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DESCRIPTION OF NEW RECORD OF BEEWOLVES *PHILANTHUS TRIANGULUM* (FABRICIUS, 1790) (HYMENOPTERA: CRABRONIDAE) FROM IRAQ

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Abstract

Beewolf *Philanthus triangulum* (Fabricius, 1790) (Hymenoptera: Crabronidae) is described and illustrated based on male and female specimens from Iraq. We provide separate keys for identification of the males and females of the species in Iraq. The study was carried out in June 2018, Iraq. The study was based on important diagnostic characterisation to describe this species from the predatory wasps of honey bees such as antenna, eyes, face, chest, front and back wings, legs and abdomen. The purpose of this paper is to document this new species of beewolf *P. triangulum* (Fabricius, 1790) (Hymenoptera: Crabronidae) from Iraq, provide a diagnostic comparison to morphologically between males and females.

Key words: Beewolves, *Philanthus triangulum,* taxonomy, Apoidea

Introduction

This dissertation's taxonomic parameters are centred around and within the hymenopteran superfamily of Apoidea, a somewhat diverse. There are approximately 30,000 species and tremendously important aculeate clade that both critical pollinators (bees, Anthophila or Apiformes) and their predatory wasp (Spheciformes" sensu Brothers 1975; now named referred to as apoid wasps). Approximately two-thirds of the included species or about 20,000 species are bees (Alcock and Bailey, 1997; Alcocka, 1975). The remainder constitute a somewhat more heterogeneous and presumably paraphyletic assemblage of around 9,500 species of predatory wasps (Alcock, 1975b; Alcock et al., 1977; Blösch, 2000). Female and male describe is one of the most interest forces driving evolutionary changes like size, color and others (Bohart and Grissell, 1975; Brockmann and Grafen, 1992). Several models are suggested how females can increase the fit ness of their progeny by choosing particular mates. According to the good genes model, male with intrinsically superior genes are the best choice for all females (Cazier and Mortenson, 1965; DeJong, 1987; Evans and O'Neill, 1987). According to Bohart and Grissell (1975) there is too many differences between wasps' species. By contrast, model of genetic complementarity assumes that the mate differs among females and depends on the genotype of individual females (Evans, 1982; Fergusona, 1983; Fergusonb, 1983). Where usually no obvious precopulatory indicators of description of male and female exist. In the present study, a taxonomic study of Beewolves *Philanthus triangulum* (Fabricius, 1790) (Hymenoptera: Crabronidae) with description as new species in Iraq was investigated.

Usually, males are either sterile or not viable at all (Goetler and Strohm, 2008). If females share one sex determination allele with a mate so called matched mattings, 60% of her fertilized eggs will develop into diploid males (Gwynne, 1980). Inbreeding considerably increases the probability of matched matings, and thus increases the proportion of 'futile' diploid males. With sibling matings, the proportion of matched matings varies between 50% and 100% depending on whether the mother was outbreeding or also inbreeding accordingly, the proportion of diploid males varies between 25% and 50% of the diploid progeny (Hansen, 1997). Avoidance of mating with

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close relatives in Hymenoptera would thus be beneficial and represents a special case of mate choice for genetic complementarity (Herzner *et al.,* 2006; Kaltenpoth and Strohm, 2006).

Whereas female choice based on acoustic and visual male signals has received considerable attention (Kaltenpoth *et al.,* 2007; O'Neill, 1983), surprisingly little is known about female choice based on chemical signals (O'Neill, 1985; Shelly and Whitter, 1997). This is although chemical signals are probably the most important sensory cues for mate-finding in the clear majority of species. Owing to both the potential for variation in qualitative and quantitative features of semiochemicals (Simon *et al.,* 1972; Strohm and Lechner, 2000; Strohm and Linsenmair, 1997).

The species that belong to this family are spread over the world, but they are not found in Australia and South America, especially the Philanthus species, which includes 137 species (Strohm and Linsenmair, 1999). These wasps are living individually, and they build their nests under the ground. They build their nests as like a tunnel under the soil and on both sides of the tunnel, they made cells that put their eggs on them (Strohm and Linsenmair, 2001; Stubblefield *et al.,* 1993). The females attack the bee, especially *Apis mellifera* species. *Philantus triangulum* is a leading species that attacks many new species of insects (Stubblefield *et al.,* 1993). The population density of these species is low, and under a good condition of a long dry summer, it can reach hundreds of individuals, these insects appear from June to September in each year with a variety of individuals and they have one or two generations per year (Strohm and Linsenmair, 1997). Males and females live in a separate with separate tunnels. Male's tunnel is shorter than that of female one. The females build their nest, where the length of the nest is 1 meter underground. The larvae of wasp are feed on the bee. Male bees use visual and sound signals and released chemicals to attract females (Strohm and Lechner, 2000, Young *et al.,* 2009). The purpose of this paper is to document this new species of beewolf *Philanthus triangulum* (Fabricius, 1790) (Hymenoptera: Crabronidae) from Iraq, provide a diagnostic comparison to morphologically between males and females, and provide a more complete identification keys to both males and females of this subgenus from south and middle of Iraq.

