Original article

Taxonomy of Egyptian members of wool carder bees (Hymenoptera: Megachilidae: Megachilinae: Anthidiini) based on morphological variations

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ABSTRACT

Tribe Anthidiini (Hymenoptera: Megachilidae: Megachilinae) is composed of intriguing solitary bees that are cosmopolitan in distribution (widely distributed in all continents, except Antarctica). This family includes the mason and leafcutter. The name carder bee may be referred to the female of this tribe are scrapes and collects the soft downy hairs (trichomes) of some plants to build their nest to lay eggs and for her young. The wool carder bees are represented in Egypt by seventeen species within five genera. Taxonomic keys were established for genera of the tribe and species of genera whenever needed. Verbal descriptions accompanied by detailed illustrations and photographs were presented. The distribution of species in Egypt and the world was presented. The classification of the tribe updated and received changes according to the recent publication and examination of the Egyptian entomological collections and fauna. Some taxonomic updates were carried out during the present study e.g., Anthidium karschi Friese, 1899 dropped as a synonym for Afranthidium alternans (Klug,1832); Anthidium alternans Klug, 1832 transferred to genus Afranthidium.

Keywords
Taxonomy
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Graphical abstract

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1. Introduction

Bees (Apoidea: Hymenoptera) among the largest groups of insects (about 16,000 species worldwide), are known as the most useful pollinators of plants and play a major role in ecosystems (1). Among the bee groups, Megachilidae is the most effective pollinator among all insect groups as they have specialized apparatus (Scopa) for collecting pollen grains (2).

Anthidiini bees, commonly known as wool carder bees (are so named because the female bee scrapes and collects the soft plant hairs (trichomes) mixed with plant secretions to use in building a nest for her young), which help them to waterproof the cell and protect broods against microbial infections (1). This pollinator bee group includes about 870 species worldwide (3).

Anthidiini distinguished from other megachilid tribes in having a mandible of female larger than that of male, provided with three or more teeth. Stigma length is less than twice the width; pre stigma small; female claws forked; body with yellow, white, or red marks (4).

Classification of Anthidiini subjected to different changes since established by Fabre (5) who classified members of Anthidiini as those who use plant resins in building nests and those which use plant fibers. Michener (6) presented twenty-two genera of the tribe, while Pasteels(7) classified it into forty-seven genera. On the other hand, Urban and Moure (8) divided neotropical Anthidiini into thirty-nine genera.

In Egypt, the taxonomic studies on the members of the tribe Anthidiini were first conducted by Alfken (9, 10) and the recent revision to the family Megachilidae were carried out by Salem and El Azab (11) who presented eighteen Egyptian species of tribe Anthidiini within a single genus (Anthidium Fabricius, 1804). Before and after Salem and El-Azab's classification (11) many authors distributed these species among five genera (Pachyanthidium, Icteranthidium, Pseudoanthidium, Afromanthis, and Anthidium) (e.g., Litman et al. (3), Fatergyaa (12) and Zakikhani et al. (13), accordingly, the present revision adopts this classification to the Egyptian Anthidiini.

Key to genera of Anthidiini

(Modified after Michener, 2007)

1- Mandible with 3-4 teeth  .......................................................................................................................... 2
1a- Mandible with 5-18 teeth separated by acute notches  ................................................................. 3
2- Omaulus lamellate continued above venter of the thorax and three separated from middle coxa by less than the width of middle trochanter; propodeum without fovea behind spiracle; preoccipital ridge behind vertex lamellate; arolia is present ................................................................. Pachyanthidium Friese
2a- Omaulus lamellate or not, if lamellate then often not continued onto venter of thorax, the lower part of preoccipital carina sloping forward and continuing directly to lower mandibular articulation; axilla frequently pointed posteriorly; posterior coxa with lamella in most species; hind trochanter of male with preapical ridge, carina, lamella, or tooth on inner surface; arolia is absent .................................................................................................................. Icteranthidium Michener
3- Tergum 5 with posterior margin depressed and more finely punctate than rest of tergum.4
3a- Tergum 5 with a posterior margin not depressed, or if depressed then punctures same as rest of tergum; T7 of male markedly narrower than T6, two- or three toothed or lobed; sub antennal suture arising from epistomal suture well above the tentorial pit .......................... Pseudoanthidium Friese

The present study aimed to focus on updating of the nomenclature, classification, and taxonomic status of the tribe Anthidiini because it is necessary to keep track of changes in name. For example, in the case of similar species, this involves comparing the original descriptions and ideally the type of material.

