

First Record of a Parasitic Wasp of the Genus *Anaprostocetus* Graham, 1987 (Hymenoptera, Eulophidae: Tetrastichinae) from Russia (Environs of St. Petersburg)

O. V. Kosheleva^{a,*}

^a All-Russian Institute of Plant Protection, St. Petersburg–Pushkin, 196608 Russia

*e-mail: kosheleva_o@mail.ru

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Abstract—The only European species of the genus *Anaprostocetus* Graham, 1987, *A. acuminatus* (Ratzeburg, 1848), is recorded from the environs of St. Petersburg, Russia, for the first time. Additional diagnostic features, data on the distribution and host-parasitoid association are provided. A photograph of the female genitalia of this species is given for the first time.

Keywords: Chalcidoidea, Eulophidae, Tetrastichinae, *Anaprostocetus*, parasitoids, distribution, new record, Russia

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The subfamily Tetrastichinae is one of the largest and most widespread of all parasitic Hymenoptera groups. The World fauna of the Tetrastichinae currently includes about 2000 recognized species from 110 genera; 453 species from 19 genera have been recorded from Russia (Yegorenkova, Kostjukov, 2019). Hosts for Tetrastichinae have been found in 100 families of insects in 10 different orders, plus spider eggs, mites, and even nematodes. There are also species that are phytophagous (some of them gall-inducers) or inquilines (LaSalle, 1994).

In his reclassification of the European Tetrastichinae Graham (1987) described nine new genera, including *Anaprostocetus* Graham, 1987, with type species *A. dehraensis* Graham, 1987. *Anaprostocetus acuminatus* (Ratzeburg, 1848) was redescribed and transferred by him from the genus *Aprostocetus* Westwood, 1833. At present, *Anaprostocetus* comprises seven species: *A. acuminatus* (Europe, Turkey, Georgia, China, Japan, North America, India and Russia – new record), *A. dehraensis*, *A. areos* Narendran et Fousi, 2005, *A. keralicus* Narendran et Girish Kumar, 2005, *A. sringeriensis* Narendran et Santhosh, 2005 (India), *A. cenxiensis* Sheng, 1995 (China), and *A. ankarensis* Gençer, 2010 (Turkey) (Domenichini, 1966; Graham, 1987; LaSalle, 1994; Sheng, 1995; Ikeda, 1997; Naren-

dran et al., 2005; Gençer, 2010; Doganlar, 2011; Kostjukov et al., 2017).

About forty *A. acuminatus* females were collected by me in August of 2018 in the environs of St. Petersburg. Specimens were swept from *Salix fragilis* L. with injuries by a tenthredinid sawfly. The newly collected specimens differ in some morphological features from the specimens examined by Graham (1987); additional measurements and a photograph of female genitalia (Fig. 1, 7) are given.

MATERIALS AND METHODS

All the collected specimens are deposited in the Zoological Institute of the Russian Academy of Sciences, St. Petersburg (ZISP).

The morphological terminology follows that of Graham (1987, 1991). The abbreviations F1–F3 are used for funicular segments.

The photographs of specimens were taken with a combination of a stereomicroscope (Olympus SZX10) and a digital camera (Olympus OM-D). Some parts of specimens were slide-mounted in Canada balsam and photographs were taken from them using a ZEISS

SteREO Discovery.V12 modular stereo microscope and an AxioCam MRc5 camera.

RESULTS

Family EULOPHIDAE

Subfamily TETRASTICHINAE

Genus *ANAPROSTOCETUS* Graham, 1987

Anaprostocetus Graham, 1987 : 84.

Type species: *Anaprostocetus dehraensis* Graham, 1987 (original designation).

Descriptive note. Propodeum as long as, or longer than dorsellum, with sharp paraspiracular carinae, plicae absent; surface between paraspiracular carinae with strong, slightly raised reticulation (Fig. 1, 5). Hind coxa with a curved subdorsal carina on its outer surface. Antenna of female with funicle and clava each with three segments (Fig. 1, 4), with three discoid anelli, of which the third tends to be slightly larger than the others. Antenna of male with ventral plaque of scape in upper half, two discoid anelli, four funicular segments, and a three-segmented clava; segments of flagellum with compact subbasal whorls of long dark setae. Vertex having ocelli enclosed in an area marked by impressed lines (Fig. 1, 6) (Graham, 1987).

Body dark green with metallic green to bluish luster. Antennae brown to fuscous. Coxae usually colored similar to the body or dark brown; femora varying from brown to yellow or colored proximally similar to the body. Tegula varying from black to pale yellow. Wings hyaline, venation varying from pale yellow and brownish yellow to testaceous. Body length 1.8–3.9 mm.

Distribution. Europe, Russia (Leningrad Province) (new record), Turkey, Georgia, China (Guangxi), Japan (Hokkaido, Honshu), North America (Canada), and India (Kerala, Karnataka) (Domenichini, 1966; Graham, 1987; LaSalle, 1994; Ikeda, 1997; Narendran et al., 2005; Gençer, 2010; Doganlar, 2011; Kostjukov et al., 2017).

