First occurrence of Phoird Flies (Diptera: Phoridae) as necrophagous on mulberry silkworm, *Bombyx mori* L. with new record specie in Egypt

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Abstract: Phorid flies (Diptera : Phoridae) are widespread globally. They comprise the third largest group in the world of Dipteran parasitoids after Tachinidae and Bombyliidae. In Egypt Phorid flies were classified into two subfamilies, Phorinae (with two genera contains two species) and Metopininae (with one genus contains 4 species). Present study was carried out at Ismailia, Egypt from May to November 2024. During mulberry silkworm, *Bombyx mori L.* rearing, dead larvae were contained dipterous larvae turned to adult flies which identified as Phoridae. This is the first detection of Phorid flies as necrophagous on mulberry silkworm. Obtained results indicated that three Phorid fly's species were taxonomically identified, *Megaselia scalaris*m *Megaselia koffleri* Schmitz, 1935 name updated by *Megaselia curtineura* Brues,1909 and *Megaselia ventralis* Borgmeier, 1963. Identification key to the three species of Genus *Megaselia* were illustrated. The present study first recorded new two subgenera of genus *Megaselia* in Egypt, Sub genus *Megaselia* Rondani and Sub genus (*Megaselia*) *Aphiochaeta* Brues with new specie, *Megaselia ventralis* Borgmeier, 1963.

Keywords: Scuttle flies – Sericulture - Phorinae – Metopininae

INTRODUCTION

Phorid flies, commonly referred to as scuttle flies (Diptera: Phoridae), constitute one of the most taxonomically and ecologically diverse insect families. They fulfill numerous ecological functions, including roles as scavengers, fungal associates, herbivores, predators, and parasitoids. In some cases, they have been implicated in causing myiasis in humans (Disney, 2012). Their larval habitats are highly heterogeneous, encompassing decaying plant and animal matter, fungal fruiting bodies, bird nests, feces, decomposing insects, and even sewage treatment systems. Certain species exhibit parasitoid behavior, particularly as internal parasites of other arthropods (Gerhardt & Hribar, 2019). Among them, *Megaselia scalaris* is notable for its wide distribution and ecological versatility, with significant implications in both medical and economic contexts. It also plays a prominent role in forensic entomology and has been associated with various forms of human myiasis (Disney, 2008). Globally, approximately 4,000 species of phorid flies have been described across 230 genera. In Egypt, six species are currently recorded, distributed among three genera. The most widespread and studied species is the cosmopolitan *M. scalaris* (Steyskal and El-Bialy 1967). Recent surveys conducted in Egyptian Governorates, Beheira and Giza, have identified phorid flies belonging to two subfamilies Phorinae (Bezzi, 1796) and Metopininae (Brues, 1932). The subfamily Phorinae includes two genera *Spiniphora* and Conicera with two species, *S. bergenstammii* and *C. tibialis*. Metopininae is represented by the genus *Megaselia*, comprising four species: *M. curtineura* (formerly *M. koffleri*, Brues, 1909), *M. luttela*, *M. scalaris*, and *M. xanthozona* (Elsheakh *et al*., 2024). Given their significance in forensic science and their potential use in biological pest control, further taxonomic and ecological studies on this dipteran family are highly recommended, thus present study conducted to identify Phorid flies on mulberry silkworm.

MATERIAL AND METHODS

Silkworm rearing:

Eggs of the mulberry silkworm, *Bombyx mori* were obtained from Sericulture Research Department, Plant Protection Research Institute. The resulting larvae were subsequently reared under controlled conditions in the laboratory of the Plant Protection Department, Faculty of Agriculture, Suez Canal University, located in Ismailia, Egypt during summer season of 2024 (May- November). Regular rearing was applied according to (Mahmoud, 2017). Clean mulberry leaves were introduced to larvae four times per day. In the end of the summer rearing season, fungi infected larvae were isolated for further study when eggs and larvae of dipterous larvae were noticed on fungi mycelium and spores, Plat (1). All silkworm dead larvae collected and transferred to plastic jars covered tightly till the dipterous pupation and adult emergency for further study. Dead flies, dry or stored in 70% Ethyl Alcohol, were transferred to Plant Protection Research Institute for taxonomical studies.

Specimen's investigations

The Dipterous specimens were proposed examined by Insect body parts were dissected under a stereo microscope, binuclear Optika Italy**.** The specimens were proposed as in the following: Insect body parts were dissected under a stereo microscope by using fine forceps. Dissected parts as mouthparts, antenna, legs, and halters were kept in KOH solution, thoroughly washed with tap water, then dehydrated in

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ethyl alcohol 70% and cleared in xylene and mounted in Canada balsam.

For preparing male and female genitalia the posterior part of abdomen was removed and kept in 10% KOH for 24 hours, dehydrated, cleared and mounted in Canada balsam, (Grella *et al.,*2015).

Drawings were made from pinned specimens and microscopic slides by using a stereo microscope. Genital parts were examined in a drop of glycerin under light microscope (Sukontason *et al.,* 2004; Wolf and Liu 1996).

External Morphology:

Morphological study was carried out on the Phorid species, M. *scalaris*, *M. curtineura, M. ventralis*, (Sub family: Metopininae), as a standard model of the taxonomic study.

External Taxonomy:

Terminology used in the present study was after examination of Phorid samples in insect collections in Egypt were restricted to (The Egyptian Reference Museum of Insects in Egypt), Ministry of Agriculture, Giza, Cairo, the insect museum Survey and Classification Research Department, Plant Protection Research Institute, Agricultural Research Center, Ministry of Agriculture.

Keys, diagnostics of sub families, genera and species are given:

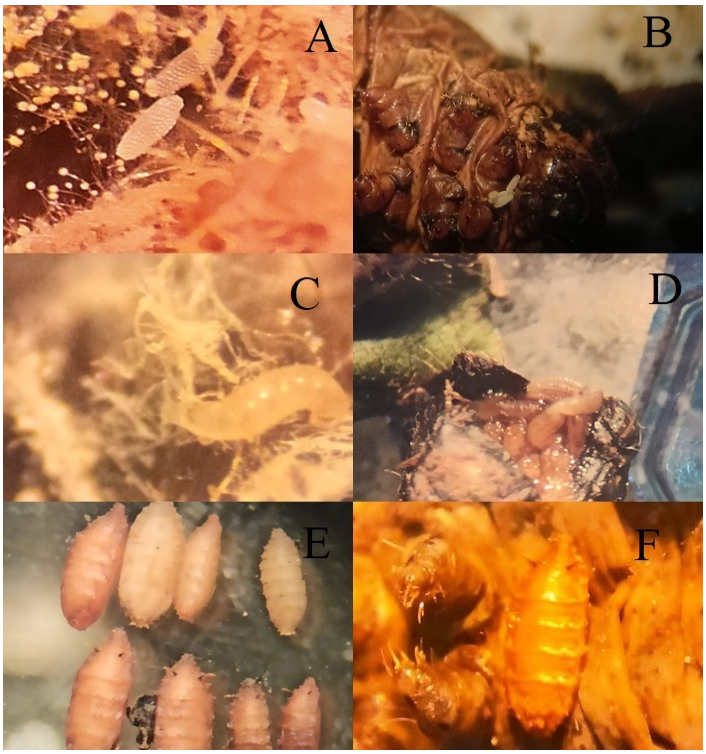


Plate 1: Immature stages of Phorid flies on dead mulberry silkworm, *Bombyx mori* L.

