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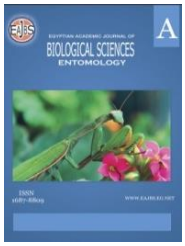

Taxonomic Revision of Subgenus *Lophanthophra* Brooks and *Paramegilla* Friese (Hymenoptera – Apidae) of Egypt

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ABSTRACT

Twenty-six *Anthophora* species belonging to Subgenus *Lophanthophra* Brooks (10 species) & Subgenus *Paramegilla* Friese (16 species) are revised taxonomically. *A. rutilans* Dours is transferred from the first Subgenus *Lophanthophra* Brooks to Subgenus *Paramegilla* Friese due to its obvious dilated & hunped hind basitarsus as most related Paramegillian species than the not conspicuous weak mid-leg brushes. Many specimens are collected from various localities and genitalia are desiccated. Keys, diagnostic characters, synonyms, coloured pictures, line drawing illustrations, and the distribution are introduced, in addition to Scanning Electron Microscopic photographs are taken for *A. hispanica* (Fabricius). *A. Shoumarae* Rawda is redescribed, *A. boops* Alfken still considered as distinct species, not as a synonym of *A. vidua* (Klug).

INTRODUCTION

Anthophora is a hymenopterous species included in Suborder Apocrita (waisted-species), Aculeata group (species with modified ovipositor to sting apparatus), Superfamily Apoidea (bees and crabronid wasps that visit flowers for nectar and pollen for their larval food). Since Gabriel &Rodrigo 2005, this long-tongued bee related to Tribe Anthophorini, Family Apidae, not as the former in Family Anthophoridae although this has not been widely accepted in many literatures. *Anthophora* Latreille is one of the largest genus in Family Apidae (over 450 worldwide species, in 14 subgenera) (Michener 1944, 1965 &2000; Priesner 1957; Brooks 1983 & 1988; Rawda 2001, 2003& 2011; Engel 2007& Engel *et al.* 2017 & Powney *et al.* 2019).

The majority of bees are solitary, usually nest in large aggregations or in subsocial habits, where more than one female can share one nest as clear in carpenter bees. Although these digger bees as other bees is associated with many positive things especially the pollination, their population has been in decline annually, this widespread loss of pollinating insects would mean Humanity End (Celary & Wisniowski 2007**,** Blacquiere *et al.* 2012, Shebl *et al*. 2013, 2014, Shebl and Farag 2015, Amin & Mawlood 2017and Falk 2019).

MATERIALS AND METHODS

University of Suez Canal (30 37 13 N, 32 16 11 E) (10.7.2017), Suez (29 52 21 N, 32 28 03 E) (14.11.2017), Wadi El Rabine, Saint Catherine, South Sinai (28 33 45 N, 33 56 58 E) (23.10.2018), Qantara East, Ismaillia (30 52 02 N, 32 20 07 E) (24.11.2017& 27.11.2018), Qantara Gharb El-masaied (30 37 40 N, 32 14 29 E) (29.10.2018), El Fayoum, wadi-El Rayian (25.2.2016) and several locations are visited for collecting *Anthophora* species by the sweeping method. Specimens are pinned, labelled and preserved at the Department of Entomology, Faculty of Science, Ain Shams Collection. Male genitalia was dissected, Microscopic slides are prepared for fine parts. A digital camera is used for photographic Photos and line drawings are made for all available samples. Electron microscopy photographs are taken in Central Labe Unite at the Faculty of Science, Ain Shams University. Main Collections are examined, Ain Shams Collection (Ain Coll.), Cairo Collection (Car. Coll.), Entomological Egyptian Society Collection (Soc. Coll.), Ministry of Agriculture Collection (Agric. Coll.) and Al Azhar Collection (Alferi Coll). Many hosts are recorded as *Lantana camara*, (*Basilc*), (*Brassica* sp.), *Vicia faba* L. and some grasses.

RESULTS AND DISCUSSION

Subgenus *Lophanthophra* Brooks

Lophanthophra Brooks, 1988, Univ. Kans. Sci. Bull. 53:464.

Type species: *Anthophora porterae* Cockerel, 1900, Ann. Mag. Nat. Hist. (7)5: 401-416.

Diagnosis: 13.5-20 mm in length, flabellum has finger like projection (except in ***A. caelebs*** Gribodo), the male has a yellow face (frons, clypeus, labrum & 1st antennal segment), but black in ***A. caelebs***, with a distal brush, well developed basitibial plate & pygidial plate; 6th sternum with oblique ridges.

Genitalia: gonocoxite with simple apex, gonostylus 3-6 as long as wide, 7th sternum has short apodem (1.25 times as long as disc length), 8th sternite without strong longitudinal sclerotization.

Female: has a black face (frons, clypeus, labrum & 1st antennal segment) except ***A. aegyptora*** Priesner with yellow face.

