

Revision of the enigmatic genus *Gastralysia* Fischer (Hymenoptera, Braconidae, Alysiinae)

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Abstract

The enigmatic genus *Gastralysia* Fischer, 1967 (Hymenoptera: Braconidae: Alysiinae) and its type species, *G. garambana* Fischer, 1967, are redescribed and illustrated. The female is described for the first time. The position of the genus is discussed and the genus is placed in a new subtribus, *Gastralysiina* **subtrib. n.** The genus is reported new for Ivory Coast and Tanzania.

Keywords

Braconidae, Alysiinae, *Gastralysia*, redescription, Afrotropical, Zaire, Ivory Coast, Tanzania

Introduction

Gastralysia Fischer, 1967, is an Afrotropical genus belonging to the large subfamily Alysiinae (Hymenoptera, Braconidae), with 2,442 valid species in 107 genera up to 2015 according to Yu et al. (2016). It is a common group containing generally small (2–5 mm) parasitoid wasps, but *Gastralysia* Fischer is extremely rarely collected and is highly aberrant because of the convex metasomal carapace. The latter is unique in the Alysiinae, but common in Cheloninae and Brachistinae, groups that are only distantly related to the Alysiinae (Sharanowski et al. 2011). Within the cyclostome lineages (to which the Alysiinae belong) a convex carapace is rare except in the tribe Physaraiini van

Achterberg, 1984 (Braconinae). Physaraiini are mainly Afrotropical and parasitoids of gall-forming larvae of Curculionidae (Donaldson 1989). The biology of *Gastralysia* is unknown, but all Alysiinae are koinobiont endoparasitoids of larvae of cyclorrhaphous Diptera (e.g., van Achterberg 1993). It is likely that the carapace indicates oviposition in a hard substrate, e.g. galls caused by dipteran larvae or woody branches with mining dipteran larvae. The type species (and only known species) consists only of males; here we describe and illustrate for the first time the female of the type species and the species is reported as new for Ivory Coast and Tanzania.

Material and methods

The redescribed specimen was collected in a Malaise trap and preserved in 70% alcohol. For identification of the subfamily Alysiinae, see van Achterberg (1993), for identification of *Gastralysia* Fischer, see Fischer (1967) and the diagnosis in this paper, for references to the Alysiinae, see Yu et al. (2016) and for the terminology used in this paper, see van Achterberg (1988, 1993). Measurements are taken as indicated by van Achterberg (1988): for the length and the width of a body part the maximum length and width is taken, unless otherwise indicated. The length of the mesosoma is measured from the anterior border of the mesoscutum to the apex of the propodeum and of the first tergite from the posterior border of the adductor to the medio-posterior margin of the tergite. Observations and descriptions was made with an Opto-Edu A230903 stereomicroscope and a fluorescent lamp. Photographic images were made with the Keyence VHX-5000 digital microscope. The redescribed female specimen is deposited in the Naturalis Biodiversity Center, Leiden, the Netherlands (RMNH); a second female is present in the Hungarian Natural History Museum, Budapest, Hungary (MTMA).

Systematics

Gastralysia Fischer, 1967

Figures 1–16

Gastralysia Fischer, 1967: 110, 134. Type species (by monotypy): *Gastralysia garambana* Fischer, 1967 [lost?].

Diagnosis. Antenna with 39–41 segments and third segment (including annellus) $0.9 \times$ as long as fourth segment; epistomal sulcus crenulate (Fig. 7); median groove of mesoscutum complete and similarly crenulate as complete notauli (Fig. 5); posterior half of precoxal sulcus vertical, runs to mesosternum and nearly connecting to lamelliform postpectal carina; pleural sulcus wider than precoxal sulcus and coarsely crenulate (Fig. 4); mesosternal sulcus medium-sized and crenulate; propodeum very short, in dorsal view slightly longer than metanotum (Fig. 5) and with curved transverse lamelliform

carina; antero-dorsally propodeum with a parallel-sided lateral lamellae (spine-shaped in lateral view) as long as posterior metanotal lamella (♂) or distinctly longer (♀); vein CU1b of fore wing longer than vein cu-a, only pigmented, interstitial with vein m-cu and reclivous; vein 2-SR of fore wing longer than vein 3-SR; first subdiscal cell of fore wing ventrally and posteriorly without sclerotized veins; hind wing reduced (Fig. 3) and vein cu-a absent; tarsal claws normal (Fig. 10); first metasomal tergite $0.5\text{--}0.6 \times$ as long as its apical width, movably connected to second tergite (Fig. 11), with its dorsal carinae flattened and posteriorly united in a wide median lamella (Fig. 5); dorsope absent; second and third metasomal tergites form a strongly convex carapace, closed apically, with serrate ventral margin posteriorly and covering following segments; hypopygium long (Fig. 11); ovipositor short and its sheath only apically setose (Fig. 11).