A-B: Eggs – C-D: Larvae – E-F: pupae

RESULTS AND DISCUSSION

1-Survey

The Study carried out from May to November 2024 in Ismailia Governorate. The samples were identified as Ismailia Samples. These samples were counted numerically from different families, as well as identifying the samples that were counted in insect groups in Egypt.

The specimens of Phoridae recorded from Ismailia were three species belong to genus *Megaselia* Rondani, 1856. They were M. *scalaris* (59 individual), *M. curtineura*, (6 Individual) and *M. ventralis,* (29 Individual). The highest population recorded was *M. scalaris* and lowest population was M. *curtineura*,

2-Taxonomy

Present results gave a new record species *M. ventralis* Borgmeier, 1963 (Diptera: Phoridae) for the first time in Egypt were collected from Ismailia Governorate. The general key of the two subgenus *Megaselia* well be given to facilitate the important characters of each species.

Family: Phoridae Curtis 1833
Phoridae Curtis 1833, Brit,Ent, Pl,437.
Phorites Newman ,1834, Ent, Mag.2:396.
Phoridae Haliday,1851, inWalkers Ins, Brit,Dipt,1:9.
For other synonyms refer to Handlirsch, in Schroder (1925 :1000 10010).
See Collin, 1949a : Hafez, 1947 : Schmitz, 1929, 1938, 1939, 1949: Seguy, 1938, 1940, Many more Phoridae should be eventually found.
Aphiocheta aritalis Malloch. Bull.Brook. Ent. Soc., vol. Ix. No. 3,June, 1914, P. 57.
Type male: Havana, Illinois, September 20, 1895 (A. Hempel). Aec. No. 13709.
Aphiochaeta bisetulata Malloch. Bull. Brook. Ent. Soc., vol. x, No. 3, July, 1915, p, 65.
Type female: Urbana, Illinois, June 14, 1914 (E. H. Swigert). *Aphiochaeta nasoni* Malloch. Bull. Brook. Ent. Soc., vol. Ix, No. 3. June, 1914, P.58.
Type male: Algonquin, Illinois, November 16, 1896 (W. A. Nason). *Aphiochaeta pallidiventris* Malloch. Bull, Brook, Soc., vol., Xiv, No. 2, April, 1919,p,47,
Type female: Cobden, Illinots, May 9, 1918 (J.R.Maloch). *Aphiochaeta plebela* Malloch. Bull. Brook, Ent, Soc., vol. IX, No. 3, June 1914, p,59.
Type male: Urbana, Illionols, reared from decaying vegetation, July 18, 1885. Acc. No. 6889.
Lectoallotype female: Urbana Illinois, reared from decaying vegetion, July 18, 1885. Acc, No. 6889.
Paratype female: Urbana, Illinois, reared from decaying vegetion, July 18, 1885. Acc. No. 6889.

Synonyms
Tarsophoromyia Beyer, 1965
Hemiplastophora Beyer, 1965
Trisometopia Lioy, 1864
Trichometopia Bezzi and Stein, 1907
Mallochina Schmitz, 1918
Lioyella Enderlein, 1924
Pogonopleura Enderlein, 1924
Epimegaselia Beyer, 1959
Metaplastophora Beyer, 1965
Obelosia Lioy, 1864
Aphiochaeta Brues, 1904
Byrsophrys Enderlein, 1912
Heterophora Borgmeier, 1923
Parametopina Borgmeier, 1924
Stirocnemia Enderlein, 1927
Quasipseudacteon Beyer, 1959

Descriptions of Family Phoridae:

Phoridae family, also known as scuttle flies with about 4000 described species, is considered one of the largest families of Diptera. This family is generally distributed worldwide and can be easily recognized by their reduced wing venation (Plate.2 Fig.1) and humpbacked outwards characteristics (Plate.2 Fig. 2). The larvae have broad natural histories ranging from true parasites, but they are not real parasites, **(**Elsheakh *et al.,* 2024).

Sub Family Metopininiae:

Family Phoridae is represented in Egypt by family Phoridae Curtis 1833,
Sub family Metopininae Brues, 1932
Sub family Metopiniae Rondani
Metopinina Rondani,1856, Dipt, Ital , prodder.1:27
Gymnophorini Enderlein,in part ,1924, Ent .Mitt,13(6):273.
Metopinini Enderlein ,in part 1924,Ent,Mitt13(6):280.
Metopininae Schmitz1929, Rev .der phoriden, BerlinP.69.
Tribe: Beckerinini, Beckerina Malloch, 1910,

Descriptions of Subfamily: Metopininae

Head of Metopininae, Frons with supra-antennal bristles proclinate or absent; when present, bristles not strongly divergent (Plate.2 Fig. No.4). **Antennae the upper spines** curve obliquely downward to the mid- thoracic aspect plate is always divided into two segments (Plate.3 Fig. No.4). **Thorax of Metopininae, Wing** generally fully developed, but sometimes reduced, rudimentary, or absent in female of some species, Rs forked or simple (Plate.2 Fig. No.1). **Tibiae** usually without bristles (Plate.2 Fig. No.8). **The abdomen of the Metopininae** specimen exhibits dark brown tergites interspersed with distinct yellow markings. The palate is straw-yellow in coloration. The terminal portion of the anal tube bears feather-like bristles, consistent with the morphological features illustrated in Plate 3, Figures 3 and 4). (Alam *et al.,* 2016; Zahang *et al.,* 2017).

Genus: *Megaselia* Rondani, (1856).

Based on the most recent comprehensive survey conducted by (Steyskal and El-Bialy 1967), the subfamily Metopininae in Egypt is represented by a single recorded genus:

Genus: *Megaselia* Rondani, 1856.

