



RESEARCH PAPER

OPEN ACCESS

**Characterization and morphology study of honeybees worker
Apis florae Fabricius 1787 (Hymenoptera: Apidae) in Wasit
Governorate**

Khalid J. Al-Hussainawy^{*1}, Hassnen T. Kareem², Hasan H. F. Al-Khshemawee²

¹College of Agriculture, Al-Muthanna University, Diqar, Iraq

²College of Agriculture, Wasit University, Wasit, Iraq

Article published on July 30, 2018

Key words: Morphology, *Apis florae*, Apidae, Honeybees.

Abstract

This study is carried out during March and April, 2018, which is used a significant characterization for discrimination this species with other honeybees' species such as antennae, tongue, the veins of the front and back wings, the third pair of legs, pollen collection basket, and abdomen.

***Corresponding Author:** Khalid J. Al-Hussainawy ✉ hasan_hadi1984@yahoo.com

Introduction

Honeybee follows Apidae family from Hymenoptera order and Apis genus. There are five Apis species including small bees *Apis Florea*, big bee *Apis dorsata*, East bee (Indian) *Apis cerana*, West bee *Apis mellifera* and *Apis laboriosa*. Recently, *Apis laboriosa* is listed to these species as a fifth species and they looks like the big bee in the morphology (Fabricius, 1775; Derwesh, 1965; Ariana *et al.*, 2009; Delaplane *et al.*, 2000).

Winston, (1991); Franck *et al.* (1998); Michener, (2000) explained that the honeybee originally found in South Asia. The West bee divided to two species include *Apis mellifera* and *Apis adansonii*, while other West bee are strains of these species However, Arias and Sheppard, (1996); Winston, (1991) indicated that the honeybees originally found in Tropical Africa. They are divided to the three groups within 12 species in continents (Hepburn and Radloff, 2013). *Andrena Fabricius* (1775) (Hymenoptera: Andrenidae) commonly called sand or solitary mining bees, is the largest genus of bees in number of species according to present day classification (Michener, 2007). To date, *Andrena* contains about 1500 valid species and about as many synonyms (Gusenleitner and Schwarz, 2002). The actual number of species of *Andrena* may be higher, and roughly estimate a total of about 2000 species since many have yet to be described, especially from South America and the dry regions of Central Asia. *Andrena* (Andrenidae: Andreninae) is the most diverse bee genus in the Holarctic (Michener, 2007). It can be considered as one of the most important pollinators of spring-blooming crops and trees by (Derwesh, 1995) first *Andrena* were described and listed 14 species (Fabricius, 1775). Subgenus *Andrena* (*Brachyandrena*) was first record by (Gusenleitner, 2009).

Sanderson *et al.*, (2006) have been divided honeybees according to the colour to the three groups including black bee, yellow bee and slightly black colour. Each group have 10 or more strains of bees. The bees *Apis florea* is the smaller bees in the size and they have tolerance for high temperature at 50°C (Osytsnjuk, 1994).

The bees can build one framework from the wax on the Low-altitude trees that is closer to the ground. This bee is found in South Asia and originally found in Thailand, Malaysia, India and Pakistan areas (Alexander, 1991; Derwesh, 1995). Based on that, the study was carried out to characterize and morphological study of this species in Wasit Governorate, Iraq. This study was the first record of this species in this city.

Materials and methods

Sample collection

The samples were collected from Jazan, Kut, Wasit Governorate. Fifty samples were placed in petri dishes and all the information are listed including the date, the place of collected samples. The samples were kept in Ethyl alcohol (70%).

Analysis of the samples

The body were cut to different parts such as antennae, tongue, mouthparts, veins of the front and back wings, third pair of legs, pollen collection basket, and abdomen. All the part send for to characterize by placed all the parts on the slides. Dissecting Microscope 2x and Compounds Microscope (Olympus) (10x, 4x) have been used in this experiment. Measurement and photographed all the parts have been done by Dino lite digital microscope.

Results and discussion

Describe of female of *Apis florea* Fabricius 1787.

Body length: Fig. (1) showed that the body length is 9-10mm.

Head: Fig. (2) described the head of the bee. The head is ovoid shape and dark brown colour. The length is between 2.5-3 mm and width is 2-2.5 mm. Combined eyes fill most of the head, and the distances between the eyes is 1-1.5 mm. On the forehead, there is white thick hair in there.

Antennae: Fig. (3) has been described the antennae part of this bee. The antennae is elbows 3 mm length with dark brown colour. There is black thin hair cover all the antennae. The antennae part is consists from 10 pieces.



