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The sphecid wasps of Egypt (Hymenoptera: Sphecidae): Introduction and generic key

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ABSTRACT

A review and simplified key are given to the 60 genera of the family: Sphecidae present in the Egyptian fauna, with a short introduction and a brief diagnosis of the family.

KEYWORDS: Hymenoptera, Sphecidae, genera, taxonomy, Egypt

INTRODUCTION

This paper is the first of a series in which it is proposed to review the wasps of the hymenopterous family, Sphecidae which are known to occur in Egypt.

They were last reviewed in a series of papers by Alfieri, de Beaumont, Honore, Mochi and Priesner in the 1930's to 1950's, published in the Bulletin of the Entomological Society of Egypt. These were added to by later papers by de Beaumont and Pulawski.

In 1942 Honore produced his "Introduction a l'etude des Sphegides en Egypte". This gave a key to the genera that occurred in Egypt or which might be expected to be found there, together with a list of species. In the 50 years since then much revisionary work has been done and a considerable amount of additional material has been collected. Together this has made this new study necessary to provide a basis for the next half century's continued study of this fauna.

This paper is confined to a review of the genera now known to form the Egyptian fauna with a key to them. In later papers it is hoped to give an annotated synonymical checklist of the known species, with references applicable to Egypt and then in convenient-sized smaller papers, the species themselves will be dealt with in their various genera.

Diagnosis of the Sphecidae

The sphecid wasps and their closest relatives the Apoidea, the bees, may readily be distinguished from the other hymenopterous groups by the possession of a pronotum

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which in dorsal view does not reach back to the tegulae and which laterally has a rounded lobe; this lobe is also separated from the tegula. The sphecids may be most easily separated from the bees by the possession of a cleaning pecten or brush on the inner side of the hind basitarsus which is opposed to a normally pectinate inner tibial spur. The other major distinctive character is the presence of branched or plumose hairs in the bees while the setae of the sphecids are always simple or unbranched. This character requires high magnification to see and is thus less useful than the specialised hindleg characters in the sphecids.

Sphecid genera

One of the most important features in recent sphecid research is the great attention which has been paid to the generic classification of the family.

During the last century and the first half of this a large number of genus level names were proposed. Following the conservative lead of Kohl and Handlirsch, in most cases broad genera were the norm with many subgenera. This was the prevailing pattern used by Honore and his colleagues in the "golden age" of Egyptian sphecidology. Modern research culminating in Bohart & Menke's monumental generic revision of 1976 has reassessed these old all-embracing genera, upgrading many of the subgenera giving them full generic status and putting the classification of the family on to a sound basis.

Some recent authors treat the family as a superfamily, with the Bohart & Menke subfamilies being given family status and their tribes being treated as subfamilies. The logic suggested for this is to give similar rankings to those used commonly in the Apoidea. Other authors have gone to the opposite extreme, treating the Sphecidae as a family within the Apoidea and combining all the usual bee families to subfamilies of the Apidae; this, it is argued, keeps the higher classification in line with the numerous families recognised in the Chalcidoidea and other parasitic superfamilies of the Hymenoptera.

This paper and its successors use the classification set up by Bohart & Menke. This includes keeping the sphecids as one family.

In order to enable the older literature to be understood within the new generic classification the following changes have been made so far as the Egyptian fauna is concerned. Of the old genera:

- *Chalybion*, formerly thought to be a subgenus of *Sceliphron*, has been given full generic status;
- *Sphex* - as understood by Honore *et al* this included, in addition to *Sphex (s.s.)* itself, *Palmodes, Prionyx,* (this last subdivided into the subgenera *Harpactopus, Prononyx, Parasphex, Prionyx, Calosphex* or, perhaps better, into species groups) and *Chlorion* (now included in a different tribe, the Sceliphrini);
- *Ammophila* - this is now divided into *Parapsammophila, Podalonia, Eremochares* and *Ammophila (s.s.)* itself. These four were subgenera under the old regime and there was absolute confusion as to the distinction between *Parapsammophila* and *Eremochares*;
- *Dryudella,* formerly treated as a subgenus of *Astata*, is now recognised as a separate genus;
- *Crabro* - the changes here have resulted in the recognition of the genera *Entomognathus, Lindenius, Dasyproctus, Ectemnius, Lestica* and *Crossocerus*;
- *Stizus* - this has been separated into *Stizus, Stizoides* and *Bembecinus*;

- *Gorytes* - this has been divided into *Harpactus, Ammatomus, Kohlia, Gorytes, Psammaecius* and *Hoplosoides;*
- *Tachysphex* where *Parapiagetia* and *Holotachsphex* have been removed from *Tachyphex* itself.
- *Philanthus* - in addition to *Philanthus* itself, *Philanthinus* and *Pseudoscolia* are now given generic status.

The opposite has happened also where former separate genera have been combined:

- *Notogonidea* (or *Notogonia*) has been combined with *Liris* under that name;
- *Homogambrus* is now known to be synonymous with *Prosopigastra*; there was a ridiculous situation with holoptic males being described in *Homogambrus* and their females in *Prosopigastra* by the same author in the same paper!
- *Nectanebus* has been combined with *Cerceris*.