Biology. Unknown.

Distribution. Afrotropical (Zaire, Ivory Coast, Tanzania). One species.

Notes. Fischer (1976) placed *Gastralysia* in his “Gruppe F” because of the complete wing venation, third antennal segment as long as fourth segment or longer, vein 2-SR not shorter than vein 3-SR of fore wing and second metasomal tergite sculptured. *Gastralysia* does not fit in with the other genera of this group (e.g., *Trachyusa* Ruthe, 1854 and *Bobekia* Niezabitowski, 1910) because of having the third antennal segment slightly shorter than the fourth segment (Fig. 12), an entirely differently shaped hind wing, propodeum and first tergite, different venation of the fore wing, etc. It fits somewhat better in his “Gruppe C” because of the shortened third antennal segment and in this group it has some superficial resemblance to the Oriental and East Palaearctic genus *Hylcalosia* Fischer, 1967. The latter has also a coarsely sculptured (but less convex) carapace formed by the second and third metasomal tergites (e.g., van Achterberg 1983, Belokobylskij 2015, Zhu et al. 2017) and the third antennal segment is more or less widened in lateral view. However, it differs in the shape of the mandible, clypeus, head, propodeum and ovipositor as well as in several details of the venation. Actually, *Gastralysia* occupies a very isolated position within the Alysini and, therefore, we propose a new subtribus for this genus, *Gastralysiina* subtrib. n. The new subtribus is monobasic (including only *Gastralysia* Fischer) and differs from all other Alysini by the apically closed and strongly convex carapace, the long unsclerotised and reclivous vein CU1b of the fore wing, the wide median lamella of the first tergite united to a flattened ring of carinae submedially and the enlarged hypopygium.

Gastralysia garambana Fischer, 1967

Figures 1–16

Gastralysia Fischer, 1967: 110, 134–137. Type species (by monotypy): *Gastralysia garambana* Fischer, 1967 [lost?].

Type material. Holotype ♂ from Zaire should be in Brussels (in the collection of the “Institut des Parcs Nationaux [de Congo belge]” now housed in the Koninklijk Bel-

