

## Two new species of the genus *Aprostocetus* Westwood, 1833 (Hymenoptera: Eulophidae: Tetrastichinae) from Kenya and Russia

### Два новых вида рода *Aprostocetus* Westwood, 1833 (Hymenoptera: Eulophidae: Tetrastichinae) из Кении и России

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КЛЮЧЕВЫЕ СЛОВА: Hymenoptera, Eulophidae, Tetrastichinae, *Aprostocetus shuvakhinae* sp.n., *A. vatrjapitzini* sp.n., Кения, Россия.

ABSTRACT. Two new species of the genus *Aprostocetus* Westwood, 1833 (Eulophidae, Tetrastichinae) are described. *Aprostocetus shuvakhinae* sp.n. is described from High Mountain Valleys of Inner Dagestan (Russia) and compared to *A. forsteri* Walker, 1847. *Aprostocetus vatrjapitzini* sp.n. is described from the subalpine zone of Mount Elgon (Kenya) and compared to *A. aethiops* Zetterstedt, 1838.

РЕЗЮМЕ. Описаны два новых вида тетрастихин рода *Aprostocetus* Westwood, 1833 (Eulophidae, Tetrastichinae). *Aprostocetus shuvakhinae* sp.n. описан из высокогорных котловин Внутреннего Дагестана (Россия) и сравнивается с *A. forsteri* Walker, 1847. *Aprostocetus vatrjapitzini* sp.n. описан из субальпийского пояса горы Элгон (Кения) и сравнивается с *A. aethiops* Zetterstedt, 1838.

#### Introduction

The subfamily Tetrastichinae Förster, 1856 is the largest one in the family Eulophidae. The Tetrastichinae are represented throughout the world by 97 genera and about 1800 species [Noyes, 2012; Kosheleva, 2013].

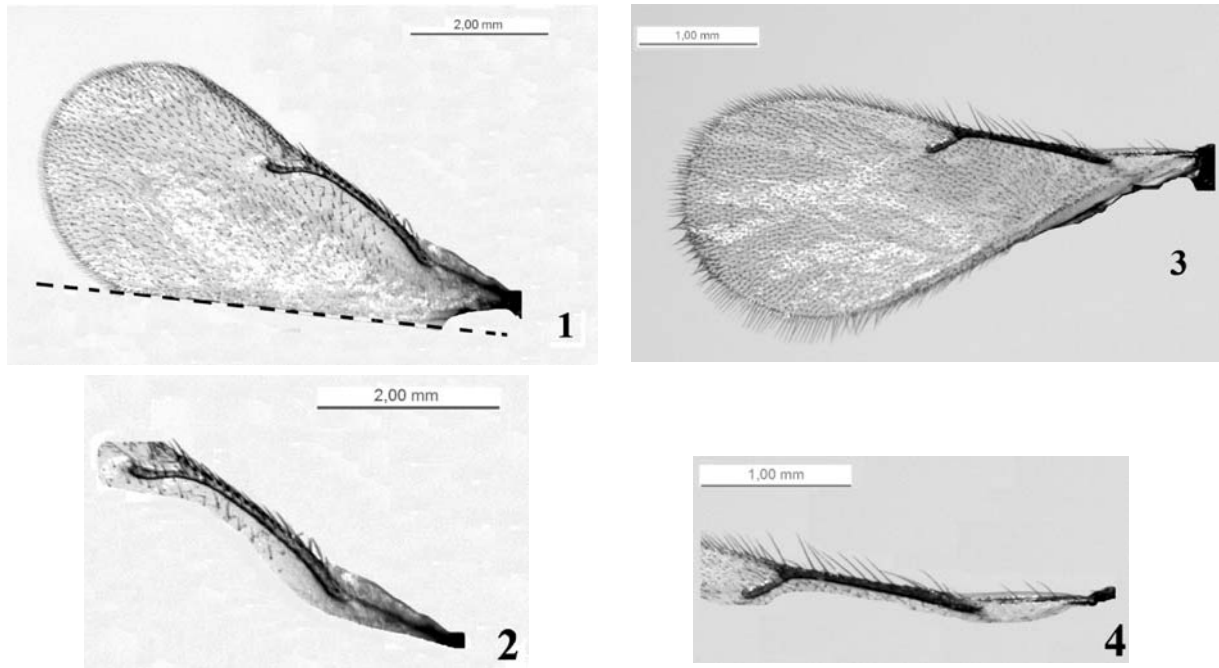
The genus *Aprostocetus* Westwood, 1833 belongs to the subfamily Tetrastichinae. Walker [1838-1839] described most of the species of the Tetrastichinae as members of the genus *Cirrospilus* Westwood, 1832, which belonged to the subfamily Eulophinae Westwood, 1829. Therefore Walker might not consider *Aprostocetus* as a valid genus. Later on [Walker, 1846], he transferred the described species to the genus *Tetrastichus* Haliday, 1844, which was initially proposed for a single species, *Cirrospilus attalus* Walker, 1839. Surprisingly, Walker ignored the generic name *Tetrastichus*

that was earlier published by himself ([Walker, 1842]; type species: *Cirrospilus lycidas* Walker, 1839), and the reasons for that are uncertain.