2. Materials and Methods

The present contribution-based mainly on specimens representing the member of Anthidiini bees in Egypt collected during the survey conducted in different geographical regions in Egypt, side by side with specimens from different reference entomological collections in Egypt. A sweeping net, is mainly, used in collecting specimens. Identification and confirmation of the most species within the scope of the present work carried out by the specialists of the Plant Protection Research Institute, Cairo, Egypt. In addition, the available recent taxonomic keys and investigations were used. Investigations were carried out with a stereomicroscope. All available species were verbally described, illustrated, and photographed. The main sources of the examined specimens were obtained from:

1- Plant Protection Research Institute (PPRI). Egypt.
2- Al-Azhar University, Faculty of Agriculture Collection (AUCE). Egypt.
3- Cairo University, Faculty of Science (CUE). Egypt.
4- Ain Shams University, Faculty of Science (ASUC). Egypt.

3. Results

The results include diagnosis for species, synonymy, taxonomic update as possible, and distribution, available species were verbally described, and photographed.

Tribe Anthidiini Ashmead,1899

Diagnostic characters: Integument of individuals are common with yellow or white sometimes red integumental marks; stigma and pre stigma less than 2X as long as broad; claws of female bi-fed or with an inner tooth; hind tibia dorsally with simple bristles (1).
4- Posterior margin of tergum 6 denticulate; T5 of the female with basal edge of depressed marginal zone does not angulate medially; penis valves close together or fused basally, bridge therefore short or absent; volsella small or absent

4a- Posterior margin of tergum 6 not denticulate, T5 of female with basal edge of depressed marginal zone commonly obtusely angulate medially; penis valves of male widely separated basally, united by long, narrow bridge; volsella projecting as lobe at apex of gonocoxite

Genus Afranthidium Michener, 1948

Anthidium (Afranthidium) Michener, 1948

Type species: Hypanthidium halophilum Cockerell, 1936.

Diagnostic characters: Female: Small (7 - 9 mm. long) and megachilid form. With multidentate mandibles. The posterior margin of T5 is depressed, medially widened, and not angulate; largely black, usually has considerable yellow ornamentations on the body; the yellow or cream-colored abdominal bands are usually unbroken, and the tergal margins translucent brownish (1).

Male: Penis valves close together or fused basally, bridge therefore short or absent; volsella small or absent; reduced gonostyli, laterally compressed and fused to the gonocoxites (1).

Distribution: The Afranthidium distribution extends from Morocco eastward through the Mediterranean basin to Egypt, Turkey, Bulgaria, and central Asia (1). Pasteels (7) listed ten species in Palearctic. In Egypt represented by one species.

Afranthidium alternans (Klug, 1832),[ Plate I, Figures 1-6 ♂♀]


Anthidium karschi Friese, 1899.

Material examined: 1♂, Gabal Asfar (Qalyoubia), 16.III, 1929 [AUCE].


Taxonomic notes: Anthidium karschi Friese, 1899 was a synonym for Afranthidium alternans (Klug, 1832).

Anthidium alternans Klug, 1832 transferred to genus Afranthidium.

Genus Anthidium Fabricius, 1804

Diagnostic characters: Species of this genus are mostly robust, moderate-sized, and characteristic in shape, with a rather parallel-sided but broad, somewhat flattened abdomen. The body is sometimes black but usually exhibits a conspicuous yellow maculation. The abdomen in the African species tapers posteriorly, T4 being only 0.8 X as wide as T1 or T2 (1).