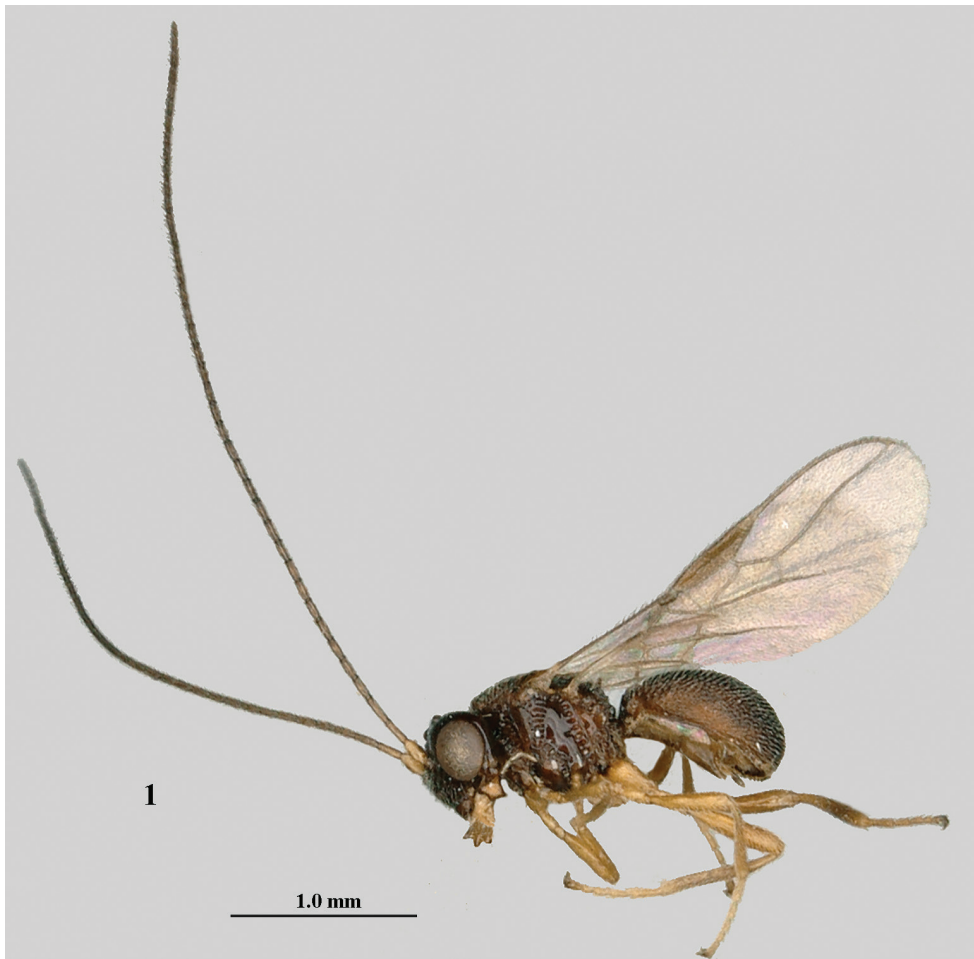


Figure 1. *Gastralysia garambana* Fischer, ♀, Ivory Coast, habitus, lateral aspect.

gisch Instituut voor Natuurwetenschappen) but could not be found. Repeated searches for the holotype and the three ♂ paratypes in the collections in Tervuren, Paris, Vienna, London and Genève were also in vain. The type series was collected in a ruderal savannah near the campsite on *Sorghum* leaves by hand net during the exploration of the Garamba National Park by H. de Saeger in 1949–1952 (Fischer 1967).

Additional material. 1 ♀ (RMNH), “Côte d’Ivoire, Katiola, 23.v.1981, Malaise [trap], J.W. Everts c.s.”; 1 ♀ (MTMA), “Tanzania – Kilombero distr., Namawala, 21.iii.1990, J.O. Charlwood”.

Diagnosis. See generic diagnosis.

Redescription. Female from Ivory Coast, length of body 1.9 mm and of fore wing 2.2 mm.

