

Two new species of the genus *Aprostocetus* Westwood from Ul'yanovsk Province of Russia (Hymenoptera: Eulophidae, Tetrastichinae)

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Aprostocetus arvus sp. n. and *A. flavimetanotum* sp. n. are described from Ul'yanovsk Prov., Russia.

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Introduction

The subfamily Tetrastichinae Foerster, 1856 is the largest in the family Eulophidae and includes 87 genera and about 1600 species in the world fauna (Noeys, 1998). The list of *Aprostocetus* of Russia comprises 106 species (Yefremova, 2002, 2004).

The study of the Eulophidae fauna of Ul'yanovsk Prov. (as well as of the middle Volga Region) began in 1995. Yefremova et al. (1995, 2000) published checklists of Eulophidae for this region, excluding Tetrastichinae. The first checklist of Tetrastichinae (Yefremova & Yegorenkova, 2004) included six species of the genus *Aprostocetus*, among them three species new to science. Two of the latter are described in the present paper.

The sculpture terminology follows that of Eady (1968) and Harris (1979), other morphological terminology follows that of Askew & Bouček (1968) and Gibson (1997). The following abbreviations are used: F1-F4 – 1st-4th segments of antennal funicle; SMV – submarginal vein; MV – marginal vein; PMV – postmarginal vein; SV – stigmal vein. All measurements are given in μm , except as otherwise noted. Holotypes and paratypes of new species are deposited at Natural History Museum, London, UK (BMNH) and Zoological Institute, Russian Academy of Sciences, St.Petersburg (ZIN).

Genus *Aprostocetus* Westwood, 1833

Type species: *Aprostocetus caudatus* Westwood, 1833, by monotypy.

Diagnosis (some characters are taken from Graham, 1987). *Female*. Antenna with scape and pedicel weakly sculptured; clava with 3 (Figs 1, 3) or, rarely, 2 segments (Figs 9, 11); all segments of funicle longer than broad. Mesosoma with distinct metallic colour. Mesoscutum with or without median line, with one or, rarely, 2-3 rows of adnotaular setae. Scutellum slightly broader than long, usually with 2 pairs of setae situated almost always nearer to submedian than to sublateral lines; submedian lines distinct. Dorsellum not divided longitudinally. Propodeum with reticulation varying from obsolescent to slightly raised; median carina present; plicae and paraspiracular carina absent.

Male. Funicle with 4 segments; funicle and clava with whorled long dark setae (Figs 2, 10, 12); scape with ventral plaque (Figs 2, 12), sometimes swollen. Digitus of genitalia with one, sometimes 2-3 spines (Figs 8, 17); paramere with 2 setae.

Distribution and biology. The genus is distributed worldwide; a total of 939 species are known in the World fauna (Noyes, 1998). A key to European species was given by Graham (1987). Species of the genus are ecto-, sometimes hyperparasitoids. Their hosts are eggs, larvae, nymphs and pupae of Acari (Eriophyidae), Orthoptera (Blattodea and Gryllidae), Odonata (Lestidae), Homoptera (Coccidae), Coleoptera (Chrysomelidae, Coccinellidae and Curculionidae), Diptera (mostly Cecidomyiidae, also Agromyzidae and Tephritidae), Hymenoptera (Cynipidae and Eulophidae), and Lepidoptera (Gracillariidae) (Noyes, 1998).

***Aprostocetus arvus* sp. n.**
(Figs 1, 2, 4-8)

Holotype. ♀, **Russia**, 38 km NW of Ul'yanovsk, Mar'evka, 19.VIII.2003 (Yegorenkova) (BMNH).