Female: Sub antennal suture is usually straight; T6 of the female has an apical depressed rim, usually smooth and shiny, often hidden by hairs, and sometimes unrecognizable. This rim and usually the tergum as a whole have a median apical notch or emargination, sometimes small or largely hidden by hairs, but sometimes large. Laterally, T6 of the female has a tooth, angle, or shoulder, medially is an emargination, sometimes very weak, (1).

Male: S1 to S5 are unmodified, commonly fringed, S5 sometimes being quite short and broadly emarginated. The body of S8 is moderately elongate, commonly longer than broad. The male gonostyli are finger- or club-shaped, hairy; basal volsellar lobes are present, and the penis valves are widely separated but connected by a long, slender bridge.

Distribution: This genus is found on all continents except Australia. It is rather poorly represented in sub-Saharan Africa (1). In Egypt, Anthidium is represented by six species.

Key to species of genus Anthidium
(Modified after Warncke, 1980)

1. Scopa present. Abdomen with 6 terga; antenna with 10 segments [ ] .......................................................... 2
1a. Scopa absent; abdomen with 7 terga (although T7 is often small and little visible); antenna with 11 segments [ ] ........................................ 7
2. Metasomal terga with light maculation .................................................. 3
2a. Metasomal terga with yellow or red maculation; T1-T5 with dark red maculation; face and antenna black; posterior margin of scutellum and its lateral lobes dark red; 9 mm long .................................................. A. auritum (Part)
3. Posterior margin of T3-5 with densely white hairs ................................ 4
3a. Posterior margin of T3-5 without white setae ................................ 5
4. Head black; vertex above the eyes with a small yellow spot; mesonotum slightly shiny, moderately dense, and finely punctate; metasomal bandages wide, triangularly cut apically, yellow. 10.5-11.5 mm long .......... A. echinatum (Part)
4a. Mandible, clypeus, gena, and head posteriorly white yellow; mesonotum very glossy, smooth, with sparsely punctate; abdomen binding narrow, equal width, snow-white; 5 mm ........................................ A. pulchellum (Part)
5. Large species 8.5-11 mm; scopa at the top black; last metasomal tergum entire, the disc not the same color; frons with 2 tufts of yellow, red setae; scutum with dense setae; vertex without yellow longitudinal line; apical and lateral of T1 covered with dense setae; yellow bandages cut in the middle, so almost 4 spots are present; tibia ventrally black. From 8.5 to 10 mm long .................................................. A. tessellatum (Part)
5a. Small species maximum 7.5 mm; scopa white ........................................ 6
6. The yellow maculation of gena continued as a narrow strip on the inner eye margin extended upwards into the yellow color of vertex; gena narrow; posterior margin of scutellum with a little maculation; abdomen is red or red with brown posterior margins; T1-T5 with yellow binding, sometimes narrowed or interrupted in the middle; mesoscutum with dense, very strong, wrinkled punctate; 7 mm ........................................ A. xanthopygum (Part)
6a. Genal maculation short, not extended upwards; vertex black, with small round, yellow spot; gena broad; posterior margin of scutellum without decoration; abdomen black, with broad, more, or less interrupted, yellow-red bandages. Mesonotum with dense punctures and rather coarse. Metasomal terga punctate and coarse. 7 mm ........................................ A. amabile (Part)
7. T4 - T6 serrated laterally, T7 with narrow and pointed teeth, not expanded inside; T7 basally smooth and glossy, without sculpture; T6 with fine depressed punctures. 11-13 mm long .................................................. A. tessellatum (Part)
7a. T4 - T6 not serrated laterally .................................................. 8
8. T7 without teeth, posterior margin slightly indented; T1 - T5 with broad yellow, red binding, more or less interrupted in the middle. femur red, black basally. 6 - 7 mm ........................................ A. xanthopygum (Part)
8a. T7 differently formed .................................................. 9
9. Posterior margin of T6 medi ally flat (not bent); Posterior margin of T7 emarginated (notched) or serrated ........................................ 10
9a. Posterior margin of T6 bent, laterally dented, and sharply toothed; Posterior margin of T7 curved rounded, without distinction; abdomen rusty red, with narrow, interrupted, yellow bandages near the apical margin. 8-9.5 mm ........................................ A. amabile (Part)
10. Mesoscutum, dull with dense and strong punctures ........................................ 11
10a. Mesoscutum, smooth, shiny, finely, and sparsely punctuate; scutellum with lateral lobes smooth, glossy, and very scattered punctures, whitish-yellow 8 - 8.5 mm ........................................ A. pulchellum (Part)
11. Abdomen, rusty red, with wide yellow bandages; posterior margin of T2 covered with more or less densely white hairs; T7, in addition, rounded it curved. 11 - 11.5 mm ........................................ A. echinatum (Part)
11a. Metasoma black, T1-6 laterally with dark red maculation, posterior margin without white setae; T7, in addition, rounded sloping forward 9 mm ........................................ A. auritum (Part)
Anthidium amabile Alfken, 1932.

