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A new genus and species of maimetshid wasps in Lebanese Early Cretaceous amber (Hymenoptera: Maimetshidae)

Michael S. Engel[1,2]

Abstract. An interesting new maimetshid wasp is described and figured from the Early Cretaceous of Lebanon. ***Zorophratra corynetes*** Engel, new genus and species, differs in several important features from all other Maimetshidae and is classified within its own subfamily, **Zorophratrinae** Engel, new subfamily. A revised key to the genera of the family is provided, and attempts to incorporate all of those taxa known only as compression fossils. The genera of the family are organized into a revised classification, with the tribe **Ahiromaimetshini** Engel, new tribe, newly recognized within Maimetshinae, and the genus ***Turgonaliscus*** Engel, new genus, described for *Turgonalus cooperi* Rasnitsyn & Jarzembowski (resulting in *Turgonaliscus cooperi*, **new combination**).

INTRODUCTION

The extinct parasitoid wasp family Maimetshidae has been one of those groups which has grown considerably in the last 20 years. The family was first described from a female in Santonian amber from Taimyr, Siberia (Yantardakh locality, Kheta Formation), and originally attributed to Ceraphronoidea, with those features reminiscent of Megalyridae putatively linking these lineages (Rasnitsyn, 1975). A few other fossils were described subsequently, mostly from Cretaceous compressions, and were not initially recognized as allied to *Maimetsha arctica* Rasnitsyn in Taimyrian amber (*e.g.*, Rasnitsyn, 1977, 1990; Rasnitsyn *et al*., 1998). Shaw (1988, 1990), considering only *M.*

[1] Division of Entomology, Natural History Museum, and Department of Ecology & Evolutionary Biology, 1501 Crestline Drive – Suite 140, University of Kansas, Lawrence, Kansas 66045-4415, USA (msengel@ku.edu).

[2] Division of Invertebrate Zoology, American Museum of Natural History, Central Park West at 79th Street, New York, New York 10024-5192, USA.

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Table 1. Hierarchical classification of Maimetshidae (Trigonalyomorpha: Trigonalyoidea), with geographical and temporal ranges indicated.

Family MAIMETSHIDAE Rasnitsyn	
Subfamily Zorophratrinae, n. subfam.	
Genus *Zorophratra*, n. gen.	
Z. corynetes, n. sp.	Barremian, Lebanon
Subfamily Maimetshinae Rasnitsyn	
Tribe Ahiromaimetshini, n. trib.	
Genus *Ahiromaimetsha* Perrichot *et al.*	
A. najlae Perrichot *et al.*	Barremian, Lebanon
Genus *Turgonaliscus*, n. gen.	
T. cooperi (Rasnitsyn & Jarzembowski), n. comb.	Barremian, England
Genus *Turgonalus* Rasnitsyn	
T. minor Rasnitsyn	Aptian, Russia
Tribe Maimetshini Rasnitsyn	
Genus *Afrapia* Rasnitsyn & Brothers	
A. globularis Rasnitsyn & Brothers	Turonian, Botswana
A. variicornis Rasnitsyn & Brothers	Turonian, Botswana
Genus *Afromaimetsha* Rasnitsyn & Brothers	
A. robusta Rasnitsyn & Brothers	Turonian, Botswana
Genus *Ahstemiam* McKellar & Engel	
A. cellula McKellar & Engel	Campanian, Canada
Genus *Andyrossia* Rasnitsyn & Jarzembowski	
A. joyceae (Rasnitsyn & Jarzembowski)	Barremian, England
Genus *Burmaimetsha* Perrichot	
B. concava Perrichot	Cenomanian, Myanmar
Genus *Cretogonalys* Rasnitsyn	
C. taimyricus Rasnitsyn	Cenomanian, Taimyr
Genus *Guyotemaimetsha* Perrichot *et al.*	
G. enigmatica Perrichot *et al.*	Albian, France
Genus *Iberomaimetsha* Ortega-Blanco *et al.*	
I. nihtmara Ortega-Blanco *et al.*	Albian, Spain
I. pallida Perrichot & Perkovsky	Santonian, Taimyr
I. rasnitsyni Ortega-Blanco *et al.*	Albian, Spain
Genus *Maimetsha* Rasnitsyn	
M. arctica Rasnitsyn	Santonian, Taimyr
Genus *Maimetshasia* Perrichot	
M. kachinensis Perrichot	Cenomanian, Myanmar
Genus *Maimetshorapia* Rasnitsyn & Brothers	
M. africana Rasnitsyn & Brothers	Turonian, Botswana

arctica, united Maimetshidae with Megalyridae since the species fell within Dinapsinae in his phylogenetic analysis. Perrichot *et al.* (2004) later discovered a genus and species in the latest Albian amber of Archingeay-Les Nouillers, France, and were able to provide further clarity beyond what was available to Shaw (1988, 1990), and rightly considered the family as distinct from Megalyridae (following Rasnitsyn, 1988; Ronquist *et al.*, 1999). These authors also correctly showed that *Cretogonalys* Rasnitsyn, also in amber from Taimyr but of the Dolgan Formation (Agapa locality) and of Cenomanian age (Rasnitsyn, 1977), were related to *M. arctica* and the French species, conclusions further corroborated by the later discovery of additional material from France and Spain (Perrichot, 2009). This evidence reinforced the notion that Maimetshidae were in fact an early relative of, perhaps even a stem group to, Trigonalyidae. Rasnit-

