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On the identities of *Paracacoxenus exiguus* (Duda) and *Paracacoxenus inquilinus* (Hendel), with the description of a new *Paracacoxenus* species from Italy (Diptera, Drosophilidae)

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Three male paralectotypes of *Cacoxenus exiguus* Duda, 1924 and the male holotype of *Cacoxenus inquilinus* Hendel, 1933, once considered to be lost, are examined. It is concluded that the latter binomial is a junior synonym of the former, which has precedence. So, the four specimens are re-described as *Paracacoxenus exiguus*. The subgenus *Paracacoxenus* is re-elevated to generic rank. Additionally, *Paracacoxenus* sp. *aff. kaszabi* sp. nov., a species closely related to *P. kaszabi*, is described from specimens mostly collected at Parco Nazionale dello Stelvio, Bolzano province, Trentino-Alto Adige region, Italy. Photomicrographs and drawings of their male terminalia are also included.

Keywords: aedeagus extrusion, *Cacoxenus kaszabi*, genus *Paracacoxenus*, male terminalia, *Paracacoxenus* sp. *aff. kaszabi* sp. nov., Steganinae.

INTRODUCTION

While identifying a series of *Cacoxenus* specimens collected by J. Ziegler and collaborators as part of the «Diptera Stelviana» project (Bächli 2008; Ziegler 2008), it became obvious to one of us (GB) that at least two species were present. Besides some specimens of *C. argyreator* Frey, it was predicted that others would belong to *C. exiguus* Duda, 1924, described from Habelschwerdt (Silesia, Poland), to *C. inquilinus* Hendel, 1933, described from the Austrian Semmering area, or to *C. kaszabi* (Okada, 1973), described from Mongolia and later recorded (just one male and three females) also from the Czech Republic (Máca 1980; Máca & Laštovka 1985; Máca & Bartak 2001). A possibility existed that the remaining specimens would represent an undescribed species. Modern re-descriptions with full details of the male terminalia of *C. argyreator* and *C. indagator* are provided by Bächli *et al.* (2004: 54, 56, figs 119–126), of *C. exiguus* by McAlpine (1968: 525, figs 22, 23), and of *C. kaszabi* by Máca (1980: 340, fig. 1), but those of *C. inquilinus* have not yet been published. Therefore, for a correct identification there was a need to check the holotype of the latter species and to study its characteristics.

In his study of Drosophilidae with bare or micropubescent arista, McAlpine (1968) redescribed three species of *Paracacoxenus*, namely *P. argyreator*, *P. exiguus* and *P. guttatus*, then having a generic status. A male lectotype was designated for *C. exiguus* and its terminalia were for the first time illustrated. Additionally, the unique specimen upon which Hendel (1933) described *C. inquilinus* was assumed to be lost (McAlpine 1968:530), as it could not be found in the collections

of the Naturhistorisches Museum Wien (NHMW, Vienna) where it had originally been deposited. Thus, instead of a redescription, McAlpine only gave an adapted translation from German to English of the original description of *C. inquilinus*. Unfortunately, Hendel compared his *C. inquilinus* predominantly with the distantly related *C. indagator*, therefore not providing useful characters separating it from the closely related *C. exiguus*, which had been described by Duda (1924) nine years before.

While preparing a catalog of the Drosophilidae deposited in the collections of the NHMW, one of us (Bächli 1988: 139) found the supposedly lost holotype of *C. inquilinus* among the 2,940 specimens examined. The holotype, previously dissected by Dr. J. Máca, was borrowed from the NHMW to prepare a redescription and to clarify its identity. After comparing its terminalia with those illustrated for the lectotype of *C. exiguus*, we suspected that the unusual aedeagus illustration made by McAlpine (1968:525, fig. 22) for this latter species could be just an artefact resulting from the apically damaged, hairy, membranous, bag-shaped, and fragile aedeagus. To address this concern we borrowed male paralectotypes of *C. exiguus* from the Zoologisches Museum der Humboldt Universität, Berlin. One of them has been dissected, and its terminalia illustrated and photographed under transmitted-light microscopy.

Putting aside the well-known species *Cacoxenus argyreator*, all the *Cacoxenus* material of the «Diptera Stelviana» project is described below. *Cacoxenus exiguus* and *Cacoxenus inquilinus* are found to be synonymous, as previously suggested by Bächli & Burla (1985: 47). We present arguments below for treating *Paracacoxenus* as a genus. Additionally, we conclude that the male terminalia of some specimens of *Cacoxenus* from the «Diptera Stelviana» project were sufficiently distinct from the original description of *Cacoxenus kaszabi*, as well as from Máca's (1980: 340, fig. 1) supplementary description and drawing, to warrant description of a new *Paracacoxenus* species. However, no formal scientific name will be proposed for this species until more information on *Paracacoxenus kaszabi* is available, including a detailed analysis of its male terminalia, especially its inner paraphyses.