Fig. 1. Female of *Apis florum* Fabricius 1787.



Fig. 2. Head of female *A. florum*.

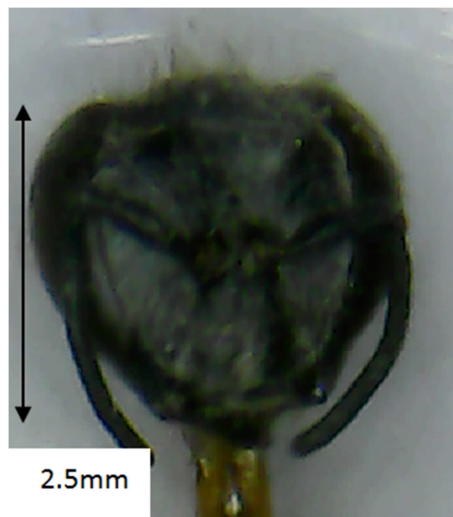


Fig. 3. Antennae of female *A. florum*.

Mouthparts: Fig. (4) has been showed that the mouthparts and tongue parts. Tongue length is 2-2.5mm with yellow colour.

Thorax: The thorax of this species is ovoid shape and dark brown to black colour. It covers with white long hair. Propodeum area is too short and it is covered

with long white hair. Petiole part is short without hair and its colour is dark yellow (Fig. 5).

Wing: The length of front wing is 7-8 mm. The colour is brown and transparent. The number of veins cells is 9 cells and transient veins cu-1cm. The length of back wing is 5.5-6 mm and transparent (Fig. 7).

Back legs: The length of back legs is 7-8 mm and it is cover with long hair. The colour of all parts of legs is dark brown, and the wrist is mixed with brown and yellow colours. The pollen basket is covered with long white hair (Fig. 8).

Abdomen: The abdomen length is 3.5-4 mm. The colour of dorsal platelet for first two circles is orange, and the dorsal plate of circles is dark brown and orange. The colour of forth circle is dark brown and orange with white tape (Fig. 9). The colour of platelet of abdomen is dark brown and orange except the last one. The sting colour is dark brown and its length 0.5 mm (Fig. 10).

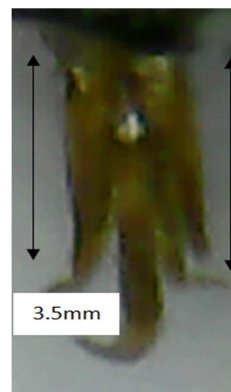


Fig. 4. Tongue of *A. florum*.

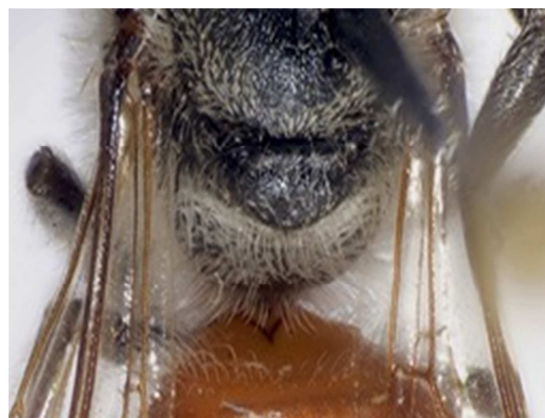


Fig. 5. Thorax of *A. florum*.



Fig. 6. Front wing of *A. floriae* female.

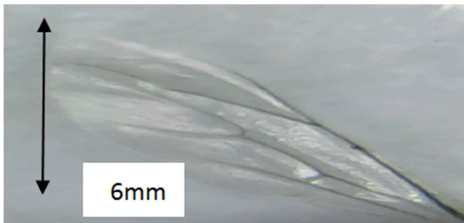


Fig. 7. Back wing of *A. floriae* female.

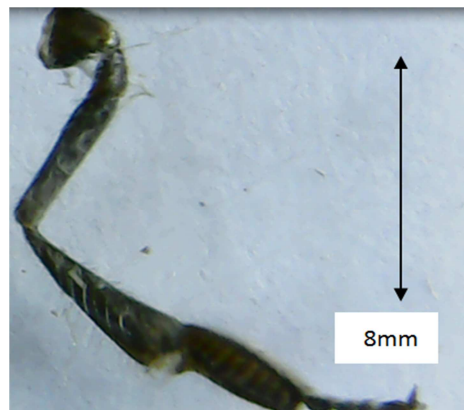


Fig. 8. Back legs of *A. floriae*.