Various corrections have been made in the same period to the nomenclature used:

- *Pelopoeus*, frequently misspelt as *Pelopaeus*, has been sunk into the synonymy of *Sceliphron*;
- *Dienoplus*, used as a subgenus of *Gorytes*, is now known to be a junior synonym of *Harpactus*;
- *Philoponus* and *Philoponidea* are both synonyms of *Pseudoscolia*.

While this greatly improved and stabilised classification is very much welcomed, it has had the unfortunate effect of causing changes in specific names, both by way of synonymy, and because the new genera are sometimes of a gender different from the one in earlier use. These changes are not mentioned in this paper which goes down only to the generic level. They will be given in the subsequent.

Key to the genera occurring in Egypt

The following artificial key will suffice to identify Egyptian sphecids to genus level. The terminology used follows that used by Bohart & Menke, 1976. Figures 1 & 2 illustrate a generalised sphecid thorax in dorsal and lateral views. Figures 3 & 4 show the wing vein and cell names respectively. Most of the illustrations have been drawn by the junior author, but others have been taken from other works; in these cases the original sources have been acknowledged. The following abbreviations have been used:

T	=	abdominal tergite
S	=	abdominal sternite
RV	=	recurrent vein
SMC	=	submarginal cell
DOA	=	diameter of anterior ocellus

Section A - Forewings with 1 submarginal cell

Note: *Trypoxylon* has a second submarginal cell with colourless veins, visible only at certain angles.

1 Eyes internally deeply emarginate (fig. 5) *Trypoxylon*

\- Eyes internally entire 2

2 Submarginal and discoidal cells confluent (fig. 6) 3

-	Submarginal and discoidal cells not confluent, distinctly separated as usual by Rs + M (fig. 7)	5
3	At least T1-3 with lateral carinae (fig. 8)	*Belomicrus*
-	Only T1 & 2 with lateral carinae	4
4	Propodeal mucro absent	*Belomicroides*
-	Propodeal mucro present (fig. 9)	*Oxybelus*
5	Scape as long as basal three flagellomeres together (fig. 10); eyes converging towards clypeus or parallel	6
-	Scape shorter than basal three flagellomeres (fig. 11); eyes usually converging towards vertex	12
6	Mandibles notched externoventrally; eyes hairy	*Entomognathus*
-	Mandibles not notched externoventrally; eyes not hairy	7
7	Ocelli in equilateral triangle (fig. 12)	8
-	Ocelli in low triangle (fig. 13)	9
8	Head strongly constricted behind	*Lestica* (♂)
-	Head not strongly constricted behind	*Crossocerus*
9	Abdomen with peduncle, its apex nodose (fig. 14); body matt	*Dasyproctus*
-	Abdomen sessile; body shining	10
10	Mandibles apically simple	*Lindenius*
-	Mandibles apically bi- or tridentate	11
11	Orbital foveae absent or shallow; upper frons without coarse punctation	*Ectemnius*
-	Orbital foveae distinct; upper frons coarsely punctate	*Lestica* (♀)
12	Externoventral margin of mandibles entire; hindwings without closed cell	*Nitela*
-	Externoventral margin of mandibles notched; hindwings with closed cell [abdomen with metallic reflections & forewings with transverse dark band]	*Miscophus* (part)

Section B - Forewings with 2 submarginal cells

1	Abdomen with long, apparently two-segmented petiole, comprising S1 followed by T1 (fig. 15) [black & red species]	*Ammophila* (part)
-	Abdomen usually without marked petiole; if there is a short petiole, it comprises S1 only and the species have no red markings	2
2	Submarginal cell 2 petiolate (fig. 16)	3
-	Submarginal cell 2 not petiolate	4
3	Pterostigma very large, much larger than the marginal cell which is much reduced and its apex far removed from the wing margin (fig. 17)	*Protostigmus*
-	Pterostigma not unusually large, smaller than the marginal cell, the apex of which is on the wing margin as usual	*Miscophus* (part)

4	Hind ocelli deformed, represented by long narrow scars (fig. 18)	*Gastrosericus*
-	Hind ocelli normal, lenticular	5
5	Forewing with only one discoidal cell (fig. 19)	*Spilomena*
-	Forewing with two discoidal cells (fig. 20)	6
6	Marginal cell short and truncate (fig. 21)	*Dinetus*
-	Marginal cell long and pointed (fig. 20)	*Diodontus*