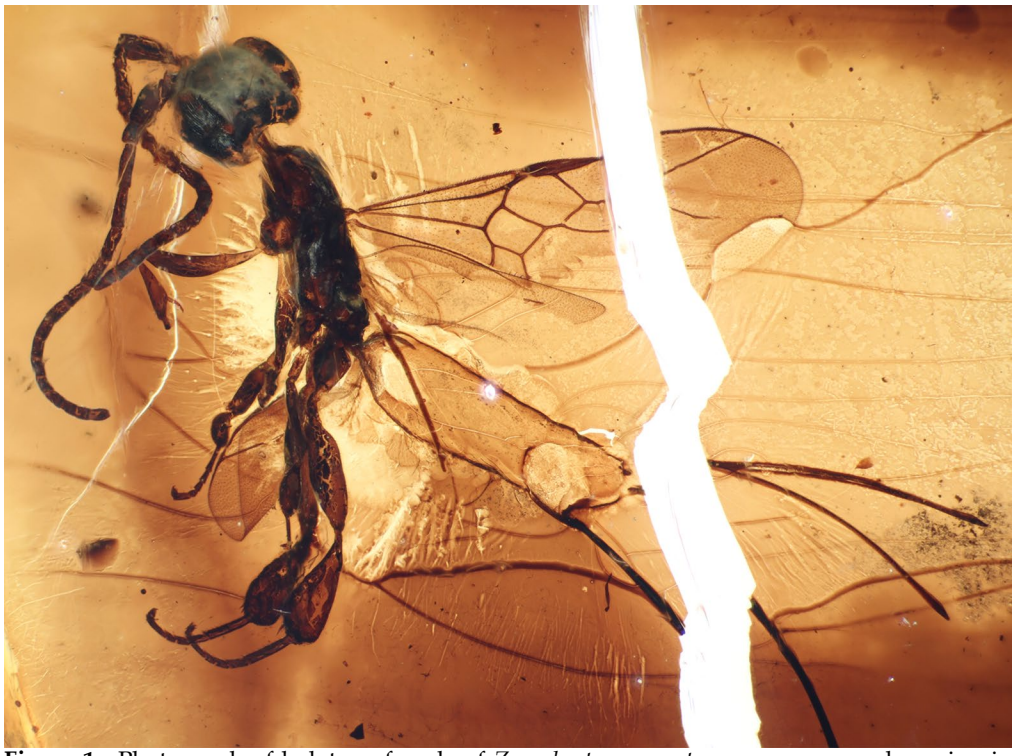


Figure 1. Photograph of holotype female of *Zorophratra corynetes*, new genus and species, in Early Cretaceous amber from central Lebanon.

syn & Brothers (2009) added several genera and species from Turonian compressions of Botswana, and Perrichot *et al*. (2011), Perrichot (2013), and Perrichot & Perkovsky (2016), expanded the diversity considerably based on amber inclusions from a variety of ages and localities (Table 1). Vilhelmsen *et al*. (2010) were able to establish Maimetshidae as thoroughly distinct from Megalyridae and corroborated more conclusively their relationship to Trigonalyidae.

Maimetshidae have become one of a series of apocritan families that seem to be hallmarks of the Cretaceous, in this respect analogous to the Stigmaphronidae (Rasnitsyn, 1975; Engel & Grimaldi, 2009; Ortega-Blanco *et al*., 2011a; McKellar & Engel, 2011a, 2012), Spathiopterygidae (Engel *et al*., 2013, 2015; Krogmann *et al*., 2016), Alavarommatidae (Ortega-Blanco *et al*., 2011b), Gallorommatidae (Gibson *et al*., 2007; Engel & Grimaldi, 2007; Ortega-Blanco *et al*., 2011b), and Serphitoidea (Brues, 1937; Kozlov & Rasnitsyn, 1979; Ortega-Blanco *et al*., 2011c; McKellar & Engel, 2011b, 2012; Engel *et al*., 2011; Engel & Perrichot, 2014; Engel, 2015). Like several of these families, Maimetshidae were widespread and could be found throughout the world (Table 1). The group is therefore of interest for understanding the diversity and biogeography of Cretaceous parasitoid wasps, and changes between this period and the subsequent Cenozoic by which time these groups were gone, perhaps dwindling in the stages leading up to the K-T boundary and pushed to extinction by either climatic changes or possibly loss of hosts that were impacted by such events.

Described here is a new species of peculiar maimetshid wasp from the Early Cretaceous of central Lebanon (Fig. 1). In some respects, the present species could be classified as a family separate from maimetshids as there are traits that are more similar

to Trigonalyidae (*e.g.*, the postfurcal 1cu-a of the forewing), but as the polarity of such features is unclear and there seem to be a greater number of shared characters with the former family, it is retained as a distinct subfamily within Maimetshidae. In addition, a revised classification and key to the genera of Maimetshidae is provided.

MATERIAL AND METHODS

A single female was found in a thin flake of Early Cretaceous amber from the Hammana locality of central Lebanon. The age, origin, and general fauna of the locality is summarized by Azar *et al*. (2010) and Maksoud *et al*. (2014). The amber is broken into two pieces, the fracture traversing the forewing beyond the pterostigma and the ovipositor (Fig. 1), but otherwise not damaging the wasp. The pieces are stabilized within Canada balsam on a slide mount, thereby preventing further damage as well as separation and misplacement of the two halves. The wasp can only be observed in lateral views and is weakly cleared except for the metasoma which is strongly desclerotized such that the boundaries of the individual sclerites are difficult to discern. The head is twisted to the left, such that in this view it is seen from above. The left wings are extended outward, and although the hind wing is partly damaged its venation remains easy to delineate. The right wings are damaged, partly missing and crumpled along the body.

