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RESEARCH ARTICLE

A New Species of the Genus *Sphex* Linnaeus, 1850 (Hymenoptera: Sphecidae; Sphecinae) from Iraq

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Abstract

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A new species of *Sphex zubaidiyanis* sp. nov was described from Iraq . The diagnostic characters of this species is illustrated.

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Key words:

sphecid wasps, Sphecidae,
Sphecini, *Sphex* ,
Wassit province, Digger wasps

Introduction

The Sphecidae is a cosmopolitan family of wasps, currently there are 9660 described species distributed throughout the world (Pulawski,2009).Sphecidae is a diverse group of solitary wasps which may be of different shaped, size and color; the female digs it nest in sand, soil or wood and provisions each nest cell with paralyzed prey and lays a single on it (Murray, 1940; Bohart and Menke, 1976; Gillott, 2005).

Sphex Linnaeus,1758 belong Sphecini tribe is a cosmopolitan genus with species are moderate to very large wasps (11-47 mm), this genus separated from other closely genus especially *Isodontia* Patton by having complete spiracle groove on propodeal side; species characters are easy to find especially in the males, male genitalia offer good characters and the number and arrangement of placoids on the male flagellum are very useful in species discrimination (Bohart and Menke, 1976; Hensen, 1991); members nest in the ground, often gregariously, their prey is composed of crickets and grasshoppers (Roche, 2007)

Diagnostic key to determination of genera in Egypt designed by Honore(1944) and revision of genera which may be found in Palaearctic region (Honore, 1943);then Guichard(1986, 1988) was recognized genera and designed diagnostic key to species in Saudi Arabia. Generally; the sphecid wasps fauna of Iraq have been studied and they are known only by scattered faunistic lists as follow; Beaumont(1961) studied this wasps in Iraq and registered *S. afer* Lep.(= *S. leuconotus* Brulle), then

Kaddou(1967) added *S. maxillosus* F. (= *S. funerarius* Gussak.) and *S. pruinus* followed by El-Haidari *et al.* (1971) mentioned to that *S. flavipennis* Fabricius found in Iraqi fauna. Augul (2012) redescribed and was registered just two species belong to this genus: *S. flavipennis* and *S. pruinus* throughout the survey from march 2010 to November 2011 from some governorates of Iraq

MATERIALS AND METHODS

The adults of wasps (29 specimens) were collected by arial net, through May 2010, 2011 and 2012 from Al-Zubaidiya region, Wassit province, middle of Iraq(Fig.1). The specimens are mounted and deposited in the Iraq natural history museum, the locality and date of collection were provided on the labels. The morphological terminology used herein follows that proposed by Bohart and Menke(1976). The publications (Honore, 1944; Guichard, 1986 and 1988; Roche and Gadallah, 1999; Menke and Pulawski,2000) are used in this study. The following morphological abbreviations are used:

Anterior vein(av)
Apico-ventral seta (apvs)
Flagellomere (F)
Fronto-clypeal suture (Fcs)
Galea (G)
Gasteral sternite (S)
Gasteral tergite (T)
Inner orbit (Io)
Lower metapleural area (Lmp)
Metanotum (Metn)
Pronotal collar(Pc)

Pronotal lobe (PL)
 Propodeum (Prop)
 Pubescences (Pub)
 Recurrent vein (Rv)
 Scutum (Sc)
 Scutellum (Sct)
 Spiracle groove (Sp. g.)
 Stipes (St)
 Submarginal cell (SMC)
 Tarsomere (t)
 Upper metapleural area (Ump)

Taxonomy

Sphex zubaidiyacus sp. nov.

Material (10♀♀, 19♂♂): Holotype ♂: **Wassit province**: center of Al-Zubaidiya region 23.May.2010. Allotype ♀, **Wassit prov.**, center of Al-Zubaidiya region 23.May.2010. Paratypes: (9♀♀, 18♂♂): **Wassit**; Sher'han village 12.July.2010 (1♀, 5♂♂), 28.May.2011 (4♀♀, 6♂♂), 29.May.2011 (5♀♀, 7♂♂). The holotype and paratype specimens stored in Iraq natural history research center and museum, university of Baghdad.

Holotype male

General description (Fig.2a): length 16-18 mm; **color**: black with exception as follow: wings are orange with black tips, veins brown; pubescences and hairs yellow with golden tinge, silver pubescences and hairs on legs and last four of abdominal segments covered with short silver hair; ferruginous small area on apical half of abdominal sternites.

Head(Fig.2b,d): inner orbits conspicuously convergent at lower part of face; clypeus elongate and clearly swollen at the middle, covered with densely appressed of shining goldenish yellow pubescences mixed with same color of long hairs, free edge of clypeus convex and entire; broadly distance between fronto-clypeal suture and antennary pits; frons with pubescences and hairs similar to that found on clypeus, but become finely and decrease at upper parts, finely punctuation appeared nearly ocelli, medio-longitudinal depression simple, erect yellowish golden and scattered hairs at near vertex. Vertex: pubescences, hairs and sculpture similar to that found on upper area of frons, the distance between posterior simple eye wider than distance between one posterior and inner margin of compound eye. Genae covered with densely appressed pubescences and long erect hairs with mixed a little and moderately long black hairs.

