosum Buysson (Male)

Fig.1: Head, thorax and abdomen (dorsal view); Fig.2: Head (frontal view); Fig.3: Antenna (pedicel and F-I-III); Fig.4: Internal view of (a) Mid tibia, (b) Hind tibia; Fig.5: T-III (lateral view).

Hedychrum rutilans var. *uniformis* Trautmann, 1927. Die Goldwespen Europas, p.65. G. Uschmann, Weimar.

Hedychrum intermedium ssp. *ermak* Semenov, 1967. Trans. Zool. Inst. Akad. Nauk SSSR, 43, p.142.

Hedychrum intermedium ssp. *subparvulum* Lisenmaier, 1968. Mitt. Schweiz. Ent. Ges., 41, p.19.

Diagnosis: (Female)

Body length: About 5.5 mm

Colouration: Head and thoracic dorsum metallic bright brassy green; abdominal tergites metallic coppery red; tegulae iridescent brown; femora metallic green, tibiae and tarsi light brown; scape and upper surface of pedicle green, flagellum dark brown; mandible metallic green at the base, dark brown apically and ochreous (yellowish brown) in the middle; fore wing stained pale brown; S-II and S-III dark brown.

Head: Interocellar distance about 0.5 as long as ocellocular distance. Vertex and brow moderately reticulate-punctate, both with short and sparse silvery pubescence. Scapal basin deeply concave and strongly cross-ridged medially, the sides raised and finely reticulate-punctate. Subantennal space about 1 MOD. Malar space about 0.5 MOD. Clypeus nearly smooth and slightly convex in the middle, laterally becomes finely subreticulate-punctate, with straight apical margin. Mandible edentate. F-I L/W about 2.5; F-I/F-II/F-III about 2.5/1.25/1.

Thorax: Pronotum moderately reticulate-punctate; scutum, scutellum and metanotum largely reticulate-punctate; PD widest on metanotum (up to 1 MOD), slightly narrower on pronotum, scutum and scutellum. Pronotum about 1.5 as long as metanotum, with shallow lateral depression. Tegula ovoid and smooth. Metanotum evenly convex. Propodeal lateral digital-like, subtruncate apically and slightly concave posteriorly. Mesopleuron rounded ventrally, largely reticulate-punctate, with indistinct omaulus and short scrobal sulcus. Mid and hind tibiae with small drop-like subapical pit on inner surface; tarsal claws with subsidiary subparallel tooth. Fore wing M vein gently curved and arising at cu-a; outer veins of discoidal cell quite faint.

Abdomen: Tergites finely subreticulate-punctate (T-III rather more sparsely punctate). T-III with weak subapical swelling and darkness distal rim;

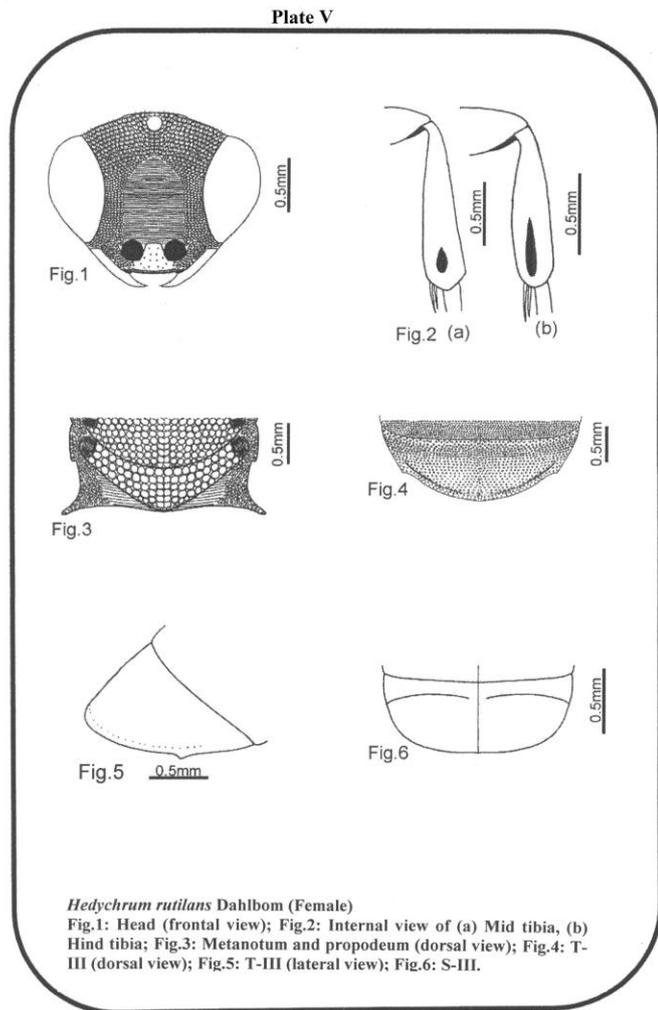
T-III apical margin entire medially and acutely angulate laterally. S-III with sub-basal sulcus extending toward mid-line.