Hosts. Tenthredinidae (Hymenoptera) (Graham, 1987) and Cecidomyiidae (Diptera) (Doganlar, 2011).

Remarks. This genus is not difficult to distinguish from the similar *Aprostocetus*, by the following features: outer surface of hind coxa with a fine curved

dorsal carina; propodeum with a sharp curved paraspiracular carina on either side; surface between the two carinae with distinct, slightly raised reticulation; vertex having ocelli enclosed by an impressed line.

Anaprostocetus acuminatus (Ratzeburg, 1848)

(Fig. 1, 1–7)

Entedon acuminatus Ratzeburg, 1848 : 169. Syn-types: ♀♀, Germany, Mecklenburg (British Museum Natural History, London) (not examined; destroyed).

Geniocerus acuminatus (Ratzeburg): Kurdjumov, 1913 : 251.

Aprostocetus acuminatus (Ratzeburg): Graham, 1961 : 46.

Tetrastichus acuminatus (Ratzeburg): Domenichini, 1966a : 181; 1966b : 16.

Anaprostocetus acuminatus (Ratzeburg): Graham, 1987 : 84; LaSalle, 1994 : 134.

Material. **Russia.** *St. Petersburg*: Pushkin District, Tyarlevo, swept from *Salix fragilis*, 3.VIII.2018 (O. Kosheleva), 7 ♀; same data, 6.VIII.2018 (O. Kosheleva), 4 ♀; 10.VIII.2018 (O. Kosheleva), 2 ♀; 14.VIII.2018 (O. Kosheleva), 30 ♀.

Distribution. See distribution of the genus.

Host. *Euura atra* (Jurine) (Ratzeburg, 1848; Domenichini, 1966a), *Eu. laeta* (Brischke) (Hymenoptera: Tenthredinidae) (Graham, 1987), *Dasineura oleae* (F. Loew), and *Lasioptera oleicola* Skuhrová (Diptera: Cecidomyiidae) (Doganlar, 2011).

COMMENTS

The redescription of this species was based on 6 males and numerous females from Great Britain, Sweden, France, Germany, Italy, Austria, Czechoslovakia, and Hungary. The type specimens were subsequently destroyed (Graham, 1987). The newly collected specimens of *Anaprostocetus acuminatus* correspond to the redescription by Graham (1987) in most characters, but differ in the features given in Table 1. They also exhibit variations in the structure of the gaster and coloration of the legs and tegulae, and in the size (see Table 1).