[Plate II, Fig. 1-5 ♀ and Plate III Fig. 1-5 ♂]


World distribution: Algeria, Egypt, Palestine, Saudi Arabia, and Iran, (16).

**Anthidium auritum** Klug, 1832


*Anthidium fischeri* Spinola, 1838.


*Anthidium echinatum* Klug, 1832.


Material examined: 1 ♂, Dakhla Oasis. (New valley), 18.III.1934; 1 ♂ Kharga O. (New Valley), 14. II. 1934 [PPRI]; 1 ♀, 27. II. 1914, W. Redid [AUCE].

World distribution: Libya and Egypt, (14).

**Anthidium pulchellum** Klug, 1832


World distribution: Egypt, Morocco, and Saudi Arabia (14).

**Anthidium tessellatum** Klug, 1832


*Anthidium tessellatum* var. *aegypticum* Friese, 1897.


World distribution: Morocco, Algeria, Tunisia, Lebanon, Turkey, Palestine, and Jordan, (14).

**Anthidium xanthopygum,** Klug, 1832


Material examined: 1 ♀, Borg El Arab (Alexandria), 19. X. 1933 Coll. Dr. Hodges [PPRI]; 1 ♀, Salloum (Marsa Matrouh), 14. V. 1917 [AUCE].
**Genus *Ictranthidium* Michener, 1948**

Type species: *Anthidium limbiferum* Morawitz, 1875.

Diagnostic characters: *Ictranthidium* species is characterized by the presence of rich yellow markings or with the body largely yellow; the size is variable (7.5-15 mm long); arolia absent; preoccipital carina is absent behind the vertex but is strong laterally, its lower end extends nearly straight to the posterior mandibular articulation. The mandible of the female has four teeth separated by shallow concavities. The pronotal lobe has a strong lamella and the omaulus is carinate. The axilla is frequently produced to a posterior angle or point projecting beyond the contour of the scutellum. A strong carina or lamella between the ventral and anterior surfaces of the front coxa characterizes most species, (1). Female: T6 of the female concave in profile, the margin convex with a median notch.

Male: the truncate T7 of the male has a mid-apical projection, sometimes also a lateral projection or tooth, and is thus trifid.

Distribution: This genus ranges from Morocco and Portugal to Mongolia. It is particularly well represented in the xeric areas of Asia but occurs in southern Europe (north to Hungary), northern Africa to Senegal, Mali, Chad, northern Kenya, and southeast Pakistan, (1). While in the Palearctic region there are 15 species, (14). In Egypt, this genus is represented by 5 species.

