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Reclassification of Tiphiidae (Hymenoptera, Aculeata) with description of a new subfamily from Turkey

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Summary

A remarkable new subfamily, and presumably, a Laurasian relic from the Tertiary, was recently discovered in Turkey. ***Silifka fatima,*** new genus and species, is described as the type of the new subfamily Silifkinae. It suggests a reconsideration of the systematics of Tiphiidae. Within this classification eleven new tribes and ten new genera are established for the known species. The greatest changes of classification, intended to indicate close phylogenetic affinities, are presented in a conventional dichotimic key.

Introduction

The family Tiphiidae contains aculeata wasps, represented by about 500 described species in all warmer parts of the world. All tiphiids are of economic importance, since they develop as external parasites of soil inhabiting, root-feeder scarabaeid larvae, whose pest-control is extremely difficult with other methods than biological ones.

Systematically, however, Tiphiidae is the most intricate family of fossorial wasps. The unreliable diagnostic characters applied once by the earlier student, laconic original descriptions, associated to color pattern based keys, great intraspecific variability of the sample involved, deter most hymenopterist from identifying tiphiid material. The present work resulted from the need to describe a new subfamily for a female collected by the junior author in Turkey, a task that prompts for an urgent revision of all main taxa encountered. During the study we discovered many new and reliable features not previously used in keys, which could facilitate a better identification of various taxa. At the same time, techniques of numerical taxonomy were appllied by the senior author to obtain

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phenetic distances and character correlations. These results were compared for congruence with the classifications obtained intiutively. For the sake of brevity, our conclusions are presented by means of a conventional dichotomic key.

Tiphiidae is now a compact, easily characterizable and definitely monophyletic group. Its position in the earlier classifications was varied widely. In accordance with Ashmead (1903), only Tiphiinae and Pterombrinae were included. Some subsequent authors, however, were inclined to sink here many more, convergent subfamilies: Anthoboscinae, Myzininae, Thynninae, Brachycistidinae, Methocinae, Myrmosinae, Chyphotinae, Apterogyninae, and so forth, but their arguments have been legitimately disproved by cladistics. It has become clear that the large assemblage of the above mentioned subfamilies represents a heterogenous complex,united by a few symplesiomorphous characters only.

We conceive Tiphiidae in its restricted sense, excluding all different subfamilies mentioned above. It may be morphologically characterized by the following combination of unique apomorphous character states: 1. propodeal spiracle separated from metanotum by a distance greater than its own major diameter, being situated et middle of the carinately bordered propodeum; 2. scutellum provided with a functional or atrophied spiracular pit; 3. notaulices of mesoscutum primitively not developed. None of the a. nleate families share this combination of characters considered above.

The significance of the discovery of a plesiomorphic new subfamily, Silifkinae, in the Palaearctic Region is obvious and unexpected. Its closemost relatives inhabit the Nearctic and Neotropical regions, and they are closely linked to the more apomorphic subfamily Tiphiinae of cosmopolitan distribution. We endeavored to use for this new family-group the name of an already known genus, ***Scoliphia*** Banks, 1912, described with one species, ***spilota*** Banks, 1912, a female collected in Garcia, Arizona (deposited in Museum of Comparative Zoology, Harvard University, Cambridge,Mass.). It was considered by Allen (1966) to be a junior synonym of ***Epomidiopteron julii*** Romand, 1836, also based on a female from Cayenne, French Guiana (now in Zoologische Sammlung des Bayerischen Staates at Munich). Our casual examination has indicated that these two females are two distinct species. In ***spilota,*** the apex of scutellum provided with a functional spiracle, as broad as diameter of an ocellus, wainscoted at inside with sensorial or filtering hairs; the mesosternum is flat and distinctly longer that the precoxal lobe; lateral pronotal lobe not carinulate anterad; apex of fore tibia with setulae only. Whereas in ***julii,*** apex of scutellum have a small trace of pit of a nonfunctional spiracle; mesosternum is conspicuously concave transversely and much shorter than its precoxal lobe; anterolateral pronotal lobe sharply carinulate; first tergum with a complete transverse ridge; fore tibia with strong apical spines. We conjectured the possibility that these two species are distinct specifically but not generically. So far, however, we have examined specimens of both sexes of ***julii*** and ***duodecemmaculata*** Cameron, 1904 (from Panama), but only female sex of ***heterospilura*** Cameron, in lit. (? from Argentina) and of ***spilota*** Bank. Under these circumstances, we have not found enough taxonomical evidence to reconsider the status of ***Scoliphia*** as valid generic-group name. From the available genera, ***Epomidiopteron, Paratiphia*** and ***Silifka,*** our option was for Silifkinae, due to its euphonic nature.