Materials and Methods

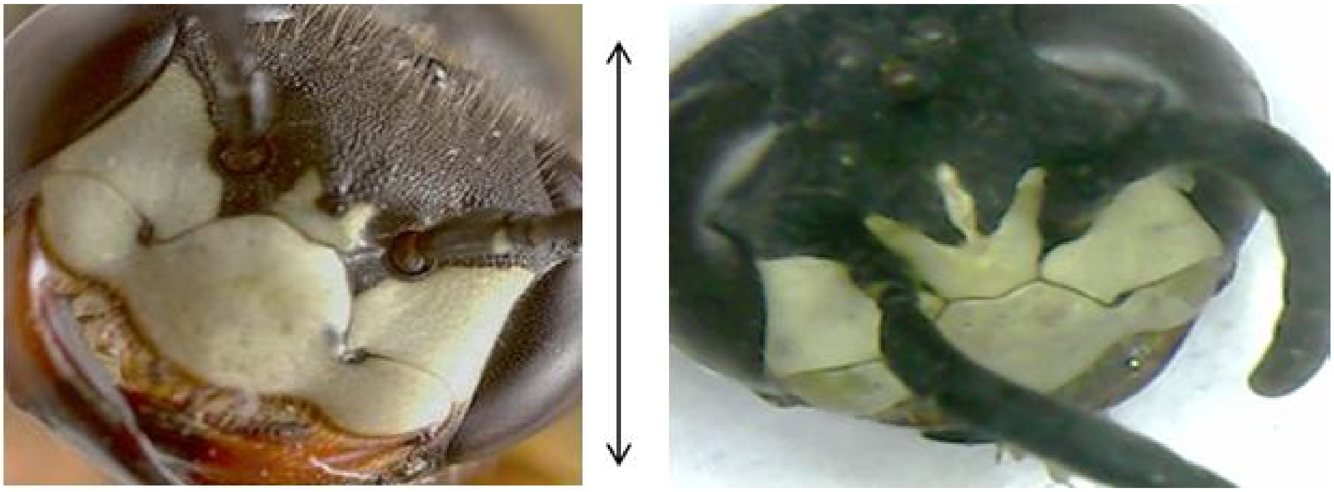
Samples were collected from Al-Kut area in Wasit Governorate, Iraq during June 2018 from. The adult samples placed in Petri dishes, with all information (date, gender, place of collect), and samples than transferred to the insect laboratory at the Faculty of Agriculture. The samples were kept with the alcohol concentration of 70%. The body has been dissecting to (antenna, head, chest, front wing, back wing and abdomen), these parts were examined with a dissecting microscope on a 2 x, and an Olympus-type microscope on 10x, 4x. All measurements photographed were taken by microscope Dino lite digital microscope.

Results and Discussion

General describe

The length of the body is 16-18 mm. Fig. 1 showed that head and chest are black with yellow marks. The most important characteristic between males and females is the presence V in the head of females while in males there are three complicated lines. The antenna in female has 12 pieces, but the male 13 pieces. Mouth of the female is bigger than the male, and the female is larger than male (2a-b).

Fig. 1: Showed the head and chest are black with yellow marks.



a. Female **b.** Male

Fig. 2: Showed that jaws of the female is bigger than the male.

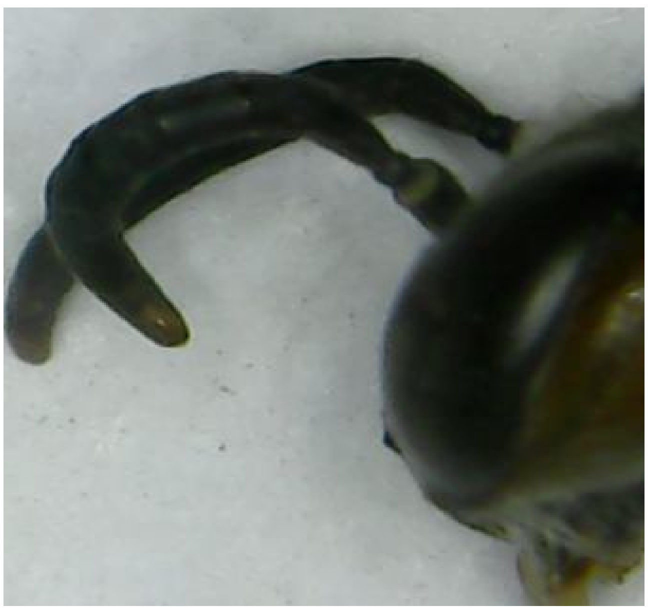


Fig. 3: Antenna of beewolves

Fig. 4: The complicated eyes of beewolves

Head

Head is brown color and circular shape. It is approximately 4 mm long with thick white hair. Antenna is horns with 12 pieces; the length of antenna is 5 mm. All of them black color except for the last piece of whip is brown color (Fig. 3). The complicated eyes are oval shaped and large in size. The length of eye is 3 mm long. There are black color (Fig. 4). There are three simple eyes at the top of the head, black color, and the top jaws

Fig. 5: The thorax of beewolves

Fig. 6-a: The front wings of beewolves.