The specimen was photographed with a Canon 7D digital camera attached to an Infinity K-2 long-distance microscope lens. Measurements were taken with an Olympus SZX-12 stereomicroscope and ocular micrometer. Morphological terminology for the description follows Perrichot *et al*. (2011), with some updates to vein and cell nomenclature.

SYSTEMATIC PALEONTOLOGY

Superfamily Trigonalyoidea Cresson
Family Maimetshidae Rasnitsyn

DIAGNOSIS (modified from Perrichot *et al*., 2011): Head hypognathous and somewhat globular; vertex with or without longitudinal median sulcus; compound eyes without ocular carina; subantennal groove absent (*i.e*., without groove to accommodate scape); antenna filiform, with scape short to moderate in length, never elongate, flagellomeres variable in number (14–19, most often 16), without tyloids and without apparent sexual dimorphism; mandibles endodont, often asymmetrical, with 3–4 teeth.

Pronotum short medially; mesoscutum with notauli and median sulcus, notauli percurrent but not meeting posteriorly; axillae meeting anterior to mesoscutellum or separated by scutoscutellar sulcus; propodeum areolate. Forewing with costal space moderate to wide; C and pterostigma present; 1Rs and 1M subequal in length, not continuously aligned (*i.e*., not forming smoothly continuous vein); marginal cell closed, wide (not triangular), moderately short to moderately long; two or three submarginal cells, depending on presence of 2rs-m, second submarginal cell sometimes petiolate owing to position of 1rs-m; first medial closed, typically separated from second submarginal cell by 2Rs+M (2Rs+M absent in Ahiromaimetshini, n. trib.); second medial cell often not defined and open or delimited by spectral or nebulous 2m-cu; 1cu-a antefurcal (subfamily Maimetshinae) or postfurcal (Zorophratrinae, n. subfam.). Hind

wing without jugal lobe; 4–5 distal hamuli; basal cell closed (Maimetshinae, but not known for several taxa) or open (Zorophratrinae), when closed, then free apex of Rs usually present (lacking in *Maimetshasia kachinensis* Perrichot); free apices of M and Cu short or absent, that of A absent. Legs with or without trochantelli (apparently lacking in Zorophratrinae and some Maimetshinae, but this putative absence may be the result of poor preservation and faint sulci demarcating the trochantelli and therefore should be confirmed in future studies); tibial spur formula 1-2-2; protibial calcar variable (curved to comparatively straight; simple or apically bifid); tarsal formula 5-5-5; tarsal plantulae present in some females; pretarsal claws with preapical tooth; arolium present.

Metasoma attached low on propodeum, rather short and compact (subequal to or shorter than mesosoma in Maimetshinae) to elongate and tubular (in Zorophratrinae), with integument not strongly sculptured; first metasomal segment longest [as noted by Perrichot *et al*. (2011), articulatory ring mentioned by Rasnitsyn and Brothers (2009) was apparently a mistake in interpretation]; apical sternum of female elongate, nearly reaching metasomal apex; ovipositor external, usually short (most Maimetshinae) but sometimes long (Zorophratrinae), sheaths at most as long as metasoma, not fitting tightly to ovipositor (often preserved detached).

Comments: Herein the family is considered to comprise two distinct subfamilies, Zorophratrinae, n. subfam., and Maimetshinae. Table 1 summarizes the diversity of the family as it is presently understood, with a total of 18 species in 15 genera considered as belonging to the family, spanning the Barremian through the Campanian and distributed in Laurasia as far west as the Western Interior Seaway and across Eurasia to its southeastern boundaries, and across the Tethys Sea into Africa.

A revised key to the supraspecific diversity is provided below, attempting to incorporate some of the more poorly known taxa documented from compression fossils. In this regard, it is worthwhile briefly discussing some variations across the family in the number and form of the submarginal cells of the forewing.

The condition of the number of submarginal cells and whether or not the second is petiolate relates to the presence or absence and connections of crossveins 1rs-m and 2rs-m. Among maimetshids, the condition of arriving at two submarginal cells can be quite different and, perhaps, independent. In one type, the loss of 2rs-m results in the disappearance of the third submarginal cell, the result being two cells retained (the first and second submarginal cells). However, a similar condition of two submarginal cells may also result from the loss of 1rs-m, in which case the two cells present are effectively the first and third (or a 'merged' second and third submarginal cell). Moreover, when 1rs-m is present (independent of the presence or absence of 2rs-m), its relative connections define whether or not the second submarginal cell is petiolate or not. When 1rs-m connects to Rs prior to r-rs (*i.e*., on 2Rs after its divergence from Rs+M), then the second submarginal cell appears reduced and petiolate. When this same crossvein connects to Rs distad r-rs (*i.e*., on 3Rs), then the second submarginal cell has a defined anterior border along the marginal cell and is either trapezoidal, rectangular, or squarish.

It therefore seems most appropriate to focus on the condition of the rs-m crossveins (absent vs. present, and if present for 1rs-m, then which longitudinal vein abscissae it connects). It is this arrangement that seems to be homologous across taxa, and less so the raw number of submarginal cells that are observed. Given this, some couplets in the key provided here emphasize the condition of the crossveins, rather than the character state as defined relative to the cells.