**Key to species of genus *Ictranthidium* Michener, 1948**

(Modified after Warncke 1992)

1- Scopa present; abdomen with 6 tergits; antenna with 12 segments [♀] ................................................................. 2
1a- Scopa absent; abdomen with 7 terga (although T7 is often small and little visible; antenna with 13 segments [♂] ........................................ 6
2- Posterior margin of T2 medially without appendix ................................................................. 3
2a- Posterior margin of T2 medially with a lighter, usually sinuate, tab-like appendix .................................................. 5
3- Vertex 3X ocellus wide ................................................................. 4
3a- Vertex 2X ocellus wide; T2 almost twice as long as wide; T1 black with a yellow middle bandage; T1 laterally densely punctate, this distance usually less than 0.5 X mm puncture diameter ........................................... *I. grohmanni* (Part)
4- Basal half of vertex, propodeum, and depression black ................................................................. *I. afrum* (Part)
4a- Vertex, propodeum, and only slightly darkened depression yellow; body dirty yellowish; frons, antenna basally and eye sides; the disk of mesoscutum and small triangular, sometimes laterally enlarged spots at the base of the abdominal terga black; posterior margin of the later reddish-brown; mesoscutum dense and strong wrinkled punctuate; wing clouded; 12-14 mm ................................................................. *I. decoratum* (Part)
5- Mesoscutum laterally coarsely densely punctate with non-uniform strongly raised, almost sharp-edged; T1 with scattered punctures laterally; T2-T3 with black bandages; body black and yellow ................................................................. *I. limbiferum* (Part)
5a- Mesoscutum flat, without raised edges of punctures; T1 densely punctate; most species strongly colored yellow; vertex 1.5 X ocellus wide (in red abdomen 2 ocellus wide), densely punctate, at most scattered punctured laterally; T1 densely punctate; clypeus usually with impunctate midline ................................................................. *I. ferrugineum* (Part)
6- Large species 12-18 mm ................................................................. 7
6a- Small species 8 to 10 mm in exceptional cases ................................................................. 8
7- Hind coxa posteriorly with acute, long tooth, at least as long as the base width; abdomen very narrow unindicated midline; mid tooth of last tergum broader than long, approximately the same width and rounded end; T1 densely punctate distance less than 0.5 mm puncture diameter; 14 mm ................................................................. *I. afrum* (Part)
7a- Hind coxa with posterior margin rounded to obtuse short toothed, tooth shorter than the base width; vertex 3 X ocellus wide; mid tubercle of last tergum tooth-like wide, punctate; mesopleuron relatively fine and equally punctate ................................................................. *I. decoratum* (Part)

8- T1 laterally impunctate with a several puncture widths area; last tergum semicircular; posterior margin of abdominal terga clearly transparent; T6 laterally obliquely truncated and blunt toothed; posterior margin of T1-T3 with densely white hairs; 8.5 - 10 mm ................................................................. *I. limbiferum* (Part)
8a- T1 densely punctate, laterally more than one punctures-diameter distance (if scattered, mesopleuron black); the last tergum transversely truncate ................................................................. 9
9- Abdomen red; posterior margin of abdominal terga not or indistinctly transparent; tooth of T6 triangular and curved; posterior margin of T1-T3 with sparsely white hairy; 9-10.5 mm ................................................................. *I. ferrugineum* (Part)
9a- Abdomen not uniformly red-colored or all yellow; vertex behind ocelli strongly punctate, posterior margin and laterals coarse; mesoscutum densely punctate ................................................................. *I. grohmanni* (Part)

**Ictranthidium afrum** (Lepeletier, 1841)

*[Plate. IV, Figures 31-4.]*


Material examined:1♂, Abu Rawash (Giza), 27.V.1925 [AUCE].

World distribution: Egypt, Morocco, and Algeria, (14).

Taxonomic notes: *Anthidium afrum* Lepeletier,1841 transferred to genus *Ictranthidium*.

*Ictranthidium decoratum* (Alfken, 1932)

Ictranthidium flavipes Morawitz, 1895. 
Anthidium flavipes var. aegypticolum Alfken, 1932. Ictranthidium flavipes var. aegypticolum (Fabricius, 1787) transferred to genus Ictera ferrugineum (Fabricius, 1787). Anthidium cinctum Klug, 1832 was treated as synonym for Ictera ferrugineum (Fabricius, 1787).