The key presented below comprises the classification of Tiphiidae as we thought useful for definiton. Both subfamilies are strongly diversified, with their intrinsic mor-

phological adaptations, and their parallel evolution from the extinct pro-aculeate ancestor is conceivable. The key is not fully comprehensive hence we have purposely restricted it only to taxa used for generating the nomenclature of tribal classification, and those considered having imprecise limits in the past. A complete differential diagnosis will be presented elsewhere.

Subfamily Silifkinae Argaman and Özbek subfam. n.

Diagnosis.- Small to large aculeate wasps, with 5 to 25 mm body length. Both sexes fully winged, female with 12-, male with 13-segmented antennae. Mandibles tridentate in both sexes of ***Epomidiopteron,*** in all males of ***Paratiphia,*** and in female ***Silifka*** (at most bidentate but very often unidentate in Tiphiinae). Inner orbit of eye weakly emarginate, antennal toruli situated high, above lower eye margin ***(Epomidiopteron, Paratiphia*** males), or low, touching the imaginary line of lower eye margin ***(Silifka, Paratiphia,*** females). Clypeal disc entire ***(Epomidiopteron)*** or divided in two sectors. Submandibular triangle not developed, and then maxillary palpus shorter than hypostoma ***(Epomidiopteron, Paratiphia),*** or fully developed and then palpi very long ***(Silifka).*** Occipital carina developed dorsally and on the sides, but narrowly incomplete ventrally and base of oral cavity directly descend to the foramen magnum ***(Epomidiopteron*** and ***Paratiphia)***; or developed dorsally and ventrally, but not on the sides beyond temples, and base of oral cavity broadly separated from the occipital carina by the postgenal bridge (***Silifka***). Prepectal carina of mesopleuron developed ***(Paratiphia)*** or not ***(Epomidiopteron, Silifka).*** Mesoscutum of female without anteromedian escarpment. Tegula twice as long as wide and then disc of the propodeum at least slightly longer than scutellum ***(Epomidiopteron),*** or tegula orbicular, about as long as wide, and disc of propodeum medially as long as, to distinctly shorter than scutellum ***(Silifka, Paratiphia).*** Mesotibia with two movable spurs (only one spur in Tiphiinae, sometimes associated with a motionless spine), both of the same length and identical strength ***(Epomidiopteron, Silifka);*** or the inner spur only half as long as the outer ***(Paratiphia).*** Forewing with three submarginal cells, first and second almost entirely separated basally. Hind wing cu-a vein angularly bent and prolonged in a spectral fold (always straight in Tiphiinae). First tergum and second sternum with strong transverse ridge between the declivity and disc. Hind tibia and basitarsus without sensorial groove (always developed on tibia of Tiphiinae). Body with rich yellow markings ***(Epomidiopteron),*** or only on the clypeus and mandibles (some ***Paratiphia*** males), or the whole abdomen ferruginous ***(Silifka).***

Genus *Silifka* Argaman and Özbek gen.n.

Type-species : ***Silifka fatima*** Argaman and Özbek sp.n.