Key to Genera of Maimetshidae
(modified from Perrichot *et al*., 2011; Perrichot, 2013; and Perrichot & Perkovsky, 2016)

NOTE: Not all characters are known for each genus (*e.g*., some are known only from isolated forewings), and so the present key will certainly require expansion and revision as more complete material is discovered for some of the species presently known only as compression fossils.

1. Metasoma globular, ovipositor short; metatibia not clavate; forewing with cu-a proximal to basal vein, with or without 2m-cu, and with apical abscissa Cu long; hind wing with abscissae of Rs, M, and Cu present, with Cu and A meeting (hind wings completely or partially unknown for several species and so this trait will require further confirmation in future studies) [Maimetshinae; Barremian–Campanian] 2
—. Metasoma long and tubular, ovipositor long; metatibia distinctly clavate; forewing with cu-a apical basal vein, lacking 2m-cu, and apical abscissa Cu short; hind wing with only C, R1, M+Cu, and A present, abscissae of Rs, M, and Cu absent, with Cu and A not meeting [Zorophratrinae, n. subfam.; Barremian; Lebanon] ..... *Zorophratra*, n. gen.

2(1). Forewing 2Rs+M absent, 1m-cu effectively confluent with 2Rs [Ahiromaimetshini, n. trib.; Barremian–Aptian] 3
—. Forewing 2Rs+M present (*i.e*., 1m-cu basad 2Rs) [Maimetshini; Barremian–Campanian] 5

3(2). Forewing 2rs-m tubular [Barremian; Lebanon] .... *Ahiromaimetsha* Perrichot *et al*.
—. Forewing 2rs-m nebulous 4

4(3). Forewing 1M not arched; second submarginal cell not petiolate, with 1rs-m contacting Rs at r-rs; 2m-cu nebulous [Aptian; Chita, Russa] .... *Turgonalus* Rasnitsyn
—. Forewing 1M arched; second submarginal cell petiolate (*i.e*., 1rs-m contacing Rs before r-rs; 2m-cu absent [Barremian; Rudgwick, England] .... *Turgonaliscus*, n. gen.

5(2). Forewing with 1rs-m and 2rs-m present (*i.e*., three submarginal cells, third apically delimited by either tubular or nebulous 2rs-m); 14–19 flagellomeres 6
—. Forewing with 2rs-m absent (*i.e*., two submarginal cells); 14 flagellomeres ... 13

6(5). Forewing 2Rs+M subequal to or distinctly longer than 1m-cu 7
—. Forewing 2Rs+M distinctly shorter than 1m-cu [Albian–Santonian; Peñacerrada I, Spain and Taimyr, Siberia] ... *Iberomaimetsha* Ortega-Blanco *et al*., in part

7(6). Forewing 1rs-m meeting Rs prior to r-rs 8
—. Forewing 1rs-m meeting Rs at r-rs [Cenomanian; Taimyr, Siberia] .... *Cretogonalys* Rasnitsyn

8(7). Forewing 1rs-m long, closer to r-rs than to 2Rs+M, thus second submarginal cell not reduced and with short petiole (*i.e*., 1rs-m longer than 3Rs); pedicel, where known, not curved 9
—. Forewing 1rs-m exceedingly short, closer to 2Rs+M than r-rs, thus second submarginal cell greatly reduced and with long petiole (*i.e*., 1rs-m much shorter than 3Rs; pedicel arched [Campanian; Alberta, Canada] .... *Ashtemiam* McKellar & Engel

9(8). Forewing costal cell narrow, about as wide as pterostigma 10
—. Forewing costal cell distinctly broad, broader than pterostigma [Barremian;

Capel, England] ..... *Andyrossia* Rasnitsyn & Jarzembowski

10(9). Notauli more or less parallel 11

—. Notauli strongly diverging anteriorly [Turonian; Orapa, Botswana] .... *Afromaimetsha* Rasnitsyn & Brothers

11(10). Forewing Rs originating well before pterostigma, prestigma about as long as or longer than 1Rs 12

—. Forewing Rs originating close to pterostigma, prestigma much shorter than 1Rs; prestigma incrassate, swollen apically and broader than basal abscissa of Rs [Turonian; Orapa, Botswana] ..... *Maimetshorapia* Rasnitsyn & Brothers

12(11). Prestigma linear and similar to basal abscissa R; 2m-cu absent [Turonian; Orapa, Botswana] ..... *Afrapia* Rasnitsyn & Brothers

—. Prestigma incrassate; 2m-cu present, nebulous [Albian; Peñacerrada I, Spain] ..... *Iberomaimetsha* Ortega-Blanco *et al*., in part

13(5). Forewing 1rs-m proximad meeting Rs prior to r-rs (*i.e*., second submarginal cell petiolate anteriorly); hind wing with free apex of Cu; vertex without medial longitudinal line; compound eyes bulging; tarsal plantulae present in females (unknown for *Maimetshasia* Perrichot) 14

—. Forewing with second submarginal not petiolate, 1rs-m meeting Rs distad r-rs; hind wing without free apex of Cu; vertex with medial longitudinal line; compound eyes not bulging, almost following head contour; tarsal plantulae absent [Santonian; Taimyr, Siberia] ..... *Maimetsha* Rasnitsyn