Section C - Forewings with 3 submarginal cells

1	Abdomen with a petiole comprising S1 alone (followed by T1 in *Ammophila)* (fig. 15)	2
-	Abdomen without a petiole comprising S1 alone	12
2	Smaller species: length less than 10mm	*Mimesa*
-	Larger species: length greater than 11mm	3
3	Propodeum with U-shaped enclosure dorsally (fig. 22)	4
-	Propodeum without a dorsal U-shaped enclosure	5
4	Both recurrent veins received in SMC2 (fig. 23); with yellow markings	*Sceliphron*
-	RV2 received in SMC3 or interstitial between SMC2 & 3 (fig. 24); without yellow markings	*Chlorion*
5	Metallic blue species	*Chalybion*
-	Species coloured otherwise	6
6	RV2 received in SMC3 or interstitial between SMC2 & 3, but in the latter case there are at least 3 claw teeth	7
	RV2 received in SMC2 or interstitial between SMC2 & 3, if the latter, there are a maximum of 2 claw teeth	9
7	Length of basal vein of SMC2 equal to or shorter than anterior vein (fig. 25); inner hind tibial spur finely and closely pectinate (fig. 26); propodeum with complete spiracular groove (fig. 27)	*Sphex*
-	Length of basal vein of SMC2 greater than anterior vein (fig. 28); pecten of inner hind tibial spur coarse and well spaced, at least near middle (fig. 29); spiracular groove absent	8
8	♀clypeal margin entire or with a small mesal notch (fig. 30); ♂ tarsal claws with 2-4 teeth, if with 2 teeth, then antennae with placoids (fig. 31)	*Prionyx*
-	♀clypeal margin mesally bilobate with lateral notches (fig. 32); ♂ tarsal claws with two teeth and antennae without placoids	*Palmodes*
9	Apex of S1 not reaching the base of S2; seen in profile, spiracle of T1 located at or beyond the apex of S1 (fig. 15); (tarsal claws without teeth; mouthparts long)	*Ammophila* (part)
-	Apex of S1 meeting or overlapping base of S2; viewed in profile, the spiracle of T1 located before the apex of S1 (fig. 33)	10

10	Petiole socket nearly completely surrounded by propodeal tergite (fig. 34); mesosternum with forward projecting process; claws with 2 basal teeth; ♀ inner orbits strongly convergent below (fig. 35)	*Eremochares*
-	Petiole socket open (fig. 36); mesosternal process absent; claws with 0, 1 or 2 teeth; ♀ inner orbits more or less parallel	11
11	Mouth parts long; tarsal claws without a tooth or with one; inner hind tibial spur coarsely pectinate (fig. 37)	*Podalonia*
-	Mouth parts short; tarsal claws with one or two basal teeth; pecten of inner hind tibial spur fine (fig. 38)	*Parapsammophila*
12	Inner orbits deeply emarginate (fig. 5) or notched (fig. 39)	13
-	Inner orbits simple	14
13	Inner orbits deeply emarginate (fig. 5); black species	*Pison*
-	Inner orbits with small but sharp notch (fig. 39); species with yellow markings	*Philanthus*
14	Prestigmal length of SMC1 much more than half total cell length (fig. 40)	15
-	Prestigmal length of SMC1 much less than half total cell length	18
15	Ocelli deformed, vestigial; labrum very long, forming a beak, protruding below the closed mandibles (fig. 41)	*Bembix*
-	Ocelli normal, lenticular; labrum not extended into a beak, protruding beyond the closed mandibles	16
16	Propodeum compressed into a usually notched ridge posterolaterally; median cell of hindwing with only one distal veinlet appendix (fig. 42); ♂ antenna with spine-like process from apex of ninth segment (fig. 43)	*Bembecinus*
-	Propodeum not posterolaterally compressed; median cell of hindwing with two distal appendices (fig. 44); ninth antennal segment of ♂ without spine-like process	17
17	Eyes converging strongly below; mandibles simple	*Stizoides*
-	Eyes almost parallel; mandibles toothed apically	*Stizus*
18	Hind ocelli deformed, represented by scars of various shapes	19
-	Hind ocelli normal, lenticular	26
19	Clypeus divided into three parts (fig. 45); ♂ sternites modified	*Palarus*
-	Clypeus not divided into three parts; ♂ sternites without modifications	20
20	Frons with M-shaped swelling below mid-ocellus and along inner orbits	21
-	Frons without M-shaped swelling	22
21	Sides of propodeum densely punctate, shining	*Larra*
-	Sides of propodeum impunctate, often striate, usually dull	*Liris*
22	Petiole socket isolated from mid-coxal cavities by a pair of dark propodeal sternites (fig. 46)	*Parapiagetia*
-	Petiole sockets completely membranous	23