Ictranthidium var. aegypticolum Alfken, 1932 dropped as synonym for Ictera ferrugineum (Fabricius, 1787).

Ictranthidium ferrugineum Fabricius, 1787 transferred to genus Ictera ferrugineum.


Taxonomic notes: Anthidium latreilli Lepeletier,1841 was treated as a synonym for Ictera ferrugineum (Spinola, 1838). Anthidium grohmanni Spinola, 1838 transferred to genus Ictera ferrugineum.


World distribution: Egypt, Turkey, (14).

Taxonomic notes: Anthidium limbiferum Morawitz, 1875 transferred to genus Ictera ferrugineum.

Genus Pachyanthidium Friese, 1905

Diagnostic characters: Members of this genus are robust, compact, and small-sized from 5 to 12 mm long. The abdomen tapers so that T5 is 0.5 X as wide as T1 and T2. The mandibles of the female are short and variable in dentition, from four-toothed to five-to ten-toothed (the teeth short and blunt, and the notches between them sometimes acute), to minutely denticulate with multiple, minute teeth. The color pattern is also variable, from black and yellow. The arolia are absent. Pachyanthidium is among the most carinate of the Anthidini; T7 of the male is trifid. The apices of the front and middle tibiae have two spines, often reduced to one in the subgenus Trichanthidium (1).

Pachyanthidium in Egypt is represented by only subgenus Trichanthidium which is characterized by small body size, 5 to 8 mm long, entirely black or has very restricted yellow areas, occurring only as sublateral spots on abdominal terga. The transverse carina of T1 is doubled laterally. The sides of T3 to T5 and sometimes...
T2 have long spines. The apices of the front and middle tibiae sometimes have two spines but usually only one is recognizable. The wings are strongly darkened.

Distribution: *Trichanthidium* consists of this subgenus ranges in Africa from southern Egypt, south to Angola and Natal Province in South Africa, and in Asia from India to Yunnan Province, China. There are at least three species but in Egypt, represented by only one species *Pachyanthidium benguelense* (Vachal, 1903).

**Pachyanthidium benguelense** (Vachal, 1903)

*Anthidium benguelense* Vachal, 1903.

*Anthidium denticulatum* Alfken, 1932.

Material Examined: 1♀, W. Edrib (G. Elba), 30.1.1826, [PPRI].


Taxonomic notes: *Anthidium denticulatum* Alfken 1932 was treated as a synonym for *Pachyanthidium benguelense* (Vachal, 1903). *Anthidium enslini* Alfken,1928 transferred to the genus *Pseudoanthidium*.

**Genus Pseudoanthidium Friese,1898**


Type species: *Anthidium alpinum* Morawitz, 1873.

Diagnostic characters: Members of the genus *Pseudoanthidium* characterized by tibiae are tuberculate on the outer surfaces or somewhat coarsely punctuate in a few species. The integument is black with yellow markings, the abdominal bands are broken or reduced to lateral spots. Sub antennal suture is arcuate outward (although not always visible); the pronotal lobe is lamellate; T6 of the male lacks lateral teeth, and T7 is usually bilobed, the margin then being convex and sometimes undulate. The tergal margins, are rather broadly impunctate, slightly to strongly flared as seen in lateral view, and often translucent. S3 to S5 of the male are concave, the posterior margin of S3 with an area of wavy bristles. The margin of at least S5 is concave and has an apical lateral process (the process is frequently armed at the tip with a small comb), (1).

Distribution: *Pseudoanthidium* ranges from Europe (north to Germany), and the Mediterranean basin, including northern Africa, east to Central Asia, India, and Southeast Asia. In Egypt, it is represented by four species.