Graham [1961] placed nearly all European species of the Tetrastichinae in the genus *Aprostocetus* (s.l). In this paper, *Aprostocetus* was recognized as a genus that included *Tetrastichus* Haliday, 1844 and *Tetrastichus* Walker, 1842. However, many entomologists favored the opinion to preserve *Tetrastichus* Haliday. In 1965, the International Commission of Zoological Nomenclature decided that the name *Tetrastichus* Walker, 1842 was invalid [Opinion 720..., 1965]. Domenichini [1966] accepted the name *Tetrastichus* Haliday, 1844 for both *Aprostocetus* Westwood, 1833 and *Tetrastichus* Walker, 1842. Kostjukov [1977] discussed morphology, types of parasitism, and host-parasite relationships of the genus *Tetrastichus* (s.l) containing 17 subgenera.

Graham [1987] published a revision of the European Tetrastichinae with 28 valid genera including *Tetrastichus* Haliday, 1844 and *Aprostocetus* Westwood, 1833 with the following subgenera: *Tetrastichodes* Ashmead, 1887, *Ootetrastichus* Perkins, 1906, *Coriophagus* Graham, 1987, *Chrysotetrastichus* Kostjukov, 1977, and *Aprostocetus* Westwood, 1833. Kostjukov [2004] restored the generic status of *Tetrastichodes*, *Ootetrastichus*, *Hyperteles* Förster, 1856 and *Synthomosphyrum* Förster, 1878. He also considered *Chrysotetrastichus* and *Coriophagus* as separate genera and transferred the *aurantiacus* group to the genus *Stepanovia* Kostjukov, 2004.

Two new species of the genus *Aprostocetus*, *A. shuvakhinae* sp.n. and *Aprostocetus vatrjapitzini* sp.n., are described below from Russia (High Mountain Valleys of Inner Dagestan) and Kenya (the subalpine zone of Mount Elgon) respectively.



Figs 1–4. *Aprostocetus* spp.: 1, 2 — *A. shuvakhinae* sp.n.; 3, 4 — *A. vatrjapitzini* sp.n.; 1, 3 — forewing; 2, 4 — details of forewing venation.

Рис. 1–4. *Aprostocetus* spp.: 1, 2 — *A. shuvakhinae* sp.n.; 3, 4 — *A. vatrjapitzini* sp.n., 1, 3 — переднее крыло; 2, 4 — детали жилкования переднего крыла.

Morphological terminology follows Graham [1987, 1991]. Abbreviations used in the text: POL — postero-ocellar length, the shortest distance between lateral ocelli; OOL — oculo-ocellar length, the shortest distance between lateral ocellus and eye margin; OD — major diameter of lateral ocellus;  $F_1$ ,  $F_2$ ,  $F_3$  — funicular segments of antenna;  $C_1$ ,  $C_2$ ,  $C_3$  — claval segments of antenna; SM, M and ST — submarginal, marginal and stigmal vein of forewing respectively.

*Aprostocetus shuvakhinae* Kostjukov, sp.n.  
Figs 1–2.

**TYPE MATERIAL.** Holotype ♀: Russia, Inner Dagestan, Kumukh, Khuri 1500 m. 12.09.2004 Leg. Gunasheva. Holotype is deposited in the collection of the Zoological Institute of the Russian Academy of Sciences (St. Petersburg).