Diagnosis. -Female (male unknown) small wasp with black and ferruginous coloration. Head globular (Fig.2), antennal toruli separated mesally up to level of front. Antennae not clavate distally (Fig.2), pedicellus not invaginated in apex of scape. Eye large, glabrous (Fig.5), malar space practically inexistent. Clypeal disc divided from side to side by a blade-like keel (Fig.4). Mandible bulky, tridentate, with a strong apical and two minute inner teeth (Fig.2). Submandibular triangle large, connected to the base of hypostoma (Fig.3). Maxillary palpus about twice as long as hypostoma (Fig.3). Occipital carina complete dorsally and ventrally, broadly incomplete on sides, beyond temples. Post-

genal bridge half as long as scape width (Fig.3). Lateral pronotal lobe with a sharp and somewhat angular, laterally comprimated tubercle directed forward (Fig.5). Spiracular pit of scutellum being situated basally. Propodeal disc as long as scutellum, with a V-shaped areola, outer side of which carinately enclosed, the carina with adherent furrow inwardly, middle of the areola humped. First abdominal tergum loosely descend posteriorly, and not bordered in any way (Fig.7). Terga 1-5 and sterna 2-5 with an apical, ribbon-like band polished and shining, subhyaline and glabrous. Pygidial area divided in a basal dull, and an apical delicately sculptured sectors (Fig.9). Hypopygium, on its posterior half, with a median, polished longitudinal stripe. All body pubescence normal, although the strong hairs of abdominal segments slightly compressed from sides on their basal half, but neither dorsoventrally nor lanceolate apically as in the genus ***Paratiphia.***

Etymology.- Generic name derived from the type locality, gender feminine.

Silifka fatima Argaman and Özbek sp.n.

(Figs. 1-10)

Material examined.- holotype ♀, from Turkey, "Silifke, 22. VI. 1978, H.Özbek" (deposited in coll. Argaman).

Description of female holotype.- Length 9.0 mm, length of forewing 5.2 mm. Body black; basal half of mandible and whole abdomen pale ferruginous; apical half of mandible, antennae, tegulae, legs, anterior half of first sternum and the transverse ridge of first tergum dark castaneous to black. Forewing uniformly although slightly infuscated in the area of costal cell and the membrane distal from the basal vein (Fig.1). Pterostigma and subcostal vein castaneous, other veins are the color of amber. Membrane densely clothed with short brownisp pile. Pubescence of body consist of subdecumbent, moderately long yellowish golden hairs on head, thoracic dorsum, terga and subapical fringe of sterna 3-6; ventral aspect of head, thorax and legs clothed with erect, relatively long, silvery white hairs; impressed thoracic articulations and lateral discal areas of propodeum densely clothed with decumbent, short white pile. Cuticle of head and thorax, save tegulae, polished and shining, without alutaceous sculpture. Posterior half of tegulae, lateral discal areas of propodeum, legs and abdominal segments here and there, provided with a moderately engraved, reticulate network of alutaceous microsculpture.

Head (Fig.2) globular,1.5x as wide as high in frontal view. Eye, in lateral view (Fig.5), twice as high as wide, 0.75x height of head, practically glabrous. Front 1.2x as wide as height of eye, upper lobe of clypeus 5.5x as wide as long, antennocular distance twice the diameter of antennal torulus. Front angle of ocellar triangle right angle, ocelloocular line 0.86x width of ocellar triangle; lateral ocelli as distant from occipital margin as 1.13x width of ocellar triangle. Upper lobe of clypeus and front around antennal toruli densely, almost obscurely covered with micropunctures. Front, vertex, genae and temples covered with large, setiferous dimpled punctures, of vague contours; interpunctal spaces as wide as the punctures themselves, a little widest on temples. Antennae (Fig.2) short, barely reach the pronotal margin, scape 1.5x as long as wide, pedicellus as long as thick; flagellum short pubescent, cylindrical, its segments gradually increase in length but not in thickness, last segment 2.6x as long as first.