Antennae(Fig.3a,b): scape cylindrical covered with densely shining golden micropubescences and scattered semierect short yellow hairs, other segments

with densely of silvery pruinosis; first flagellomere (F1) clearly longer than second flagellomere (F2), with clearly enlarge apically than base; flagellomeres 5 and 6 with simple placoids, F1 to F11 with carinae, apical of last flagellomere rounded.

Mouth parts: relatively short, galea not reaching to base of stipes (Fig.3c); mandibles(Fig.3d) somewhat short, curved and acuminate apically, with conspicuous single tooth on inner margin near to apex than base; apex of labrum curved(Fig.3e)with median process or lobe and medio-longitudinal carina, anterior edge beside median lobe with regular and well spaced of moderately length setae.

Thorax (Fig.4): Prothorax: pronotum with short and wide collar, dorsal surface convex, covered with densely appressed yellow with tinge golden colour pubescences, collar separated from neck by shining carina; lateral surface of pronotal collar somewhat depression at the middle area compared with pronotal lobe, pubescences density are decrease at lateral surface, collar with finely punctuation and scattered small punctures. Propleuron covered with densely yellow with golden tinge and erect long hairs mixed with moderately density pubescences, sculptures consist from fine punctuation and small scattered of punctures.

Scutum with appressed backward and moderately density of pubescences which it increase at lateral margins that closely to basal wings; yellow with golden tinge hairs and medium length on anterior half but it's very short on posterior half of scutum; granular surface that consist from densely punctuation and sparsely small punctures; admedian, notauli and parapsidal lines conspicuous. Scutellum bitubercles, with simple longitudinal depression and very fine sparsely pubescences mixed with many short and erect hairs; surface with densely finely punctuation. Metanotum simple and convex with hairs and pubescences similar to scutum. Mesopleuron covered with moderately density and silvery pruinosis, prepectus and subalar area with densely pubescences and sparsely short silver hairs, sparsely fine punctuation and small punctures. Metapleuron: upper metapleural area with depression surface; less hairs and shorter compare with mesopleuron, yellow with golden tinge pruinosis, fine and moderately density of punctuation.

Propodeum(Fig. 4b, d): dorsal surface with goldenish – yellow, densely, long and erect hairs somewhat tend to forward; pubescences sparsely and appressed to backward which it mixed with pruinosis, punctuation dense; lateral surface with pubescences and hairs similar to that on dorsal

surface, sculpture indistinct, spiracle groove curved and well developed.

Wings (Fig.5): recurrent vein 1 ending between SMC2 and SMC3, recurrent vein 2 ending at SMC3.

Legs (Fig.6,7): covered with goldenish-silver pubescences and moderately density of erect hairs, posterior surface of femora and trochanters without hairs, all tibiae with short and strongly spines, tarsi with further spines and longer; Arolia well developed, tarsal claws with well separated and strongly two teeth. Apico-ventral setae (apvs) blade-shaped like and well spaced.

Gaster (Fig.8): Petiole relatively short compared with hind tibia, similar to length of metabasitarsus, covered with sparsely pubescences and hairs; gastral tergites with yellow and golden tinge and densely pruinous; T6 and T7 covered with densely, short and appressed silvery hairs; gastral sternites S2-S4 with shining surface, covered with sparsely and silvery pruinous with exception the middle of posterior half; last four sternites covered with variable length, sparsely and silvery hairs; eight sternite wider at base and semi-triangular shaped in last half; anal cerci conspicuously cylindrical with many short hairs on tip.

Male genitalia (Fig.9): gonostyles acuminate at apex, covered with sparsely pubescences and short hairs; head of digitus in volsella with pyramid-shaped like and clothed with moderately density of short hairs, apex of cuspis part distinctly acuminate and covered with many short hairs; penis valve with short head, ventral side of head with different teeth and well spaced, head and stalk separated by conspicuously depression on ventral surface.

Allotype female

General description (fig.2a): length 19-21 mm; color black with exception the parts follow: claws brown; wings yellow with orange tinge and apices black; hairs and pubescences variable from goldenish-yellow to goldenish silver; wide ferruginous areas on gastral sternites.

Head (Fig.2c,e): Inner orbits subparallel and somewhat convergent in upper parts; clypeus elongated, swollen at middle, covered with appressed goldenish-silver pubescences and mixed with densely golden and erect hairs, apical edge with double tooth-like processes and well spaced at the middle (Fig.3 f), fronto-clypeal suture well separated from antennary pits; frons with depression surface at near of antennary pits, frontal line distinct, covered with

hairs and pubescences similar to clypeus but less density, densely punctuation and sparsely punctures conspicuously; vertex with hairs, pubescences and sculptures similar to frons, distance between inner orbits and posterior simple eyes less than distance between posterior simple eyes itself; genae with more densely goldenish-silver pubescences and hairs compared than vertex. Mouth parts such as in male with exception: mandible very strong acuminate apex, internal surface with two teeth closer to base where the front is greater than the back (Fig.3 f). Antenna with short scape, swollen and semi-cylindrical shaped with more fine silvery pubescences and sparsely short hairs on anterior side; pedicel and flagellum with densely silvery pruinous; F1 longer than F2 and slightly curved with apex wider than base, carinae conspicuously on flagellomeres with exception the last two, apex of last flagellomere rounded.