Paratypes. **Russia**: 14 ♀, same data as in the holotype; 24 ♀, 7 ♂, 34 km NW of Ul'yanovsk, Tsil'na, 20.VIII.2003 (Yegorenkova); 18 ♀, 3 ♂, 9 km NW of Ul'yanovsk, Laishevka, 19.VIII.2003 (Yegorenkova); 3 ♀, same locality, 17.VIII.2003 (Yegorenkova); 19 ♀, 37 km SE of Ul'yanovsk, Tushna, 16.VII.2003 (Yegorenkova); 1 ♀, 42 km S of Ul'yanovsk, Artyushkino, 17.VII.2003 (Yegorenkova); 4 ♀, 15 km SE of Ul'yanovsk, Krasny Yar, 5.VIII.2003 (Yegorenkova); 4 ♀, Ul'yanovsk, 10.VIII.2003 (Yegorenkova); 4 ♀, Ul'yanovsk, 2.VII.1989 (Yefremova); 9 ♀, Ul'yanovsk, 27.VI.1989 (Yefremova); 16 ♀, Ul'yanovsk, 31.VII.2003 (Yegorenkova) (ZIN, BMNH).

Description. *Female*. Body length 1.53 mm; fore wing 1.1 mm.

Colour. Head black with metallic tint; eyes dark brown; ocelli white; clypeus dark yellow; mandibles brown. Antenna dark brown. Thorax and gaster black with metallic reflection. Fore, middle and hind legs yellow; coxae, distal 3/4 of femora, middle part of tibiae and 2 last segments of tarsi brown.

Head transverse, its height 14, width 16. Face granulate. Distance between eyes 4.5; eyes bare. Clypeus weakly bidentate. Maxillary and labial palpi 1-segmented. Malar sulcus present. Antennal toruli situated at level of the lower margin of eyes. Antenna (Fig. 1) with scape = 4.5 and pedicel = 2.0; one anellus. Funicle with 3 segments (F1 = 2.4, F2 = 2.3, F3 = 2.0); clava 3-segmented (6.0), 1.3 times as long as scape, 3.0 times as long as F4.

Mesosoma. Pronotum bell-shaped, granulate, with 12 pairs of short setae on hind margin. Mesoscutum granulate, with median line and one row of 4 pairs of adnotaular setae; notauli complete. Axillae situated above mesoscutum, alutaceous. Scutellum alutaceous, with submedian lines and 2 pairs of setae. Dorsellum rounded, small, smooth. Propodeum smooth, with complete median carina. Callus with one seta.

Fore wing (Fig. 4) 2.4 times as long as wide (44.0 Ч 18.0). Speculum small, extending along 1/5 of MV. SMV with 3 setae. Relative measurements of veins: SMV : MV : SV = 4.5 : 6.2 : 1.3. PMV absent. Costal cell with dorsal row of setae, with 4 setae near parastigma. Basal and intercubital lines of setae present. Apex of hind wing rounded (Fig. 6). Middle and hind tibiae with one short spur each.

Metasoma. Gaster almost twice as long as wide (40.0 Ч 19.0). Petiole very short, transverse. Sheaths of ovipositor slightly extended. Ovipositor occupies entire length of gaster (visible in slide in paratype). Gonostyle IX with trichoid sensillae, connected with gonocoxite IX by articulation.

Male. Body length 1.15 mm; fore wing 1.0 mm. Colour of body as in female. Clypeus distinctly bidentate. Antenna (Fig. 2) with 4 funicular segments, covered with whorled setae; whorled setae of each funicular segment reaching tip of next segment. Antennal scape = 7.0, pedicel = 3.1, F1 = 3.4, F2 = 4.6, F3 = 4.1, F4 = 4.3. One anellus. Clava 3-segmented (9.2), twice as long as F4. Ventral plaque of scape 0.23 times as long as scape. Fore wings (Fig. 5) 40.0 Ч 15.0, 2.7 times as long as wide. Relative measurements of veins: SMV : MV : SV = 5.0 : 6.0 : 1.8. PMV absent. Speculum of fore wing equal in size to that in female. Hind wing (Fig. 7) slightly longer than in female, apically acute. Gaster 2.25 times as long as wide (18.0 Ч 8.0). Genitalia as in Fig. 8. Digitus longitudinal, with 3 spines. Paramere with 2 setae.