The genus *Megaselia* Rondani, 1856, which includes synonyms such as *Aphiochaeta* Brues, 1903 and *Plastophora* Brues, 1905.
Sub family Metopininae Brues, 1932.
Tribe: Metopinini Genus *Megaselia* Rondani 1856.
Type species: *Megaselia crassineura* Rondani, 1856.
Megselia rondani, 1856, Dipt. Ital., Prodr. 1 :137.
type species : *M. crassinura* Rondani,
synonym of *phora costalis* v. Roser, Europe). Schmitz, 1956, In Lindner, Flieg. Palaearkt. Reg., Phoridae 33 : 388. Trisometopia Lioy, 1864, Istit. Vento Atti. III, 10 :77. *Trichometopia*, see Becker,Bezzi *et al*., 1907, Kat. Pal. Dipt., 175.
Trisometopia lioy,1864,Atti.Ist. Veneto(3)10:77.
Obelosia lioy ,1864,AttiIstmveneto(3)10:77.
Tricometopia Becker *et al*., 1907,Kat.Pal.Dipt.,P.175.
Heterophora Borgmeier,1923,Deutsch. Ver. Wiss.Kunst,s,Paulo, 3:158.
Lioyella Enderlein, 1924,Ent.mitt.Berlin. Dahelem, 13:275.
Megaselia (Megaselia) Rondani, Schmitz 1926, Ent, Mitt, Berlin Dahlem, 15(1):50 57:Schmitz, 1927, Maandbl Natuurh. Genootsch. Limburg 16:111.

The diagnostic key provided below facilitates the identification of all species within *Megaselia sensu stricto* possessing an unbranched radial sector, as described from Southeast Asia, the Pacific region, and Australia.

The original description of *Megaselia* Rondani (1856) appears in Dipt. Ital. Prodr. 1:137, where *M. crassinura* Rondani is listed as the type species, later synonymized with *Phora costalis* v. Roser from Europe. Subsequent taxonomic reviews and catalogues, including Schmitz (1956) in Lindner's Fliegen Palaearkt. Reg. and Becker *et al*., (1907), have contributed to the refinement of this genus's classification.

Descriptions of Genus: *Megaselia*:

Head: Frons broader than long but sometimes quadrate or longer than broad (Plate.3 Fig.1). **Thorax:** is wide and the anterior thoracic opening can be seen from the back It is difficult to see the posterior edge from the side because the middle thoracic extends to the front which is the extension of the upper edge of the lateral which is the presence of the miraculous spiracle It is clear and clearly visible. It has independent hairs on the leg at least on the leg and the second has an alley of hairs for both sexes' males and females normal (Plate.2 Fig. 2). **Wings:** fully developed in female *Megaselia* (Plate.2 Fig.1). **Abdomen:** Female abdominal tergites 5- 7 have Bristles (Plate.3 Fig.3,4). For the first time in Egypt. The study recorded two subgenera of genus *Megaselia.*

(A)- Sub genus *Megaselia* Rondani:

Megaselia Rondani, 1856, Dipt. Ital. Prodr. 1:137.
Trisometopia Lioy, 1864, Atti. Ist. Veneto (3) 10:77.
Obelosia Lioy, 1864, Atti. Ist. Veneto (3) 10:77.
Trisometopia Becker *et al*., 1907 , Kat. Pal. Dipt., P. 175.
Heterophora Borgmeier, 1923, Deutsch. Ver. Wiss. Kunst, S. Paulo, 3:158, Nec *Heterophora* Santos, 1921 , Mem. Acad. Barcelona 17 (1) :81.
Lioyella Enderlein, 1924, Ent. Mitt. Berlin – Dahlem, 13:275.
Megaselia (*Megaselia*) Rondani, Schmitz, 1926, Ent. Mitt. Berlin – Dahlem,15 (1) :50-57; Schmitz, 1927, Maandbl. Natuurh. Genootsch.Limburg 16: 111.

***Megaselia* (*Megaselia*) *scalaris,* (Loew, Hermann 1866).**

(Plate. 2, Fig.1,2,4,5-Plate 3,Fig.1,2,3,4,5,6).
Megaselia (Megaselia) scalaris (Loew). 1866.
Phora scalaris Loew, 1866, Berliner Ent. Zeitschrift 10: 53 (type, North America, in Museum of Comparative Zoology).
Phora xanthina Speiser, 1908, Berliner Ent. Zeitschrift 52: 148.
Phora coniuncta Becker, 1908, Zoo1. Mus. Berlin, Mitt. 4 (1) : 210.
Phora fissa Becker, ibid., 193.
Aphiochaeta circumsetosa de Meijere, 1911, Tijdschr. Ent. 54: 348.
Aphiochaeta ferruginea Brunetti, 1912, Indian Mus., Rec. 7: 83.
Aphiochaeta repicta Schmitz, 1914, Nat. Hist. Gen. Limburg, Jaarb., 108.
Obelosia plusiivorax Enderlein, 1929, Wiener Ent. Zeitung
Megaselia scalaris, *Phora scalaris* Loew, Berlin Enl Zeitschr. (Centuria VII), vol. 10, p. 53, 1866.
Megaselia scalaris (Loew) - La Palma, Tenerife, August 1983 and 1986.
Gran Canaria. Loew, Hermann (1866). "Diptera Americae septentrionalis indigena. Centuria Septima". Berl. Ent. Z. 10: 1–54. Retrieved 14 March 2022.
Location of type : Museum of Coparative Zoology, Cambridge, Massach usetts, according to schmiyz (1929:25) .

***Megaselia* (*Megaselia*) *scalaris,* (Loew, Hermann 1866).**

Megaselia (*Megaselia*) *scalaris* (Loew, 1866) can be readily distinguished from other *Megaselia* species by its predominantly yellow coloration and relatively larger size.

Head: The frontal bristles are long and moderately robust; the supra-antennal bristles are approximately equidistant, with the outer pair slightly stronger than the inner. The antial bristles are positioned slightly higher than the outer supra-antennal and nearly as widely spaced as the lower frontal bristles. Females possess a short, fleshy proboscis. Notably, the upper post-antennal bristles are spaced twice as far apart as the lower post-antennal bristles. The head characters are as in the upper post antennal bristles are two times farther apart than are the lower bristles. Thorax propleura with numerous scattered hairs in addition to a dorsal posterior fringe and two to four ventral bristles ; pleura otherwise bare; posterior margin of scutum with single pair of long slender bristles and scutellum with two pairs of subequal bristles; scutal pubescence dense and composed of very small hairs; halters yellow, sometimes with darker apical spot.

Thorax: The propleura bear numerous scattered hairs alongside a dorsal posterior fringe and two to four ventral bristles, while the remainder of the pleura is bare. The posterior margin of the scutum supports a single pair of long, slender bristles, and the scutellum exhibits two pairs of subequal bristles. The scutal pubescence is dense, composed of very small hairs. The halteres are yellow, occasionally featuring a darker apical spot. The thorax is relatively large and often described as having a humped profile. A diagnostic feature unique to *M. scalaris* is the presence of characteristically feathered major bristles in this region. **The legs** are robustly attached to the thorax, with the hind femora being stout, enlarged, and laterally compressed. The entire thorax presents a yellow coloration, with bare mesopleura and a mesonotum densely covered with short, black, appressed setae.

