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***Trachyarus borealis* sp. n., a previously undescribed
parasitoid of Psychidae in Finland**
(Ichneumonidae, Ichneumoninae, Phaeogenini)

Kees ZWAKHALS & Jelmer A. ELZINGA

Abstract

Trachyarus borealis sp. n. is described as a new parasitoid of Naryciinae sp. (Lepidoptera, Psychidae) from Finland. An illustrated key for the closely related *Trachyarus* species is given.

Introduction

In the course of an investigation into the life history of bagworms (Lepidoptera, Psychidae) and their parasitoids in Central Finland a great number of ichneumonids were reared from various Naryciinae species (KUMPU-LAINEN et al 2004, ELZINGA, to be published).

Among them was a large series of *Trachyarus* THOMSON, 1891 species (Ichneumonidae, Ichneumoninae). *Trachyarus* species are specialized parasitoids of Psychidae (DILLER, 1988, 1989, GOKHMAN, 2007). For their identification a recent key is presented in GOKHMAN (2007) and this key has been used for the identification of the Finnish specimens. Altogether four species were found in Finland: *Trachyarus brevipennis* ROMAN, 1918, *T. fuscipes* (THOMSON, 1891), *T. solyanikovi* GOKHMAN, 2007 and an undescribed species. The vast majority, 740 specimens, representing 84 % of all *Trachyarus*, belongs to this new species.

GOKHMAN (2007) divides the genus *Trachyarus* into two species-groups: group 1 with the upper tooth of the mandible greater than the lower tooth, and group 2 with the opposite character set. The new species belongs to group 1 and is described in the present communication. It is a koinobiont endoparasitoid that emerges from the host pupa or from a prepupa (<1%).

Technical note

The photographs are the result of stacking photography with an Olympus SZX 12 stereomicroscope in the Zoologische Staatssammlung München (ZSM). Pictures were captured with Prog Res Capture and stacked with Combine ZM stacking software (see <http://www.hadleyweb.pwp.blueyonder.co.uk/>).

The required diffuse illumination was provided by an energy saving lamp Philips Master PL Electronic 27W.