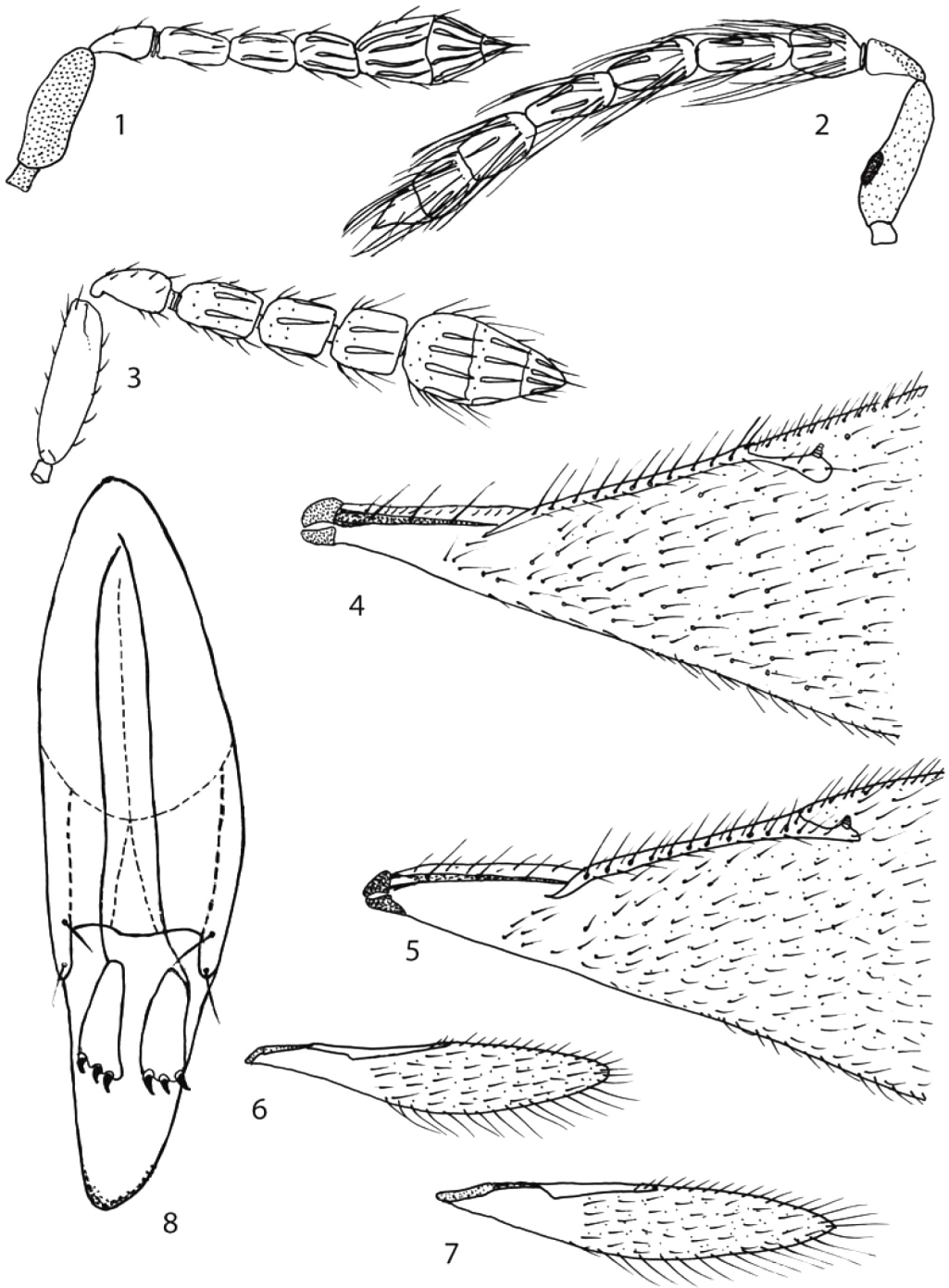
Etymology. The species name is derived from Latin "arvum" (field) and refers to the places of collecting.