23	Ocellar scars very long, distance between mid-ocellus and end of scar less than length of scar (fig. 47); both sexes with pygidial plate, densely covered with setae, usually gold or silver	*Tachytes*
-	Ocellar scars shorter, distance between mid-ocellus and end of scar greater than length of scar; ♀ pygidial plate without dense setae; ♂ without pygidial plate	24
24	T2 without lateral carina (frons with small shining tubercle above each antennal socket)	*Tachysphex*
-	T2 with lateral carina (fig. 48)	25
25	Frons without a swelling; eyes dichoptic; ♀ without foretarsal rake; ♂ forefemur notched beneath (fig. 49)	*Holotachysphex*
-	Frons usually with glabrous swelling; eyes of ♂ often holoptic; ♀ with foretarsal rake; ♂ forefemur simple	*Prosopigastra*
26	RV2 received by SMC3 (fig. 50)	27
-	RV2 received by SMC2 (fig. 51)	30
27	Apex of hind femur truncate, flattened (fig. 52)	28
-	Apex of hind femur simple	29
28	Hindwing media diverging before cu-a (fig. 53)	*Pseudoscolia*
-	Hindwing media diverging after cu-a (fig. 54)	*Cerceris*
29	Frons with supra-antennal platform; without silver pubescence; shining black with red apex to abdomen	*Dolichurus*
-	Frons without platform; with silver pubescence; yellow, black and red species	*Philanthinus*
30	SMC2 petiolate (fig. 51)	31
	SMC2 not petiolate	32
31	Radial cell rounded (fig. 51); smaller species	*Solierella*
-	Radial cell pointed (fig. 55); larger species	*Nysson*
32	Mid-tibia with one apical spur	33
-	Mid-tibia with two apical spurs	34
33	Very small species, 2-3mm; SMC3 narrow (fig. 56)	*Eremiasphecium*
-	Much larger species, at least 8mm; SMC3 not narrow (fig. 57)	*Laphyragogus*
34	Very small species, 3mm; radial cell short, shorter than stigma (fig. 58)	*Diploplectron*
-	Larger species, over 5mm; radial cell not short	35
35	Hindwing jugal lobe large, almost as big as the anal area (fig. 59); mandibles notched beneath	36
-	Hindwing jugal lobe less than half the length of the anal area; mandible simple beneath	37
36	SMC2 shorter than SMC1 on the media; ♂ malar space longer than DOA; ♀ pygidial plate not bordered by spines	*Dryudella*

-	SMC2 longer than SMC1 on the media (fig. 60); ♂ malar space shorter than DOA; ♀ pygidial plate bordered with short recurved spines	*Astata*
37	♀ with 2 rake setae on fore-basitarsus before apex; ♂ without special modifications on last 4 flagellomeres; spiracular groove present	*Gorytes*
-	Without the above combination of characters	38
38	Hindwing media diverging well after cu-a (as in fig. 54)	*Harpactus*
-	Hindwing media diverging before cu-a (as in fig. 53)	39
39	Forewings with dark patches (picture wings)	40
-	Forewings without dark patches	41
40	T1 relatively narrow apically and T2 narrowed basally; abdomen basically black with yellow narrow apical band on T1 and a large spot on T2	*Hoplisoides*
-	T1 and 2 not particularly narrowed; first three tergites and part of T4 ferruginous, whitish apical bands on T2-4 or 5	*Psammaecius*
41	Antennae markedly club-like apically	*Ammatomus*
-	Antennae not swollen apically	42
42	Medium-sized species; ♂ antennae simple	*Kohlia*
-	Large species resembling *Sphecius*; last ♂ antennal segment deformed	*Sphecius*

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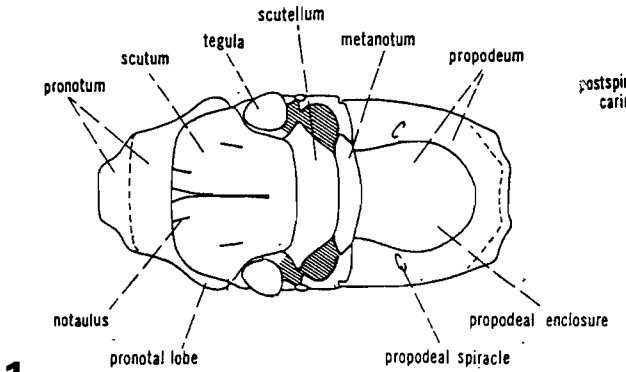
Figures:

1 Morphology of the generalised sphecid thorax - dorsal view (Bohart & Menke, 1976)
2 Morphology of the generalised sphecid thorax - lateral view (Bohart & Menke, 1976)
3 Sphecid wing morphology - veins (Bohart & Menke, 1976)
4 Sphecid wing morphology - cells (Bohart & Menke, 1976)
5 Frontal view of head of *Trypoxylon attenuatum*
6 Forewing of *Oxybelus lamellatus*
7 Forewing of *Ectemnius continuus*
8 Lateral view of abdomen of *Belomicrus* sp. (Guichard, 1986)