Thorax (Fig.10): Prothorax: Pronotal collar short and wide, dorsal surface convex with simple medio-longitudinal depression, anterior of dorsal surface graduated with neck, pubescences and hairs moderately density with same color to that found on face, cervical carina with regular erect pubescences, dorsal surface with densely punctuation; pronotal lobe with hairs and pubescences similar to that on pronotal collar. Propleuron covered with less pubescences and hairs compared with pronotal collar, densely punctuation and sparsely small punctures can be distinguished. Scutum: Admedian, notauli, parapsidal lines conspicuous; silvery pubescences moderately density but its more densely at lateral margin close to tegulae and posterior margin which forming U-shaped, short and erect goldenish-silver hairs; sculptures conspicuously at middle surface that consist from densely punctuation and different sizes punctures. Scutellum convex with more fine and slightly goldenish and shining pubescences compared with pubescences of scutum, mixed with sparsely goldenish-silver and short erect hairs. Metanotum as in male. Mesopleuron similar to male with exception: hairs and pubescences less shining and tend to silvery color. Metapleuron such as to male but pruinous more densely. Dorsal surface of propodeum less shining and density hairs compared with male.

Legs: similar than in male excepted the fore leg have a many strong setae on outer surface of tarsomere which are called tarsal rake (Fig.11b) and follows:: tarsomere 1 with ten setae, three on lateral process of apex and other seven position before apex; tarsomere 2 with five setae, three on lateral process of apex; tarsomere 3 with four setae, two on lateral

process of apex; tarsomere 4 with three setae, two from them on lateral process of apex.

Gaster(Fig.11a): Petiole moderately long, shorter than hind tibia and metabasitarsus which it seen from above, clothed by densely silver pubescences mixed with many short and erect of silver hairs, apex of petiole under T1 with shining surface with some very short and light brown of erect setae. Gasteral tergites covered with densely goldenish-silver pruinosis, T5 and T6 with many short and erect setae at close to posterior margins. Gasteral sternites from S2 to S6 covered with moderately density and silvery pruinosis, mixed with very short and slightly brown erect setae at the middle of areas, S6 with more and somewhat longer setae than others.

Diagnostic characters

Male: Eight tergites with cylindrical shaped like of anal cerci (Fig.8 b); head and stalk clearly separated in penis valve, stalk thin (Fig.9c). The new species

differ from closely species especially *S. leuconotus* Brullé by number of placoids on flagellomeres; in *S. zubaidiyacus* the placoids are narrow and found on flagellomeres 5 and 6 while in *S. leuconotus* the placoids are well developed and found on flagellomeres from F4-F6 (Menke and Pulawski, 2000), to addition the male genitalia in the latter species is unknown because the specimens are lack specimens; male of *S. pruinosis* somewhat similar to male of *S. zubaidiyacus* in color but a new species lacking the transverse ridges on dorsal surface also the Flagellomeres from F3 to F6 with wide and very conspicuously placoids in *S. pruinosis*.

Female: Apical margin of clypeus with conspicuous two teeth at middle (Fig.3 f); gaster completely black color and petiole longer than wide but in *S. leuconotus* the petiole is wider than long(Menke and Pulawski, 2000).