Key to species (Males)

1-Midtarsi with long black hairs as a triangular fan, length of basal hairs longer than the 1st tarsal segment (Figs. 34 &35), gonocoxite with blunt apex with the inner and outer process (Figs. 26 &27) …….....***hispanica*** (Fabricius)

-Midtarsi without this long black triangular fan, gonocoxite without this blunt apex but with elongated apex…….……...(2)

2-For tarsi with a distinct tarsal brush (Figs. 1, 2 & 4-7), penis valve rectangular in shape with curved apex (Fig. 3)..… ….……..…….....***aegyptora*** Priesner

-Fortarsi without brushes, penis valve not rectangular in shape, without curved apex.……..……..(3)

3-Head black, without mid-distal brush …….……...…. ***caelebs*** Gribodo

-Head yellow, with middistal brush……..……..……..……...…..(4)

4- Hind basitarsus has antirior basal tooth…… ***disparilis*** Friese

-Hind basitarsus normal without this tooth……..…… (5)

5-Abdominal fasciae clear complete; midtarsi has conspicuous middistitarsal brushes and mid-basi-tarsal brushes, genital valve triangular in shape (Fig. 21) ……. ***dispar*** Lepeletier

-Abdomen with weak fasciae on the first three abdominal tergites only, midtarsi with weak distal brush only. Genital valve not as the above…….……***biciliata*** Gribodo

Key to species (Females)

1- Face yellow (Fig. 8), abdominal Fasciae of 2nd and 3rd abdominal tergites brood (more than 1/3 tergite length) and widened at the middle (Figs. 9&10)…… ……..….***aegyptora*** Priesner

- Face black, all abdominal fasciae of 2nd and 3rd abdominal tergites thin, not widened medially ……...……. (2)

2-All abdominal tergites have clear fasciae, body length 16-19 mm. ……...……..... (5)

-Abdominal fasciae present in two or three tergites only, body length more than 19 mm….....…. (3)

3-Abdominal tergites with golden colour, the last tergites reddish, has ferruginous hairs……....***disparilis*** (Friese)

-Not as the above…….……...……(4)

4-Length is 17-19 mm., with whitish-grey pilosity, fasciae clear in all tergites……..…..***niveiventris*** Friese

-The length is 16-17 mm.. with yellowish pilosity at two first abdominal tergites, the rest has more black hairs (Figs 16-20) …… …….……***dispar*** Lepeletier

5-Legs brownish has white hairs exteriorly with grey hairs at first two abdominal tergites ……..…...…….***biciliata*** Gribodo

-Legs black have ferruginous hairs at 1st two tergites ……..….(6)

6-Length 19-20 mm. with black and yellow hairs on head (Figs.22&36) ……...***hispanica*** (Fabricius)

-Length 16.5-18.5 mm. with black hairs only on the head (Figs. 11-15)..……...….***caelebs*** Gribodo

***Anthophora aegyptora* Priesner (Figures 1-10)**

Anthophora atricella aegyptorum Priesner, 1957 , Bull. Soc. Entomol. Egypt, XLI: 30-31.

Type locality Egypt (El Borg) 2.5.1921 (1) male (**Alferi Coll.**).

Diagnosis: Male (Figs.1-7): Length 18-20 mm., face yellowish, clypeus has two large bold brown basal spot, mandibles have a white basal spot, head and thorax has heavy white pilosity, the abdomen has wide obvious fasciae, the 5th tarsal segments of fore and mid tarsi has an obvious brush of black hairs, the first tarsal segment of mid tarsi without brushes, the tibia with long white hairs from the outside of the tibiae.

Genitalia (Fig. 3) has rectangular penis valves, its length one & half time than the width and with curved apex.

Female (Figs. 8-10)**:** Length is 18.5-20 mm., the face has white hairs, clypeus on both sides black and with two large rectangular bold basal spots; fasciae of abdomen wide and large; legs have light colour hairs.

Material examined: Abu Keer Jun.1918 (1), Mariout Mar.1918 (3) **(Soc. Coll.)**, El Borg 25.4.1953 (21) **(Car.Coll.),** Wadi El Arbaein 21.3.1958 (2) **(Ain.coll.),** El Borg 2.5.1921 (1) male type **(Alferi Coll),** Max 30.5.1914 (3), Maamoura 24.6.1914 (2) **(Agric.Coll.).)**, El Fayoum 25.2.2016 (1).

Distribution: Sinai, west desert & Costal strip.

***Anthophora biciliata* Lepeletier**

Anthophora biciliata Lepeletier, 1841: Hist. Nat. des Ins., Hymen., 2. Roret. Paris: 680.

Anthophora mucida Gribodo, 1873, Bull. Soc. Nt. Ital, V: 80.

Podalirius mucida Friese, 1897, Bienen Europas, III: 230.

Anthophora biciliata Lepeletier in Brooks, 1988, Univ. Kans., Scien. Bull.:466.

Diagnosis: Male Length, 15-16 mm., face yellow, clypeus has two bold basal spots; mandibles black, clypeus very strong protruding, has light transverse carina on either side and faint carina; abdominal fasciae of the 2nd and 3rd tergites faint.

Female: Length, 16-17 mm. thorax and the 1st and 2nd abdominal tergites covered by mixed black and grey hairs, the 4th and 5th tergites covered on sides by black hairs and white hairs

and abdominal fasciae in the 1st, 2nd and 3rd tergites only.
Distribution: Costal strip.
Note: It is not collected and not found in all Egyptian collections.