9 Propodeal mucro of *Oxybelus lamellatus*
10 Antenna of *Dasyproctus arabs*
11 Antenna of *Miscophus ctenopus*
12 Dorsal view of head of *Lestica clypeata* (♀) (Bohart & Menke, 1976)
13 Dorsal view of head of *Dasyproctus arabs*
14 Lateral view of abdomen of *Rhopalum* sp. (Bohart & Menke, 1976)
15 Gastral segments 1 and 2 of *Ammophila* sp. (Bohart & Menke, 1976)
16 Forewing of *Miscophus ctenopus*
17 Forewing of *Protostigmus sinaiticus* (Bohart & Menke, 1976)
18 Ocelli of *Gastrosericus waltlii* (♀) (Bohart & Menke, 1976)
19 Forewing of *Spilomena* sp. (Bohart & Menke, 1976)
20 Forewing of *Diodontus oraniensis*
21 Forewing of *Dinetus pictus* (Bohart & Menke, 1976)
22 Dorsal view of propodeum of *Chlorion hirtum*
23 Forewing of *Sceliphron spirifex*
24 Forewing of *Chlorion hirtum*
25 Forewing of *Sphex fumicatus*
26 Hind tibial spur of *Sphex fumicatus*
27 Lateral view of propodeum of *Sphex* sp. (Guichard, 1986)
28 Forewing of *Prionyx viduatus*
29 Hind tibial spur of *Prionyx viduatus*
30 Clypeus of *Prionyx viduatus*
31 Antenna of *Prionyx crudelis* (♂)
32 Clypeus of *Palmodes occitanicus*
33 Gastral segments I and II of *Podalonia* sp. (Bohart & Menke, 1976)
34 Posterior view of petiole socket of *Eremochares* sp. (Bohart & Menke, 1976)
35 Frontal view of head of *Eremochares dives* (♀)
36 Posterior view of petiole socket of *Parapsammophila* sp. (Bohart & Menke, 1976)
37 Hind tibial spur of *Podalonia tydei*
38 Hind tibial spur of *Parapsammophila turanica*
39 Frontal view of head of *Philanthus variegatus*
40 Forewing of *Bembix capensis*
41 Labrum of *Bembix capensis*
42 Hindwing of *Bembecinus tenellus*
43 Apical segments of antenna of *Bembecinus tenellus* (♂)
44 Hindwing of *Stizus bizonatus*
45 Clypeus of *Palarus spinoli*
46 Petiole socket of *Parapiagetia mongolica*
47 Ocelli of *Tachytes* sp.
48 Lateral view of gaster of *Prosopigastra handlirschi*
49 Forefemur of *Holotachysphex hologmathus* (♂)
50 Forewing of *Cerceris fischeri*
51 Forewing of *Solierella* sp.
52 Hindfemur of *Cerceris fischeri*
53 Hindwing of *Pseudoscolia soikai*
54 Hindwing of *Cerceris fischeri*
55 Forewing of *Nysson* sp.
56 Forewing of *Eremiasphecium schmiedeknechti*
57 Forewing of *Laphyragogus pictus* (Mochi & Mochi, 1937)
58 Forewing of *Diploplectron palearcticum* (Pulawski, 1958)
59 Hindwing of *Astata boops*
60 Forewing of *Astata boops*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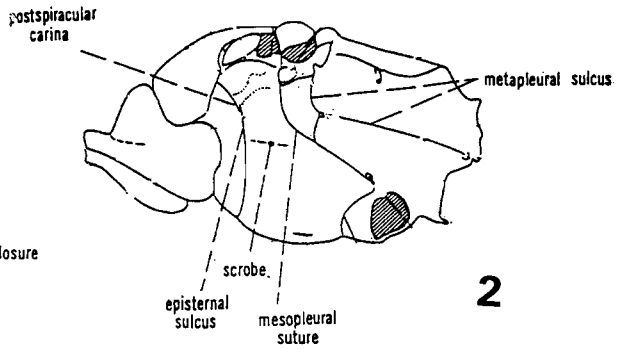
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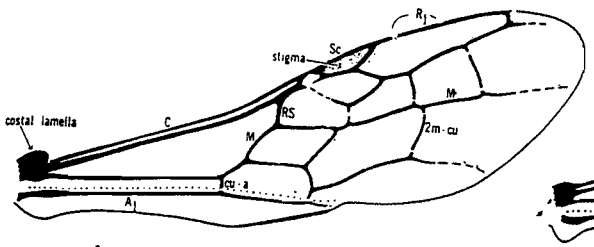
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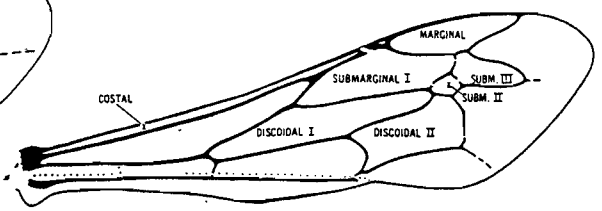
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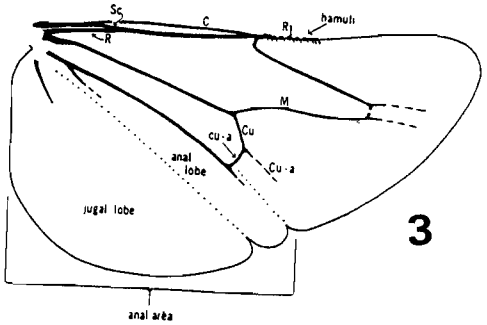
SUBM. III
SUBM. II
COSTAL
DISCOIDAL I
DISCOIDAL II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Cu
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jugal lobe
anal area