**DESCRIPTION.** **Female** (holotype). Head 1.12 times broader than mesoscutum, 2.9 times as long as broad and 1.07 times as broad as high. POL 2.15 OOL, OOL 2.6 OD. Malar space 0.75 length of eye, malar sulcus slightly curved. Mouth 1.2 malar space. Scape as long as eye, not reaching median ocellus, 3.9 times as long as broad; pedicel 2.0 times as long as broad, 1.2 times longer than  $F_1$ ;  $F_1$  1.6 times as long as broad, slightly longer than  $F_2$ ;  $F_2$  1.56 as long as broad, 1.08 times longer than  $F_3$ ;  $F_3$  1.35 times as long as broad; clava 1.2 times longer than  $F_2$  plus  $F_3$ , 2.0 times as long as broad, 2.5 times broader than  $F_3$ ;  $C_1$  1.06 times as long as broad, 1.5 times longer than  $C_2$ , 1.25 times broader than  $C_2$ ;  $C_2$  1.2 times as long as broad, 2.5

times longer than  $C_3$ ;  $C_3$  as long as broad; terminal spine 0.5 length of  $C_3$ . Thorax 1.34 times as long as broad; propodeal slope about  $50^\circ$ . Pronotum 2.1 times as broad as long, 0.5 length of mesoscutum. Mid lobe of mesoscutum slightly broader its length (1.03), moderately convex, median line distinct, complete and rather strong; 7 adnotaular setae on each side, arranged in one row. Scutellum 1.35 times as broad as long, 0.7 length of mesoscutum, more or less strongly convex; submedian lines nearer to sublateral lines than to each other, subparallel, enclosing a space about twice as long as broad; distance between submedian lines 1.8 times more than distance between submedian line and sublateral line. Anterior pair of setae situated behind the middle of scutellum, distance between the anterior pair of setae and anterior margin of scutellum 2.7 times longer than distance between anterior and posterior pairs of setae. Dorsellum 4.0 times as broad as long, 1.28 times longer than propodeum medially; hind margin angulate. Propodeum with median carina slightly raised; spiracles oval, nearly touching anterior margin of propodeum, inner diameter 0.9 length of propodeum; callosus with 2 long setae; hind margin deeply and narrowly emarginate. Forewing 2.25 times as long as broad; costal cell 1.1 times shorter than M, about 10.0 times as long as broad; the row of setae on its lower surface widely broken medially; SM with 5 dorsal setae; M slightly thickened, 3.7 times length of ST, 1.56 times longer than SM, its anterior edge with 15 setae, which are 0.75 length of ST; PM a stub, up to 0.2 length of ST;

speculum rather small, hardly extending below *M*; cilia 0.3 length of *ST*. Hindwing 3.8 times as long as broad, with obtusely angulate apex, cilia 0.2 breadth of wing. Legs of medium length, hind femora 4.1 times as long as broad; spur of mid tibia 0.85 length of basitarsus; basitarsus of mid legs 1.35 times as long as fourth tarsomere; basitarsus of hind legs 1.2 times as long as fourth tarsomere. Gaster longish-oval, 2.4 times as long as broad, 1.5 times longer than thorax, 1.14 times longer than head plus thorax; last tergite 1.4 times as long as broad; extending part of ovipositor sheaths 0.43 length of hind tibia; longest seta of cercus 1.7 length of next longest, slightly curved.

Body black with green metallic tint, dorsellum yellow; antenna brown; tegulae yellow; legs yellow, except coxae, hind femora, fore tarsi, 3-4 tarsomere of mid and hind legs; venation yellowish-brown.

Body length 2.1 mm.

**Male:** unknown.

HOST. Unknown.

ETYMOLOGY. The species is named after the Russian entomologist E.Ya. Shuvakhina.

DIFFERENTIAL DIAGNOSIS. The new species differs from *Aprostocetus forsteri* Walker in a set of morphological characters listed in Table 1.

Table 1. Distinction features of females of *Aprostocetus shuvakhinae* sp.n. and *A. forsteri* Walker, 1847.  
Таблица 1. Отличительные признаки самок *Aprostocetus shuvakhinae* sp.n. и *A. forsteri* Walker, 1847.

Morphological character	<i>A. forsteri</i> Walker, 1847	<i>A. shuvakhinae</i> sp.n.
Pedicel	Slightly shorter than $F_1$	1.2 times longer than $F_1$
Clava	1.3 times broader than $F_3$ ; 1.05 times longer than $F_2$ plus $F_3$	2.5 times broader than $F_3$ ; 1.2 times longer than $F_2$ plus $F_3$
Last tergite	1.1–1.2 times as broad as long	1.4 times as long as broad
Body	Yellowish	Black with metallic tint

*Aprostocetus vatrijapitzini* Kostjukov, sp.n.  
Figs 3–4.