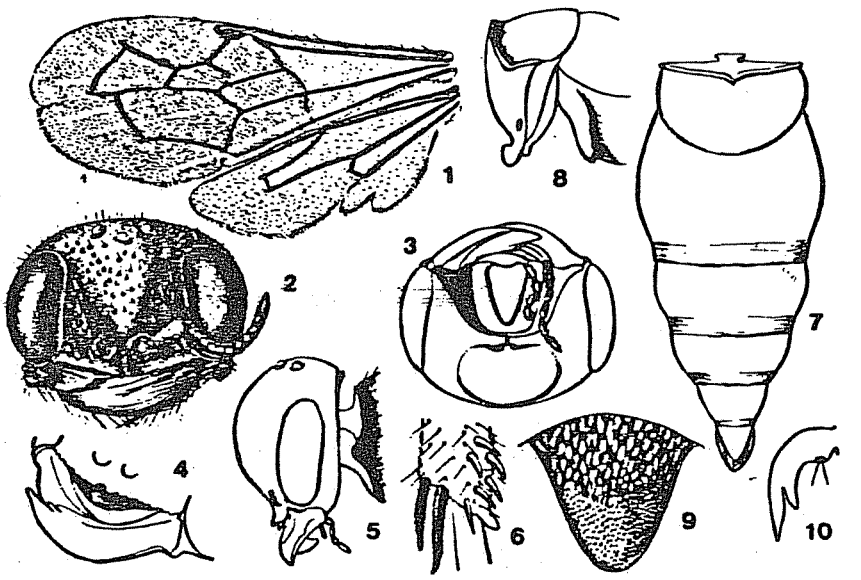
Thorax 1.3x as long as wide; pronotum parallel-sided in dorsal view, its anterolateral corners slightly projecting in an acute lobe (Fig.5); pronotal disc bordered anteriorly

by a weak, irregular transverse carina, disc and upper half of lateral pronotal lobe punctate like the vertex, lower half obliquely costulate; an impunctate stripe on posterior quarter of disc or less. Mesoscutum, scutellum, metanotum and outer disc of mesopleuron sparsely macropunctate; subtegular patch of micropunctures as wide as tegula. Triangular areola of propodeum 1.13x as wide basally as long medially, bordering carinae and the apical transverse carina of propodeal disc rather strong; discal areas laterad to areola with shallow, scattered micropunctures. Lateral lobe of propodeum with moderately dense carinules on upper half, aciculate on lower half. Posterior declivity densely micropunctate, its median ridge rather low but complete, Legs fossorial, of the general aspect, within the subfamily; foretarsal rake not longer than the following tarsal segment; mesotibial spurs as long as half basitarsus (Fig.6); inner spur of metatibia 0.8x basitarsal length; claws cleft (Fig.10). Pterostigma of forewing (Fig.1) 2.3x as long as wide, marginal cell apically not enclosed, 2.6x as long as wide; sectors 1-4 of the radius in a ratio as 1.0 : 1.25: 2.8: 0.5; pterostigma separated from basal vein by its own length.

Abdomen (Fig.7) roughly cordiform in outline; first tergum parallel-sided, transverse ridge sharp and triangularly produced mesad; anterior declivity densely micropunctate, laterally with a densely pilose area in a shallow depression, as in female ***Paratiphia.*** Abdominal segments with posterad obliquely enlarged macropunctures gradually becoming denser toward the sixthsegment. Pygidium (Fig.9) uneven on its basal 2/3, rugose and irregularly ridged; regularly covered with individually convex papillae on apical 1/3. Transverse ridge of second sternum sharply defined except on its extreme sides (Fig.8).

Male and biology unknown.

Remarks.- The new genus described above resembles ***Epomidiopteron*** in possessing tridentate mandibles, unbordered apex of first tergum, uniform sized mesotibial spurs, large ribbonlike bands on the abdominal segments, lack of lanceolate setulae and prepectal carina of mesopleuron. At the same time, the transversely divided clypeal disc (Fig.4), basally pitted scutellum, forward projecting lateral lobe of pronotum, sensorial area on lateral lobe of first tergum and the specialized pyggidial area associates it with ***Paratiphia.*** Whereas it appears at the first glance to be in intermediate between these two genera, actually ***Silifka*** possesses unique and obviously apomorphous features, in having hypostomal structure (Fig.3) which does not occur in any of the above mentioned genera, and the unusual, lamellar division of the clypeal disc (Fig. 4), a character that is unknown elsewhere throughout the family Tiphiidae. Apparently, Silifkinae, with the included genera distributed in both Old-and New Worlds, have been derived from a Laurasian ancestral stock. The subfamily has now a disjunct distribution, similar to that of the Fedtschenkiinae (Sapygidae) which is a Turanian element in the Old World and Lower Sonoran in the Americas.