Comparison. The new species is similar to the European *Aprostocetus brachycerus* (Thomson) (described from Sweden), but the female differs in the pedicel shorter than F1 [equal to F1 in *A. brachycerus* (Fig. 3)], middle spur short (0.95 times as long as basitarsus in *A. brachycerus*), antenna dark brown (blackish in *A. brachycerus*), body black with metallic tint (black with bluish or greenish blue metallic reflection in *A. brachycerus*). The male differs in the 1st funicular segment elongate (quadrate in *A. brachycerus*), whorled setae of F1 reaching tip of F2 (reaching tip of F3 in *A. brachycerus*), digitus with 3 spines (with one spine in *A. brachycerus*).

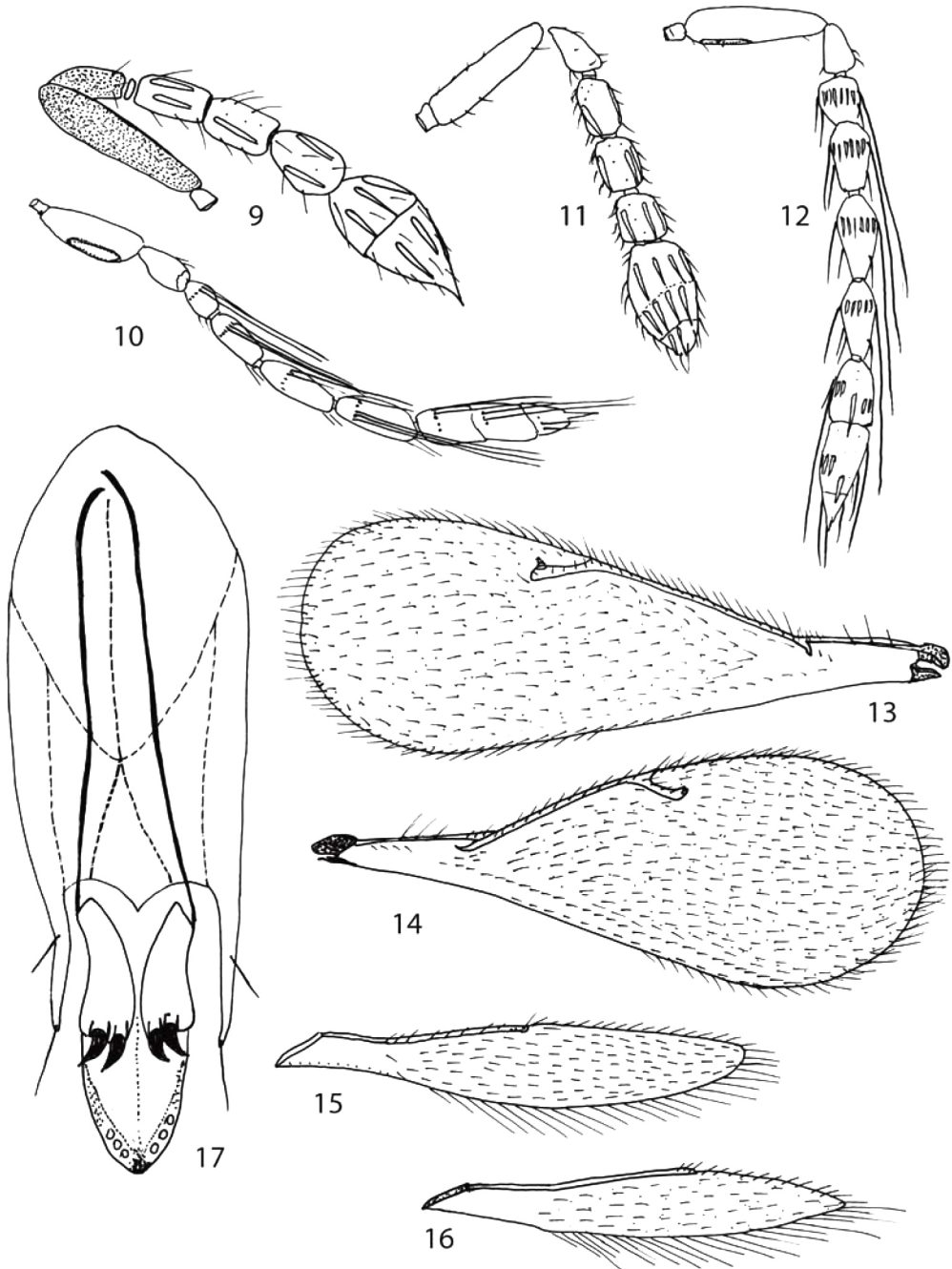
***Aprostocetus flavimetanotum* sp. n.**
(Figs 9-10, 13-17)

Holotype. ♀, **Russia**, Ul'yanovsk, 8.VIII.2003 (Yegorenkova) (BMNH).