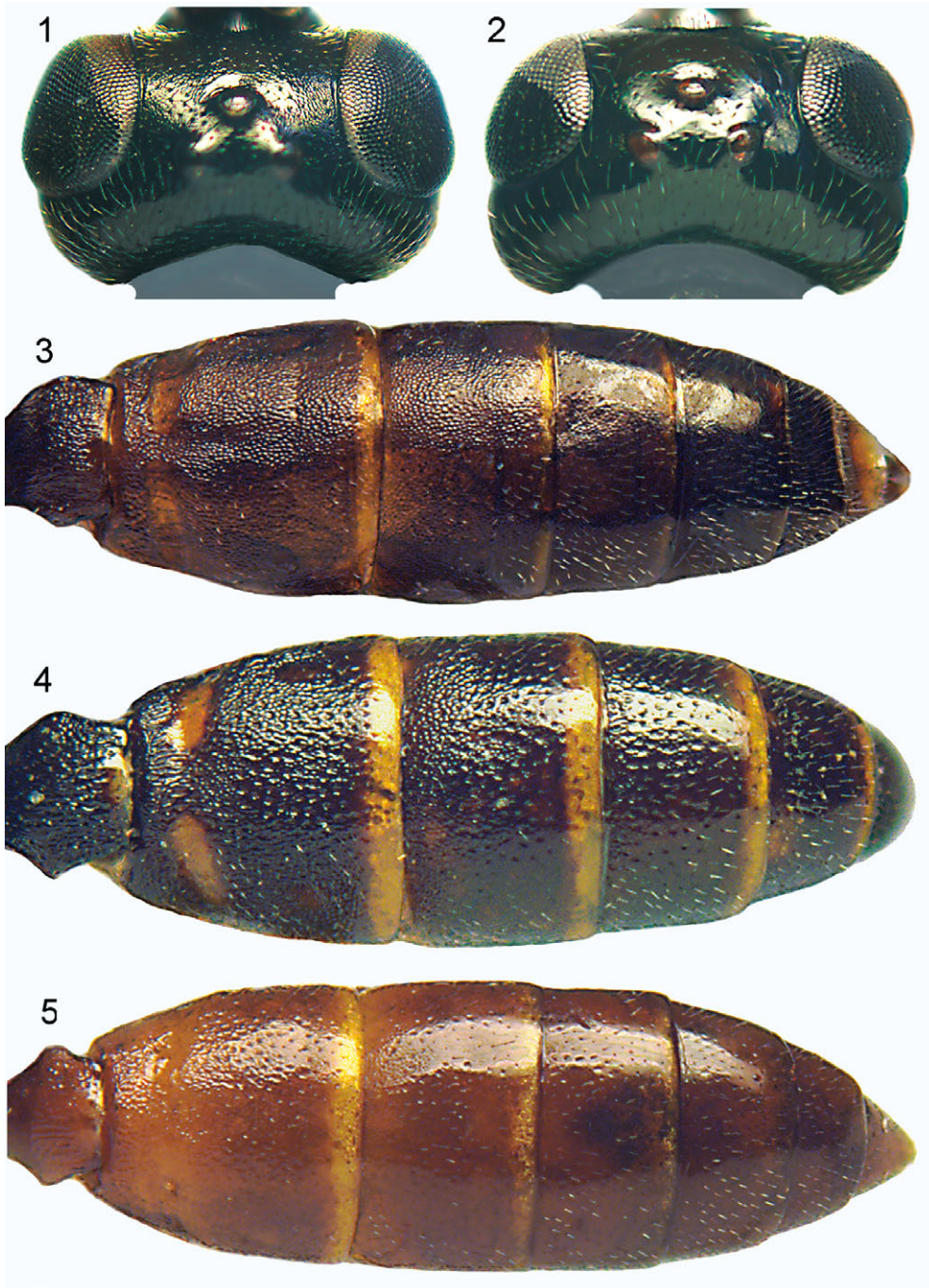
***Trachyarus borealis* sp. n.**

Author of *Trachyarus borealis* sp. n. is ZWAKHALS.

Description

♀: Fore wing length = 2.5 mm, thorax = 1.2 mm and metasoma = 2 mm.

Head behind the eyes in dorsal view convexly narrowing (Fig. 1). Mandible yellowish brown with upper tooth larger than lower tooth. Malar space coriaceous and as long as width of base of mandible. Clypeus polished, slightly convex, thin apical border without punctures. Palpi greyish brown. Pedicel largely black. Frons polished and almost impunctate. Face rather polished with some scattered punctures and somewhat more convex at the centre. Head in lateral view with cheek as wide as compound eye. Occipital carina meeting hypostomal carina behind the mandible at a distance of about half the width of base of mandible. Fuscous flagellum with 23 segments. Flagellar segments 1, 2 and 3 with length/width: 3, 2.5, 2, segment 10 square. Distance between hind ocelli 2x ocellar diameter. Distance between hind ocellus and compound eye 5/3 diameter of hind ocellus.



Trachyarus ♀♀: Figs 1 - 2 Head, Figs 3-5 Metasoma. Figs 1. & 3. *T. borealis*, Fig. 2. *T. fuscipes*, Fig. 4. *T. corvinus*. Fig. 5. *T. anceps*.

Mesoscutum finely coriaceous with some widely scattered micropunctures. Notauli rather weak, short, only present in basal quarter of mesoscutum. Tegulae fuscous. Mesopleura coriaceous to weakly longitudinally rugulose with no speculum. Propodeum rather rugulose and fully areolated. Area superomedia triangular, horizontal, making an angle with descending area petiolaris. Carina between area superomedia and area petiolaris sometimes weak.

Coxae and trochanters black, trochantelli yellowish-fuscous. Femora fuscous, dirty yellowish apically. Tibiae and tarsi (fuscous) yellowish with last tarsal segment fuscous. Hind femur with length to breadth 3.5. Nervulus slightly postfurcal, areolet open.