14(13). Forewing with first medial cell rhombic, with 1M and 1m-cu nearly parallel; 2Rs+M longer than 1Rs+M; short stubs reminiscent of 2rs-m present (*i.e*., apical abscissa of Rs distad r-rs appearing as composed of 4Rs and 5Rs), apical abscissa Rs distinctly angled at position of 2rs-m stubs 15

—. Forewing with first medial cell trapezoidal, with 1M and 1m-cu strongly converging posteriorly; 2Rs+M shorter than 1Rs+M; 2rs-m entirely absent (*i.e*., apical abscissa of Rs distad r-rs composed only of 4Rs); apical abscissa of Rs continuously arched [Cenomanian; Kachin, Myanmar] .... *Maimetshasia* Perrichot

15(14). Face distinctly concave; right mandible surpassing left one by its entire apical tooth when closed; antenna with pedicel inserted deeply into scape's apex, in male with flagellomeres elongate (never as broad as long); forewing apparent 4Rs (abscissa of Rs distad r-rs) slightly shorter than r-rs [Cenomanian; Kachin, Myanmar] ..... *Burmaimetsha* Perrichot

—. Face weakly concave; mandibles overlapping apically when closed (their apical teeth aligned); antenna with pedicel inserted apically on scape, in male with flagellomeres compact (penultimate one as broad as long); forewing apparent 4Rs (abscissa of Rs distad r-rs) longer than r-rs [Albian; Archingeay-Les Nouillers, France] ..... *Guyotemaimetsha* Perrichot *et al*.

Zorophratrinae Engel, new subfamily

ZooBank: urn:lsid:zoobank.org:act:AC54B5DD-DCEA-4AA3-9733-145C61E302EC

Type genus: *Zorophratra* Engel, new genus.

Diagnosis: Metatibia distinctly clavate; tarsal plantulae present; forewing with cu-a postfurcal (*i.e*., apicad basal vein), 2m-cu absent, apical abscissa Cu (3Cu) short, stub-like; hind wing with only C (presumably C+Sc+R), R1, M+Cu, and A present, abscissae of Rs, M, and Cu absent, with M+Cu (or what presumably would apically be merely Cu) and A not meeting; metasoma tubular, elongate, longer than meso-

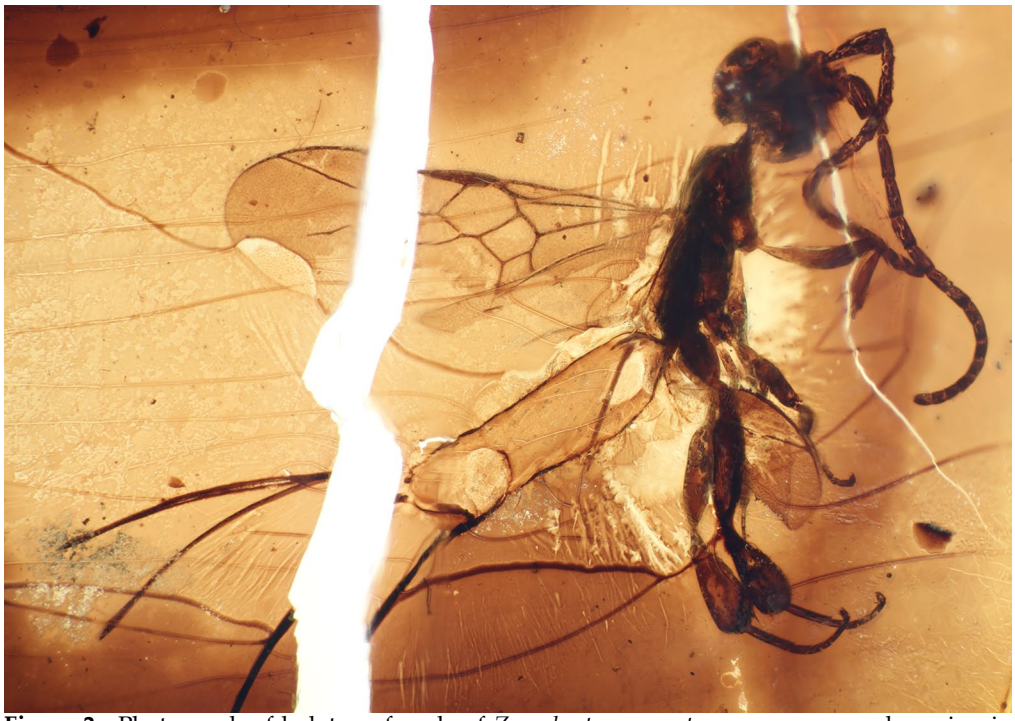


Figure 2. Photograph of holotype female of *Zorophratra corynetes*, new genus and species, in Barremian amber from Lebanon.

soma; ovipositor elongate. In addition, compound eyes large, slightly bulging; vertex without medial sulcus; occipital carina present; antennal scape longer than wide and widening apically, length approximately 2.2 times apical width; pedicel slightly longer than wide, straight; flagellum with 14 flagellomeres, flagellomeres cylindrical, first flagellomere longest; forewing with two submarginal cells (2rs-m absent), second submarginal cell not petiolate, trapezoidal; 1rs-m nebulous; 2cu-a absent; and protibial calcar arched with apex simple.

Zorophratra Engel, new genus

ZooBank: urn:lsid:zoobank.org:act:D17C688D-D623-4A42-9B15-FD6AE1108523

TYPE SPECIES: *Zorophratra corynetes* Engel, new species.

DIAGNOSIS: As for the subfamily (*vide supra*).