Specimens examined: W. Hoff (Cairo), May 1922-----Al-Azhar Univ. Coll. **World distribution:** Palaearctic: s Europe, North Africa, Turkey and SW USSR.

4. DISCUSSION

Chrysidid wasps represent one of the largest families of Hymenoptera (about 2.500 species are known worldwide) (Aguiar *et al.* 2013). Chrysidids known for being a taxonomically difficult group, and the biology of several species is still poorly known Paukkunen *et al.* (2015).

About 150 species within *hedychrum* are known worldwide, the majority of which occur in the palaearctic region and africa (kimsey and bohart, 1991).



Rosal and Xu (2015) in their study in the Spinola collection observed that, two specimens from Egypt and South Africa *Hedychrom coelestinum* are present. Both specimens were examined by Dahlbom (1854) and they are found under the name "*Hedychrom coelestinum* Kl.", a species never described by Klug. Dahlbom (1854) erroneously assigned this species to Klug and not to Spinola. Furthermore, Dahlbom (1854) named this species "*caelestinum*", which we consider an incorrect subsequent spelling (Madl and Rosa 2012). The two females have different colours: one is greenish and the second is a deep blue. The blue one was matches Spinola's description.

During the present study, one species was subjected to change in specific name and dropped as a synonym: *Hedychrom lucidulum* Fabricius changed into *H. nobile* (Scopoli).

Hedychrom nobile (Scopoli) previously separated of into two distinct species, *H. nobile* and *H. niemelai* Linsenmaier by Linsenmaier (1997).

Baldock and Hawkins (2016) concluded that the validity of the separation of *niemelai* and *nobile* were unsure and retain the name *niemelai* for the species as it was familiar and had been used for the British species for the previous 25

years. The authors stated that the species required further investigation and re-examination all British specimens of the species. They found that the problem of males with apparently intermediate genitalia had already been discussed by Linsenmaier (1951), who reported that the genitalia of *nobile* varied more towards the new form.

Buysson (1892–1906 and 1908), Bohart and French (1986) classified genus *Hedychrom* Latreille within subfamily Ellampinae.

Later, Rasmussen and Asenjo (2009), Rosa *et al.* (2013) and Paukkunen *et al.* (2015) classified the genus within subfamily Chrysidinae and Ellampinae demoted to tribe rank.

The aim of this study is to present a simple dichotomous identification key for the Egyptian species, and to display the reliable information on their description and distribution. The key will hopefully provide a basis for further studies on the biology and morphology of Egyptian species.

ACKNOWLEDGMENT

We express our appreciation to the late Prof. Dr. Alaa Din A. Oshaibah, whose contribution to this work was of great significance. He is among the great pioneer scientists in the field of taxonomy, established a taxonomy school in the faculty of science, Al- Azhar University. We express our respect and gratitude for his parental, scientific and moral support. We pray to God to grant him his mercy, may Allah bless his soul, forgive him, make his grave a garden of the Paradise and grant him the highest levels of paradise..... Ameen“