TYPE MATERIAL. Holotype ♀: Kenya, Mt. Elgon Nat. P., E. slope of Chemwote, subalpine Ericaceae, bush, 3200 m, swept. No. 493. 24.1.1992. G. Várkonyi. Paratypes, ♀, same label; ♀, Kenya, Mt. Elgon Nat. P., near Chepneall Cave, dry evergreen montane forest, 2500 m, singled and swept from the vegetation. 28.1.1992. No. 509. O. Merki et G. Várkonyi; ♀, Kenya, Mt. Elgon Nat. P., bamboo (*Arundinaria alpina*) thicked, 2740 m, swept. No. 496. 22.1.1992. G. Várkonyi; ♀, Kenya, Mt. Elgon Nat. P., nr. Rimonthon River, 3200 m, subalpine mossy forest, swept. No. 467. 14.1.1992. G. Várkonyi. Holotype and paratypes are deposited in the collection of the Zoological Institute of the Russian Academy of Sciences (St. Petersburg, Russia).

DESCRIPTION. **Female** (holotype). Head 2.2 times as broad as long, slightly broader than mesoscutum and 1.15 times as broad as high. POL 2.0 OOL; OOL 1.6

OD. Eyes 1.1 times as long as broad, 0.6 times as long as high. Malar space 0.8 length of eye; malar sulcus slightly curved. Mouth 1.25 malar space. Scape distinctly extending above the level of vertex, 1.25 times as long as eye, 3.6 times as long as broad; pedicel 1.7 times as long as broad, as long as  $F_1$ ;  $F_1$  1.25 times as long as broad, 1.1 times longer than  $F_2$ ;  $F_2$  1.2 times as long as broad, 1.15 times longer than  $F_3$ ;  $F_3$  1.05 times as long as broad; clava 2.6 times as long as broad, 1.3 times broader than  $F_3$ , 1.2 times longer than  $F_2$  plus  $F_3$ ;  $C_1$  quadrate, 1.3 times broader than  $C_2$ , 1.1 times longer than  $C_2$ ;  $C_2$  1.05 as long as broad, 1.7 times broader than  $C_3$ , 1.3 times longer than  $C_3$ ;  $C_3$  1.15 times as long as broad; terminal spine 1.3 times longer than  $C_3$ . Thorax 1.5 times as long as broad, propodeal slope about 50°. Pronotum 3.0 times as broad as long, 0.17 length of mesoscutum. Mid lobe of mesoscutum 1.13 times as broad as long; with clear, complete median line, with 5 adnotaular setae, arranged in one row. Scutellum 1.35 times as broad as long; submedian lines parallel and situated nearer to sublateral lines than to each other, enclosing a space 2.0 times as long as broad, distance between submedian lines 2.0 times longer than distance between submedian line and sublateral line. Anterior pair of setae situated slightly behind the middle of scutellum, distance between the anterior pair of setae and anterior margin of scutellum 2.2 times longer than distance between anterior and posterior pairs of setae. Dorsellum 3.6 times as broad as long, 1.45 times longer than propodeum medially, hind margin angulate. Propodeum with strong median carina; spiracles subcircular, close to anterior margin of propodeum, with inner diameter 0.23 length of propodeum; callus with 2 setae; hind margin deeply and narrowly emarginate. Forewing 2.2 times as long as broad; costal cell 0.75 length of *M*, 14.5 times as long as broad; *SM* with 5 dorsal setae; *M* 3.2 times longer than *ST*, 1.5 times longer than *SM*, with 14 frontal setae which are 0.7 length of *ST*; speculum very small, not reaching *M*. Hindwing 5.8 times as long as broad, with acuminate apex, cilia 0.7–0.8 its breadth. Legs of medium length, hind femora 4.2 times as long as broad; spur of mid tibia 0.9 length of basitarsus; basitarsus of mid and hind tibia as long as fourth tarsomere. Gaster longish-oval, 2.9 times as long as broad, 1.8 times as long as thorax, 1.36 times longer than head plus thorax; extending part of ovipositor sheaths less than 0.2 length of hind tibia; longest setae of cercus 1.9 times longer than next longest, slightly curved.

Body, antennae, tegulae, coxae and femora dark, with weak metallic tints, tibia and tarsomere brown, wings brownish-tinged, venation brown.

Body length 1.7 mm.

VARIATION. POL 1.9–2.1 OOL.  $F_3$  1.0–1.1 times as long as broad; clava 2.4–2.6 times as long as broad. Forewing 2.15–2.2 times as long as broad; *SM* with 4–5 dorsal setae; *M* with 13–16 frontal setae. Thorax 1.4–1.5 times as long as broad. Dorsellum 1.3–1.45 times longer than propodeum medially. Gaster 2.4–2.9 times

as long as broad, 1.6–1.8 times longer than thorax, 1.15–1.36 times long than head plus thorax. Body length 1.4–1.7 mm.