Postpetiole weakly rugulose, not longitudinally striate. Metasoma dark coloured, varying from brown to black (Fig. 3). Thyridia very large, breadth of thyridium: distance between the thyridiae 4:1. Tergites 2 and 3 coriaceous, dull. Metasoma from apex of tergite 4 polished. Tergite 2 about 0.9x as long as wide, tergite 3 about 0.6x as long as wide.

Ovipositor shortly protruding, with dorsal indentation at the middle.

♂: General sculpture and colour as in female. Flagellum with 24 segments and without tyloids. Fore and hind wing fuscous in basal two thirds, clear in distal third. Notauli short but more strongly impressed than in the female. Clypeus and mandibles usually yellow. Scape largely yellow beneath. Distance between hind ocellus and compound eye equal to diameter of hind ocellus. Malar space about 0.8x width of base of mandible. Sculpture on thorax, especially on propodeum, somewhat more coarse than in female. Hypopygium with straight apical margin.

Material

Holotype: ♀: Finland, Jyväskylä, 62°15.55'N 25°41.52'E, coll. 29-IV-2008, e.p., emerg. 11-VI-2008, leg. J.A. Elzinga, LV-33, ex *Siederia listerella*.

The holotype has been deposited in the ZSM. Paratypes have been deposited in the ZSM, the Zoological Museum Helsinki and in the author's collection.

Paratypes: ♀♀: Finland, Jyväskylä, 62°13.52'N 25°44.8'E, coll. 21-IV-2008, e.p., emerg. 16-VI-2008, leg. J.A. Elzinga, JL2-194; Finland, Jyväskylä, 62°21.02'N 25°46.44'E, coll. 21-IV-2008, e.p., emerg. 21-VI-2008, leg. J.A. Elzinga, HK1-184; Finland, Jyväskylä, 62°11.48'N 25°56.04'E, coll. 21-IV-2008, e.p., emerg. 17-VI-2008, leg. J.A. Elzinga, OV1-456; Finland, Jyväskylä, 62°11.48'N 25°56.04'E, coll. 14-IV-2008, e.p., emerg. 28-V-2008, leg. J.A. Elzinga, OV1-230, ex *Siederia listerella*; Finland, Jyväskylä, 62°13.75'N 25°54.3'E, coll. 21-IV-2008, e.p., emerg. 30-V-2008, leg. J.A. Elzinga, KN1-32.

♂♂: Finland, Jyväskylä, 62°21.62'N 25°44.2'E, coll. 1-IV-2008, e.p., emerg. 9-VI-2008, leg. J.A. Elzinga, JP4-83, ex *Siederia listerella*; Finland, Jyväskylä, 62°13.75'N 25°54.3'E, coll. 21-IV-2008, e.p., emerg. 30-V-2008, leg. J.A. Elzinga, KN1-33; Finland, Jyväskylä, 62°13.75'N 25°54.3'E, coll. 7-IV-2008, e.p., emerg. 13-V-2008, leg. J.A. Elzinga, KN1-5; Finland, Jyväskylä, 62°11.48'N 25°56.04'E, coll. 21-IV-2008, e.p., emerg. 8-VI-2008, leg. J.A. Elzinga, OV1-419; Finland, Jyväskylä, 62°21.67'N 25°44.27'E, coll. 21-IV-2008, e.p., emerg. 27-V-2008, leg. J.A. Elzinga, JP3-145; Finland, Jyväskylä, 62°14'N 25°54.61'E, coll. 21-IV-2008, e.p., emerg. 29-V-2008, leg. J.A. Elzinga, KN3-43.

Diagnosis

For the differences between *Trachyarus borealis* sp. n. females and the other *Trachyarus* species of GOKHMAN's (2007) group 1 see the key below.

The only species from the reared specimens that belongs to group 2 of the genus, *Trachyarus solyanikovi*, is further characterized by the following features: head convexly narrowing, mesoscutum polished, notauli short, metasomal tergite 2 coriaceous, tergite 3 coriaceous in basal half. In the male flagellum with tyloids on segment 8-10 and wings darkened over their entire surface.

Identification key

Key for females of *Trachyarus* species with upper tooth of mandible larger than lower tooth.
Additional, but in the context of the couplet not unique, information is given in parentheses.