Figure (1) Localities of collecting specimens

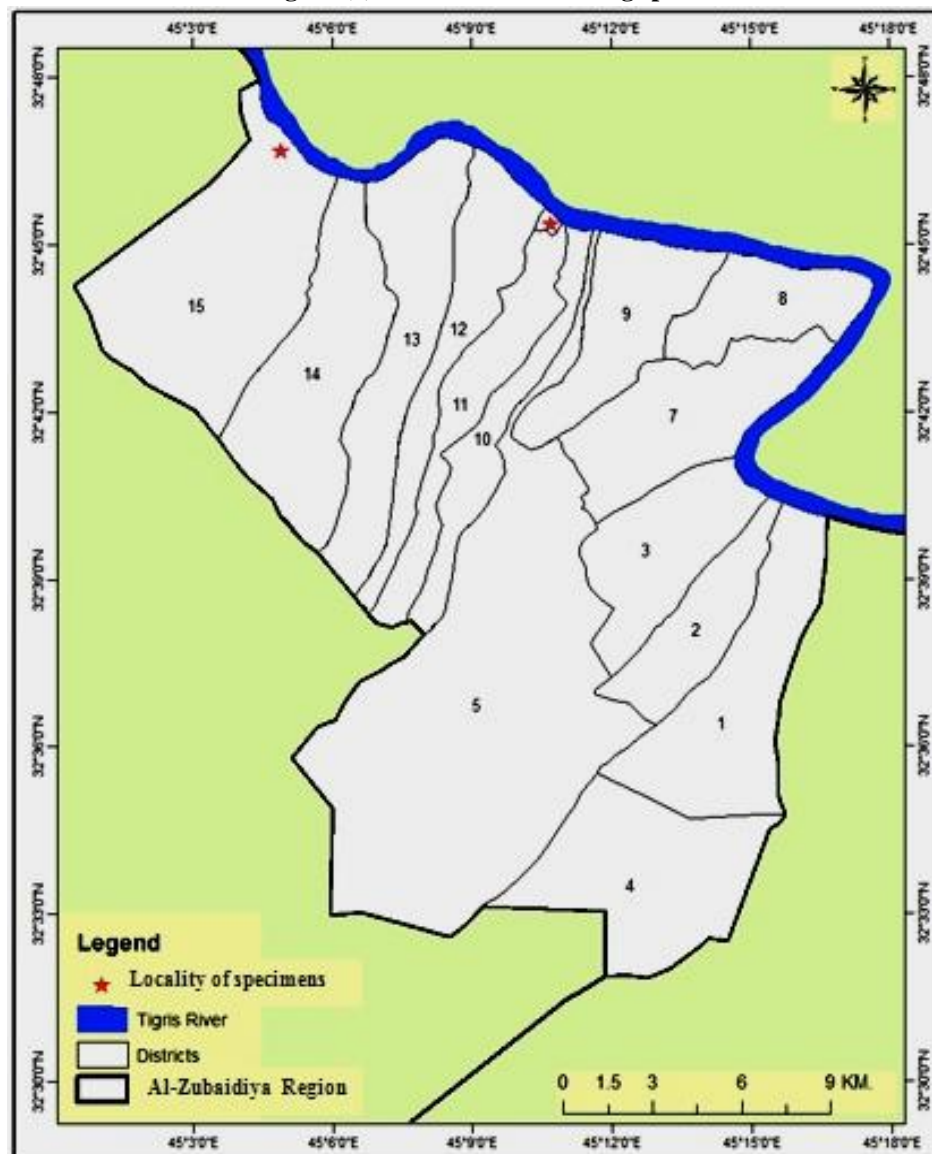
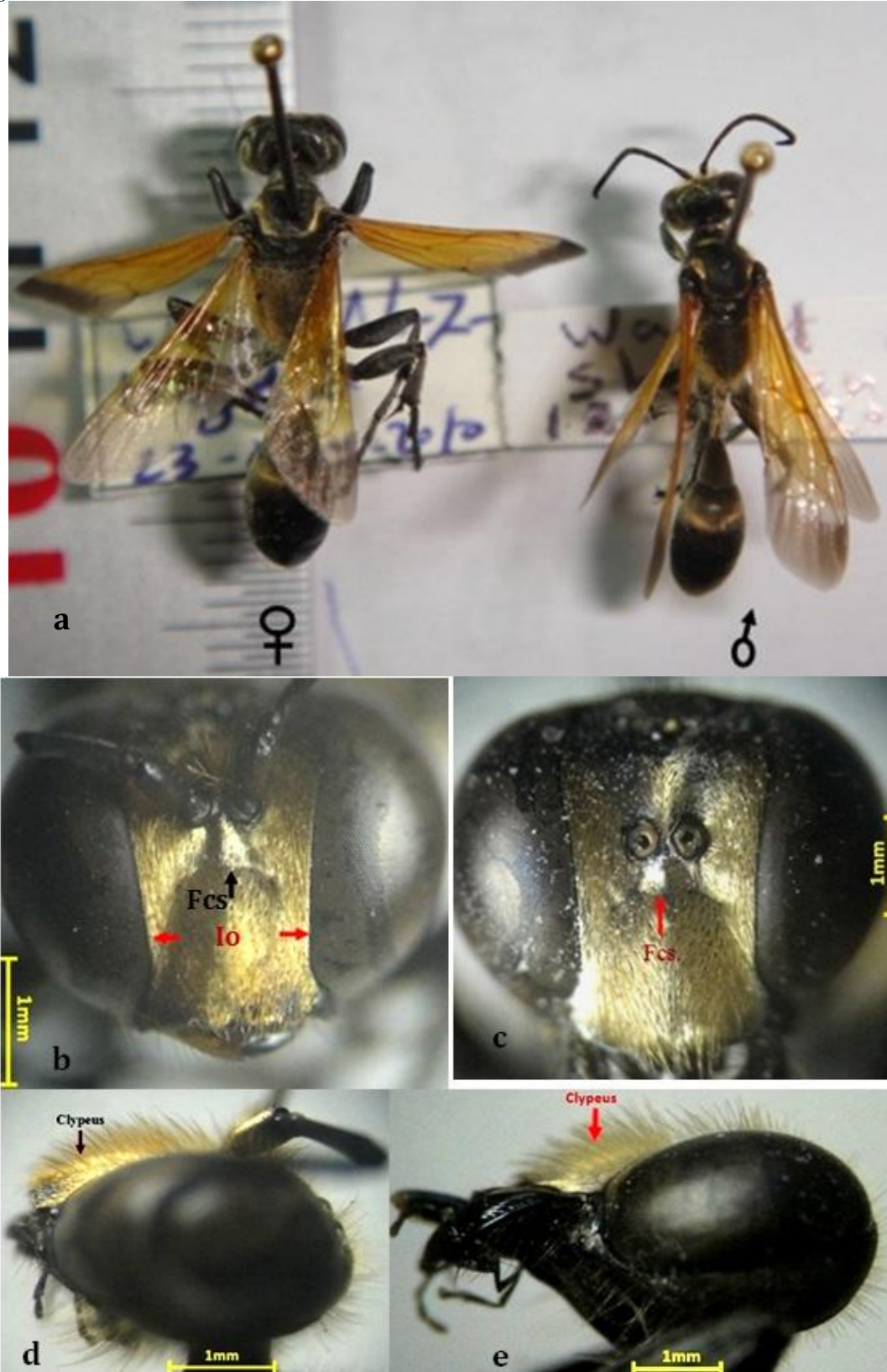