MATERIAL AND METHODS

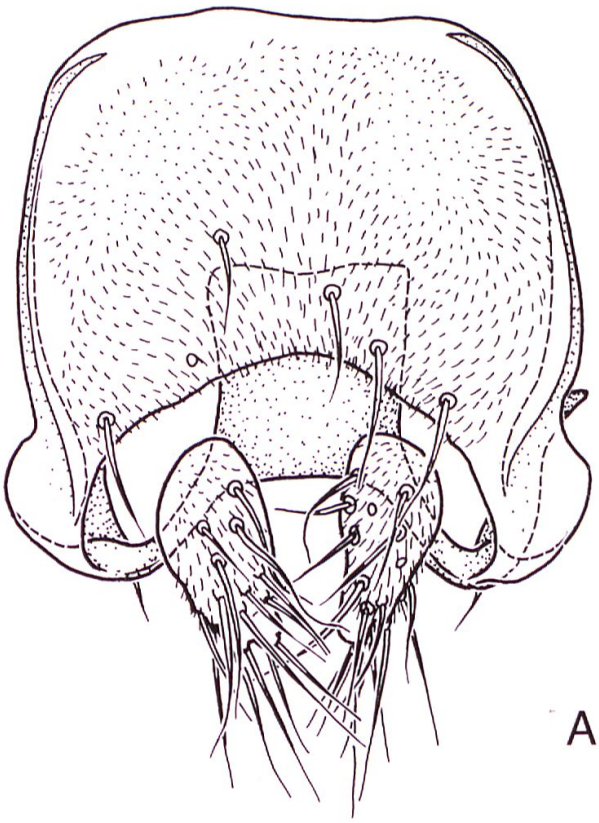
In addition to the material mentioned above, specimens kept in the Zoologisches Museum Zürich and two specimens on loan from Bernhard Merz (Muséum d'histoire naturelle, Genève) were also examined.

The following museum abbreviations are used:

ZMUZ	Zoologisches Museum Zürich
NHMW	Naturhistorisches Museum Wien
ZMB	Zoologisches Museum, Humboldt-Universität Berlin
MHNG	Muséum d'histoire naturelle de la Ville de Genève

Label data attached to each type specimen are cited in full with a double slash (.../...) indicating a label change, a backslash (...\...) indicating a label verso and a forward slash (.../...) indicating a new line. Our own notes or interpretations are included in brackets.

exiguus



0.1 mm

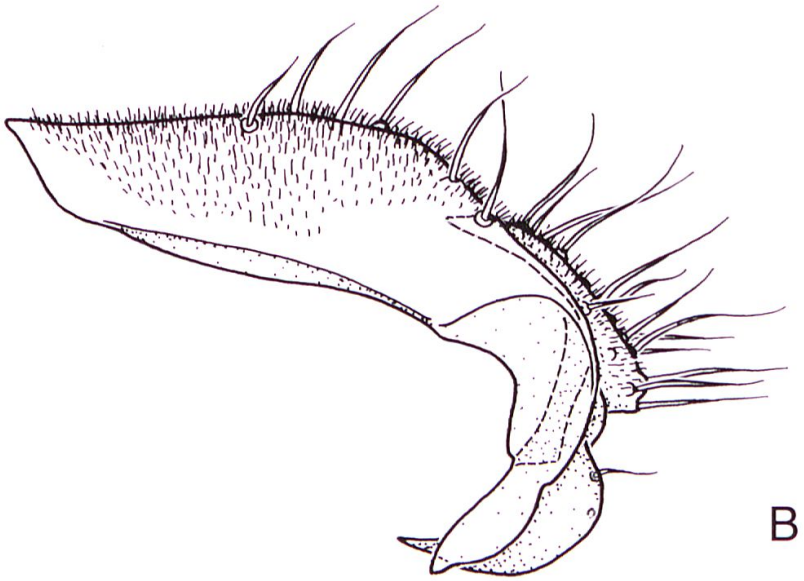


Fig. 1. *Paracacoxenus exiguus* (Duda), male paralectotype, Habelschwerdt, Poland. A, epandrium, cerci, surstyli, and decasternum (proximal section), dorsal view. B, epandrium, left cercus and left surstylus, left lateral view.