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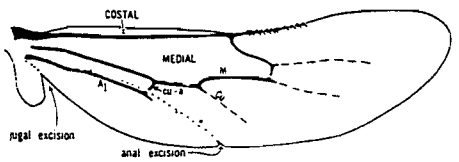
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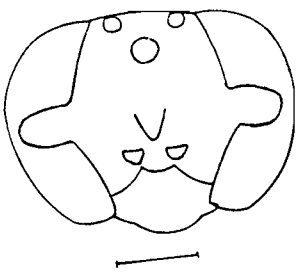

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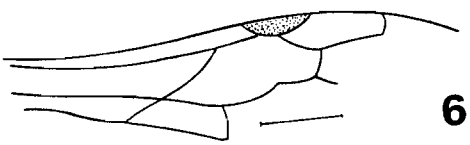

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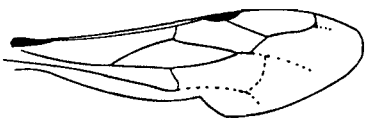

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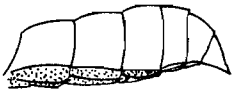

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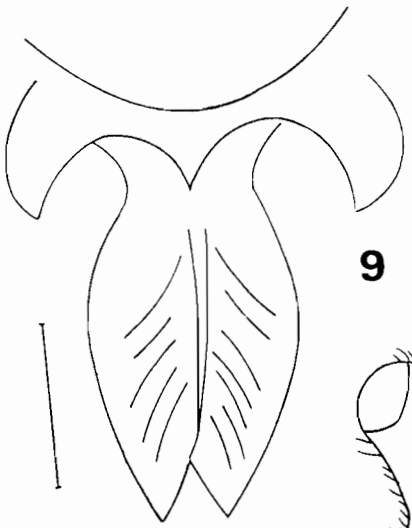
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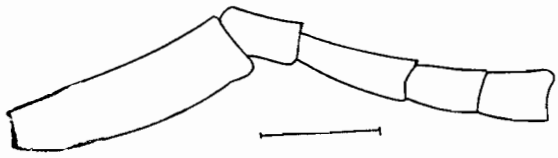
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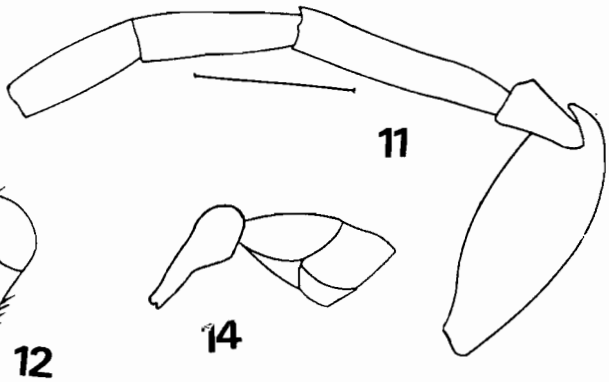
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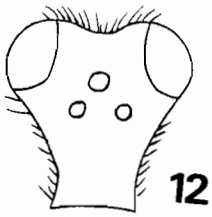
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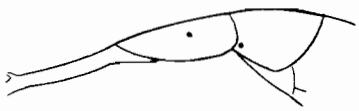
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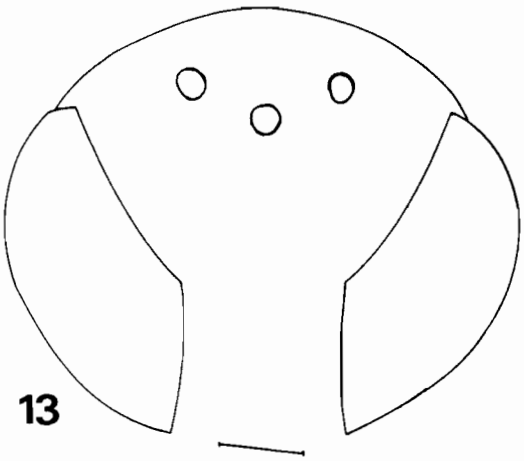
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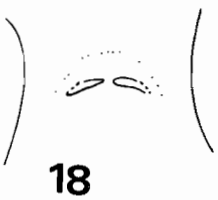
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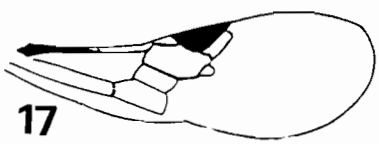
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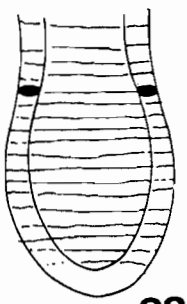
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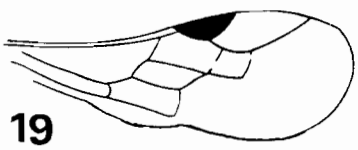