Wings: The costa is distinctly longer than the remaining wing length, with veins devoid of setae except for a moderately short, dense costal fringe and the usual bristles on the basal posterior margin. The segment of the costa between the humeral cross vein and the second longitudinal vein slightly exceeds the length from this point to the apex of the third longitudinal vein. Vein 3 is typically forked, though occasionally the inner branch of the fork may be incomplete or absent.

Legs: The mid tibiae feature a weak fringe of setae outside the dorsal hair fringe and a stronger fringe internally. The hind tibiae possess an outer fringe composed of 9 to 12 relatively strong setae. The fore tibiae are setose dorsally but lack a distinct row of setae. In males, the hind tibial spur is nearly as long as the metatarsus. The legs are predominantly yellow, except for a black spot at the apex of each middle and hind femur. Both the front and middle tibiae exhibit a row of densely packed black hairs along the dorsal surface. Additionally, the hind and front tibiae bear a row of approximately twelve evenly spaced short bristles on the anterodorsal surface. The middle tibia is characterized by two rows of short bristles flanking the dorsal hair seam.

Abdomen: The tergites are sparsely covered with short, stiff hairs laterally, with longer hairs apically on tergites 5 to 7. The abdominal terga exhibit a predominantly black coloration laterally with yellow median regions. Color patterns on the abdomen and other body parts display considerable variation within the species. The male anal tube bears strong terminal bristles, with the hairs at its tip distinctly feathered. The hind tibia features a dorsal hair palisade. *Megaselia scalaris* is recognized as a vagile species with a cosmopolitan distribution, frequently transported globally through human activity **(**Nickolls and Disney, 2001). It is a dominant necrophagous species and often acts as an early colonizer in habitats where blow flies are absent, particularly in confined spaces **(**Bugelli *et al*., 2015). Females are generally larger than males, with females displaying a shorter and broader sixth tergite and males characterized by a single strong bristle on the left side of the epandrium **(**Disney and Sinclair, 2008). The female abdomen tip is more elongated than that of the male. Both sexes exhibit alternating dark bands along the posterior abdomen; females possess six distinct dark V-shaped bands.

Specimens examined:

Ismailia,(8-2024,9-2024),(Total,59-Male,19-Female 40), Doqqi,Giza, (The Egyptian Reference Museum of Insects in Egypt),(Total, 18 Male,6 Female,12) from Alexandria in 1917, Wadi El-Natrun in 1962 and Giza in 1925, Ain Shams, Cairo The entomological collection of Ain Shams University, in which 5 samples were found that were collected from Abbasia in 1955, Cairo Governorate.

Megaselia (Megaselia) curtineura (Brues, 1909). (Plate 2, Fig. 6: A,B).

The species *M. koffleri* Schmitz, 1935 Name updated by *M. curtineura* (Brues, 1909)plat(18) fig(1,2).

Megaselia (s. str.) Koffleri Schmitz,1935,Broteria Ser, Ci .Nat. 4 (31) ,1 :11.

Megaselia biformis Brues,1942,proc, Haw. Ent, Soc, 11(2):155.New synonym.

Type data: Syntype (s) whereabouts unknown ♂♀ series, Dr. C.S. Banks, Philippines, Manila Oahhu (type Locality of biformis Brues, Honolulu, bred from the gaint African snail, *Acatina fulica* Bowdich) and Maui. Probably found on all the main island.

Species *Megaselia (Megaselia) curtineura* (Brues, 1909).

Aphiochaeta curtineura Brues, C.T. 1909. Some new Phoridae from the Philippines. Journal of the New York Entomological Society 17: 5-6 .

Aphiochaeta insulana Brues, C.T. 1911. The Phoridae of Formosa collected by Mr. H. Sauter. Annales Historico-Naturales Musei Nationalis Hungarici (Zoologica) 9: 530-559 (Date published 20 December) (542-543).

See Brues (1911, Ann. Mus. Nat. Hung. 9:542, and 1924, Psyche31 (5) :215.

Type data: Syntype (s) HNHM 3♀, April, May & Nov 1907, H. Sauter, Taiwan, T'ai-nan, Takao.

Aphiochaeta variata Malloch, J.R. 1912. The insects of the dipterous family Phoridae in the United States National Museum. Proceedings of the United States National Museum 43(No. 1938): 411-529 (Date published 14 December) (515-516).

Type data: Holotype USNM ♂, no date, W.A. Stanton, Philippine Islands, Manila.

Megaselia biformis Brues, C.T. 1942. A species of Phoridae bred in Hawaii from the immigrant African land snail (*Achatina fulica*).Proceedings of the Hawaiian Entomological Society 11: 154-156 (Date published 6 October)(155-156).

Type data: Holotype BPBM ♀ (Feb. 1941, Y. Kondo, bred from dead specimen of African land snail *Achatina fulica*), Hawaii, Honolulu.

Megaselia curtineura (Brues, 1909)

Aphiochaeta Aphiochaeta (Rariata, 1912)

Aphiochaeta insalana (Brues, 1911) *Aphiochaeta subfurcata* (Brues, 1912) *Megaselia biformis* (Brues, 1942) *Megaselia kofflieri* (Schmitz 1935). *Megaselia curtineura* (Brues, 1909).

Description

The costa of *Megaselia curtineura* is notably short, extending to approximately one-third of the wing length, with very short costal cilia. **The male's frons** is subquadrate and exhibits a subopaque black surface, occasionally showing a reddish ground color beneath. The ocellar tubercle is prominently defined and deep black. A distinct median impressed line is present, with dense, conspicuous fine hairs. Four postantennal bristles are arranged such that the lower pair is slightly smaller and positioned noticeably closer together than the upper pair. The antial bristles are located distinctly,

below the upper supra-antennal bristles approximately midway between these and the inner eye margin, positioning them considerably nearer to the eye than to the median furrow. The second transverse row consists of four bristles spaced roughly equidistantly, slightly bowed medially downward. The second lateral bristles are set a little farther from the lower bristles than from the upper ones. The third antennal segment is black, with the ventral margin bearing two rows of three bristles each, four of which are relatively long; the apical bristle is not distinctly longer than the others. **The thorax** is predominantly black, with the mesonotal sides and pleura-tinged reddish brown; in some specimens, the entire mesonotum appears reddish. A single pair of dorsocentral bristles is present, accompanied by an additional pair of bristle-like hairs between them. **The scutellum** bears one pair of bristles. The mesopleura is entirely bare. The fore coxa is yellow, while the middle and hind coxae range from brownish to yellowish. The hind femora are darkened apically. The front legs are slender, measuring slightly more than three times their breadth. The front tarsi are slender and notably longer than the tibia, with tarsal segments maintaining a relatively uniform width throughout. Wings display a slight grayish tint. **The abdomen** is broadest at the end of the second segment and tapers posteriorly. The tergites are dull black, with the first tergite often appearing reddish brown. Each tergite exhibits a narrow gray to yellow pollinose band across its posterior margin. Very fine, short hairs are present along the hind margins and lateral edges of the abdominal sclerites. The second tergite lacks lateral tufts of stiff bristles. The ventral side of the abdomen is grayish to yellow and largely bare except for the sixth segment. The hypopygium is small, distinctly higher than long, lacks projections, and is dull black, bearing only a few scattered minute hairs on the lower half of each side. The anal tube is short, stout, and darkened, with weak terminal hairs. **Females** resemble males closely except for typical sexual dimorphism. The female scutellum has four subequal bristles. Overall body length ranges between 1.3 and 1.7 mm.