Figure-2 a: habits b: face of male c: face of female d: lateral view of male head e: lateral view of female head



Figure(3) a, b: antenna of male c: mouth parts of male d: mandibles and free edge of clypeus in male e: labrum of male
f: mandibles and free edge of clypeus in female

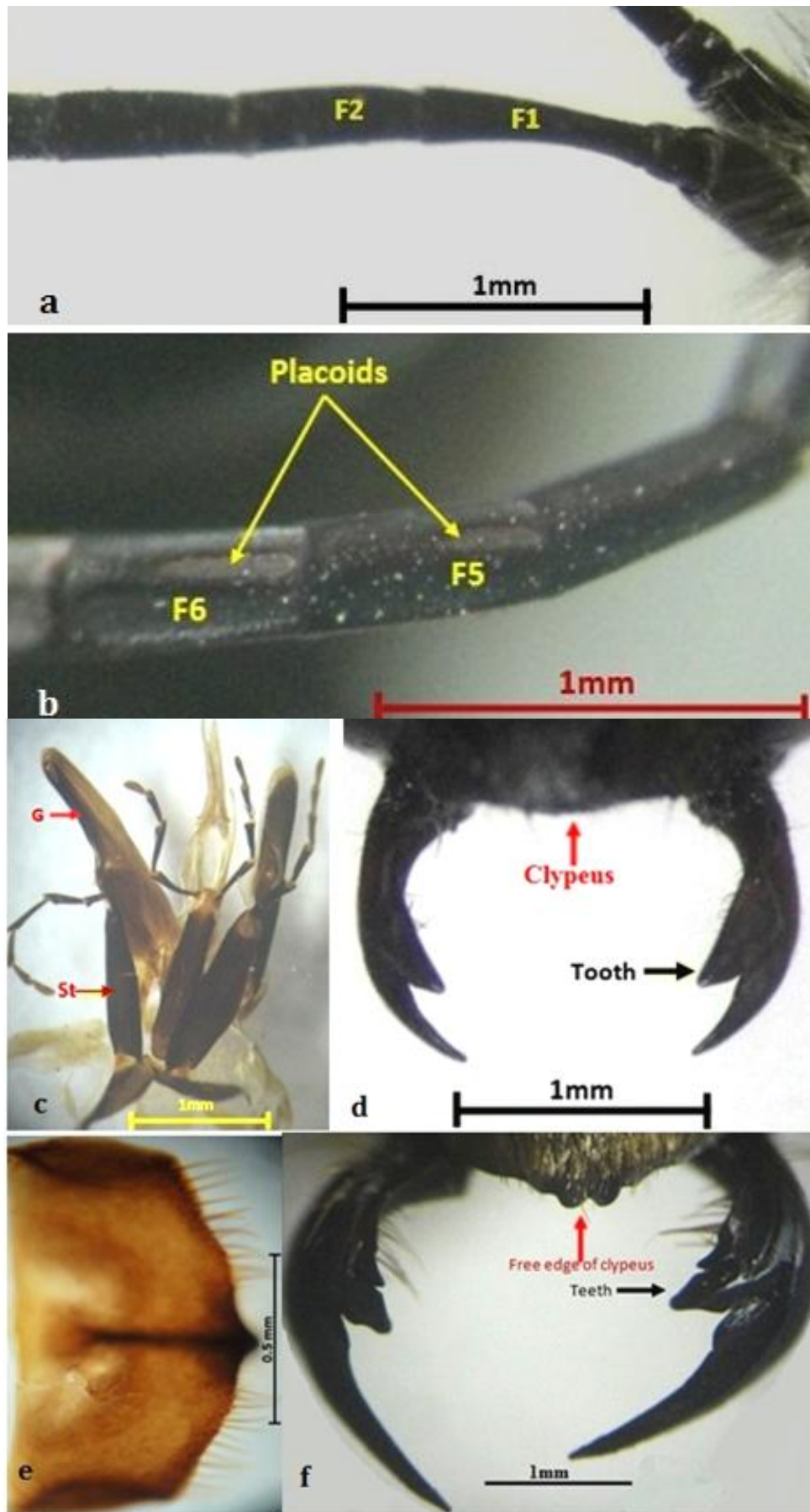


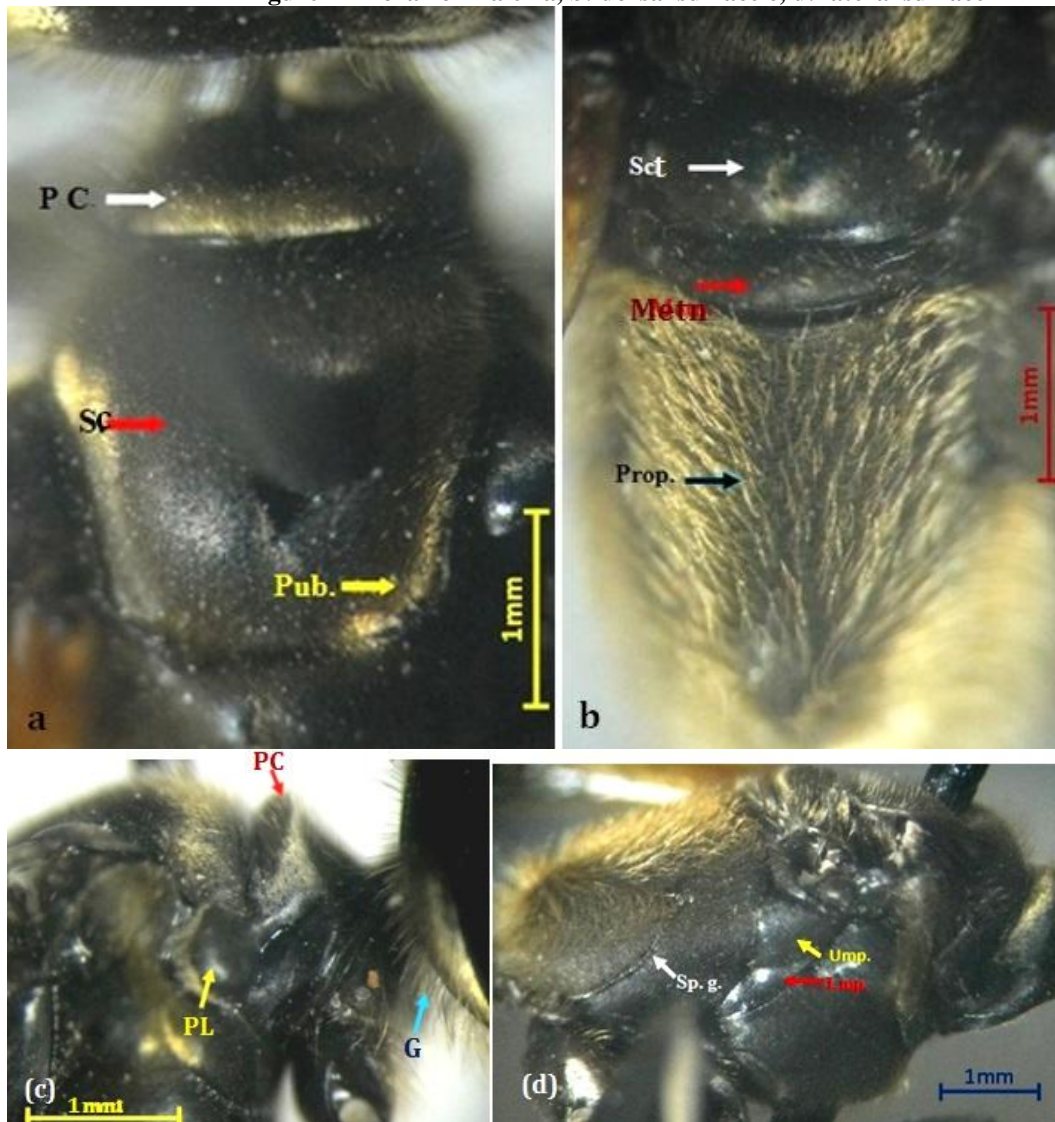
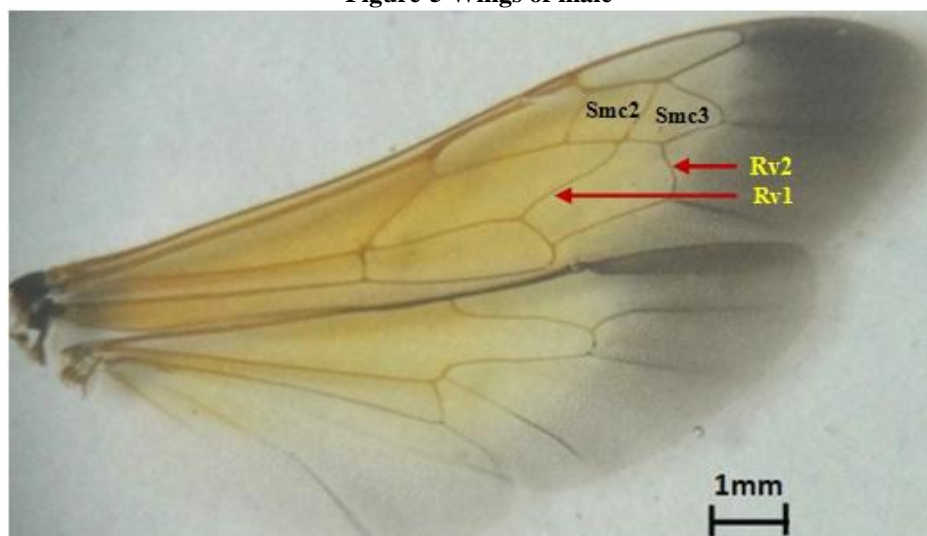
Figure-4 Thorax of male a, b: dorsal surface c, d: lateral surface**Figure-5 Wings of male**