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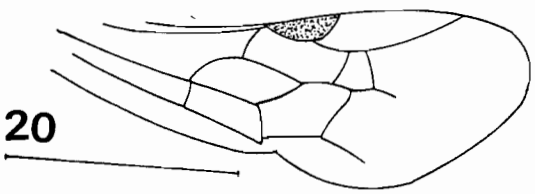
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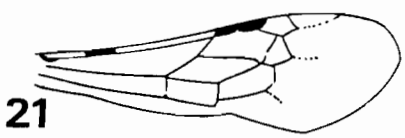
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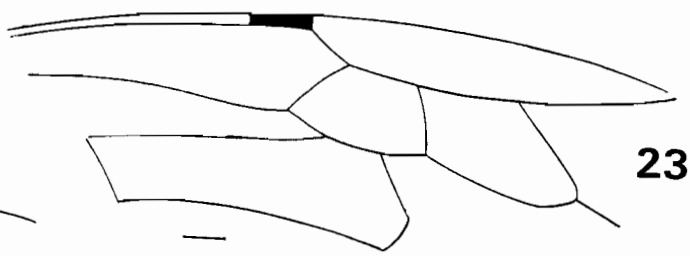
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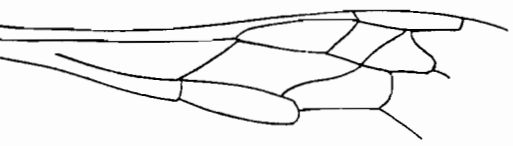
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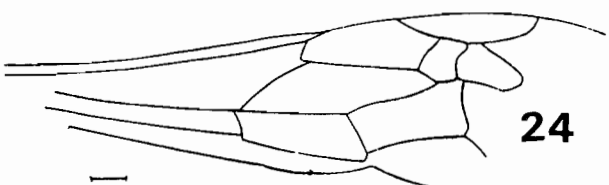
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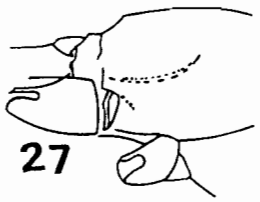
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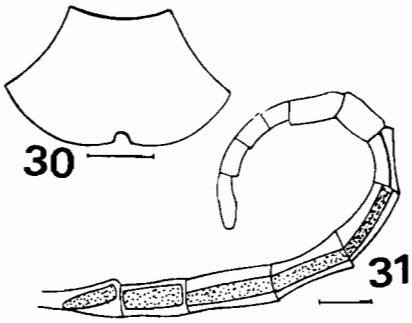
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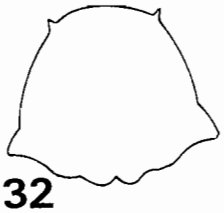
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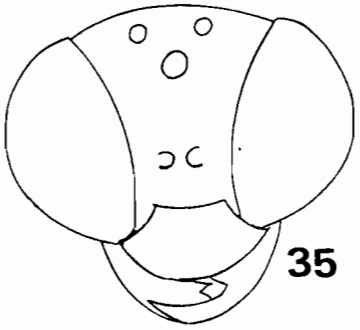
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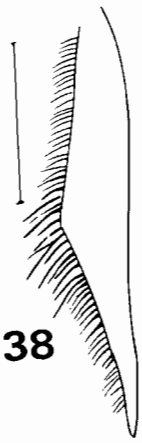
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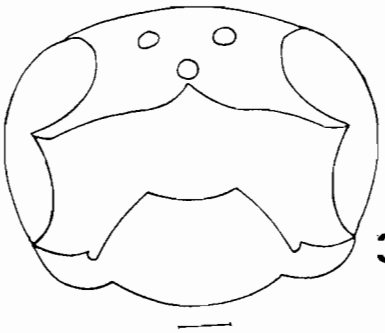
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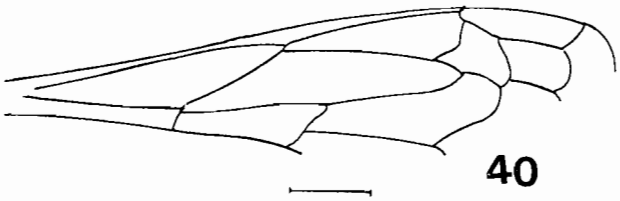
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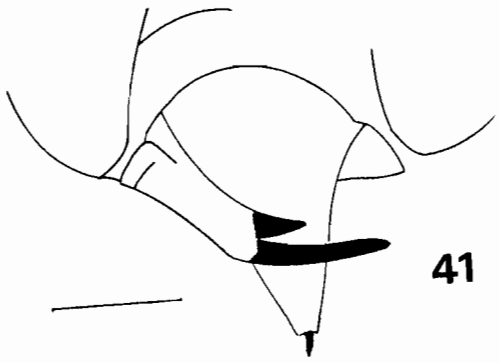
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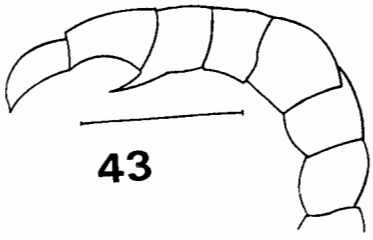
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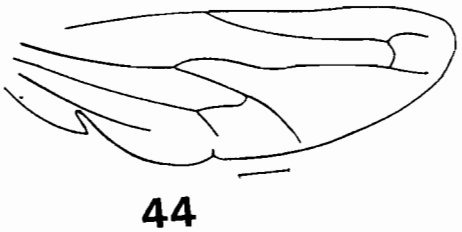
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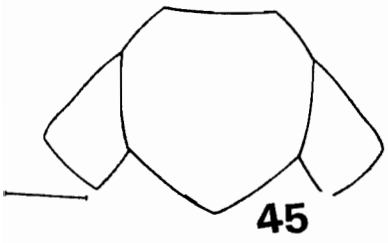