exiguus

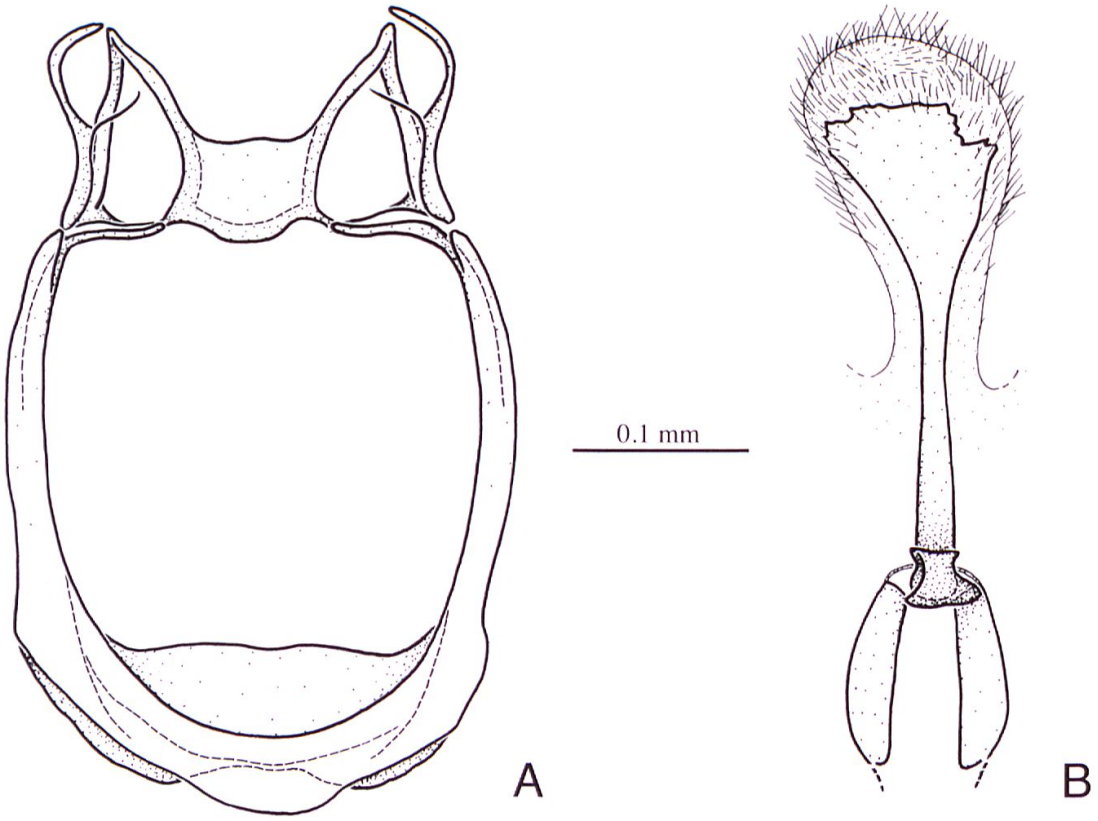


Fig. 2. *Paracacoxenus exiguus* (Duda), male paralectotype, Habelschwerdt, Poland. A, hypandrium+gonopods, decasternum (proximal section), ventral view. B, proximal branches of inner paraphyses, distal section of decasternum (dorsal arch) plus aedeagus, dorsal view.

Preparations of microscope slides were made following Wheeler & Kambysellis (1966) and Kaneshiro (1969). The abdominal sclerites, including the disarticulated terminalia, are preserved in microvials filled with glycerin and attached by the stopper to the pin of the respective specimen. Refer to Vilela & Bächli (2000) and Bächli *et al.* (2004) for further details.

Male terminalia were drawn using a camera lucida (1.8x) attached to a compound microscope under a 20x or 25x objective. They were photographed with a photomicroscope under a 6.3x objective.

Figures presented in the same plate are drawn to the same scale and all photomicrographs were taken and enlarged to the same magnification, except when otherwise indicated.

For measurements and indices see Vilela & Bächli (1990), for morphological terminology see Vilela & Bächli (2000) and Bächli *et al.* (2004).

RESULTS

Genus *Paracacoxenus* Hardy, 1960

Paracacoxenus Hardy in Hardy & Wheeler, 1960: 358 [description]; McAlpine 1968: 518 [description, key, taxa included];
Cacoxenus (*Paracacoxenus*): Tsacas & Desmier de Chenon 1976: 500 [description, new status as subgenus of *Cacoxenus* Loew]; Wheeler 1981: 23 [catalog]; Sidorenko 2002: 18 [systematic status]; Bächli *et al.* 2004: 55 [diagnosis]; Brake & Bächli 2008: 261 [catalog].

Re-established as a genus by present decision.

Type species. *Paracacoxenus guttatus* Hardy and Wheeler, 1960: 358 (original designation).

Diagnosis (external morphology [as a subgenus of *Cacoxenus*] adapted from Bächli *et al.* 2004: 55). Acrostichal setulae in at most 12 rows; scutum dark brown to blackish but in certain species may show more or less distinct dark spots around the bases of setae; syntergite 6+7 with (*Paracacoxenus argyreator* and *P. guttatus*) or without (*P. exiguus*, *P. kaszabi* and *P.* sp. *aff. kaszabi*) a spine-like process at posterolateral margin; mesocoxa with several short setae only (2 strong setae in *Cacoxenus*); surstylus apparently fused to epandrium (except in *P. argyreator*), devoid of prensisetae, bearing variable number of setae; distal section of decasternum mostly paired (in *P. guttatus*), partially paired (in *P. argyreator*) or single but anteriorly bifid (in *P. exiguus*), clearly articulated with the anteroventral margin of proximal section of decasternum, well-developed, distally fused to aedeagus (except in *P. guttatus*); gonopods indistinct, fused to each other and to very anterior region of hypandrium; aedeagus mostly hairy and membranous; two pair of paraphyses, inner paraphysis strongly sclerotized, branched.