Figs. 1-10, ***Silifka fatima*** gen. and sp.n., holotype female

1, Wings; 2, Head, frontal view; 3, Head, in ventral view, showing the large submandibular triangle and that maxillary palpus longer than hypostoma; 4, Clypeal region of head, in sublateral view, showing ventral lobe of clypeus concealed under the dorsal lamella; 5, Head and pronotal declivity, in lateral view, showing the forward projecting lateral pronotal tubercle; 6, Mesotibial spurs. 7, Abdomen, in dorsal view, showing the arcuate first tergum; 8, Base of the abdomen, in lateral view, showing first tergum and second sternum both with a transverse ridge; 9, Pygidium; 10, Foretarsal claw

Key to selected taxa of Tiphiidae

1 (6) Hindwing cu-a nervure rectangularly bent at the middle; tibial spur formula 1-2-2; forewing with three submarginal cells; hind tibia without sensorial pit ..... ***Silifkinae***

2 (3) Apex of scutellum with spiracular pit; maxillary palpus shorter than half length of hypostoma; clypeus undivided; mesopleuron without prepectal carina; tegula twice as long as wide. (Epomidiopterini trib. n.Nearctic and Neotropical. Type-species : ***Epomidiopteron julii*** Romand, 1835) .... ***Epomidiopteron*** Romand, 1835

3 (2) Base of scutellum with spiracular pit; maxillary palpus longer than half hypostoma; clypeus divided in apical and basal sectors; prepectal carina always developed in male, often indicated in female; tegula as long as wide.

4 (5) Maxillary palpus 4/5 length of hypostoma; basal rim of oral cavity intersect occipital carina, postgenal bridge not developed; submandibular triangle indistinct; apical margin of first tergum bordered by a deep sulcus; inner spur of mesotibia half as long as outer spur. Paratiphiini trib.n. Nearctic and Neotropical. (Type-species : ***Epomidiopteron sumichrasti*** Sichel, 1864) ..... ***Paratiphia*** Sichel, 1864

5 (4) Maxillary palpus twice as long as hypostoma; basal rim of oral cavity far removed from occipital carina, postgenal bridge developed; submandibular triangle large, connected to base of hypostoma; apical margin of first tergum unbordered; mesotibial spurs alike, Silifkini trib.n. Palaearctic (Asia Minor) ..... ***Silifka*** Argaman and Özbek

6 (1) Hindwing cu-a nervure straight or quite so; tibial spur formula 1-1-2; forewing with two submarginal cells; inner aspect of metatibia with sensorial pit always developed. ..... Tiphiinae

7 (12) Maxillary palpus shorter than hypostoma; submandibular ridge connected to the apex of hypostoma, submandibular triangle not developed ..... Neotiphiini Argaman and Özbek

8 (9) Abdominal segments 2-5 with an apical, ribbon-like band polished and shining; lateral lobe of propodeum uniformly costulate troughout; first tergum with a transverse ridge. Nearctic. Type-species : ***Neotiphia acuta*** Mallcoh, 1918 ..... ***Neotiphia*** Malloch, 1918

9 (8) Abdominal segments 2-5 without apical band, entirely punctate or microscamose up to the very margin, at least on the sides; lateral lobe of propodeum sharply separated into upper costulate and lower aciculate sectors; first tergum without transverse ridge.