***Anthophora caelebs* Gribodo (Figures 11-15)**

Anthophora caelebs Gribodo, 1924, in Brooks, 1988, Univ. Kans. Sci. Bull.:466.
Anthophora alfierii Alfken, 1942, Veroff. Dtsch. Kolon. Mus. Berlin: 209.
Paratype: locality Egypt (Helwan) Mar.1918 (5) male (Alf. Coll.).
Diagnosis: Male Length is 17-18 mm. face black, covered by black hairs, the 1st and 2nd tergites, vertex, and thorax covered by mixed short brownish- yellow hairs and few black hairs, clypeus nearly flattened; legs and sternum covered by black hairs, the 3rd antennal segment as long as the next four segments.
Female (Figs, 11-15): Length is 17.5-19 mm. face and head black, abdominal fasciae absent but the 2nd tergite covered by tightness fasciae, thorax and first tergites brownish- yellow, 2nd tergite covered with weak fasciae, legs have black hairs.
Material examined: Borg El Arab 3.3.1955 (5), Wadi El Arbaein 21.3.1998 (1), 24.4.1998 (1) **(Ain. Coll.),** Wadi El Arbaein 24.4.1940 (2), 22.3.1928 (1) **(Car.coll.),** Helwan Mar.1918 (5) Paratype male **(Alf. Coll.).**Three unlabelled specimens **(Soc. Coll.),** Wadi Hoff 10.3.1916 (1), 23.3.1918 (2), Wadi Hussein 22.4.1916 (3), Wadi Abu-zuleiga 26.3.1918 (1), Wadi Abu Handal 27.3.1918 (2), Wadi Rashid 27.3.1918 (2), Wadi Um Elek 28.3.1918 (2) **(Agric.coll.),** El Fayoum 25.2.2016 (1).
Distribution: Sinai, west desert, Lower Nile & Costal strip.

***Anthophora cinerascens* Lepeletier**

Anthophora cinerascens Lep., 1841, Hist. Nat. Ins. Hym., II: 51 females.
Anthophora hypopolia Dours, 1869, mem. Soc. Linn. Nord. France, 2: 5-211.
Diagnosis: Male: Unknown. **Female:** Labrum yellowish-white with two ferruginous colour dots on either side, clypeus yellowish-white with the squared spot on either side, the pilosity of head, thorax and the 1st and 2nd abdominal tergites has weak hairs, the first three fasciae clear, the 4th and 5th abdominal tergites have long black hairs, sternites has long white fringe, legs ferruginous colour, tibia has black colour on the underside, tarsi have ferruginous colour.
Note: It is of doubt occurrence in Egyptian fauna.

***Anthophora dispar* Lepeletier (Figures 16-21)**

Anthophora dispar Lepeletier, 1841, Hist .Nat. Ins. Hym., II.P. 56.
Podalirius dispar Friese, 1897, Bienen Europas, III, P. 202.
Anthophora dispar Storey, 1916, Min. Agric. Techn. Bull., 5, P: 18.
Anthophora niveohirta Friese, 1922, Konowia, 1:60.
Anthophora dispar Alfken, 1926, Senckenbergiana, VII.
Anthophora dispar v. *speciosa* Alfken, 1926, Senckenbergiama, VIII: 101, 103.
Anthophora speciosa Friese in Brooks, Univ. Kans. Sci. Bull., 53:465.
Diagnosis: Male: Length, 13.5-15 mm. face yellowish colour with two basal dots of clypeus and labrum, has black line between them; mandibles black colour; the 1st and 2nd abdominal tergites have mixed light grey –yellowish and some black hairs, fasciae clear in all abdominal tergites, sternites has white hairs, legs have black hairs and mixed with white hairs between segments, mid-leg well developed basi-tarsal brush and dis-tarsal brush hind basi-tarsus little swollen disc of 7th sternite has pair of sharp-tooth about protuberances.
Gantalia (Fig. 21): Gonostylus is five times the length of wide, apex of penis valve is 1.7 times the length of wide, with a triangular shape, pygidial plate shelf-like projection, 7th tergite with broad apical plate has a nearly rectangular shape.
Female (Figs.16-20): Length, 16.5-17 mm. head dark brown has white-yellowish pilosity, thorax covered by a mix of whitish and black hairs, the 5th abdominal tergite has white hairs on either side and black hairs in the middle, fasciae narrow and clear in all tergites, legs have

brownish pilosity exteriorly & black interiorly.

Material examined: Khanka Mar.1918 (1) **(Soc. Coll.)**, Meadi Feb.1914 (2), El Borg 5.1.1913 (1) **(Alf. Coll.)** Suez 14.1.1954 (1), Ain Shams 5.1.1958 (1), Giza 7.2.1914, Egypt 4.2.1928 (1), Wardan 4.4.1951 (2), Wadi El Arbaein 21.3.1997 (5), 20.4.1998 (3), Kom Osheim 23.3.1997 (1), 25.4.1998 (2) **(Ain. Coll.).** Meadi Dec.1912 (6), jan.1913 (4), 6.2.1914 (12), Giza 5.1.1913 (3), Nawa 7.1.1913 (4), Giza 7.2.1914 (4), 2.1.1929 (8), Mariout 10.3.1914 (8), Helwan2.3.1929 (8), Tourh 29.1.1929 (4**) (Agric.Coll.)**, El Fayoum 25.2.2016 (1), Ismailia Al Massaied 18.11.2011 (1), Suez 14.11.2017 (1).

Distribution: Sinai, Costal strip, East, West desert, Upper & Lower Nile.

***Anthophora disparilis* Friese**

Anthophora disparilis Friese, 1922, Konowia, 1:60.

Anthophora disparilis Alfken, 1926, Senckenbergiana, VIII: 101,124.

Diagnosis: Male: Similar with *A. dispar* but larger then it, the abdomen has long pilosity, legs brownish.

Female: Length is 17.5 mm. It has red latser gena, the first tergite has weak bronzy luster, and the abdominal terga has red with ferruginous colour hairs.

Distribution: Gabal Elba.

***Anthophora hispanica* (Fabricius) (Figures 22-38)**

Apis hispanica Faricius, 1787, Mants. Ins., I: 300.

Podalirius hispanicus Friese, 1897, Bienen Eurpas, III: 1930

Anthophora hispanica Storey, 1916, Min. Agric. Techn. Bull., 5:18.

Anthophora hispanica Alfken, 1926, Senkenbergiana, VIII: 101.