Taxa included. *Paracacoxenus argyreator* (Frey, 1932); *P. exiguus* (Duda, 1924); *P. guttatus* Hardy and Wheeler, 1960; *P. inquilinus* (Hendel, 1933) (synonym); *P. kaszabi* Okada, 1973. Based on the male terminalia, *P. argyreator* is not so closely related to the remaining species, differing mostly by the presence of surstyli clearly not fused to epandrium and by a complete fusion between the distal section of the decasternum and the aedeagus.

Comments. The male terminalia of all included species, as previously described (Okada 1973; Máca 1980; Bächli *et al.* 2004) or shown below, are clearly different from those of the other subgenera of *Cacoxenus*: *Cacoxenus* Loew, *Gitonides* Knab, *Phragmitoxenus* Gornostayev and *Nankangomyia* Máca and Lin, each characterized by its own synapomorphies. The aedeagus is absent in the monotypic subgenus *Cacoxenus*, the inner paraphyses are absent in the species of the subgenera *Gitonides*, *Nankangomyia* and *Phragmitoxenus*. Based on the published drawings of the male terminalia of the species belonging to the latter two subgenera (Máca and Lin 1993: 8; Gornostayev 1995: 216, respectively) we cast doubt on whether two subgenera (or just one subgenus) are involved. Surstyli bearing heavily sclerotized, peglike, socketed setae («prensisetae») are present only in the species of *Gitonides*. As some terminalia characters show clear relationships with those of *Leucophenga* and *Phortica*, *Paracacoxenus* seems to be less related to *Cacoxenus* than it is to the two aforementioned genera; it therefore warrants generic status.

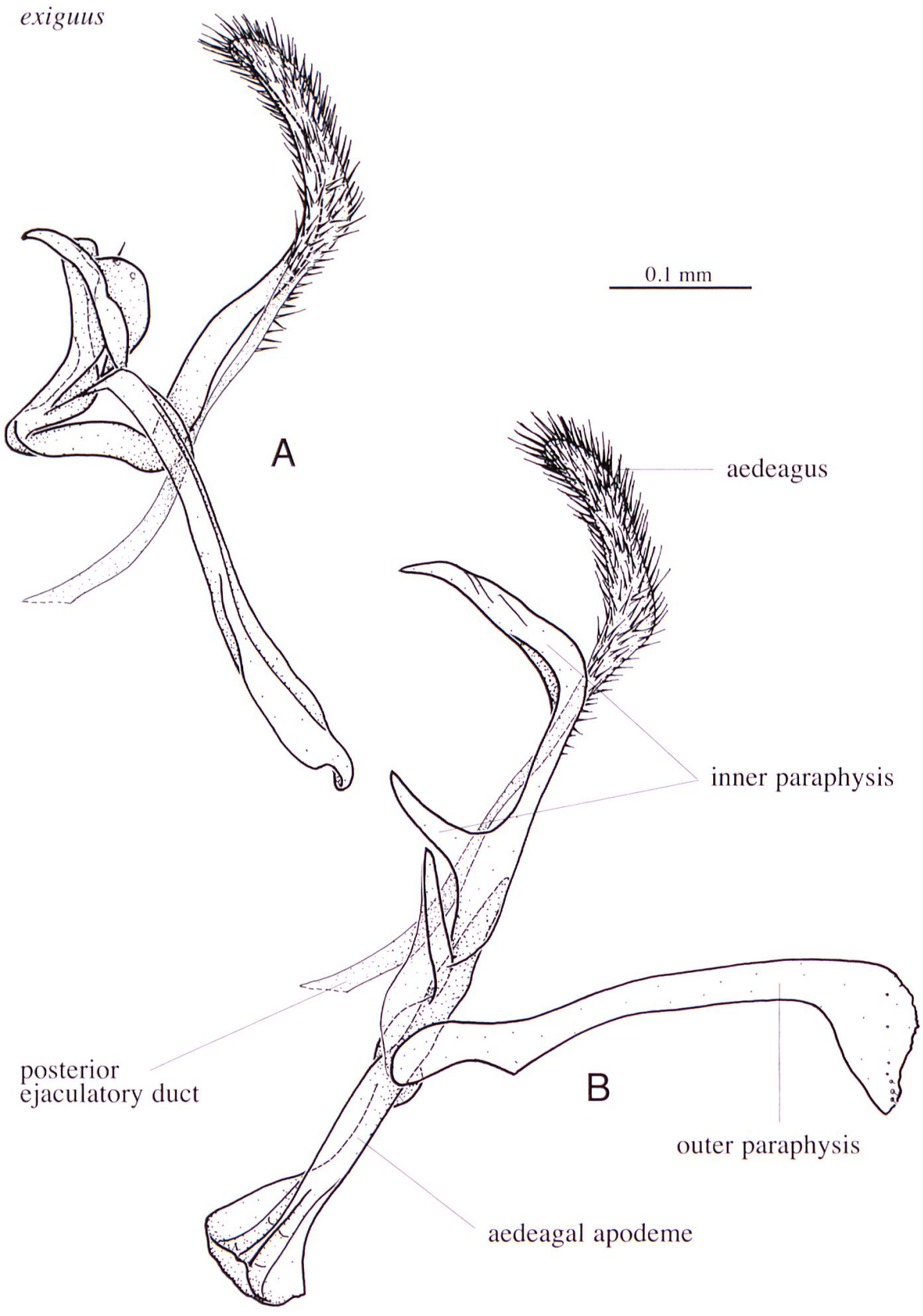


Fig. 3. *Paracacoxenus exiguus* (Duda) male paralectotype, Habelschwerdt, Poland. A, left surstylus+ventral region of epandrium arm, decasternum (proximal and distal sections), aedeagus+distal part of ejaculatory duct and hypandrium. B, aedeagus+distal part of ejaculatory duct, left three-branched inner paraphysis, left outer paraphysis and aedeagal apodeme, left lateral view.