10 (11) Prepectal carina of mesopleuron developed; mesoscutum of female with anteromedian escarpment, hind basitarsus without groove; marginal cell of male forewing shorter than second submarginal. Neotropical. Type-species : ***Mallochia arnaui*** allen, 1972 ..... ***Mallochessa*** Allen, 1972

11 (10) Prepectal carina of mesopleuron not developed; mesoscutum of female without anteromedian escarpment, hind basitarsus with a longitudinal groove; male unknown. Afrotropical. Type-species : ***Tiphia scabrosa*** Gerstacker, 1858 ..... ***Serpapinta*** Argaman, gen.n.

12 (7) Maxillary palpus longer than hypostoma; submandibular ridge connected to middle or base of hypostomal carina, submandibular triangle distinct, often very large.

13 (14) Maxillary palpus longer than hypostoma with its last segment only; submandibular ridge vanished and substituted by a thin fold, which is connected to middle of hypostoma; female micropterous, male unknown. Pseudotiphiini trib. n. Palaearctic. Type-species : ***Tiphia brevipennis*** Lucas, 1846 ..... ***Pseudotiphia*** Ashmead, 1903

14 (13) Maxillary palpus 1.5-3.0x longer than hypostoma; submandibular ridge strong, connected to the base of hypostomal carina, submandibular triangle large.

15 (16) Second tergum with a strong transverse ridge beyond the base; male macropterous, female often micropterous. Luditini trib. n. Palaearctic. (Type-species : ***Tiphia villosa*** Fabricius, 1793) ..... ***Ludita*** Nagy, 1967

16 (15) Second tergum without ridge; both sexes macropterous or female occasionally brachypterous.

17 (20) Abdominal segments 2-5 with a broad apical, polished ribbon-like band; inner basal rim of hind basitarsus in female produced in a conspicuous lamella; hypopygium of male deeply sinuate before apex ..... Krombeiniini trib.n.

18 (19) Lateral lobe of propodeum entirely costulate; inner dorsal margin of hindcoxa with a backward directed tooth; prepectal carina of mesopleuron strongly developed in male, absent in female. Nearctic. (Type-species : ***Tiphia sulcate*** Roberts, 1930) ..... ***Locodamia*** Argaman, gen.n.

19 (18) Lateral lobe of propodeum sharply separated in upper costulate and lower aciculate sectors; hind coxa withoud tooth; prepectal carina of mesopleuron strongly developed in both sexes. Nearctic. (Type-species : ***Neotiphia chiricahua*** Pate, 1939) ..... ***Krombeinia*** Pate, 1947

20 (17) Abdominal segments 2-5 without apical band or at most a narrow one, vanished on the sides; in doubtful cases, female hind basitarsus without lamella and hypopigium of male always entire subapically.

21 (24) First tergum with a subapical fold flanking anterad or entirely covering medially the row of punctures, then the sides remain uncovered..... ..... Jaynesiini trib.n.

22 (23) Disc of first tergum bordered anteriorly by a transverse ridge; tibiae of female narrow, parallel-sided; male unknown. Neotropical. (Type-species : ***Tiphia quincemila*** Allen, 1972) ..... ***Vacacunda*** Argaman, gen.n.

23 (22) Disc of first tergum without transverse ridge; tibiae of female rather wide, almost globular, inflated; terga 3-5 of male densely clothed with short, dark, erect and spine-like setulae. Palaearctic. (Type-species : ***Tiphia communia*** Allen and Jaynes, 1930) ..... ***Jaynesia*** Allen, 1969

24 (21) First tergum without subapical fold, only the free, exposed transverse row of puntures.

25 (28) Occipital carina produced ventrally beyond hypostoma in a pair of triangular, conspicuous lamellar or blunt tubercle ..... Acablasini trib.n.

26 (27) Occipital lobes allied; hind coxa simple; mesoscutum of female without anteromedian escarpment; male clypeus yellow. Afrotropical. (Tpye-species : ***Tiphia abrupta*** Turner, 1908) ..... ***Acablasa*** Argaman, gen.n.