Diagnosis: Male (Figs. 22-35), 18.5-12.5 mm, face yellow, has 2 black basal spots on clypeus, labrum and with black mandibles; thorax 1st and 2nd abdominal tergites with reddish-yellow colour , the rest tergites with reddish-yellow colour, the rest tergites with black hairs, mid tersi has the characteristic long hairs forming a triangular brush**.**

Genitalia (Figs.26-33): Gonocoxite with dense black long curved process in each side and hairs forming apical brush, 7th sternite with two semicucular apex, lateral outer hairs and cutinization, 8th sternite with acute speculum lateral chitinization and lateral apical hairs. **Female** (Figs.36-38), 19.5-20.5 mm, with black head, with yellowish –red pilosity of thorax,1st and 2nd abdominal segment, the rest with black pilosity & with a strong pygidial plate.

Material Examined: Alexandria mar .1918 (2) (**Alf.Coll)**, Mariout 1.3.1912 (2), 10.3.1914 (1), Matrouh 4.2.1917 (2), Ameriah 23 .2.1917 (1), Borg El Arab 13.2.1926 (1), Suez 26.3.1926 (1) **(Agric. Coll)**, Ismailia.Al Maseid. 18.11.2011 (2), El Fayoum 23.3.2016 (1).

Distribution: Sinai, Costal strip, Upper & Lower Nile.

Anthophora niveiventris Friese

Anthophora agama, Storey, 1916, Min. Agric., Techn. Bull. 5:17.

Anthophora robusta var. *niveiventris* Friese, 1919, Deutsch Entomol. Zeitschr: 279.

Anthophora niveiveentris Friese in Priesner, 1957, Bull. Soc. Entomol. Egypt, XLI: 36.

Diagnosis: Male: Unknown, **Female:** 17-19 mm. Clypeus, labrum, the 1st antennal segment and sides of frons black, thorax has white and black hairs, the 1st and 2nd abdominal tergites covered mixed of grey hairs and some black hairs the next tergites has black hairs, fasciae white and complete in all tergites, the 5th tergite has white hairs and black hairs on the side.

Material examined: Matrouh 16.3.1929 (1) (**Alf. Coll.)**; Mariout 7.3.1912 (2), 10.3.1914 (2) **(Agric. Coll.).**

Distribution: Costal strip. .

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Anthophora pretiosa Friese

Anthophora fulvitarsis var. *pretiosa* Friese, 1919, Deutsche Entomol. Zeitschr. : 279.

Anthophora pretiosa Friese in Priesner, 1957, Bull. Soc. Entomol. Egypt, XLI: 32.

Type locality: Egypt (IKingi, Mariout) Feb. 1912. (Berlin Museum).

Diagnosis: Male: Length is 15.5-16 mm. face yellow, thorax pilosity of vertex and the first tergite of abdomen brown-ferruginous colour hairs, the 2nd tergite has pale yellow hairs, from 3rd to 5th tergites has black hairs, thorax has covered by more yellowish hairs; the 5th tarsal segment of fore and mid-leg with raised yellow hairs provided with rounds & conspicuous brush. **Female:** Unknown.

Distribution: Costal strip (Marriout). **Note:** It is not found in the Egyptian collection, is collected (I king II. Ii 1912), A. Andres (Priesner).

Subgenus *Paramegilla* Friese .

Paramegilla Friese, 1897, Die Bienen Europas, Theil 3, Solitare Apiden. Type Genus *Podalirius*, Berlin: 18:25. *Solamegilla* Marikovs, 1980, Entomol. Obozr. 59-120. **Type species:** *Apis ireos* Pallas, 1773, Reisee durch Verschiedene Provinzen des Russischen Reiches in den Jahren 1768-1774, Petersburg: 743.

Diagnosis: 10.5-24.5 mm in length; flabellum has finger-like lobes in both sexes.

Male: Face yellowish-white in colour, sometimes has yellow markings, middle tarsi has no midtarsal brushes or weak mid-disti-tarsal brush only as in *A. rutilans* Dours, hind legs has humped or well-developed tooth in the first tarsal segment; hind tibia and femur enlarged, pygidial plate clear, the 4th sternum usually with dense hairs.

Genitalia: The 7th sternum apically emarginated at the middle, with 2-4 lobes, without lateral protuberance at the base, with a slightly sclerotized area, apodeme short usually as long as disc length or 1.1-1.7 times as long as the disc. The 8th sternite emarginated medially and angulated at the lateral margin, usually with longitudinal sclerotization; apex of gonocoxites simple, without lateral lobes, gonostylus flattened, 2.7-3 times as long as wide. **Female:** Black or sometimes have pale marking; with protruding clypeus; sting 1.7-2.8 as long as the gonostylus.

Key to Species (Males)

1-Hind basitarsus dialated & hunped at the base (Fig. 39), mid-legs with weak brushes……. ……...…….***rutilans*** Dours

- Hind basitarsus not as the above, mid-legs without brushes …….…….…..(2)

2-Abdominal fasciae especially the third, the 4th and 5th, widely interrupted in the middle, length 13-16 mm, the pilosity white; the hind basitarsus with a blunt tooth…….…..***maculigera*** Priesner

-Abdominal fasciae especially the 4th and 5th, not interrupted medially……..…….....(3)

3- Hind leg has strongly enlarged hind femora; short, robust hind tibia & with blunt angle; hind first tarsal segment with a large pointed tooth(Fig.40), 12-13.5 mm in length, the white fasciae narrow……..……..……***blanda*** Preze

-The hind femora and the hind tibia without this unusual shape …….…….……(4)