Paracacoxenus exiguus (Duda, 1924)

(Figs 1-8, 13A–D, 14A–D)

Cacoxenus exiguus Duda 1924: 225 [key, description]; Frey 1932: 85 [key]; Hendel 1933: 46 [comparison with *C. indagator* and *P. inquilinus*]; Duda 1934: 23 [key, description]; Séguy 1934a: 182 [key]; Séguy 1934b: 372 [key]; Wheeler 1952:173 [affiliation]; Hardy & Wheeler 1960: 356 [affiliation]; d'Assis Fonseca 1965: 243 [key]; McAlpine 1968: 527 [description, terminalia, figures, key, lectotype designation, affiliation]; Papp 1973: 113 [key]; Bächli 1974: 262 [distribution]; Tsacas & Desmier de Chenon 1976: 500 [distribution]; Máca 1980: 338 [comparison with *C. kaszabi*]; Wheeler 1981: 23 [catalog]; Bächli 1982: 291 [type material]; Bächli 1984: 238 [type material]; Bächli & Rocha Pité 1982: 311 [bibliography]; Bächli & Rocha Pité 1984: 191 [catalog]; Bächli & Burla 1985: 47 [key]; Razowski 1991: 225 [distribution]; Máca 1995: 120 [distribution]; Bächli 1998: 304 [checklist Switzerland]; Chandler 1998: 156 [checklist British Isles]; Tsacas & Chassagnard 1999: 93 [affiliation]; Bächli *et al.* 2004: 51 [key]; Bächli 2008: 9 [distribution]; Brake & Bächli 2008: 261 [catalog].

Cacoxenus inquilinus Hendel, 1933: 46, new synonym.

Cacoxenus inquilinus Hendel 1933: 46 [description, comparison with *C. indagator* and *C. exiguus*]; Wheeler 1952: 173 [affiliation]; Hardy & Wheeler 1960: 356 [affiliation; distribution Austria]; McAlpine 1968: 528 [description, key, affiliation]; Okada 1973: 273 [comparison with *P. kaszabi*]; Papp 1973: 113 [key]; Tsacas & Desmier de Chenon 1976: 500 [distribution]; Máca 1980: 338 [comparison with *C. kaszabi*]; Wheeler 1981: 23 [catalog]; Bächli 1982: 291 [type material]; Bächli & Rocha Pité 1982: 311 [bibliography]; Bächli & Rocha Pité 1984: 191 [catalog]; Bächli 1988: 139 [type material]; Franz 1989: 177 [distribution, type material]; Tsacas & Chassagnard 1999: 93 [affiliation]; Merz *et al.* 2001: 128 [checklist Switzerland]; Bächli *et al.* 2004: 52 [key]; Brake & Bächli 2008: 261 [catalog].

Diagnosis. Small, brownish-black flies; frons velvety black but frontal triangle and orbital plates grayish microtrichose; cheek almost linear, broadened (index about 5–7, ranging 4–9); mesonotum almost blackish, without spots; syntergite 6+7 without a spine-like process at posterolateral margin; surstylus completely fused to ventral lobe of epandrium, devoid of prensisetae, bearing ca. 2 outer setae on central membranous area; distal section of decasternum well-developed, single, mostly rod-shaped, bent, anteriorly bifid, distally plate-shaped, marginally dentate, and fused to dorsocentral surface of aedeagus; gonopods indistinct, bare, fused to each other and to very anterior region of hypandrium; aedeagus membranous, hairy, bag-shaped; two pairs of paraphyses; inner paraphysis strongly sclerotized, three-branched.

Material examined (36 ♂♂, 4 ♀♀):

HOLOTYPE male (NHMW) of *Paracacoxenus inquilinus*, labelled: «inquilinus [black handwriting] / Hend.[black manuscript] / F. Hendel det. [black printed] \ Semm[as an upperlined m]ering. Juni.23. [black handwriting] // C. inquilinus H. Holotyp [male symbol] [black handwriting] G. Bächli det. 19 [black printed] 80 [black manuscript] // HOLOTYPE [large rectangular red label] // [abdomen in plastic tube filled with glycerin and closed at both sides] // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011 // terminalia / illustrated and / photographed».