**Male:** unknown.

**HOST.** Unknown.

**ETYMOLOGY.** The species is named after the well-known chalcidologist, Professor V.A. Trjapitzin.

**DIFFERENTIAL DIAGNOSIS.** The new species differs from *Aprostocetus aethiops* Zetterstedt, 1838 in a set of morphological characters listed in Table 2.

Table 2. Distinction features of females of *Aprostocetus vatrjapitzini* sp.n. and *A. aethiops* Zetterstedt, 1838.  
Таблица 2. Отличительные признаки самок *Aprostocetus vatrjapitzini* sp.n. и *A. aethiops* Zetterstedt, 1838.

Morphological character	<i>A. aethiops</i> Zetterstedt, 1838	<i>A. vatrjapitzini</i> sp.n.
Scape	Not or hardly extending above the vertex	Distinctly extending above the vertex
F <sub>3</sub>	1.25–1.6 times as long as broad	1.05 times as long as broad
Clava	1.05 times as broad as F <sub>3</sub>	1.3 times as broad as F <sub>3</sub>
C <sub>2</sub>	1.15–1.20 times broader than C <sub>3</sub>	1.7 times broader than C <sub>3</sub>
Terminal spine of clava	2.0 times shorter than C <sub>3</sub>	1.3 times longer than C <sub>3</sub>
Costall cell	9–11 times as long as broad	14.5 times as long as broad
Head	Narrower than thorax	Broader than thorax

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## References

- Domenichini G. 1996. Tetrastichini (Hymenoptera, Eulophidae) palearctici ed i loro ospiti // Bolletino di Zoologia Agraria e di Bachicoltura. Ser.2. T.6. P.61–204.
- Graham M.W.R de V. 1961. The genus *Aprostocetus* Westwood, sensu lato (Hymenoptera, Eulophidae); notes on the synonymy of European species // Entomologist's Monthly Magazine. Vol.97. P.34–64.
- Graham M.W.R de V. 1987. A reclassification of the European Tetrastichinae (Hymenoptera, Eulophidae), with a revision of certain genera // Bulletin of the British Museum (Natural History). Entomology series. Vol.55. No.1. P.1–392.
- Graham M.W.R de V. 1991. A reclassification of the European Tetrastichinae (Hymenoptera, Eulophidae): Revision of the remaining genera // Memoirs of the American Entomological Institute. No.149. P.1–323.
- Kosheleva O.V. 2013. [Oligomerization and other evolutionary changes in the Tetrastichinae antennae (Hymenoptera, Eulophidae, Tetrastichinae)] // Entomologicheskoe obozrenie. Vol.92. No.1. P.70–84 [in Russian with English summary].
- Kostjukov V.V. 1977. [Comparative morphology of the chalcid subfamily Tetrastichinae and system of *Tetrastichus* Haliday, 1844 (Hymenoptera, Eulophidae)] // Entomologicheskoe obozrenie. Vol.61. No.1. P.177–194 [in Russian with English summary].
- Kostjukov V.V. 2004. [On the status of subgenera of the genus *Aprostocetus* Westwood, 1833 (Hymenoptera, Eulophidae), with a description of *Stepanovia* gen.n.] // Nauchno-prakticheskaya konf., posvyashchenaya 100-letiyu so dnya rozhdeniya E.M. Stepanova (1902–2002). 8–9 okt. 2002. Krasnodar. P.36–44 [in Russian].
- Noyes J.S. Universal Chalcidoidea Database — World Wide Web electronic publication. 2012. Available from: <http://www.nhm.ac.uk/entomology/chalcidoids/index.html>.
- Opinion 720. *Tetrastichus* Walker, 1842 (Insecta, Hymenoptera): suppressed under the plenary powers. 1965. // Bulletin of Zoological Nomenclature. Vol.22. P.26–27.
- Walker F. 1838–1839. Descriptions of British Chalcids // Annals and Magazine of Natural History. Vol.1. P.307–312, 381–387, 449–451; Vol.2. P.198–205, 350–355; Vol.3. P.177–182, 415–419; Vol.4. P.24–32, 232–256.
- Walker F. 1839. Monographia of Chalcitum I. Bailliere ed. London. 338 pp.
- Walker F. 1840. List of specimens of Hymenopterous Insects in the collection of the British Museum. Part II. Chalcidites. Additional species: III–IV. London. 237 pp.
- Walker F. 1842. Descriptions of Chalcidites discovered by C. Darwin, Esq., near Valparaiso // Annals and Magazine of Natural History. Vol.10. P.113–117.
- Walker F. 1846. List of the specimens of Hymenopterous insects in the collection of the British Museum. Part I. Chalcidites vii. London. 100 pp.