Specimens examined:

Ismailia,(8-2024,9-2024), (Total 6, Male,2-Female,4), Doqqi, Giza, (The Egyptian Reference Museum of Insects in Egypt),(Total, 9 Male,3 Female,9) from Alexandria in 1917, Wadi El-Natrun in 1962 and Giza in 1925,

(B): Sub genus (*Megaselia*) *Aphiochaeta* Brues:

Aphiochaeta Brues, 1904, Trans. Amer . Ent. Soc. 29:337.
Mallochina Schmitz, 1918, Jaarb. Nath. Gen. Limburg (1917) , P.
Pogonopleura Enderlein, 1924, Ent. Mitt. Berlin – Dahlem 13:275.
Stirocnemia Enderlein, 1927 , Stett. Ent. Ztg. 88: 109.
Megaselia (*Aphiochaeta*) Brues, Schmitz, 1926, Ent. Mitt. Berlin – Dahlem 15:47.

Type of sub genus: *Phora nigriceps* Loew.

Holotype. A female, Wickenburg, Maricopa County, Arizona, collected "at light," August 1950, by Howard K. Gloyd. In the collection of Chicago Natural History Museum.

Paratypes. Two females and a male, same data as the type, one of the female paratypes in the collection of Borgmeier.

***Megaselia* (*Aphiochaeta*) *ventralis*, Borgmeier, 1963.**
(Plate.2, Fig.7- Plate.4, Fig.1,2,3,4,5,6,7).

A new recorded Species of *Megaselia* from Egypt (Diptera, Phoridae)

Thomas Borgmeier, among some Phorid flies received from Ismailia, Egypt species of *Megaselia*, which is described below.

Megaselia (Aphiochaeta) ventralis.

Description: Female (preserved in alcohol): Total body length measures approximately 2.2 mm. The head exhibits a large structure with a yellow, pubescent frons and a clearly defined median furrow. Frontal bristles include a median pair of moderate length and lateral bristles. Four supra-antennal bristles are of equal length. Antial bristles are positioned slightly above the upper supra-antennals and located midway between these and the antero-lateral bristles, which themselves are situated higher than the antials. The second row of bristles is straight, with preocellar bristles positioned closer together than the upper supra-antennals. The upper post-ocular bristles are distinct, while the lower ones are notably long. The eyes are large and bear conspicuous ocular cilia. There is a single malar bristle followed by approximately seven weak genal bristles. The third antennal segment is small, rounded, and pale yellow, with a long, nearly bare arista. Palpi are pale yellow, hairy ventrally, and bear five long marginal bristles. The epistoma is slightly protruded, and the labrum is pear-shaped and chitinized. **The thorax** is reddish-yellow, equipped with two dorsocentral bristles. The mesopleura are covered dorsally with fine hairs and bear one to three moderate-length bristles posteriorly. The scutellum contains two bristles alongside two hairs. **The abdomen** is predominantly yellow. The first tergite is short and partially overlapped anteriorly by a whitish membranous seam. The second tergite is incomplete laterally, narrowing posteriorly with convex lateral margins bearing two to three delicate bristles, and its posterior margin supports some short hairs. The third and fourth segments are elongated, membranous, lacking chitinized tergites, and pubescent ventrally as well. The seventh segment is partially retracted, convex posteriorly, with a series of fine bristles along its hind margin. The sixth segment is membranous centrally, with rounded, dark brown, hairy chitinous lobes on each side. The seventh segment features a short, dark, chitinous dorsal plate. **Legs** are yellow; notably, the hind femur lacks darkening at the apex. The front tibia possesses a dorsal row of short cilia and a very short ventral terminal spur. The front metatarsus measures approximately half the length of the tibia. The mid tibia has an incomplete dorsal hair seam and two series of cilia covering the basal two-thirds. The hind femur is

about two-fifths as broad as it is long, with ventro-basal hairs that are not elongated. The hind tibia displays a complete dorsal hair seam with roughly eleven postero-dorsal cilia; the basal four are faint, while the remaining are more prominent. **Wings** are grayish-yellow with yellow veins. Costal cilia are short, numbering about 19 per row. The mediastinal vein is absent. Veins 4 through 7 become faint towards the apex, with the fourth vein slightly concave, and the fifth and sixth veins mildly sinuous. The anal margin bears five hairs. Halteres are whitish-yellow. **Male:** Total length approximately 1.6 mm. **The frons** is dark brown, with chaetotaxy similar to the female. The third antennal segment is yellowish-brown with a short, nearly bare arista. Palpi are normal. **The thorax** is reddish-yellow, darker than that of the female. The mesopleura displays a small black spot dorsally, with hairs and a single moderately long, strong bristle. The ventral surface is yellow. **Abdominal tergites** are dark brown, hairy, with elongate, bristle-like terminal hairs. Legs are yellow. The hind femur bears approximately seven long, semi-decumbent hairs ventrally on the basal half. The wing costa is shorter than in the female

Specimens examined:

Ismailia,(8-2024,9-2024),(Total, 3-Male, 1-Female,2).

Key of subgenus *Megaselia* :

1-Mesopleura haiary …….Sub genus (*Aphiochaeta*) Brues .....(3) .
(Plate 2 . Fig**. 2).**

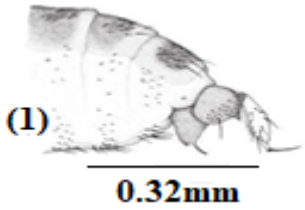
-Mesopleura bare ……..Sub genus (*Megaselia*) Rondani ……(2).
(Plate 4 . Fig. 3).

2-,Costa ending distinctly before the middle of the wing, Hypopygium large. **Species: *M. scalaris* (Loew).**
(Fig.4).

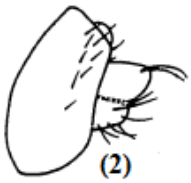
-Costa very short, extending only about one third the wing length, Costal cilia very short, Hypopygium small……
Species *M.* (*Megaselia*) *curtinura* (Brues).
(Fig.2,5).