4-The abdominal tergites with ferruginous colour, hind leg brown and with reddish hairs, the antenna brownish in colour, and with14.5-16.5 mm body length ..…….***erubescens*** Morawitz

-Abdominal tergites black, hind leg and antenna blackish……..…..…..…...(5)

5-Hind basitarsus normal, not humped, white fasciae clear in all tergites, the pilosity whitish-yellow……...(6)

-Hind basitarsus distinctly humped or with teeth, white fasciae not conspicuous in all tergites, the pilosity yellowish……..……..……....(7)

6-Legs normal, without brushes, the abdominal white fasciae not broad, 14-16 mm in length……..……...***oraniensis*** Lepeletier

-Hind tibia with long white hairs exteriorly, abdominal fasciae broad, 12-14 mm in length…… ……..***alternans*** (Klug)

6-All abdominal tergites clothed with ferruginous hairs, hind basitarsus angled and widened medially (Fig.41) ……...… ……..…***inclyta*** Walker

-Not all abdominal tergites clothed with ferruginous hairs, hind basitarsus not widened medially……..…….(7)
7-The 3rd and 6th abdominal tergites with distinct wide fasciae, hind basitarsus widened basally (Fig.42) ……..……...….***boops*** Alfken
-The 3rd and 6th abdominal tergites without distinct fasciae, hind basitarsus normal…….....(8)
8-Gonostylus subapical, its length equals the length of gonocoxite above it (Fig.43)……...……..….***shoumarae*** Rawda
-Gonostylus not as the above……..……....(9)
9-Length 18-20 mm, hind basitarsus with large pointed tooth……**armata** Friese
-Length 13-14 mm, the hind basitarsus with a curved groove at inferior margin…***semirufa*** (Friese)

Key to Species (Females)

1-Face white, abdominal fasciae conspicuous and complete……..……(2)
-Face black, abdominal fasciae not conspicuous and not complete……..…….….(4)
2-Body 13-15 mm in length, clypeus with black, rounded, fused basal spots**……...*alternans*** (Klug)
3-Body 15-16 mm in length, fasciae snow white, very narrow, hind tibiae with a triangular spot of white hairs……..…...***oraniensis*** Lepeletier
-Body length 16-17 mm, fasciae broad, not snow white, hind tibia without this spot ……..…….….***boops*** Alfken
4-Body 11-13 mm in length, abdominal fasciae present in all tergites, the tergites with short black hairs and black head ……...……..……***blanda*** Perez
-Larger species, abdominal fasciae in the first three tergites only if present…….…….(5)
5-Body 16-18 mm in length, body black, with black pilosity except for the first two tergites with some white hairs……..***vidua*** (Klug)
-Not black species……..…….(6)
6-Larger species 19.5-22 mm, wing brown in colour, veins brown, legs blac…. ***armata*** Friese
-Moderate species, body length 14-18 mm, wing white, legs ferruginous……..(7)
7-Abdominal tergites ferruginous, body length 16-18 mm, fasciae pale, antenna ferruginous……....***erubescens*** Morawitz
-Tergites black, 14-17 mm, antenna black……..……..…..(8)
8-Body 14-15 mm in length, thorax, the first and second abdominal tergites with short ferruginous hairs, the following tergites with short raised black pilosity..... ***semirufa*** (Friese)
-Body length more than 16 mm, the last abdominal tergites without black hairs……..(9)
9-The whole body clothed with ferruginous pilosity, 16-17 mm …..……....***inclyta*** Walker
-The whole body shows a gradual increase in colour, length 17-18 mm (Figs.44& 45)…… ……***shoumarae*** Rawda

***Anthophora alternans* Klug**

Megilla alternans klug, 1845, Symb. Phys. Dec. 5. Fig. 3.
Podalirius alternans Friese, 1897, Bienen Europas, III: 65.
Podalirius wegeneri Friese, 1899, Entomol. Nachrichten, XXV: 321.
Anthophora alternans (Wagneri) Alfken, 1926, senckenbergiana, VIII: 114.

Diagnosis: Male 12-14 mm in length, white face without black markings, reddish flagellar base; thorax and 1st tergite has whitish-grey hairs; the rest tergites has broad white fasciae & black hairs, middle tibiae exteriorly with a long white hair comb, middle & hind tarsi with long white hairs, hind tibia has raised black hairs anteriorlt at two basal thirds.

Female 13.5-15 mm, face white, with black basal spots fused at sides, thorax with grey-yellow, 1st tergite with long whitish hairs, has broad white fasciae, broader at sides and black hairs, the 5th tergite and sternite have black hairs; tibiae, tarsi has whitish hairs.

Material examined: Giza Apr. 1918 (1) (**Alf. Coll**.); Giza 5.1913 (2) (**Soc. Coll.**).
Distribution: Lower Nile & Western desert. .

. ***Anthophora armata* Friese**

Anthophora armata Friese, 1905, Zeitschr. Dipt., V: 234.
Anthophora armata v. tetra Friese, 1922, Zool. Johrb., Syst., 46: 10
Anthophora armata Friese, in Brooks, 1988, Univ.Kans. Sci. Bull., 53: 476

Diagnosis: Male 18-20 mm in length, with a large pointed tooth in hind basitarsus, clypeus yellow, with black basal spots; thorax has ferruginous hairs, 1st tergite with yellow hairs, black hairs at below.

Female 19-22 mm in length, head black; head, thorax, the 1 st & 2nd abdominal tergite, legs, and all sternites, with ferruginous hairs. Fore, hind wings dark brown, with slight pubescence on their cells.