27 (26) Occipital tubercles widely separated; inner ventral margin of hind coxa bordered by a sharp ridge; mesoscutum with anteromedian escarpment; male unknown. Neotropical. (Type-species; ***Tiphia vandervechti*** Allen, 1972)..... ..... ***Ocasasla*** Argaman, gen.n.

28 (25) Occipital carina not produced in any way.

29 (32) First sternum perfectly flat, its anterior petiolar part smoothly continuous into posterior discal part. Afrotropical ..... ***Cabaraxini*** trib.n.

30 (31) First tergum bell-shaped with evenly arcuate sides, its anterolateral corners truncate; mesoscutum of female without anteromedian escarpment, mid-and hind basitarsus barely longer than wide; male flagellum slightly nodose but without tyloids. (Type-species ***Tiphia latipes*** Walker, 1871) .... ***Pandasaria*** Argaman, gen.n.

31 (30) First tergum in form of very long isosceles triangle, its anterolateral corners auriculate sideward; female unknown; male flagellum with keel-shaped tyloids. (Type-species : ***Cabaraxa compedita*** Nagy, 1974) .... ***Cabaraxa*** Nagy, 1974

32 (29) First sternum with a strong transverse crest separating anterior petiolar and posterior discal areas.

33 (36) Submandibular triangle dull, densely and deeply costulate and macropunctate throughout or at least on apical outer corner. Palaearctic and Afrotropical .... ***Icronathini*** trib.n.

34 (35) Mesopleuron in female with sharp prepectal carina; hind basitarsus of male without longitudinal groove. (Type-species : ***Icronatha nuristana*** Nagy, 1975) ..... ***Gebiupala*** Argaman, gen.n.

35 (34) Mesopleuron in female without prepectal carina; hind basitarsus of male with deep longitudinal groove. (Type-species : ***Tiphia olcesei*** Tournier, 1889) .... ***Icronatha*** Nagy, 1967

36 (33) Submandibular triangle highly polished and shining, occasionally with delicately engraved alutaceous sculpture, but never with punctures of any kind.

37 (38) Mandible narrow, parallel-sided, sharply bidentate apically, its dorsal surface with only one sulcus (inner dorsal) developed, other sulci vanished; male unknown. Burdufini trib. n. Neotropical (Type-species : ***Tiphia colombiana*** Allen, 1972) ..... ***Burdufa*** Argaman, gen. n.

38 (37) Mandible broad, expressively sickle-shaped, very often unidentate, its dorsal surface with two complete and a third partially developed sulci .... Tiphiini

39 (40) Inner dorsal sulcus of female mandible developed, the median sulcus reach but not join it outwardly; male fifth sternum without lateral tubercles. Worldwide. (Type-species: ***Tiphia ordinaria*** Smith, 1873) .... ***Foforoxia*** Argaman gen.n.

40 (39) Median dorsal sulcus of female mandible developed, the inner sulcus reach but not join it inwardly; male fifth sternum with lateral tubercles always developed.

41 (42) Third segment of maxillary palpus terminating in a grip-like, strongly sclerotized and canaliculate process, about as long as width of palpal segment. Afrotropical and oriental Regions. (Type-species : ***Tiphia cinchonae*** Allen, 1975) ..... ***Sasmarila*** Argaman, gen.n.

42 (41) Third segment of maxillary palpus without grip. Worlwide. (Type-species : ***Tiphia femorata*** Fabricius, 1775) ..... ***Tiphia*** Fabricius, 1775

Özet

Türkiye'den yeni bir altfamilya ve Tiphiidae (Hymenoptera, Aculeata)'nin yeniden sınıflandırılması

Silifka fatima sp.n., bilim dünyası için yeni olan Silifkinae altfamilyasının yeni cins ve türü olarak tesbit edildi. Buna bağlı olarak Tiphiidae'nin sistematiği yeniden incelendi ve bilinen türleri içeren 11 yeni tribus ile 10 yeni cins ortaya kondu. Tiphiidae'nin taksonomik kategorileri için tanı anahtarı hazırlandı.

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