REFERENCES

1. **Baldock, D. W. and Hawkins, R. D. (2016):** *Hedychrom nobile* (scopoli): A jewel-wasp new to Britain and distinct from *H. Niemelai linsenmaier* (hymenoptera: chrysididae). Br. J. Ent. Nat. Hist., 29: 2016.
2. **Buysson, R. (1908):** Revision des chrysidés de l'Égypte. Mem. Soc. Ent. d'Égypte, 1: 1–99.
3. **Dahlbom, A. G. (1854):** Hymenoptera Europaea praecipue Borealia, formis typicis nonnullis, specierum generumve exoticorum propter nexum systematicum associatis, per familias, genera, species et varietates disposita atque descripta ab Adrea Gustavo Dahlbom. Chrysis in *sensu* Linneano. Vol. II, F. Nicolai, Berlin, 412 pp.
4. **Kimsey, L. S. and Bohart, R. M. (1991):** The Chrysidid Wasps of the World. University Press, New York, 652 pp.
5. **Kunz, P. X. (1994):** Die Goldwespen (Chrysididae) Baden-Württembergs. Taxonomie, Bestimmung, Verbreitung, Kartierung und Ökologie. – Mit einem Bestimmungsschlüssel für die deutschen Arten. Beihefte zu den Veröffentlichungen für Naturschutz und Landschaftspflege in Baden-Württemberg 77: 1–188.
6. **Linsenmaier, W. (1997):** Die Goldwespen der Schweiz. Natur-Museum, Luzern.
7. **Madl, M. and Rosa, P. (2012):** A Catalogue of the Chrysididae (Hymenoptera: Chrysoidea) of the Ethiopian Region excluding Malagasy Subregion. Linzer Biologische Beiträge 44(1): 5–169.

8. **Parn, M; Soon, V.; Vallisoo, T.; Hovi, K. and Luig, J. (2014):** Host specificity of the tribe Chrysidini (Hymenoptera, Chrysididae) in Estonia ascertained with trap-nesting. *European Journal of Entomology* 112: 91–99.
9. **Paukkunen, J.; Berg, A.; Soon, V.; Odegaard, F. and Rosa, P. (2015):** An illustrated key to the cuckoo wasps (Hymenoptera, Chrysididae) of the Nordic and Baltic countries, with description of a new species. *ZooKeys* 548: 1–116.
10. **Paukkunen, J.; Rosa, P.; Soon, V.; Johansson, N. and Odegaard, F. (2014):** Faunistic review of the cuckoo wasps of Fennoscandia, Denmark and the Baltic countries (Hymenoptera: Chrysididae). *Zootaxa* 3864 (1): 001–067.
11. **Rasmussen, C. and Asenjo, A. (2009):** A checklist to the wasps of Peru (Hymenoptera, Aculeata). *ZooKeys* 15: 1-78 (2009).
12. **Rosa, P.; Lotfalizadeh, H. and pourrafei, L. (2013):** First checklist of the chrysidid wasps (Hymenoptera: Chrysididae) of Iran. *Zootaxa* 3700 (1): 001–047.
13. **Rosa, P. and Xu, Z. (2015):** Annotated type catalogue of the Chrysididae (Insecta, Hymenoptera) deposited in the collection of Maximilian Spinola (1780–1857), Turin. *ZooKeys*, 471: 1–96.
14. **Storey, G., B. A. and F. E. S. (1914):** List of the Hymenoptera Tubulifera and Aculeate in the collection of the ministry of agriculture of Egypt. *Bulletin de la Société Entomologique d’Egypte*. 4:100–102.
15. **Strohm, E.; Kroiss, J.; Herzner, G.; Laurien-Kehnen, C.; Boland, W.; Schreier, P. and Schmitt, T. (2008):** A cuckoo in wolves’ clothing? Chemical mimicry in a specialized cuckoo wasp of the European beewolf (Hymenoptera, Chrysididae and Crabronidae). *Front. Zool.* 5.
16. **Trautmann, W. (1926):** Beitrag zur Kenntnis Aegyptischer chrysididen. *Bull. R. Soc. Ent. Egypt*, 19: 90–96.
17. **Wiśniowski, B. (2015):** Cuckoo-wasps (Hymenoptera: Chrysididae) of Poland. Diversity, identification, distribution. *Ojców*, 563pp.
18. **Zimmermann, H. (1940):** Zwei neue Goldwespen aus Aegypten. *Bull. Soc. Fouad. Ent.*, 24: 31–33.