Material examined: Gabal Elba (Wadi Adieb) 3.2.1933 (1) (**Agric.Coll.**).
Distribution: Gabal Elba. **Note:** According to Priesner, the male is not collected from Egypt.

***Anthophora basalis* Smith**

Anthophora basalis Smith, 1854 in Priesner, 1957, Bull. Soc. Entomol. Egypt, XLI: 112.
Collected from Sinai by Walker, 1871 and from that time it has not been collected again.

***Anthophora blanda* Perez (Figure 40)**

Anthophora blanda Perez, 1895, Especes nouvelles melliferes barbarie Bordeus: 1.
Podalirius blandus Friese, 1897, Bienen Europas, III: 0163.
Podalirius spinipes Friese, 1899, Entomol. Nachrichten XXV: 321.
Anthophora blanda Perez in Brooks, 1988, Univ.Kans. Sci. Bull. Vol. 53:476.

Diagnosis: Male 12-14 mm in length, face yellow except the two dark M-shaped fused basal spots, vertex, thorax, and 1st abdominal tergite has yellow hairs, no black hairs, the rest tergites have short black hairs and clear white fasciae; hind femora and tibia (Fig. 40) strongly enlarged, with two longitudinal edges; double-edged & deep emargination hind basitarsus, ending by pointed tooth, the 7th tergite with two teeth.

Female 11-13 mm in length, thorax and the first abdominal tergite with white hairs, abdominal fasciae clear, the rest tergites with black hairs.

Material examined: El Marg 4.1918 (8) (**Soc. Coll**.); Assiout 11.4.1937 (1) (**Car. Coll**.); Kharga Oasis Mar.1916 (3) (**Alf.Coll**.).

Distribution: Lower Nile, Upper Nile, and Western desert. .

. ***Anthophora boops* Alfken (Figure 42)**

Anthophora boops Alfken, 1926, Senckenbergiana, VIII: 100,105 females.

Diagnosis: Male:16-17 mm, all face white, with raised triangular frontal area, grey-white hairs; abdomen has clear complete white fasciae except the 6th fasciae interrupted in the middle, the 7th tergite and all sternites has black hairs; hind basitarsus (Figure 42) produced in a blunt angle, the 7th tergite has a broad median tooth and a lateral tooth laterally.

Note: According to Priesner (1957) who stated that *A. vidua* (Klug) was represented in the Egyptian collections by females only and he thought that these females belong to *A.boops* (Alfken) due to this comment, Brooks (1988) considered *A.boops* (Alfken) a synonym of *A. vidua*. But in Agriculture Collection there are twelve specimens are males of *A. boops*, three specimens the females of *A. boops* (Alfken) not A. vidua (Klug), they are identical with males of *A. boops* (Alfken) but with normal basitarsus, so this species is still a distinct specie.
Material examined: Giza 4.4.1927 (1) (**Soc.Coll**.); Samallout 5.1918 (1) (**Alf.Coll**.); Saquara 28.6.1914 (2), Meadi 1.8.1914 (2), Wadi Rashid 20.4.1916 (2), Samallout 27.5.1918 (2), Wadi Hussein 13.5.1919 (2), Mansorah 3.6.1925 (1), 28.4.1926 (1), Abu Rawash 19.5.1926 (2) (**Agric.Coll**.).
Distribution: Eastern desert &Lower Nile. ***Anthophora concolor* Alfken**

Anthophora concolor Alfken, 1926, Senckenbergiana, VIII: 119.

Diagnosis: Male: Unknown, **Female:** Length14 mm, black species, with flat punctured face, not noticeable gena; labrum, vertex has raised black hairs, the third antennal segment longer than the three following segments together, scutellum shining, with long raised hairs, abdominal tergites without raised hairs, the sixth tergite long and slender; legs black. **Material examined:** Giza 16.5.1914 (1 female) (**Car.Coll**.).

Distribution: Lower Nile.

Anthophora dubia Eversmann

Anthophora dubia Eversmann, 1852, in Priesner, 1957, Bull. Soc. Entomol. Egypt, 41:112.

Note: There are no specimens in the Egyptian collection, Walker (1871) collected this species from Heliopolis & Cairo, except that no specimens are collected again.

Anthophora erubescens Morawitz

Anthophora erubescens Morawitz, 1880, Bull. Claas Physio Mathemotique de L'Academic Impertale des Sci.ce.26:333-389.

Anthophora carneus Friese, 1897, Bienen Europas, III: 290.

Anthophora erubescens Storey, 1916, Min. Agric. Techn. Bull., 5:518.

Anthophora erubescens Alfken, 1926, Senckenbergiana, VII: 100.

Diagnosis: Male: 14.2-16mm, body, legs ferruginous, face, 1st antennal segment yellow, mandibular tip brown, thorax, the last abdominal tergites black; head, thorax with yellowish-white hairs, fasciae clear, widened at the middle, the abdominal tergites, tibia, and tarsi exteriorly with white hairs but interiorly with reddish, mid-leg without brushes.

Female: 16-18 mm in length, has darker ferruginous to brown colour, the pilosity reddish. **Material examined:** Meadi 4.1918 (1), Helwan 3.11.1918 (1) (**Soc.Coll**.); Moansouria 11.3.1933 (1), 5.6.1926 (1) (**Alf.Coll**.); Meadi 10.5.1912 (2), Wadi Rashied 15.5.1916 (1), Wadi Hussein 21.4.1917 (2), Helwan 1.6.1929 (1), Mansouriah 8.6.1929 (1), Kerdasa 1.3.1930 (1) (**Agric. Coll**.).

Distribution: Eastern desert & Lower Nile.