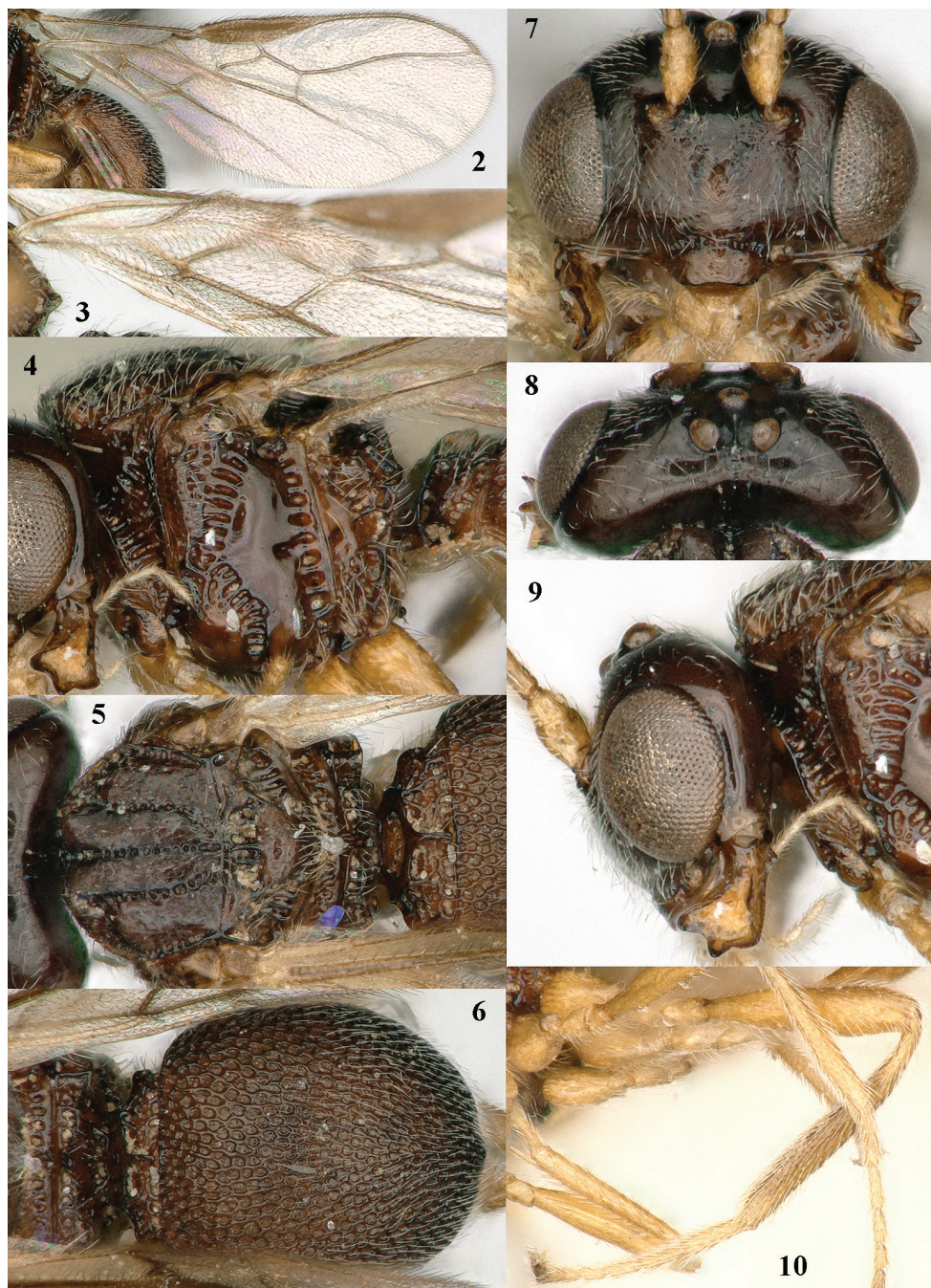
Head. Head strongly transverse, width 2.3 times median length in dorsal view and temple directly narrowed behind eyes (Fig. 8); antenna with 41 segments, 2.1 times

as long as fore wing and 2.5 times as long as body, third segment 0.9 times as long as fourth segment and slightly wider (latter only in lateral view), length of third, fourth and penultimate segments 3.3, 4.0 and 3.2 times their width, respectively (measured in lateral view), without apical spine; maxillary palp 0.7 times as long as height of head; labial palp segments slender; length of eye in dorsal view 3.2 times temple; temple and vertex smooth, frons punctulate laterally; stemmaticum weakly convex, with small depression behind stemmaticum; OOL: diameter of ocellus: POL = 11:5:6; frons nearly flat and glabrous behind antennal sockets, strongly shiny; face punctulate, rather flat (Figs 7, 9); width of clypeus 3.0 times its maximum height; anterior tentorial pits rather large (Fig. 16); clypeus moderately convex, sparsely punctate, truncate ventrally and hardly protruding, ventral rim depressed and thin; epistomal suture crenulate (Fig. 7); malar suture absent; malar space hardly developed; mandible with 3 wide lobe-shaped teeth, upper tooth gradually widened dorsally, mandible 1.5 times longer medially than wide, with wide ventral carina protruding basally (Figs 9, 15) and crest connected to third tooth serrate medially (Fig. 9).