ETYMOLOGY: The generic name is a combination of the Greek words *zoros*, meaning, "pure" or "truly", and *phratra*, meaning, "clan". The gender of the name is feminine.

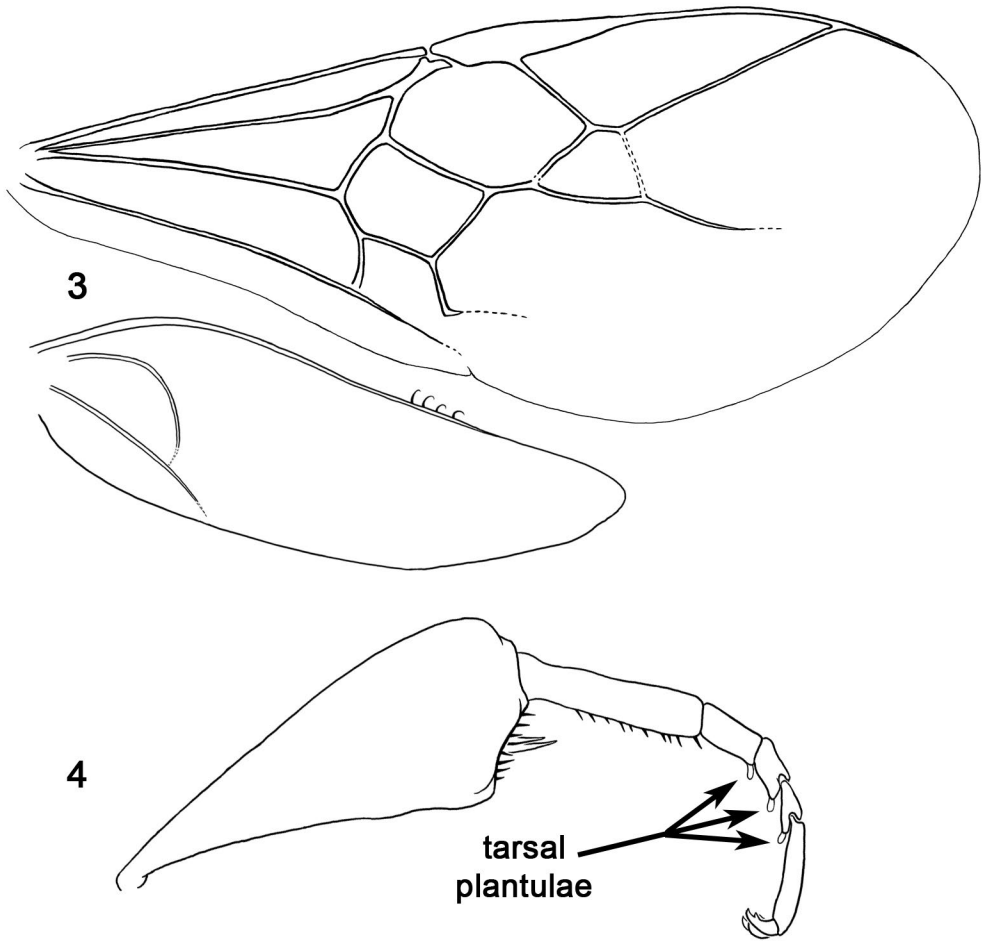
Zorophratra corynetes Engel, new species

ZooBank: urn:lsid:zoobank.org:act:96B52B2C-CF68-445E-9421-78DF15338800

(Figs. 1–4)

DIAGNOSIS: As for the genus (*vide supra*).

DESCRIPTION: ♀: Total body length approximately 3.26 mm (excluding antennae and ovipositor); forewing length 2.06 mm, maximum width 0.86 mm. Integument partially cleared throughout, and entirely cleared on metasoma (Figs. 1, 2); head, me-



Figures 3–4. Wing venation and hind leg of *Zorophratra corynetes*, new genus and species. **3.** Forewing and hind wing venation. **4.** Metatibia, metatarsus, and metapretarsus in lateral view.

sosoma, and legs apparently dark brown as preserved; ovipositor and sheaths dark brown. Pubescence, where evident, generally sparse, with minute, fine setae, except where noted below.

Head broad, width 0.75 mm, length ca. 0.59 mm (approximate as direct frontal view not possible owing to preservation), where evident integument finely imbricate; compound eyes large, without ocular setae, inner orbits straight and apparently nearly parallel, upper interorbital distance 0.39 mm; ocelli arranged in equilateral triangle on frons, upper tangent between lateral ocelli slightly below upper tangent of compound eyes; lateral ocelli separated by 0.11 mm, ocellocular distance 0.09 mm; gena narrow, much narrower than compound eye; occipital carina present; frons evenly and faintly convex, without frontal carina or sulcus. Antennae inserted low on face, toruli closer to each other than to compound eyes; scape longer than wide, but not greatly elongate, thicker apically than basally, length 0.31 mm, basal width 0.07 mm, apical width 0.14 mm; pedicel slightly longer than wide, length 0.10 mm, width 0.08 mm; flagellum filiform, with 14 flagellomeres, basal flagellomeres longer than wide, tapering in

length toward apex of flagellum, with basalmost flagellomere distinctly longer than remaining flagellomeres; flagellomeres approximately 0.06 mm in width; lengths of individual flagellomeres as follows (flagellomeres I–XIV): 0.22 mm, 0.19 mm, 0.19 mm, 0.16 mm, 0.15 mm, 0.13 mm, 0.13 mm, 0.10 mm, 0.09 mm, 0.09 mm, 0.09 mm, 0.08 mm, 0.08 mm, 0.10 mm; apical flagellomere with rounded apex. Malar space well developed, slightly longer than basal mandibular width, without malar sulcus. Mandibles asymmetrical. Clypeus apparently short, transverse.