PARALECTOTYPES (3 ♂♂; ZMB) of *Paracacoxenus exiguus*, labelled:

1 ♂: «31 5 23 [handwritten green label] // Wustung / b.Habelschwerdt / l.Duda [printed black-bordered white label] // Cacoxenus / exiguus ♂ [handwritten] / DET. DR. O. DUDA [white label] // SYNTYPE ♂ [handwriten red label] // PARALECTOTYPE [large red label] // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011»; 1 ♂: «6 5 23 [handwritten green label] // Wustung / b.Habelschwerdt /

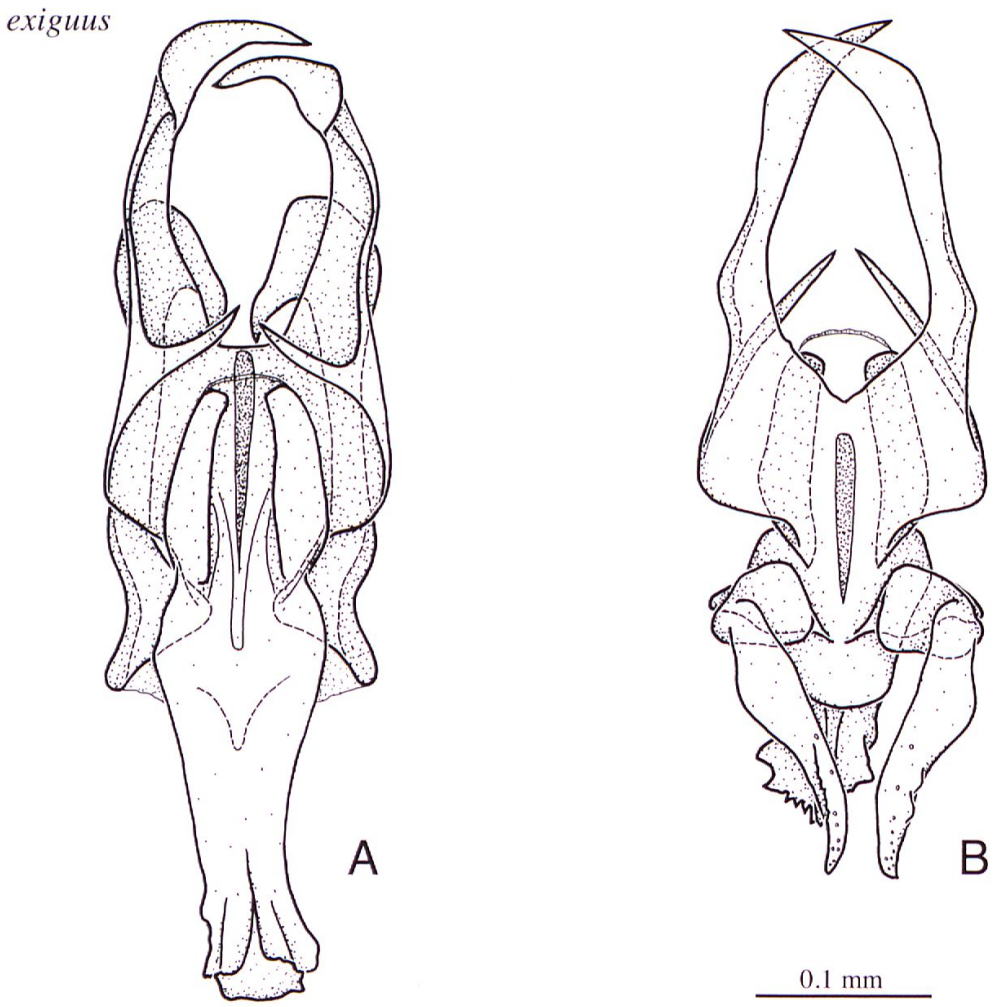


Fig. 4. *Paracacoxenus exiguus* (Duda), male paralectotype, Habelschwerdt, Poland. Outer paraphyses, three-branched inner paraphyses and aedeagal apodeme. A, dorsal view. B, idem, ventral view.

1.Duda [printed black-bordered white label] // Cacoxenus / exiguus ♂ [handwritten white label] // SYNTYPUS [red label] // [abdomen in plastic tube filled with glycerin and closed at both sides] // terminalia / illustrated and / photographed // PARALECTOTYPE [large red label] // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011»; 1 ♂: «6 5 23 [handwritten green label] // Cacoxenus exiguus [handwritten] // Flügel phot [handwritten green label] // Paratypus [sic] [printed red label] // PARALECTOTYPE [large red label] // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011».