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**Key to species of genus Pseudoanthidium Friese,1898 (After Warncke, 1980)**

1. Scopa present; abdomen with 6 terga; antenna with 12 segments [♀] ............................................ 2
2. Anterior margin of mesopleuron with a sharp stepped edge; front margin of mesopleuron completely runs from top to bottom; posterior margin of gena rounded .......................................................... P. ochrognathum (Part)
3. Anterior margin of mesopleuron rounded up more than slightly angular ........................................... 3
4. Last tergum broad, medially deepened concave so that the vertical basal half middle almost in the horizontal end half bends, scattered in the cavity punctures up to 1-point sized interspaces; depressions concave, posterior margin bent ...... 4
5. Anterior margin of mesopleuron with sharp strip; The strip on mesopleuron runs from top to bottom; S3 with long wavy bent setae; posterior margin of S5 laterally with inwardly curved stem-like extensions, posteriorly with a black bristle fringe; posterior margin of gena rounded .......................................................... P. ochrognathum (Part)
6. S5 laterally with inwardly bent, comb-like densely setae appendix; S3 with prominent long, wavy setae, far exceeding the sternum protrude backward and sometimes like a comb of obscure appendix; Metatarsus normal with sparse setae, so that surface of metatarsus clearly visible; mesoscutum densely rugo-punctate; the teeth of last tergum flat triangular and extensions of the posterior margin; body finely punctate and stained predominantly yellow .......................................................... P. enslini (Part)
7. T6 laterally slightly thickened; the cut of the last tergum on the end of the three times widened .......................................................... P. wahrmannicum (Part)
8. S5 without attachments; S3 with normal setae (When wavy-haired, the last tergum with base low cut) ................ 7
9. T6 laterally slightly thickened; the cut of the last tergum parallel to each other along the entire length or equally V-shaped; vertex and scutellum yellow-banded, posterior margin of scutellum serrated laterally; the last tergum cut u-shaped; basal segment of antenna yellow .......................................................... P. enslini (Part)

**Pseudoanthidium cribratum** (Morawitz, 1875)

*Anthidium lituratum* var nigrirarse-homonym Alfken, 1935.

*Anthidium lituratum* (Panzer, 1801).

World distribution: Egypt, Palestine, Turkey, Iran, Turkmenistan, Uzbekistan, and Kazakhstan,(16).

Taxonomic notes: *Anthidium lituratum* var nigrirarse Alfken, 1935 treated as a synonym for species *Pseudoanthidium cribratum* (Morawitz, 1875). *Anthidium cribratum*, Morawitz, 1875 transferred to the genus *Pseudoanthidium*.
Species according to recent studies, in


4. Discussion
The Anthidiini includes approximately 870 species of solitary bees characterized by dark cuticles and colored (red, yellow, or white) integumental patches or stripes (16). Salem and El-Azab (11) recorded eighteen species belonging to the tribe Anthidiini. The members of the tribe are cosmopolitan in distribution (4). The tribe grouped according to the materials of their nests into wool carder bees, cuckoo bees, and resin bees (3).

Taxonomic studies of this group in Egypt are very scarce (e.g., Alfken (9,10), Krombein (17)). The present contribution adopts the classification system of Litman et al. (3), Fateryga et al. (12), and Zakikhani et al. (13) to the Egyptian members of Anthidiini, within five genera. Other studies treated all five genera as a single one (i.e., Anthidium) (11). As shown in the results, the classification of the tribe updated and received changes according to the recent publication and examination of the Egyptian entomological collections and fauna.

5. Conclusion
Updating of the nomenclature, classification, and taxonomic status of insect groups are necessary as many taxonomic studies where periodically carried out on different insect groups, so, updating keep track of changes in name. These updates also allow adding or transferring species according to recent studies, in addition to confirming synonyms and collecting geographical distribution data. It also provides a list of local species for each insect group. It became clear from the current work the importance of these updates, as the necessary changes have been made to the Anthidiini tribe with the work of taxonomic keys that help indefinity of different categories belong to such tribe.

6. Recommendation
Continued monitoring of the Egyptian species of carder bee to determine the distribution all over Egypt. Behavioral observations may be used also as a taxonomic character to distinguish some species of this family. The morphological characteristics can also be supported by chemical analysis as cuticular hydrocarbons to give accurate identification.

References