Mesosoma 1.10 mm in length, comparatively low; pronotum dorsally reduced to short neck, without developed posterodorsal surface; mesoscutum with notauli and median sulcus simple and well-impressed, notauli percurrent, widely separated apically at transverse mesoscutal-mesoscutellar sulcus; mesoscutum and mesoscutellum comparatively flat; mesoscutum apparently about twice as long as mesoscutellum (direct dorsal view not possible as preserved, so approximated from oblique view); mesosoma without prominent sculpture, largely smooth to faintly imbricate except propodeum distinctly areolate, areolae large.

Coxae large, with broad bases; metacoxa largest, more swollen, length approximately 1.5 times length of pro- and mesocoxae; metacoxae inserted posteroventrally on mesosoma; tibiae generally slender; tibial spur formula 1-2-2; protibial calcar arched, with apex simple; metafemur slightly swollen, length 0.78 mm; metatibia distinctly clavate (Figs. 1, 2, 4), greatly expanded apically, length 0.78 mm, apical width 0.23 mm, apical margin with minute comb of short, stiff setae; metatibial spurs short, straight, and simple; basitarsus longest tarsomere, slightly shorter than combined lengths of remaining tarsomeres, metabasitarsus shorter than mesobasitarsus; tarsomere V longest of remaining tarsomeres (Fig. 4); meta-mediotarsomeres (metatarsomeres II–IV) with apical tarsal plantulae (Fig. 4); pretarsal claws with minute, subapical tooth; arolium present and large.

Wing membranes hyaline and faintly infumate, with numerous microtrichia; veins brown to dark brown; forewing (venation as in figure 3) with costal cell widened, apically slightly wider than pterostigma; pterostigma long, much longer than wide, tapering in width apically; marginal cell large, much wider than pterostigma, with acute apex terminating on anterior wing margin; R1 continuing beyond marginal cell apex as tubular vein, disappearing prior to wing apex; 1Rs slightly shorter than 1M, originating basad pterostigmal base by distance approximately equal its length; 1M not arched, roughly parallel to 1m-cu; 1m-cu straight; 2m-cu absent; first medial cell slightly longer than high; 1cu-a strongly postfurcal, with $1Cu_a$ shorter than $1Cu_b$, and 1cu-a slightly shorter than $1Cu_b$; $1Cu_a$ angled relative to $1Cu_b$; $1Cu_b$ approximately parallel to 1Rs+M; 1Rs+M longer than 2Rs+M; 2Rs+M shorter than 2Rs, slightly less than one-half length r-rs; r-rs long and straight, longer than 2Rs, originating just prior to pterostigmal midlength; two submarginal cells owing to complete absence of 2rs-m; first submarginal cell large; second submarginal cell trapezoidal, not petiolate, with nebulous 1rs-m, anterior cell width less than one-half posterior cell width; 1rs-m meeting Rs beyond r-rs, 3Rs much shorter than 2Rs; 4Rs angled relative to 3Rs and straight to wing margin; apical abscissa of M extending beyond 1rs-m by more than second submarginal cell width along M, disappearing prior to transverse tangent of marginal cell apex; 2Cu slightly shorter than $1Cu_b$, roughly parallel with 1cu-a; 2cu-a absent (thus second cubital cell open postero-apically); 3Cu present as tubular stub, then continuing as nebulous vein for short distance. Hind wing length 1.29 mm, maximum width 0.41 mm, venation as in figure 3, with four hamuli apically along anterior margin near apex of R1; venation reduced, with C+Sc+R, R1, arched M+Cu, and A present;

M+Cu not meeting apically as tubular veins; remaining veins absent (not represented by nebulous or spectral veins).

Metasoma attached low on propodeum between and slightly up from metacoxal articulations, elongate (Figs. 1, 2), approximately 1.57 mm in length, longer than mesosoma, cylindrical; integument entirely desclerotized as preserved (thus, details as to sculpturing and proportions of particular sclerites difficult to determine); apical sternum apparently enlarged; cercus short, knob-like, with minute, fine setae; ovipositor long (Figs. 1, 2), length as preserved approximately 1.92 mm, apex acutely narrowed and pointed (narrowed in apical 0.14 mm of length), margin serrated at subapical arch where ovipositor narrows to apex; sheaths long, slightly shorter than ovipositor, length 1.55 mm, not tightly adjoined to ovipositor.

♂: *Latet*.

Holotype: ♀ (Fig. 1); Early Cretaceous (Barremian) amber, Hammana, Mdeirij, Lebanon; deposited in the Natural History Museum, Lebanese University, Faculty of Sciences, Fanar, Lebanon.

Etymology: The specific epithet is taken from the Greek *korynetes*, meaning, "club-bearer", and is a reference to the distinctive clavate metatibiae.

Subfamily Maimetshinae Rasnitsyn

Diagnosis: Metatibia, where known, not clavate; tarsal plantulae present or absent; forewing with cu-a antefurcal (*i.e.*, proximad basal vein), with or without 2m-cu, and with apical abscissa Cu long; hind wing with abscissae of Rs, M, and Cu present, with Cu and A meeting (hind wings completely or partially unknown for several species); metasoma short and often globular; ovipositor typically short.