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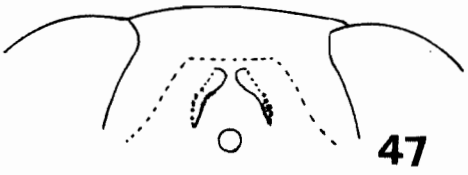

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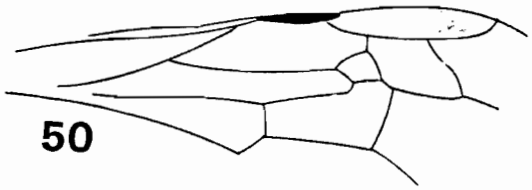

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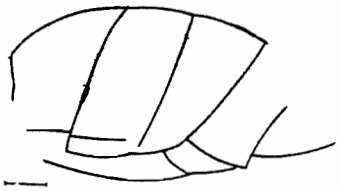

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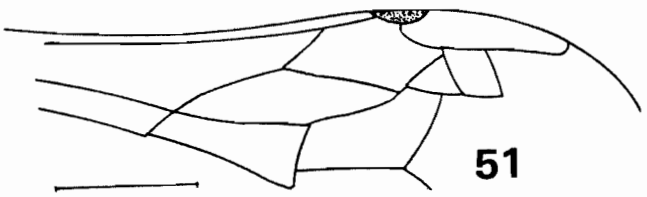

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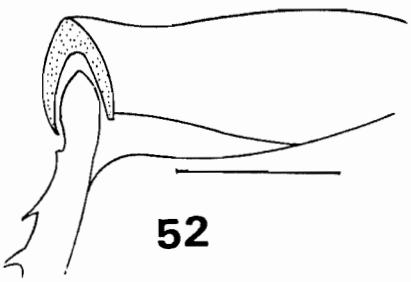

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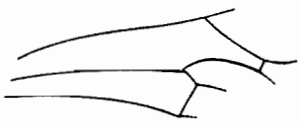

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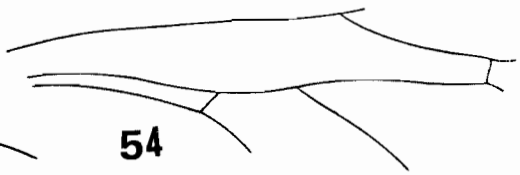

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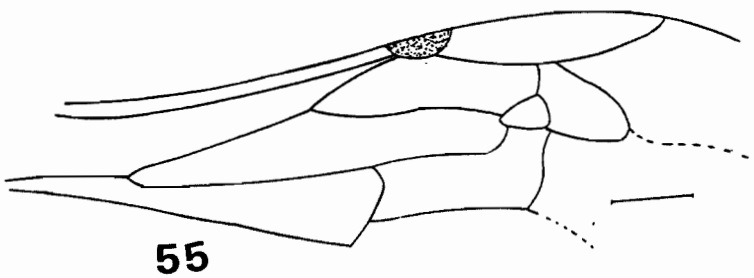

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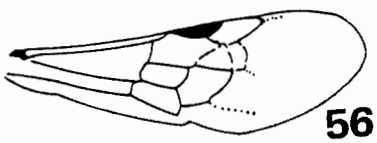

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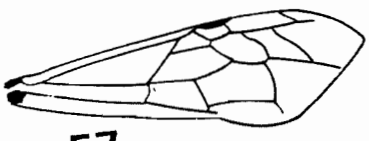

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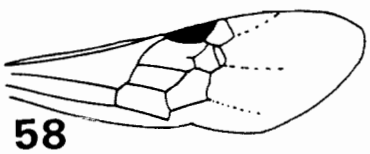

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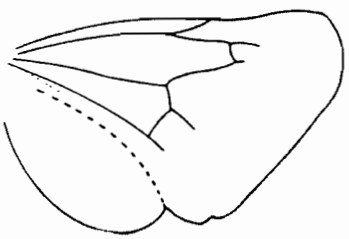

59

60

الملخص العربى

فصيلة سفيسيدى فى مصر (رتبةغشائية الأجنحة): مقدمة ومفتاح للأجناس

جيليس روش[١] و نيفين سامى جادالله[٢]

١- ٢١٢٤ ويلبروك ديريف - ليويزفيلى - تكساس - الولايات المتحدة الأمريكية
٢- قسم علم الحشرات - كلية العلوم - جامعة القاهرة - الجيزة

تم خلال الدراسة عمل مراجعة تصنيفية شاملة ومفتاح مبسط للستين جنس من فصيلة سفيسيدى فى مصر مع مقدمة بسيطة ووصف تصنيفى مبسط للفصيلة.