Paratypes. **Russia**: same data as in holotype; 15 ♀, 2 ♂, 15 km SE of Ul'yanovsk, Krasny Yar, 5.VIII.2003 (Yegorenkova); 14 ♀, 2 ♂, Ul'yanovsk, 2.VIII.2003 (Yegorenkova); 10 ♀, Ul'yanovsk, 9.VIII.2003 (Yegorenkova); 3 ♀, Ul'yanovsk, 6.VIII.2003 (Yegorenkova); 26 ♀, 37 km SE of Ul'yanovsk, Tushna, 16.VII.2003 (Yegorenkova); 15 ♀, same locality, 19.VII.2003 (Yegorenkova); 11 ♀, 2 ♂, same locality, 20.VII.2003 (Yegorenkova); 5 ♀, 6 ♂, same locality, 23.VII.2003 (Yegorenkova); 1 ♀, same locality, 24.VII.2003 (Yegorenkova); 2 ♂, same locality, 27.VII.2003 (Yegorenkova); 19 ♀, 9 km NW of Ul'yanovsk, Laishevka, 17.VIII.2003 (Yegorenkova); 7 ♀, 1 ♂, same locality, 18.VIII.2003 (Yegorenkova); 6 ♀, 34 km NW of Ul'yanovsk, Tsil'na, 16.VIII.2003 (Yegorenkova); 11 ♀, 2 ♂, same locality, 20.VIII.2003 (Yegorenkova); 1 ♂, 36 km SE of Ul'yanovsk, Shilovka, 12.VI.1991 (Yefremova); 7 ♀, same locality, 28.VII.2003 (Yegorenkova); 9 ♀, 42 km S of Ul'yanovsk, Artushkino, 17.VII.2003 (Yegorenkova); 13 ♀, 4 ♂, 34 km SE of Ul'yanovsk, Smorodino, 26.VII.2003 (Yegorenkova); 1 ♂, Ul'yanovsk, left bank of the river Volga, 6.VIII.2003



Figs 1-8. *Aprostocetus arvus* sp. n. (1, 2, 4-8) and *A. brachycerus* (Thomson) (3; from Graham, 1987). **1, 3,** left antenna, female; **2,** right antenna, male; **4-7,** right fore wing (4, 6, female; 5, 7, male); **8,** male genitalia.



Figs 9-17. *Aprostocetus flavimetanotum* sp. n. (9, 10, 13-17) and *A. eurystoma* Graham (11, 12; from Graham, 1987). 9, left antenna, female; 10, left antenna, male; 11, right antenna, female; 12, right antenna, male; 13, left fore wing, female; 14, right fore wing, male; 15, right hind wing, female; 16, right hind wing, male; 17, male genitalia.

(Yegorenkova); 1 ♂, 38 km NW of Ul'yanovsk, Mar'evka, 19.VIII.2003 (Yegorenkova); 1 ♂, Ul'yanovsk, 23.VI.1990 (Yefremova); 1 ♂, Ul'yanovsk, 1.VI.1990 (Yefremova); 1 ♀, 48 km NW of Ul'yanovsk, Tagay, 25.VIII.1988 (Yefremova).

Description. Female. Body length 1.55 mm; fore wing 1.23 mm.

Colour. Head dark brown, with yellow spot surrounding occiput; eyes and ocelli red; face with yellow spots; clypeus yellow; mandibles brown. Antenna dark brown. Thorax dark brown with yellow spots on scapulae and axillae. Tegulae and scutellum yellow. Dorsellum yellow. Propodeum brown. Gaster brown, with metallic tint. Fore, middle and hind legs bright yellow; all femora in distal halves and 2 last segments of tarsi brown.