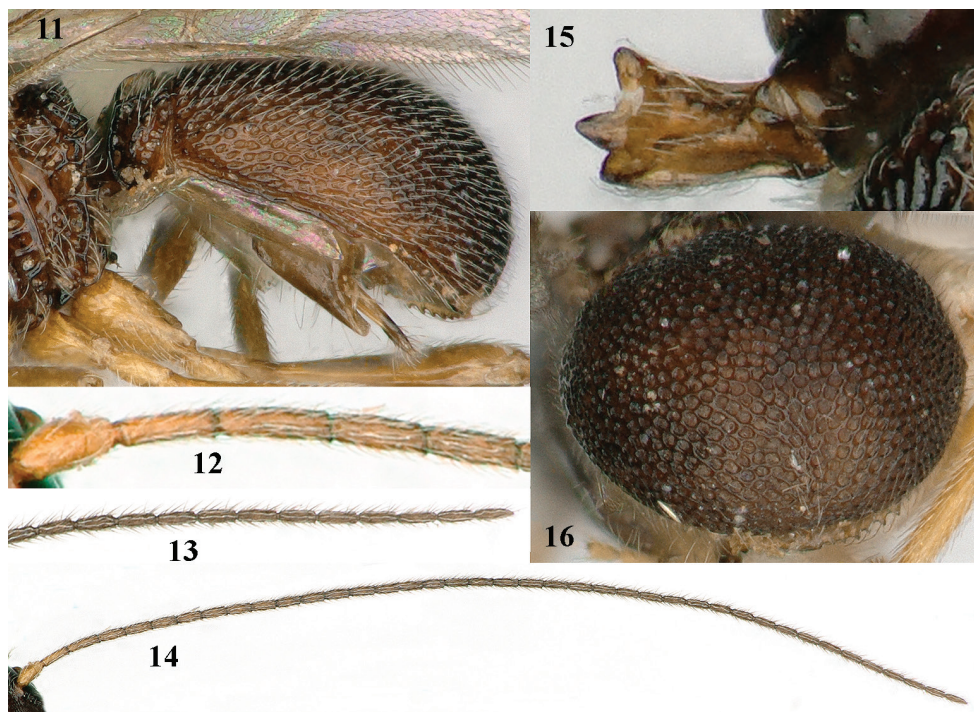
Mesosoma. Mesosoma 1.1 times longer than high; pronope absent; propleuron flattened and subapically with crenulated crest (Fig. 4); pronotal side coarsely crenulate, but antero-dorsally smooth (Figs 4, 9); epicnemial area of mesopleuron finely punctate, but crenulate ventrally (Fig. 4); precoxal sulcus close to anterior margin of mesopleuron, wide and distinctly crenulate, near middle curved down to mesosternum (Fig. 4) and almost up to wide lamelliform and crenulate postpectal carina; remainder of mesopleuron sparsely crenulate antero-dorsally and smooth in front of pleural sulcus; episternal scrobe rather small, round; pleural sulcus very wide and coarsely crenulate, more than of precoxal sulcus (Fig. 4); mesosternal sulcus medium-sized and crenulate, anteriorly metapleuron only with small pit and antero-medially smooth, remainder crenulate (Fig. 4); notauli and median sulcus distinctly crenulated and posteriorly united; mesoscutal lobes setose, smooth and moderately shiny, middle lobe rather protruding antero-laterally (Fig. 5), lateral carina of mesoscutum complete and crenulate; scutellar sulcus deep and with 3 distinct longitudinal carinae, half as long as scutellum; scutellum convex, largely smooth; metanotum crenulate anteriorly, medio-posteriorly with truncate lamella (acute in lateral view); dorsal surface of propodeum short, crenulate, posteriorly bordered by curved and lamelliform carina, culminating medio-anteriorly in a parallel-sided and apically truncate lamella (Fig. 5; but apically acute in lateral view) much longer than lamella of metanotum, its posterior surface with some carinae and rugulae (Fig. 6).

Wings. Fore wing: Pterostigma elliptical; vein r issued medially from pterostigma (Fig. 2); r:2-SR:3-SR:SR1 = 4:21:16:70; r-m vertical and unsclerotized; 2-SR and SR1 slightly sinuate; M+CU1 largely unsclerotized; cu-a reclivous; 1-CU1:2-CU1 = 1:16; CU1b long, unsclerotized and reclivous (Fig. 2) and 3-CU1 absent; m-cu antefurcal. Hind wing: M+CU:1-M:1r-m = 5:4:3; cu-a only vaguely indicated; apical half of wing narrow triangular (Fig. 3).

Legs. Hind coxa smooth; tarsal claws medium-sized (Fig. 10); length of femur, tibia and basitarsus of hind leg 4.5, 8.4 and 3.3 times their width, respectively.



Figures 2–10. *Gastralysia garambana* Fischer, ♀, Ivory Coast. **2** fore wing **3** hind wing **4** mesosoma lateral aspect **5** mesosoma dorsal aspect **6** first–third metasomal tergites dorsal aspect **7** head anterior aspect **8** head dorsal aspect **9** head lateral aspect **10** hind leg lateral.