3-Halteres dark. **Species No.1.** .
(Plate 4 **. Fig. 3,4).**
- Halteres yellow.…(4).
(Plate 4 . Fig**. 7).**

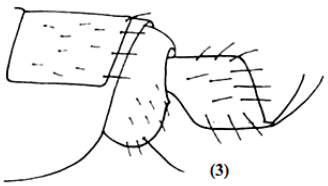
4-Front and thorax all yellow to rufous, (Plate 4, Fig. 7). Abdominal terga black on the side and yellow in (Male, Female), Wings: Costal large; veins bare except for moderately short and dense costalfringe and the usual bristles on the basal posterior margin ; costa humeral cross vein to second longitudinal slightly longer than from the latter to apex of third longitudinal. Vein 3 usually forked but sometimes inner branch of fork incomplete or absent
Fore tibiae setose dorsally but without a definite row of setae, Mid tibia lacking bristles. supra-antennal bristles directed forward, Anal margin with six hairs. Halteres yellow-browen, **Species. *M.*(*Megaselia*) *scalaris* (loew) (Fig I,4,7).**



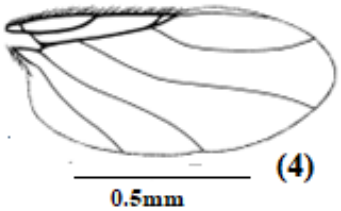
Abdominal of male *M. scalaris*.



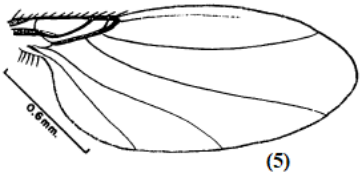
Hypopygium male of *M. curtinura*.



Hypopygium of male *M. venteralis*.



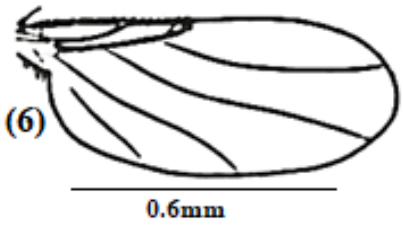
Right wing of *M. scalaris*.



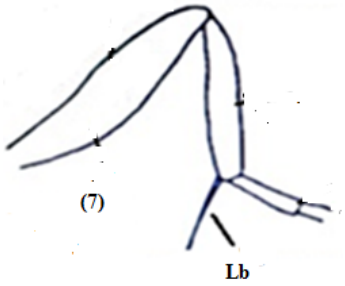
Right wing of *M. curtinura*.

-Female. Frons yellow, pubescent but Frons dark brown in male, Thorax reddish-yellow, Wing grayish-yellow, Costal cilia short, Veins 4 slightly concave, fifth and sixth slightly sinuous. Front tibia, with a dorsal row of short cilia and a very short terminal ventral spur. Abdominal tergites yellow. Abdominal tergites dark brown in male. Mid tibia with an incomplete dorsal hair-seam, Anal margin with five hairs. Halteres whitish yellow.

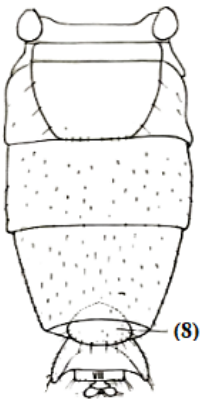
Species. *M.* (*Aphiochaeta*) *ventralis* Borgmeier, 1963. (Fig. 3,8,9).



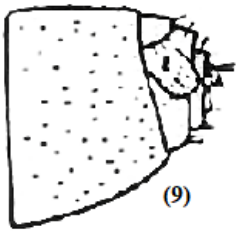
Right wing of *M. venteralis*.



Last bristle Or the hairs (semi: orthopedic dorsal hairs).



Terminal segments of female abdomen, lateral view



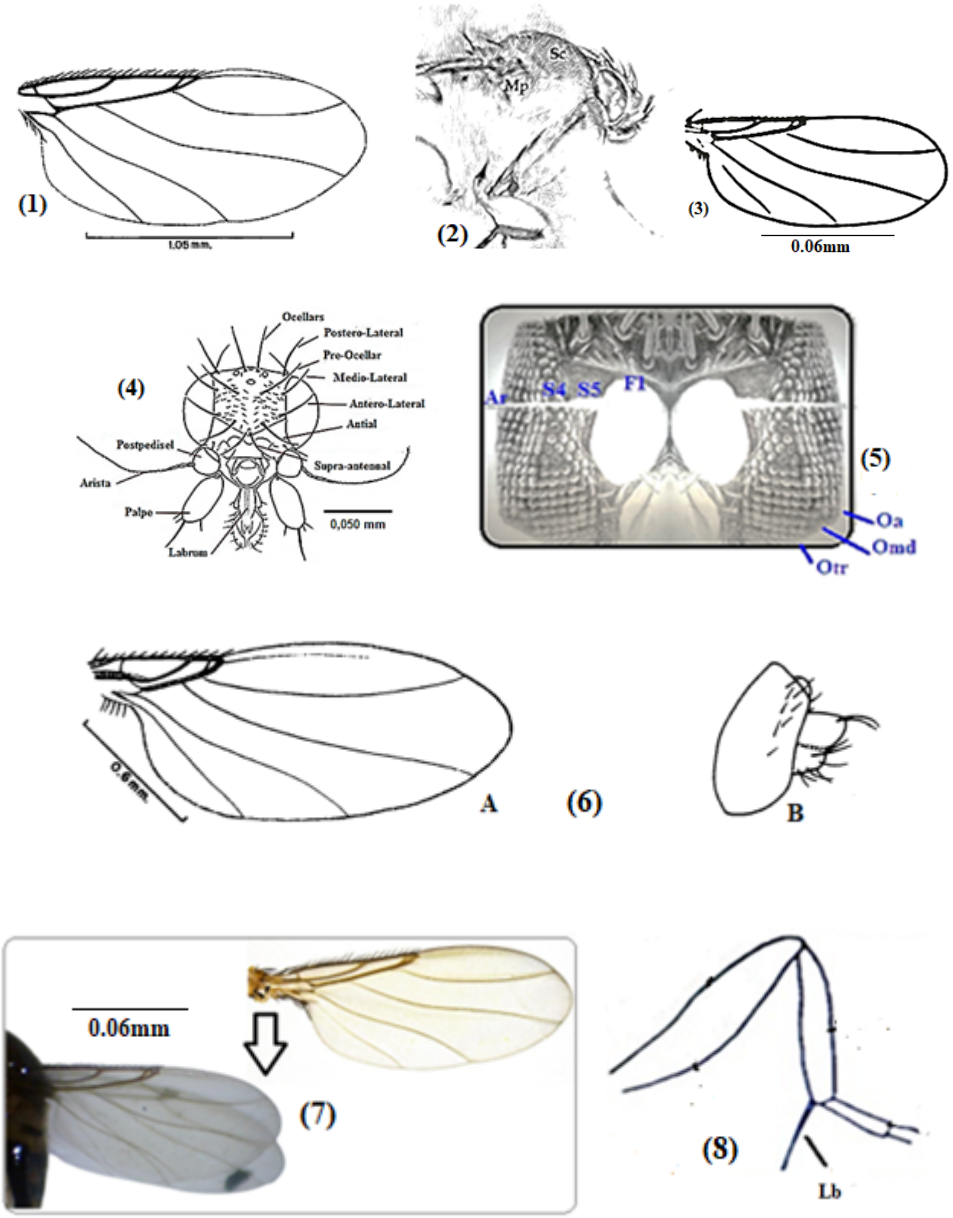
Abdomen female of *M. venteralis*.