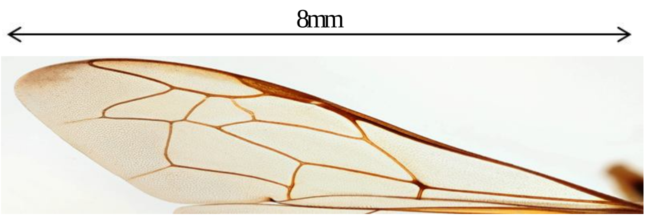


Fig. 6-b: The back wings of beewolves.

are large and brown color.

Thorax

Thorax is convex, black, thick, and long dorsal. Dorsal plate of second thorax cycle with light yellow line. Propodeum area is short and black. Wings is shown long transparent, brown colour. The front wing length is 12 mm. The number of wing cell is 3 cells and the length of back wings is 8 mm (Fig. 5).

Legs

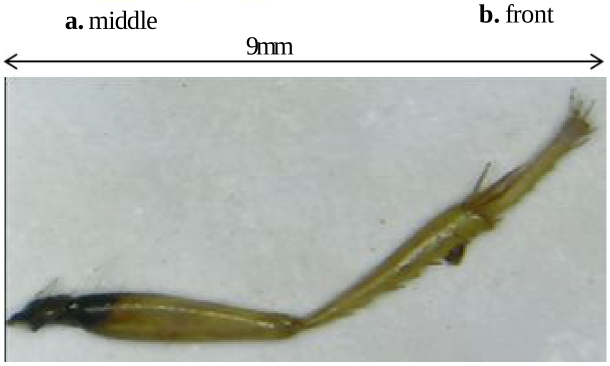
The legs are 9 mm long, and the thighs are white. The legs and forearms are yellow, and the claws are black. The wrist consists 5 pieces with 6 strong long prongs on it, the first piece of the wrist is longer than the rest of the pieces, in the front there is a simple torso (7-a), the middle leg and middle thighs are black. Thigh, leg and wrist are yellow, the wrist has nine long hairs (7-b), the posterior and back legs are black colour. There are two long hairs at the connection of the leg with the wrist (7-c).

Abdomen

The abdomen is 8 mm long and consists 9 rings of

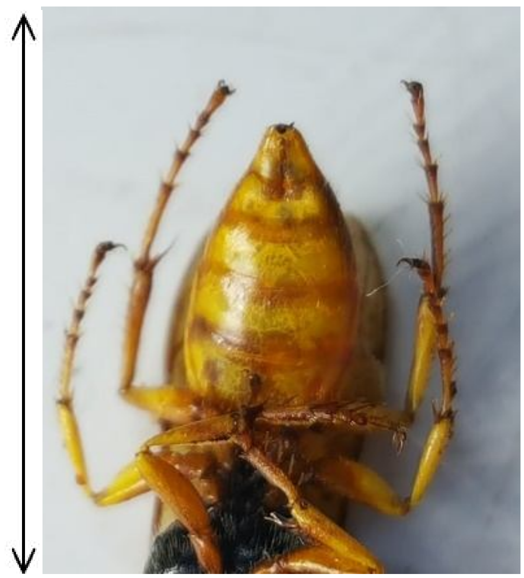
a. middle

b. front

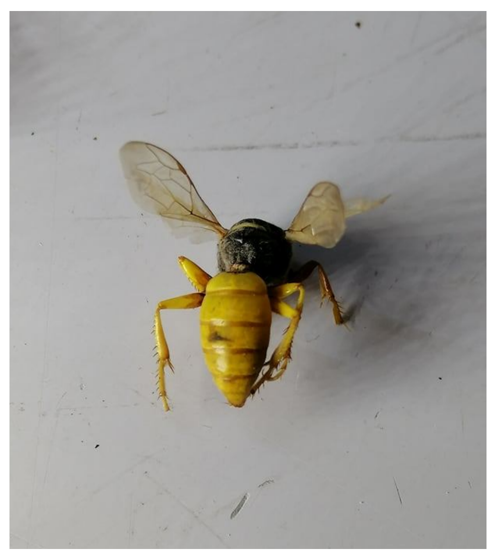


c. back legs

Fig. 7: The legs of beewolves; a. middle, b. front and c. back legs.



a. abdomen



b. back

Fig. 8: The abdomen of beewolves.

yellow colour with a black layout covered with long white hair. The third and fourth abdominal rings are yellow colour, while the rest of the abdominal rings are black (Fig. 8).

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Author contributions

HT- collecting of the samples, Data collection, preparation of the manuscript; HA- critical review of the manuscript; review of the manuscript; KH- preparation of the manuscript, sample collection, design of the study.

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