Non-type specimens examined (10 ♂♂, 4 ♀♀; ZMUZ, the last specimen: MHNG):

1 ♂: «Gomagoi 1220 m 0 / 16.–21.V.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011»; 1 ♂: «Gomagoi 1220 m 1 / 21.–31.V.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / exiguus Duda / Bächli &

inquilinus

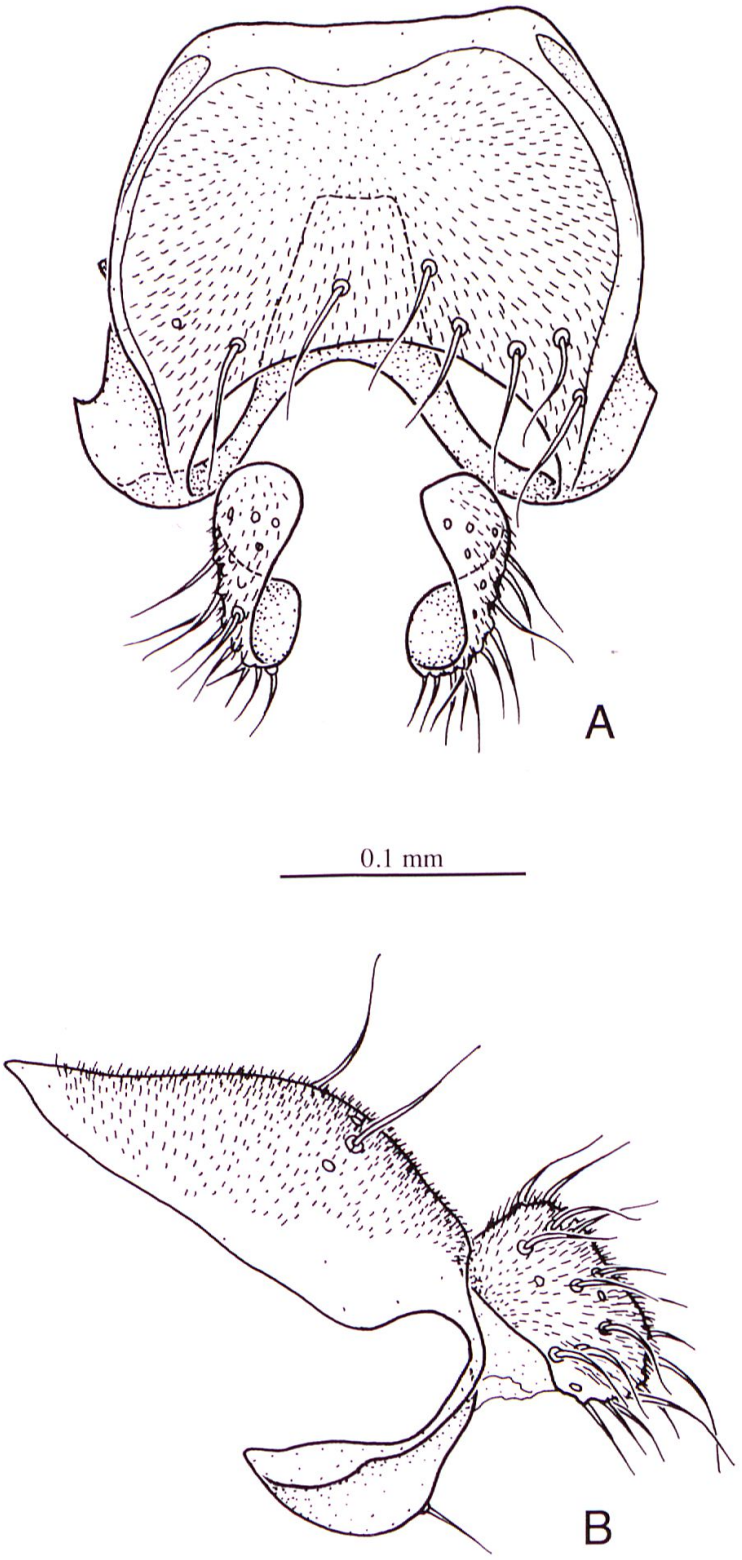


Fig. 5. *Paracacoxenus exiguus* (Duda), holotype male of junior synonym *Paracacoxenus inquilinus* (Hendel), Semmering, Austria. A, epandrium, cerci, surstyli, and decasternum, dorsal view. B, epandrium, left cercus and left surstylus, left lateral view.

Vilela det. / 2011»; 1 ♂: «Gomagoi 1220 m 1 / 21.–31.V.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011»; 1 ♂: «Gomagoi 1220 m 1 / 21.–31.V.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011«; 1 ♂: «Gomagoi 1220 m 1 / 21.–31.V.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011»; 1 ♂: «Gomagoi 1220 m 1 / 21.–31.V.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // [abdomen in plastic tube filled with glycerin and closed at both sides] // terminalia / illustrated and / photographed // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011»; 1 ♂: «Gomagoi 1220 m 2 / 31.V.–11.VI.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011»; 1 ♂: «Gomagoi 1220 m 3 / 11.–27.VI.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011 [dissected, terminalia photomicrographed, Figs 13D, 14D]»; 1 ♂: «Trafoi 1630 m 1 / 21.–31.V.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011»; 1 ♀: «Schmelz 940 m 1 / 21.–31.V.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♀ // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011»; 1 ♀: «Gomagoi 1220 m 1 / 21.–31.V.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♀ // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011»; 1 ♀: «Gomagoi 1220 m 2 / 31.V.–11.VI.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♀ // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011»; 1 ♀: «Trafoi 1630 m 3 / 11.–27.VI.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♀ // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011»; 1 ♂: «Helv. VS. 900 m / Leuk-Brentjong / 17.V.1996 leg. Merz & Bächli // ♀ // Paracacoxenus / inquilinus / Jan Máca det. // [abdomen in plastic tube filled with glycerin and closed at both sides] // terminalia / illustrated and / photographed // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011».