Based on the obtained results, all reported phorid flies on *Bombyx mori* L. larvae belonged to subfamily Metopininae (Brues1932) of Genus *Megaselia*. Three species were identified as follow, M. *scalaris* (Loew, Hermann 1866)*, M. curtineura* (Brues, 1909) , *M. ventralis* Borgmeier, 1963. The last specie is a new record for the first time in Egypt. The three identified species were abundant in the period from May to November. The present study indicated that all detected phorid species were only necrophagous on dead *Bombyx mori* L. larvae but no detected on the live larvae. Obtained results in agree with **(**Acevedo-Alcala *et al.,*2023) who stated that in laboratory tests *M. scalaris* preferred to develop as saprophagous on a dead larva, but it has no potential as a biological control agent for *Spodoptera frugiperda*.

On the opposite, Tang *et al.,* (2021) indicated that *M. scalaris* was a true parasite on *S. frugiperda.* Previous studies in Egypt reported that *M. scalaris* (Loew, 1866) was a facultative parasite to *Agrotis ipsilon*, Sweelam *et al.,* (2022), *Bactrocera zonata* and *Ceratitis capitata,* Daif *et al.,* (2023), *Nezara viridula*, El-Hawagry *et al.,* (2021), terrestrial snail *Bradybaena similaris*, Karima and Nema (2021) on American cockroaches Arafat *et al.,* (2024). Despite being a large country with various geographical regions, the fauna of Egyptian Phoridae is very poorly known. We expect that many species remain to be discovered though many will already be described.

Plate (2)

Sub family Metopininae:



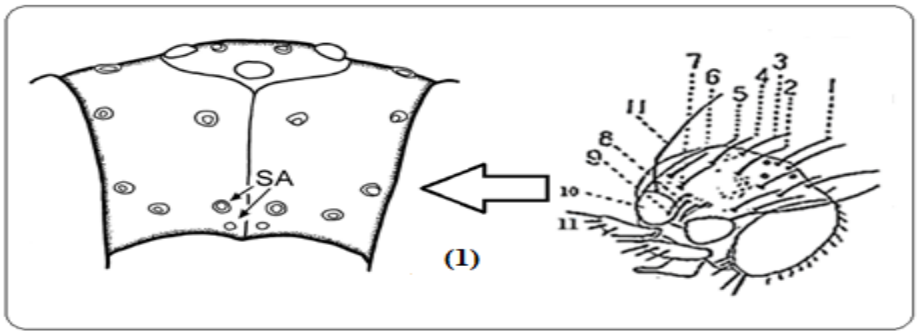
(1): Wing Right of *M. scalaris*, **(2):** Thorax of *M. scalaris*, **(3,7):** Right wing of *Megaselia venteralis*. Wing of female.

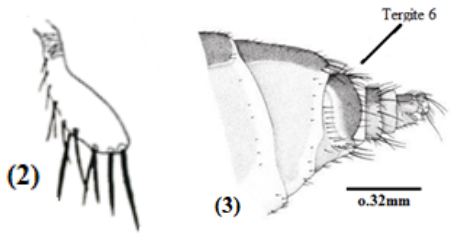
(4): Anterior view of Head Sub family Metopininae, **(5):** Antenna Left and right views of *M. scalaris* ,

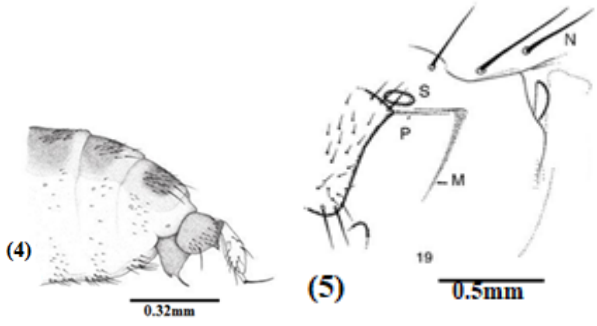
Ar: followed by segments 4 and 5, **S4,S5:** terminating at the flagellum, **Fl:** The eyes are composed of numerous ommatidia **Omd:** with ommatrichia, **otr:**present at every interstitial space, The ocularapex, **Oa:** is also highlighted. Note the hexagonal packing of the ommatidia . of Genus : *Megaselia* ,**(6): A**.Right wing B. Male hypopygium of *Megaselia curtinura*,**. (8).** Last bristle or The hairs (semi:orthopedic dorsal)

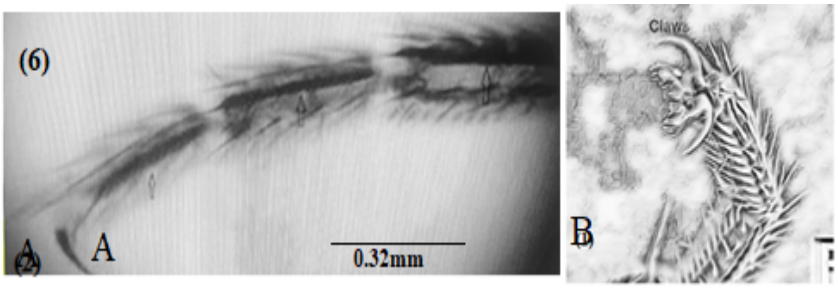
Plate (3)

Subfamily Metopininae:





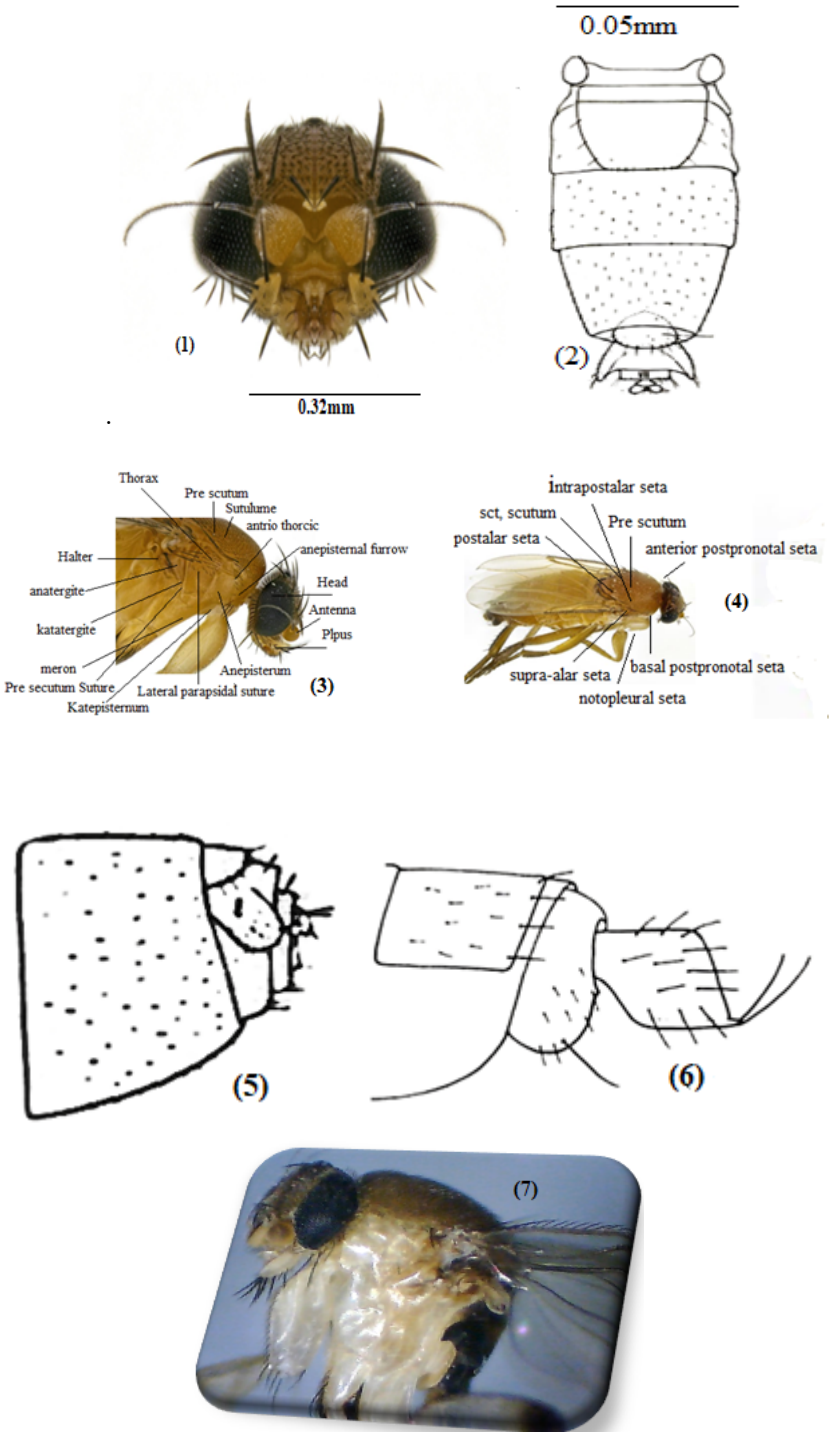




(**1):** Head of Metopininae, **1**: Post ocellar bristles**,** **2**: Po, Pre: ocellar, **3**: inner vertical bristle,**4** : anterolaterals, **5** : outer ve rtical bristle, **6**: fronto orbital bristles**, 7:** Position of antero lateral bristles,**8:** position of antial bristles, **9:** front orbital area, **10:** refersto two pairs of supra:antennal seta, **11:** anttennal seta, **(2):** Mouth part, **(3):** Abdominal section of female *M. scalaris*,**(4):** Abdominal section of male *M..scalaris*. , **(5):** Left face of mesopleuron and parts of adjacent regions (S = spiracle, N = notopleuron, P = post-propleural ridge, M = mid-mesopleural ridge) **(6):A.** Tursus of Leg of *M, scalaris*,**:B.** Claws of *M, scalar***TA:**Tentacled appendages. Scale bars = 0.1 .

Plate (4)

Subfamily Metopininae:



Megaselia (*Aphiochaeta*) *ventralis*, new sp. **(1):** Head, **(2):** Terminal segments of female abdomen, lateral view, **(3):**Thorax,**(4):** Adult, **(5):**Abdomen of female, **(6):** Hypopygium of male.

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الظهور الأول لذباب الفوريد (Diptera : Phoridae) على ديدان الحرير التوتية *Bombyx mori* L. الميتة مع تسجيل نوع جديد في مصر

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المستخلص: ذباب الفوريد (Diptera : Phoridae) منتشر على نطاق واسع في جميع أنحاء العالم، ويُعد ثالث أكبر مجموعة من الطفيليات ثنائية الأجنحة بعد عائلتي Tachinidae وBombyliidae. في مصر، تم تصنيف ذباب الفوريد ضمن فصيلتين فرعيتين: Phorinae التي تضم جنسين ونوعين، وMetopininae التي تضم جنسًا واحدًا وأربعة أنواع. تم إجراء الدراسة الحالية في محافظة الإسماعيلية، مصر، خلال الفترة من مايو إلى نوفمبر 2024. وأثناء تربية ديدان الحرير التوتية (*Bombyx mori* L.)، لوحظ وجود يرقات تنتمي لرتبة ثنائية الاجنحة على يرقات ديدان الحريرالمصابة بالفريات والنافقة، والتي تحولت لاحقًا إلى ذباب بالغ وتم تحديدها على أنها تنتمي إلى عائلة Phoridae. وتُعد هذه أول ملاحظة لذباب الفوريد كمتغذي على الجيف في ديدان الحرير التوتية. أشارت نتائج الدراسة إلى تحديد ثلاثة أنواع من ذباب الفوريد تصنيفيًا، وهي: *Megaselia scalaris*، و*Megaselia koffleri* Schmitz, 1935، والذي تم تحديث اسمه إلى *Megaselia curtineura* Brues, 1909، و*Megaselia ventralis* Borgmeier, 1963. كما تضمنت الدراسة مفتاحًا تصنيفيًا للتمييز بين الأنواع الثلاثة التابعة لجنس *Megaselia*. وسجلت الدراسة الحالية أيضًا وجود تحت جنسين جديدين من جنس *Megaselia* في مصر، هما: تحت الجنس *Megaselia* Rondani، وتحت الجنس *Megaselia (Aphiochaeta)* Brues. والتي يتبعها نوع جديد يسجل لاول مرة في مصر وهو Megaselia *ventralis* Borgmeier, 1963.

الكلمات المفتاحية: الذباب القافز – تربية ديدان الحرير – Phorinae – Metopininae