Anthophora inclyta Walker (Figure 41)

Anthophora inclyta Walker, 1871, List Hym. Egypt: 98.

Podalirius inclytus Friese, 1897, Bienen Europas, III: 298.

Diagnosis: Male16.1-17 mm in length, mandibular base yellow, thorax and abdomen with ferruginous pilosity, hind basitarsus (Fig. 41) with a lower angle, the 7th tergite ferruginous, has two yellowish teeth, strongly protruding, abdominal fasciae yellow and complete. **Female** 16.2-17 mm, head black, body clothed with ferruginous hairs, sternites & legs reddish-brown. **Material examined:** Gabal Elba, 23-30.1.1933 (3) (**Agric.Coll**.). **Distribution:** Sinai, Gabal Elba& Red seacoast.

Anthophora maculigera Priesner

Unnamed Savigny, 1812: Descr. d' Egypt, PLI, Fig. 11(male).

Anthophora maculigera Priesner, 1957. Bul. Soc. Entomol. Egypt, XLI: 85.

Diagnosis: Male 13.2-16mm, thorax, and 1st abdominal tergite have short yellowish-grey hairs, the remaining tergites black, the 2nd, 3rd, and 4th tergites have white fasciae broadly interrupted in the middle; legs with grey hairs, hind basitarsus with a blunt tooth at the middle.

Female Unknown.

Material examined: Hammam 2.5.1928 (3) (**Alf. Coll**.); Hammam 20.5.1908 (14) (**Soc. Coll**.).

Anthophora oraniensis Lepeletier

Anthophora oraniensis Lepeletier, 1841, Hist. Nat. Ins. Hym.II:39.

Anthophora oraniensis Lucas, 1846, Expi. Sci. Algerie, zool. III: 143.

Podalirius oraniensis Friese, 1897, Bienen Europas, III: 96.

Diagnosis: Male 14-15.8 mm in length, face, mandibular base and the 1st antennal segment whitish-yellow, thorax, the 1st and 2nd abdominal tergites clothed with whitish-yellow hairs; legs, the rest tergites with black hairs, fasciae clear in all tergites.

Female 15-16 mm in length, face white, vertex, thorax, and the two first abdominal tergites has short red hairs, the rest tergites have short black pilosity, the 2nd and 4th tergites have full very narrow fasciae, the 5th tergite has long white hairs, legs have black hairs, fore and middle tibiae with white hairs exteriorly, hind tibiae with a basal spot of white hairs, hind tarsi short, broad, with black hairs.

Material examined: Dekheila Mex 19.2.1919 (1) **(Agric.Coll.);** 18.2.1919 (1) (**Alf.Coll**.)**.**
Distribution: Coastal strip.

***Anthophora rutilans* Dours (Figure 39)**

Anthophora rutilans Dours, 1869, Mem. Soc. Linn. Nord France, 2: 5-211.
Anthophora moderna Morawitz, 1876, Horae Soc. Entomol. Ross. 12:1-69.
Diagnosis: Male: Length is 18-20 mm. mandibles black, thorax and the 1st and 2nd abdominal tergites have ferruginous colour hairs, abdomen black and have black hairs, pygidial plate present, brush or mid-distarsal and mid-tarsal very weak, hind basitarsus (Fig. 39) enlarged distally, has yellow long hairs interiorly.
Female: Head black, thorax, the 1st and 2nd tergites has white fasciae and ferruginous color hairs, the rest tergites black and black pilosity without fasciae, from outside of legs has yellow hairs and from inside the legs has black hairs.
Material examined: 27.2.1935 (2) **(Agric. Coll.)** without locality.

***Anthophora semirufa* Friese**

Podalirius semirufa Friese, 1898, Termsz. Fuzetek, XXI: 308.
Anthophora fulviscopa Alfken, 1930, Stettiner. Entomol. Zeitg, xci: 226.
Anthophora semirufa Friese in Priesner, 1957, Bull. Soc. Entomol. Egypt, XLIO: L78, 79.
Paratype locality: Egypt (Helwan) 2.4.1916 (4) (Alf. Coll.).

Diagnosis: Male, 13-14.5 mm, mandibles with large white basal spot, thorax and the 1st abdominal tergite with short ferruginous hairs, the rest has raised black hairs, middle and hind tibiae with black hairs, the middle tibiae exteriorly with some ferruginous hairs, hind tarsi laterally flattened, curved, with a curved groove at the inferior margin and a pre-apical rounded hump at the inferior margin, with black hairs at the base.

Female 14-15 mm in length, clypeus brown with median carina, thorax and the first three abdominal tergites with short ferruginous hairs, the following tergites with short raised black pilosity, the hind leg exteriorly with ferruginous hairs, interiorly has black hairs.

Material examined: Helwan 4.1916 (4) Paratype (**Alf.Coll**.); Massara 6.1918 (2) (**Soc. Coll.**); Wadi Rashied21.4.1916 (11), Wadi Hussein 24.4.1916 (2), Wadi Handal 7.7.1916 (3), Wadi Shabek 20.5.1919 (5), Wadi Um-Elek 25.5.1919 (2), Wadi Hussein 31.5.1919 (2) (**Agric.Coll**.).

Distribution: Coastal strip & Eastern desert.

***Anthophora shoumarae Rawda* (Figures 43-45)**

Type locality: Egypt (Wadi El Arbaein, St.Katherine), 28.2.1997 (1male, 2 female).