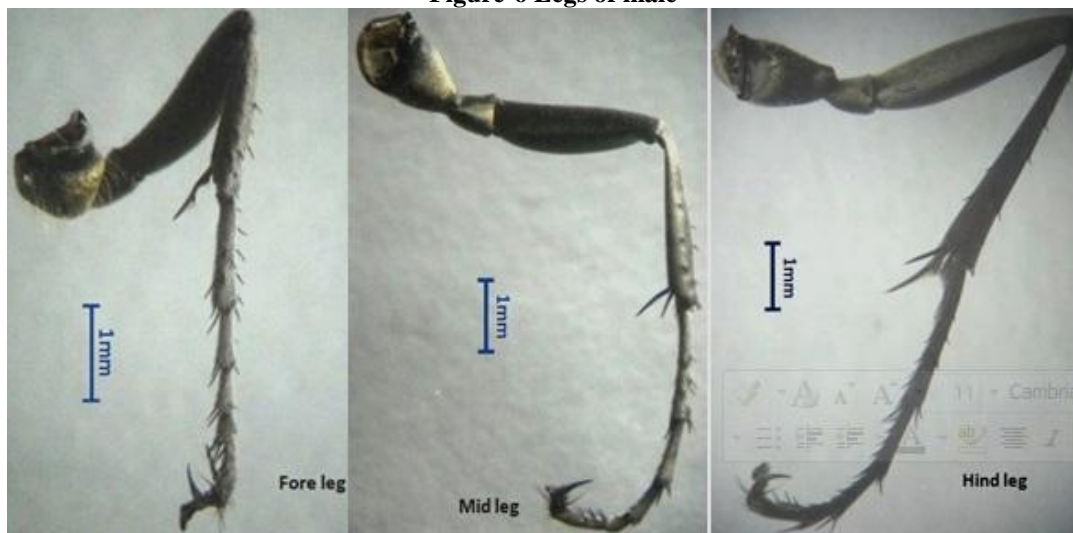
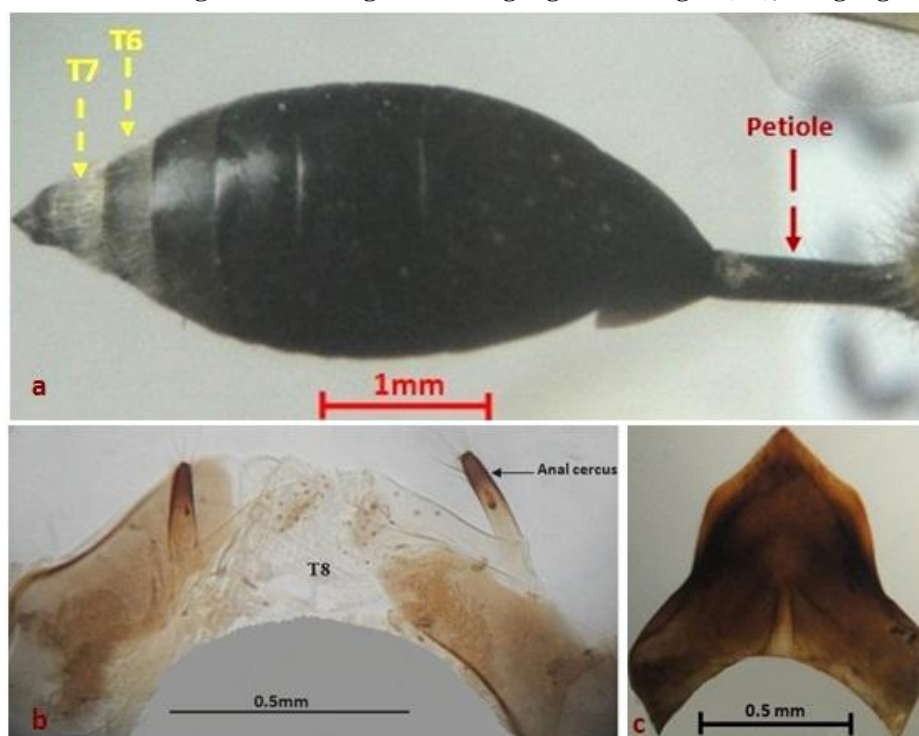
Figure-6 Legs of male**Figure-7 Some parts of hind legs in male a-claws showed distance between teeth b- ventral surface of fourth tarsomere and pretarsus****Figure-8 Abdominal region of male a:gaster b: eight gastral tergite (T8), c: eight gastral sternite (S8)**