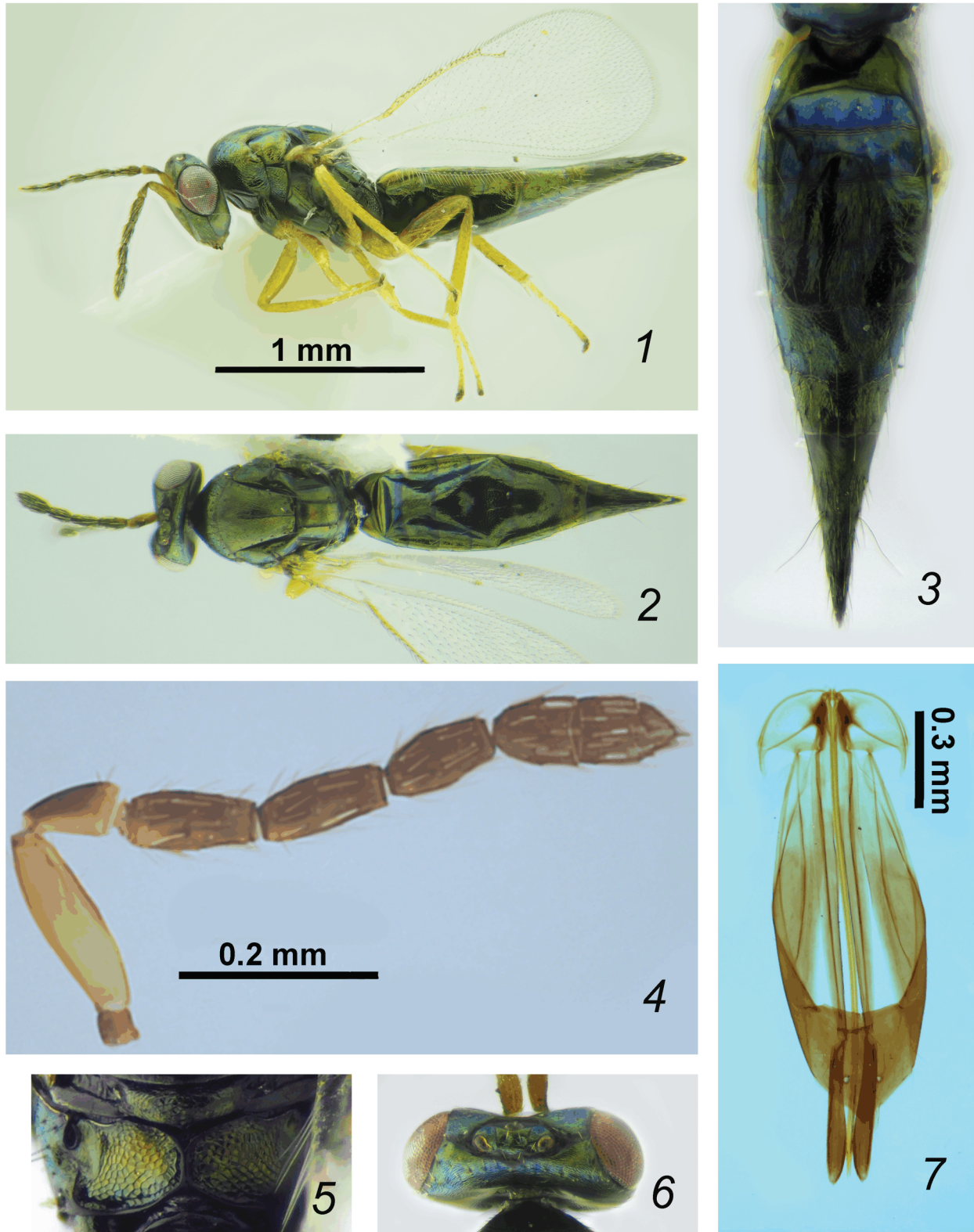


Fig. 1. *Anaprostocetus acuminatus* (Ratzeburg), 1848, females: (1) habitus, lateral view; (2) habitus, dorsal view; (3) gaster, dorsal view; (4) antenna; (5) propodeum, dorsal view; (6) head, dorsal view; (7) genitalia.

Table 1. Differences in diagnostic features between females of *Anaprostocetus acuminatus* (Ratzeburg) from different parts of the range (see Fig. 1, 1–7)

Material examined by Graham (1987)	Material from Japan (according to Ikeda, 1997)	Russian material
Clava very distinctly longer than F2 plus F3 (see comments)	Clava shorter than F2 plus F3	Clava (Fig. 1, 4) shorter than F2 plus F3.
4–6 adnotaular setae on mesoscutum	6 adnotaular setae on mesoscutum in a single row to 20 in two rows	4–6 adnotaular setae on mesoscutum
Thorax about 1.5 times as long as broad	Thorax 1.3–1.7 times as long as broad	Thorax about 1.5 times as long as broad
Propodeum slightly longer than dorsellum	Propodeum slightly longer than dorsellum to nearly twice as long as that	Propodeum slightly longer than dorsellum
Gaster lanceolate, 2.6–3.0 times as long as broad	Gaster 2.3–3.0 times as long as broad	Gaster (Fig. 1, 1–3) varies from lanceolate to elongate lanceolate, 2.4–3.6 times as long as broad
Last tergite 1.4–1.6 times as long as broad	Last tergite 1.4–1.6 times as long as broad	Last tergite 1.5–2.3 times as long as broad (Fig. 1, 2, 3)
Femora, except tips, colored similar to body and only sometimes infuscate proximally	Femora predominantly black	Femora infuscate along three-fourth from base or entirely yellow (Fig. 1, 1)
Fore tarsi brownish, mid and hind tarsi yellowish to testaceous with 4th segment and pretarsus fuscous, sometimes 3rd segment, rarely also the 2nd, brownish	Fore tarsi brownish, mid and hind tarsi yellowish to testaceous with 4th segment and pretarsus fuscous, sometimes 3rd segment, rarely also the 2nd, brownish	Tarsi, except for brown pretarsus, yellow (Fig. 1, 1).
Tegulae black, sometimes testaceous anteriorly	Tegulae black, sometimes testaceous anteriorly	Tegulae pale yellow (Fig. 1, 1, 2)
Body length 2.00–2.65 mm	Body length 1.90–3.20 mm	Body length 1.95–2.73 mm

Some additional features of *A. acuminatus* were reported by Ikeda (1997). Japanese specimens differ from those examined by Graham (1987) in the smaller body length (1.9–3.2 mm); in the number of the adnotaular setae on mesoscutum varying from 6 in a single row to about 20 in two rows; longer thorax and propodeum, which are slightly longer than dorsellum to nearly twice as long as the latter (see Table 1).

These variations are possibly due to features of the bionomics of their hosts and can be attributed to intra-specific variability. In addition, similar to the Russian specimens, the wasps from Japan have the clava distinctly shorter than F2 plus F3. According to Graham (1987), the clava of *A. acuminatus* is distinctly longer than F2 plus F3, but E. Ikeda (1997) reports, based on

the information received from J. LaSalle, that the specimens examined by M. Graham have the clava distinctly shorter than F2 plus F3.

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COMPLIANCE WITH ETHICAL STANDARDS

All the applicable international, national, and institutional guidelines for the care and use of animals were followed. All the procedures performed in studies involving animals were in accordance with the ethical standards of the institution or practice at which the studies were conducted.

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