Diagnosis: 18.8-20 mm in length, the first antennal segment, clypeus, labrum & the mandibular base yellowish-white; the mandibular tip and flagellum brownish; with fine dark anterior dark tentorial pit, the pilosity between antennae composed of few yellow hairs, the vertex and pronotum black with few whitish hairs, the rest of the thorax has yellow hairs; the first tergite with short yellow hairs, the rest tergites black have very fine yellow and black hairs, the fasciae present with fine yellow hairs, the last tergite black, the fore and mid coxa black, fringed ventrally, the fore, middle tibiae and tarsi with short yellow hairs & distinct

arolia, the hind trochanter, femur, and tibiae ventrally with elongate black & white hairs, the hind tibia with short white hairs exteriorly and dorsally, the hind tarsi with dense black hairs. **Genitalia** (Figure 43): gonocoxite simple without lateral process, has constriction & triangular apex, gonostylus short, subapically, its length 1.8-2 times as long as its width, penis valve with a blunt apex.

Female (Figures 44&45): 19-20.5 mm in length, face black, with yellowish hairs laterally, clypeus protruded, without long yellow hairs, thorax with long whitish hairs, the abdominal tergites with gradually increase in in colour from white to dark orange or golden hairs, with well-developed black pigidial plate, the fore leg blackish has brownish hairs, yellowish hairs on the tibia distally, the mid-leg has yellowish hairs exteriorly, the hind tibia and tarsi with long dark golden hairs exteriorly, the tibial spure well-developed & dark yellow, the tibial brush distinct, it can be easily separated from all related species specially *A.inclyta* Walker by the thoracic colour not ferruginous, the abdominal tergites have a gradual increase in golden colour to the tip of the abdomen, the length of the 3rd antennal segment of male as long as 2.5-three following segment.

Material examined: El-Arish 14.3.1994 (1 female Paratype) (with red label), St.Katherin 28.2.1997 (1 female Holotype, 1 male type Allotype).

Distribution: Sinai.**Note:** this species is named after our late Professor: Nagat Shoumar.

Anthophora superans Walker

Anthophora superans Walker, 1871, List of heymen. Collected by J.K. Lord: 99.

Diagnosis: Male: Unknown.

Female: Thorax and the abdominal base has thick pale ochraceous hairs, vertex white & without hairs. Eyes, tongue ferruginous, 1st antennal segment white. Abdominal three fasciae pale ochraceous, legs with cinereous hairs, tibiae & tarsi have cinereous pubescence, tarsi have ochraceous hairs beneath. Wings cinereous, veins black. **Note:** this species has not been found owing to its inadequacy of description.

Anthophora valga (Klug)

Megilla valga Klug, 1845, Symb. Phys., Dec. 5, Ins. PI. 50, (Fig.11).

Diagnosis: Male: hind tarsi have pointed tooth, the 7th tergite emarginated apically, hind tibiae with black hairs interiorly at the base.

Note: It is not collected and not represented in the Egyptian collections.

Anthophora vidua (Klug)

Megilla vidua klug, 1845, Symb. Phys., Dec. 5, Ins.PI 49, Fig. 10.
Podalirius bicinictus viduus Friese, 1897, Bienen Europas, III: 101.
Anthophora bicincta var vidua Storey, 1916, Min. Agr. Techn. Bull., 5:18.
Anthophora fumipennis Alfken, 1926 in Brooks, 1968, Univ. Kans. Sci. Bull. Vol. 53:575.

Diagnosis: Male: Unknown.**Female:** 16-18.2 mm in length, all body with black pilosity except 1st and 2nd abdominal tergites with some white hairs and white fasciae, the remaining tergites with dense black pilosity, thorax and legs have black hairs, 3rd antennal segment equal three and half times longer than broad.

Material examined: Dachor 8.5.1914 (9), Kerdasa 4.5.1914 (1), Marg 4.5.1918 (3) (**Soc.Coll**.); Marriout 5.3.1927 (2) (**Alf.Coll**.); Mazghouna 26.5.1914 (1), Burg 16-20.6.1956 (12)(**Car.Coll**.); Mazghouna 8.5.1914 (2), Saccara 28.5.1914 (4), Samallout 27.5.1918 (3), Mansouria 16.6.1925 (4), Helwan 28.5.1928 (4), Dabaa 10.3.1930 (1)(**Agric.Coll**.).
Distribution: Lower Nile & Coastal strip.

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Figs. (1-10): ***A. aegyptora***, **(1-8):** male, (1& 2): adult, (3): gonocoxite, (4& 5): head dorsally & frontally, (6): foreleg, (7): mid leg, (8-10): female, (8): head, (9): abdomen, (10): adult;
Figs. (11-15): ***A. caelebs*** female, (11): adult, (12): thorax, (13): abdomen, (14): head, (15): hind leg.
Figs. (16-21): ***A. dispar***, (16-20): female, (16): adult, (17): head, (18): abdomen, (19): thorax, (20): hind leg, (21): male gonocoxite.

Figs. (22-38): ***A. hispanica***, (22): adults, (23-33): male, (23): head, (24): thorax, (25): abdomen, (26 &27): gonocoxite, (28): 7th sternite, (29): 8th sternite, (30& 31): gonocoxite E.M., (32): 7th sternite E.M., (33): 8th sternite E.M., (34&35): mid leg, (36- 38): female, (36):adult, (37): basitibial plate, (38): pygidial plate.

Fig. (39): Hind leg of *A. rutilans* Dours male.
Fig. (40): Hind leg of *A. blanda* Perez male.
Fig. (41): Hind leg of *A. inclyta* Walker male.
Fig. (42): Hind leg of *A. boops* Alfken.
Figs. (43-45): *A. shoumarae* Rawda, (43): male gonocoxite, (44&45): female, (44): adult, (45): head.

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