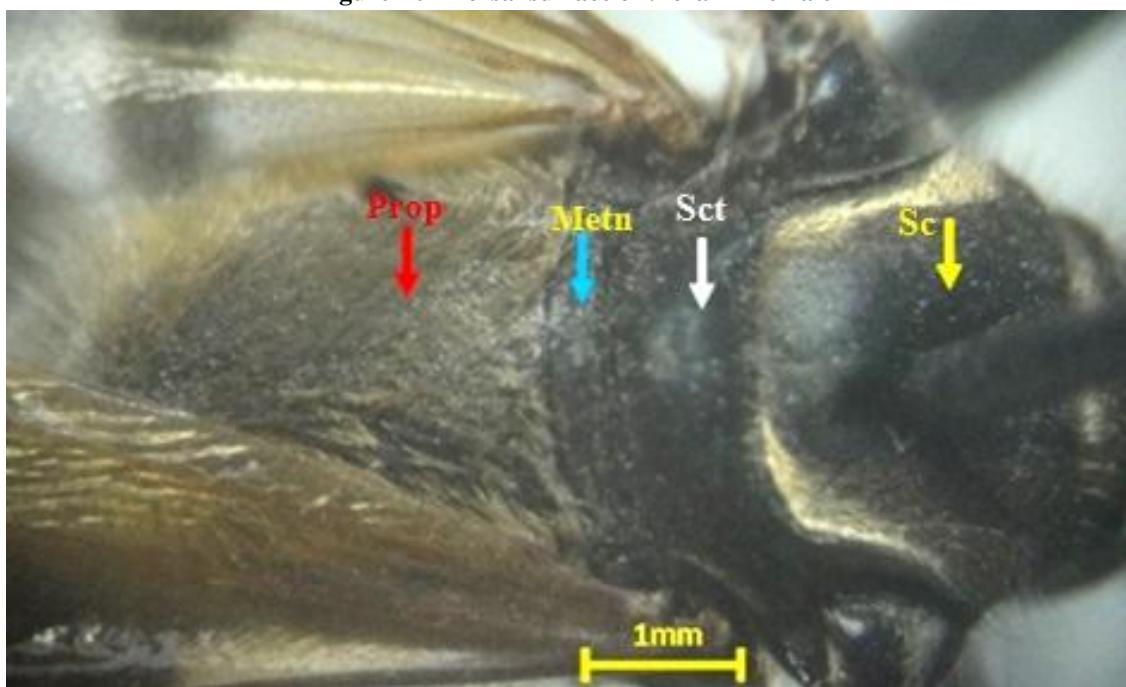
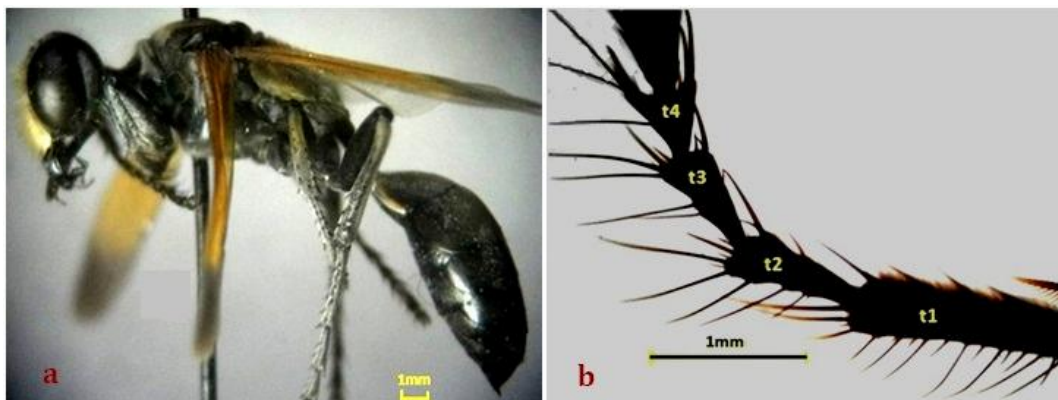
Figure-9 Male genitalia a: gonostyle b: volsella c: penis valve**Figure-10 Dorsal surface of thorax in female**

Figure-11 Female a: lateral view of adult b: tarsal rake

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