Ahiromaimetshini Engel, new tribe

ZooBank: urn:lsid:zoobank.org:act:F8B1CF49-C44F-4C4F-B464-EDE427975CC4

Type genus: *Ahiromaimetsha* Perrichot, Azar, Nel, & Engel in Perrichot *et al*., 2011.

Diagnosis: Forewing 2Rs+M absent; 1m-cu effectively confluent with 2Rs.

Included genera: The tribe includes three genera, all from the Early Cretaceous (Barremian–Aptian) — *Ahiromaimetsha* from southern Lebanon (Perrichot *et al*., 2011), *Turgonalus* Rasnitsyn from Chita in eastern Russia (Rasnitsyn, 1990), and *Turgonaliscus*, n. gen., from southern England (Rasnitsyn *et al*., 1998; *vide infra*).

Turgonaliscus Engel, new genus

ZooBank: urn:lsid:zoobank.org:act:9F9F4694-3A82-4F47-A9F6-A9287F7066BB

Type species: *Turgonalus cooperi* Rasnitsyn & Jarzembowski in Rasnitsyn *et al*., 1998.

Diagnosis: The new genus can be distinguished from the similar and slightly younger *Turgonalus* Rasnitsyn in the forewing by the arched 1M, petiolate second submarginal cell (*i.e.*, 1rs-m contacting Rs basad r-rs), and absence of 2m-cu.

Etymology: The generic name is a combination of *Turgonalus*, the original genus in which the type species was placed, and the suffix *–iscus*, denoting diminutive, as a reference to the smaller size of the type species relative to *Turgonalus minor* Rasnitsyn from Chita, Russia (Rasnitsyn, 1990). The gender of the name is masculine.

Included species: The genus presently consists of only the type species, *Turgonaliscus cooperi* (Rasnitsyn & Jarzembowski), **new combination**.

Tribe Maimetshini Rasnitsyn

Maimetshidae Rasnitsyn, 1975: 73. Type genus: *Maimetsha* Rasnitsyn, 1975.
Cretogonalinae Rasnitsyn, 1977: 106. Type genus: *Cretogonalys* Rasnitsyn, 1977.

DIAGNOSIS: Forewing 2Rs+M present, 1m-cu basad 2Rs.

INCLUDED GENERA: The tribe consists of 11 genera, thereby encompassing the majority of the Maimetshidae (Table 1), and ranges from the Barremian through to the Campanian. Included genera are: *Andyrossia* Rasnitsyn & Jarzembowski (a replacement name for *Arossia* Rasnitsyn & Jarzembowski: Rasnitsyn *et al*., 1998; Rasnitsyn & Jarzembowski, 2000), from the Barremian of southern England; *Afrapia* Rasnitsyn & Brothers, *Afromaimetsha* Rasnitsyn & Brothers, and *Maimetshorapia* Rasnitsyn & Brothers, all from the Turonian of Botswana (Rasnitsyn & Brothers, 2009); *Iberomaimetsha* Ortega-Blanco *et al*., in Albian Spanish amber and Santonian Taimyrian amber (Perrichot *et al*., 2011; Perrichot & Perkovsky, 2016); *Guyotemaimetsha* Perrichot *et al*., in latest Albian amber of France; *Burmaimetsha* Perrichot and *Maimetshasia* Perrichot, both in Cenomanian Burmese amber (Perrichot, 2013); *Cretogonalys* Rasnitsyn, in Cenomanian Taimyrian amber (Rasnitsyn, 1977); *Maimetsha* Rasnitsyn from Santonian Taimyrian amber (Rasnitsyn, 1975); and *Ahstemiam* McKellar & Engel, in Campanian Canadian amber (Perrichot *et al*., 2011).

DISCUSSION

Zorophratra corynetes could be considered as a family distinct from the remaining maimetshids, but it seems preferable to slightly expand the circumscription of Maimetshidae. The same is, of course, true for many peculiar Mesozoic taxa (*e.g*., Engel & Huang, 2017), and unless there are other compelling reasons for doing so, it seems best to avoid a proliferation of small or even monotypic family-group taxa in the absence of phylogenetic resolution, although many well-argued exceptions abound (*e.g*., Rasnitsyn, 1975; Liu *et al*., 2007; Gibson *et al*., 2007; Zhang & Rasnitsyn, 2007; Engel *et al*., 2013, 2016a, 2016b, 2017; Engel & Wang, 2016; Engel, in press). As the diversity of Maimetshidae continues to be documented and described, particularly from well-preserved material in amber, expanded cladistic analyses of Trigonalyoidea *s.l*. should be explored, at which time the circumscription of these families certainly may require revision, particularly should the distinct groups of maimetshids form a grade relative to Trigonalyidae.

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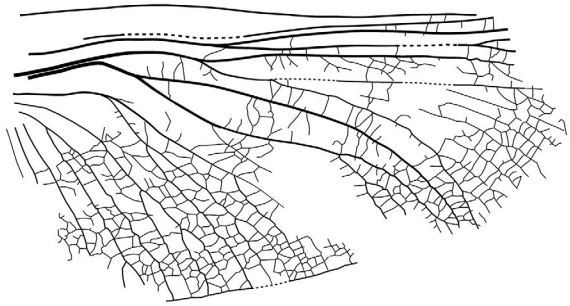

Pharciphyzelus lacefieldi Beckemeyer & Engel, 2011

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