Figures 11–16. *Gastralysia garambana* Fischer, ♀, Ivory Coast. **11** metasoma lateral aspect **12** basal segments of antenna **13** apical segments of antenna **14** antenna **15** mandible, full on first tooth lateral aspect **16** metasoma posterior view.

Metasoma. Length of first metasomal tergite 0.5 times its apical width, laterally with subhyaline wide lamella (Fig. 11), antero-medially with concave area surrounded by flattened dorsal carinae (Fig. 5), carinae posteriorly united into a protruding lamella, in lateral view wide and posteriorly separated from tergite by a gap (Figs 4, 11), only postero-dorsally reticulate (Fig. 5); dorsope, laterope and second suture absent; second and third tergites strongly convex, evenly setose and reticulate-foveate, laterally with thin lamella and posteriorly serrate (Fig. 11); following tergites retracted; combined length of second and third tergites 0.9 times total length of metasoma (Fig. 11); ovipositor sheath with long setae apically, glabrous submedially, setose part of sheath 0.04 times as long as fore wing and 0.1 times as long as hind tibia (Fig. 11).

Colour. Mainly dark brown (including tegulae); palpi pale yellowish; third-fifth antennal segments yellowish brown; mandible (except dark brown apices), scapus, pedicellus and legs brownish yellow; wing membrane subhyaline; pterostigma and veins brown.

Male. According to the original description very similar to the illustrated female; fore wing length 2.8 mm, body length 2.0 mm and antenna with 39 segments; hind femur 4.0 times longer than wide; propodeal lamella as long as metanotal lamella (Fig. 19 in Fischer 1967) and first metasomal tergite 0.6 times as long as wide posteriorly.

Distribution. Ivory Coast, Tanzania, Zaire.

Notes. The specimen from Tanzania is very similar to the female from Ivory Coast. It has 42 antennal segments.

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References

- Belokobyl'skij SA (2015) The genus *Hylcalosia* Fischer, 1967 (Hymenoptera: Braconidae: Alysiinae) of the Russian Far East. *Zootaxa* 4040(5): 530–542. <https://doi.org/10.11646/zootaxa.4040.5.2>
- Donaldson JS (1989) Revision of the braconid genus *Physaraia* Shenefelt (Hymenoptera, Ichneumonoidea). *Systematic Entomology* 14: 15–39. <https://doi.org/10.1111/j.1365-3113.1989.tb00263.x>
- Fischer M (1976) Eine neue Alysiinen-Gattung und drei neue *Aspilota*-Arten aus dem pazifischen Raum sowie Bestimmungsschlüssel zu den Gattungen der Alysiini (Hymenoptera, Braconidae, Alysiinae). *Annalen des Naturhistorischen Museums in Wien* 79(1975): 223–236.
- Fischer M (1967) Seltene Alysiinae aus verschiedenen Erdteilen. *Annalen des Naturhistorischen Museums in Wien* 70: 109–138.
- Sharanowski BJ, Dowling APG, Sharkey MJ (2011) Molecular phylogenetics of Braconidae (Hymenoptera: Ichneumonoidea), based on multiple nuclear genes, and implications for classification. *Systematic Entomology* 36: 549–572. <https://doi.org/10.1111/j.1365-3113.2011.00580.x>
- van Achterberg C (1983) A revision of the genus *Hylcalosia* Fischer (Hymenoptera: Braconidae, Alysiinae). *Zoologische Mededelingen Leiden* 57(8): 81–90.
- van Achterberg C (1988) Revision of the subfamily Blacinae Foerster (Hymenoptera, Braconidae). *Zoologische Verhandelingen Leiden* 249: 1–324.
- van Achterberg C (1993) Illustrated key to the subfamilies of the Braconidae (Hymenoptera: Ichneumonoidea). *Zoologische Verhandelingen Leiden* 283: 1–189.
- Yu DS, van Achterberg C, Horstmann K (2016) Taxapad 2016, Ichneumonoidea 2015. Database on flash-drive. www.taxapad.com, Nepean, Ontario, Canada.
- Zhu, J-C, van Achterberg C, Chen X-X (2017) An illustrated key to the genera and subgenera of the Alysiini from China (Hymenoptera, Braconidae, Alysiinae). *ZooKeys* 722: 37–79. <https://doi.org/10.3897/zookeys.722.14799>