Head granulate, slightly transverse, its height 15.0, width 16.0. Distance between eyes 7.0; eyes bare. Malar sulcus straight. Maxillary and labial palpi one-segmented. Mandibles with three teeth. Toruli situated at level of lower margin of eye. Antenna (Fig. 9) with scape (8.0) 2.5 times as long as pedicel (3.2); one discoid anellus; funicle 3-segmented (F1 = 3.0, F2 = 2.7, F3 = 3.2). F3 slightly wider than others. Clava 2-segmented, broader than flagellum, its length (6.0) equal to that of 2 last segments of funicle combined.

Mesosoma. Pronotum bell-shaped, granulate, short. Mesoscutum alutaceous, with median line and one row of 4 pairs adnotaular setae; notauli complete. Axillae situated above scutellum, granulate. Scutellum granulate, with submedian lines and 2 pairs of setae. Dorsellum (11 ♀ 2.5) rounded, smooth. Propodeum (13 ♀ 1.0) smooth, shiny, with complete simple median carina. Callus with one seta.

Fore wing (Fig. 13) 3.5 times as long as wide (56 ♀ 16). Speculum extending along MV, closed below. SMV with 3 setae. Relative measurements of veins: SMV : MV : SV = 11.0 : 21.0 : 4.0. PMV absent. Apex of hind wing rounded (Fig. 15). Hind tibia with a spur.

Metasoma. Gaster 1.7 times as long as wide (22 ♀ 13). Cerci with 5 setae, one of them the longest. Sheaths of ovipositor not extended.

Male. Body length 1.03 mm; fore wing 0.95 mm. Colour similar to that of female. Antenna as in Fig. 10. Four funicular segments with whorled long setae. Lengths of antennal segments: scape = 4.0, pedicel = 2.0, F1 = 1.7, F2 = 2.0, F3 = 1.9, F4 = 1.7, 3-segmented clava = 4.5. Scape with ventral plaque, which is 0.55 times as long as scape. Whorled setae of F1 not reaching the tip of F3; whorls of F2 reaching the base of F4; whorls of F3 reaching the tip of F4; whorls of F4 reaching the tip of 2nd segment of clava. Fore wing (Fig. 14) 3.0 times as long as wide (47 ♀ 15). Relative measurements of veins: SMV : MV : SV = 9.0 : 12.0 : 3.0. PMV absent.

Speculum of fore wing smaller than in female. Basal hairline distinct; intercubital line present. Hind wing apically pointed (Fig. 16). Gaster 1.7 times as long as wide (18 ♀ 10). Genitalia as in Fig. 17. Paramere very narrow, elongate. Digitus at most 2.7 times as long as broad. Digital sclerites elongate-triangular, with 2 processes. Paramere with 2 setae, distance between them greater than in *A. arvus*. Aedeagus with 6 celoconical sensillae on apical margin. Apodeme of phallosome 1.6 times as long as aedeagus (5.8).

Variation. Length of body 1.08-1.68 mm in ♀, 0.78-1.25 mm in ♂. Coloration varies in both sexes. Genae, lower parts of face, area around eyes and frons sometimes yellow; propodeum dark yellow.

Etymology. The name is derived from Latin "flavus" (yellow) and "metanotum" and refers to the coloration pattern.

Comparison. The new species is similar to the European *Aprostocetus eurystoma* Graham (Fig. 11) (described from Sweden), but the female differs in the 4 setae on SMV (3 setae in *A. eurystoma*), 2-segmented clava as long as 2 last segments of funicle combined (3-segmented in *A. eurystoma*, slightly shorter), pedicel longer than first funicular segment (shorter in *A. eurystoma*), MV 5.0 times as long as SV (3.0 times as long as SV in *A. eurystoma*). The male differs in the pedicel slightly longer than F1 (small pedicel and small F1 in *A. eurystoma*), plaque in middle part of scape [(in distal part of scape in *A. eurystoma* (Fig. 12)], whorled setae of F3 reaching the tip of F4 (reaching the tip of 1st segment of clava in *A. eurystoma*).

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