Fig. 9. Abdomen from the top. Sting and abdomen.



Fig. 10. Describe of male of *Apis floriae* Fabricius 1787.

Body length: Fig. (11) showed that the body length is 14-1mm.

Head: Fig. (12) described the head of the male bee. The head is dark brown to black colour and covered with white long hair. The length of head is between 3mm, and width is 4mm. Its covered with white long hair. Combined eyes is dark brown colour, and they fill most of the head. The distances between the eyes is 1-1.5mm.

Antennae: Fig. (13) has been described the antennae part of male bee. The antennae is elbows 1.5-2mm length.

Thorax: The thorax of this species is black color and covered with white long hair. The length of front wing is 10 mm (Fig. 13). The length of back wing is 7mm and transparent (Fig. 14).



Fig. 11. *Apis floriae* Male.

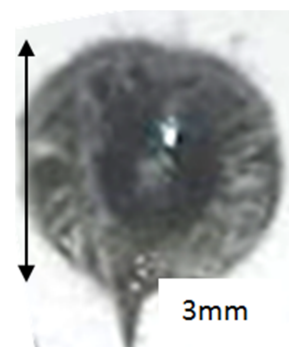


Fig. 12. *Apis floriae* male head.



Fig. 13. Front wing of *Apis floriae* male.



Fig.14. Back wing of *Apis florae* male.

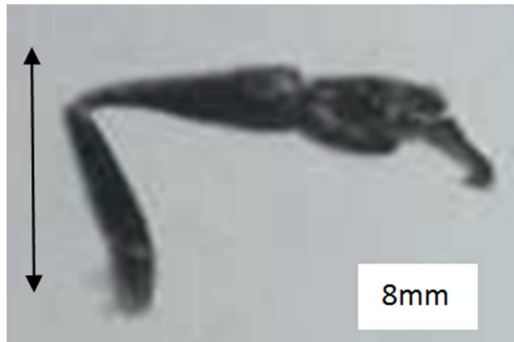


Fig. 15. Back legs of *Apis florae* male.

References

- Alexander BA.** 1991. Phylogenetic analysis of the genus *Apis* (Hymenoptera: Apidae). *Annals of the Entomological Society of America* **84**, 137-149.
- Ariana A, Erwin S, Osamu T, Fritz G.** 2009. A taxonomic revision of the subgenus *Andrena* (Brachyandrena) (Hymenoptera: Andrenidae). *Zootaxa* **2281**, 21-39.
- Arias MC, Sheppard WS.** 1996. Molecular phylogenetics of honey bee subspecies (*Apis mellifera* L.) inferred from mitochondrial DNA sequence. *Molecular phylogenetics and evolution* **5**, 557-566.
- Delaplane KS, Daniel RM, Daniel FM.** 2000. *Crop pollination by bees*: Cabi.
- Derwesh AI.** 1965. A preliminary list of identified insects and arachnids of Iraq. *Direct. Gen. Agr. Res. Proj Baghdad* **2**, 121-123.
- Fabricius JC.** 1775. *Systema entomologiae sistens insectorvm classes, ordines, genera, species, adiectis synonymis, locis, descriptionibvs, observationibvs. Flensburgi and Lipsiae* pp. 832.
- Franck P, Lionel G, Michel S, Jean MC.** 1998. The origin of west European subspecies of honeybees (*Apis mellifera*): new insights from microsatellite and mitochondrial data. *Evolution* **52**, 1119-1134.
- Gusenleitner F, Schwarz M.** 2002. Checklist of the bee genus *Andrena* with remarks and further information on the Palearctic species (Hymenoptera: Andrenidae). *Entomology* **12**, 1280.
- Gusenleitner F.** 2009. A taxonomic revision of the subgenus *Andrena* (Brachyandrena) (Hymenoptera: Andrenidae). *Zootaxa* **2281**, 21-39.
- Hepburn HR, Sarah ER.** 2013. *Honeybees of Africa*: Springer Science & Business Media.
- Michener CD.** 2000. *The bees of the world*. Vol. 1: Johns Hopkins University Press.
- Osytsnjuk AZ.** 1994. New subspecies of the Palearctic *Andrena* bees (Hymenoptera, Andrenidae). *Vestnik zoologii* **1**, 30-36.
- Sanderson CE, Benjamin SO, Peggy SH, Harrington W.** 2006. Honeybee (*Apis mellifera* ligustica) response to differences in handling time, rewards and flower colours. *Ethology* **112**, 937-946.
- Winston ML.** 1991. *The biology of the honey bee*: harvard university press.