1. First flagellomere at most 1.5x as long as apically wide, 1st+2nd flagellomeres together ca 2.5x as long as apically wide. Head buccate. Fore wings very short, not surpassing base of propodeum. Thorax, including propodeum, yellowish red. (Legs and metasomal tergites 1-3 yellowish red. Tergites 2-3 coriaceous, not punctate.) *T. brachypterator* DILLER, 1988
- First flagellomere at least 2x as long as apically wide, 1st+2nd flagellomeres together at least 4x as long as apically wide. Head not buccate. Wings longer. Thorax black..... 2
- 2 Tergite 2 ca 1.4x as long as apically wide. Lower tooth of mandible very small, about 1/3 as long as upper tooth. (Mesoscutum polished and closely, coarsely punctate. Distance between the punctures 1-2x puncture diameter. Head rather parallel. Wings normal. Flagellar segment 12 square. Tegulae yellowish.)..... *T. prominulus*, DILLER 1989
- Tergite 2 about as long as wide. Lower tooth larger. 3
- 3 Fore wings shortened, about as long as the thorax. 1st flagellomere ca 2x as long as wide, 1st+2nd flagellomeres ca 4x as long as wide. Flagellum in basal half reddish yellow. (Mesosternum and legs reddish-yellow. Last tarsal segment fuscous. Head weakly narrowing.).....
..... *T. brevipennis* ROMAN, 1918
- Wings normal. 1st flagellomere at least 3x as long as wide, 1st+2nd flagellomeres at least 5x as long as wide. Flagellum fuscous. 4
- 4 Tergites 2-4 closely punctate (Fig. 4), distance between the punctures 1-2x puncture diameter. Coriaceous between the punctures. Mesoscutum polished and closely, coarsely punctate. Distance between the punctures 1-2x puncture diameter. Flagellar segment 10 square. (Head strongly narrowing. Tegulae fuscous.) *T. corvinus* THOMSON, 1891
- If tergites 2-3 with punctation then distance between the punctures is greater and space between them is rather polished. Tergite 4 not punctate, smooth, at most weakly coriaceous at base. Mesoscutum not closely and coarsely punctate, smooth or weakly coriaceous with at most some widely scattered micropunctures. Flagellar segment 10 elongate..... 5
- 5 Head behind the eyes in dorsal view parallel to weakly narrowing (Fig. 2). All flagellomeres elongate. Area superomedia descending almost in one plane with the area petiolaris. (Mesoscutum polished. Tergites 2 - 3 polished with basal half slightly coriaceous and with some minute punctures. Tegulae whitish.) *T. fuscipes* (THOMSON, 1891)
- Head behind the eyes convexly narrowing (Fig. 1). Area superomedia horizontal, making an angle with the area petiolaris. Flagellomeres 10-12 square..... 6
- 6 Tergites 2-3 coriaceous (Fig. 3). Sometimes tergite 3 in apical quarter smooth and polished. Mesoscutum with micropunctures on a weakly coriaceous background. Tegulae fuscous
..... *T. borealis* **sp. n.**
- Tergites 2-3 polished with some scattered micropunctures (Fig. 5). Mesoscutum with micropunctures on a polished background. Tegulae whitish. *T. anceps* (BERTHOUMIEU, 1906)

Acknowledgements

The collection of the ZSM contains a large number of *Trachyarus* specimens with several type specimens and specimens that have been compared with holotypes. They could be studied thanks to the kind help and hospitality of S. SCHMIDT and E. DILLER. The latter is also thanked for stimulating discussions. G. BROAD kindly corrected the English text. All specimens were collected by J.A. ELZINGA from the Centre of Excellence in Evolutionary Research at the University of Jyväskylä, Finland, as part of a project funded by the Academy of Finland.

Zusammenfassung

Trachyarus borealis wird beschrieben als neuer Parasitoid von Naryciinae sp. (Lepidoptera, Psychidae) in Finland. Ein illustrierter Bestimmungsschlüssel für die nahe verwandten *Trachyarus*-Arten wird präsentiert.

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