Other material examined (22 ♂♂; ZMB):

1 ♂:«Schmelz 940 m 1 / 21.–31.V.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011»; 1 ♂: «Schmelz 940 m 2 / 31.V.–11.VI.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011»; 3 ♂♂: «Schmelz 940 m 3 / 11.–27.VI.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011»; 4 ♂♂: «Gomagoi 1220 m 1 / 21.–31.V.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011»; 2 ♂♂: «Gomagoi 1220 m 2 / 31.V.–11.VI.2005 /

inquilinus

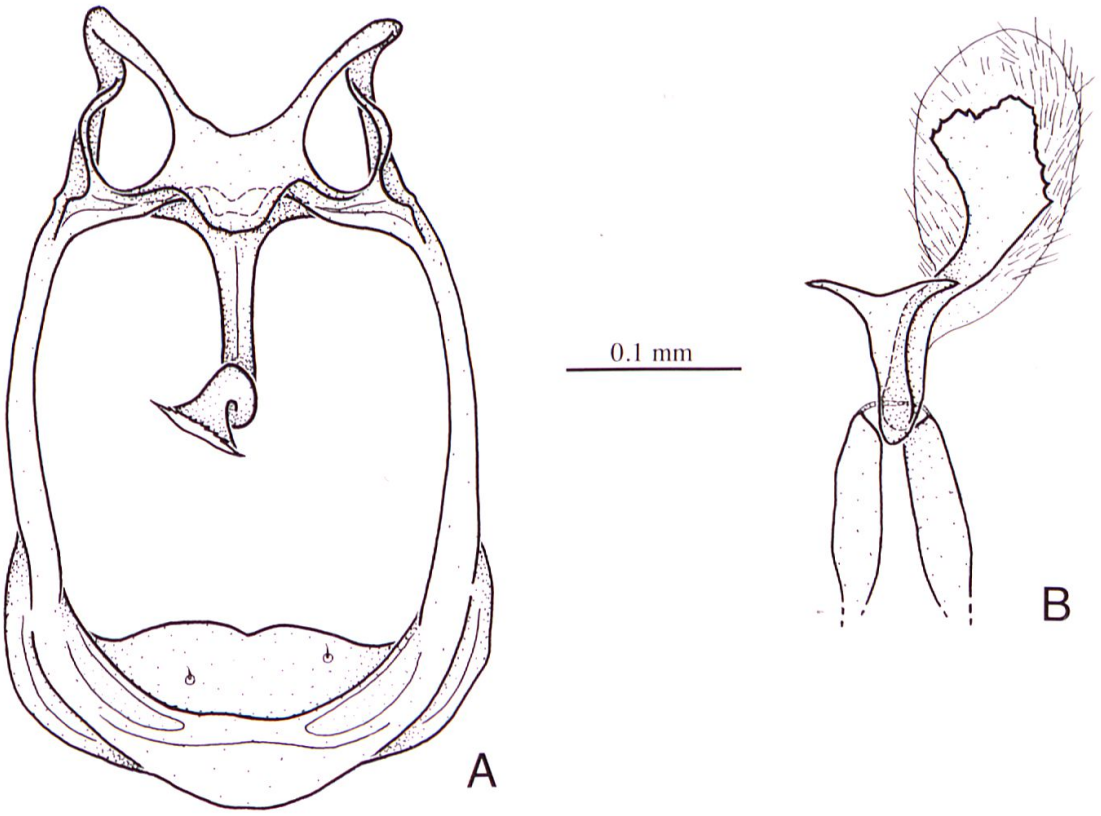


Fig. 6. *Paracacoxenus exiguus* (Duda), holotype male of junior synonym *Paracacoxenus inquilinus* (Hendel), Semmering, Austria. A, hypandrium+gonopods, decasternum («dorsal arch» = proximal and distal sections), posterior view. B, proximal branches of inner paraphyses, distal section of decasternum («dorsal arch») plus aedeagus, dorsal view.

Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011»; 2 ♂♂: «Trafoi 1630 m 2 / 31.V.–11.VI.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011»; 7 ♂♂: «Trafoi 1630 m 3 / 11.–27.VI.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011»; 1 ♂: «Trafoi 1630 m 12 / 30.VIII.–5.IX.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011»; 1 ♂: «Weisser Knott 6 / 13.–25.VII.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / exiguus Duda / Bächli & Vilela det. / 2011».

Type locality. Habelschwerdt [Bystrzyca Klodzka], Silesia, Poland, for *P. exiguus*; Semmering, Nieder-Oesterreich, Austria, for *P. inquilinus*.

Redescription. ♂ (10 specimens measured).

Head. Frons centrally velvety black, frontal length 0.39 (0.32–0.48) mm; frontal index = 1.15 (0.92–1.32), top to bottom width ratio = 1.25 (1.08–1.33). Frontal

inquilinus

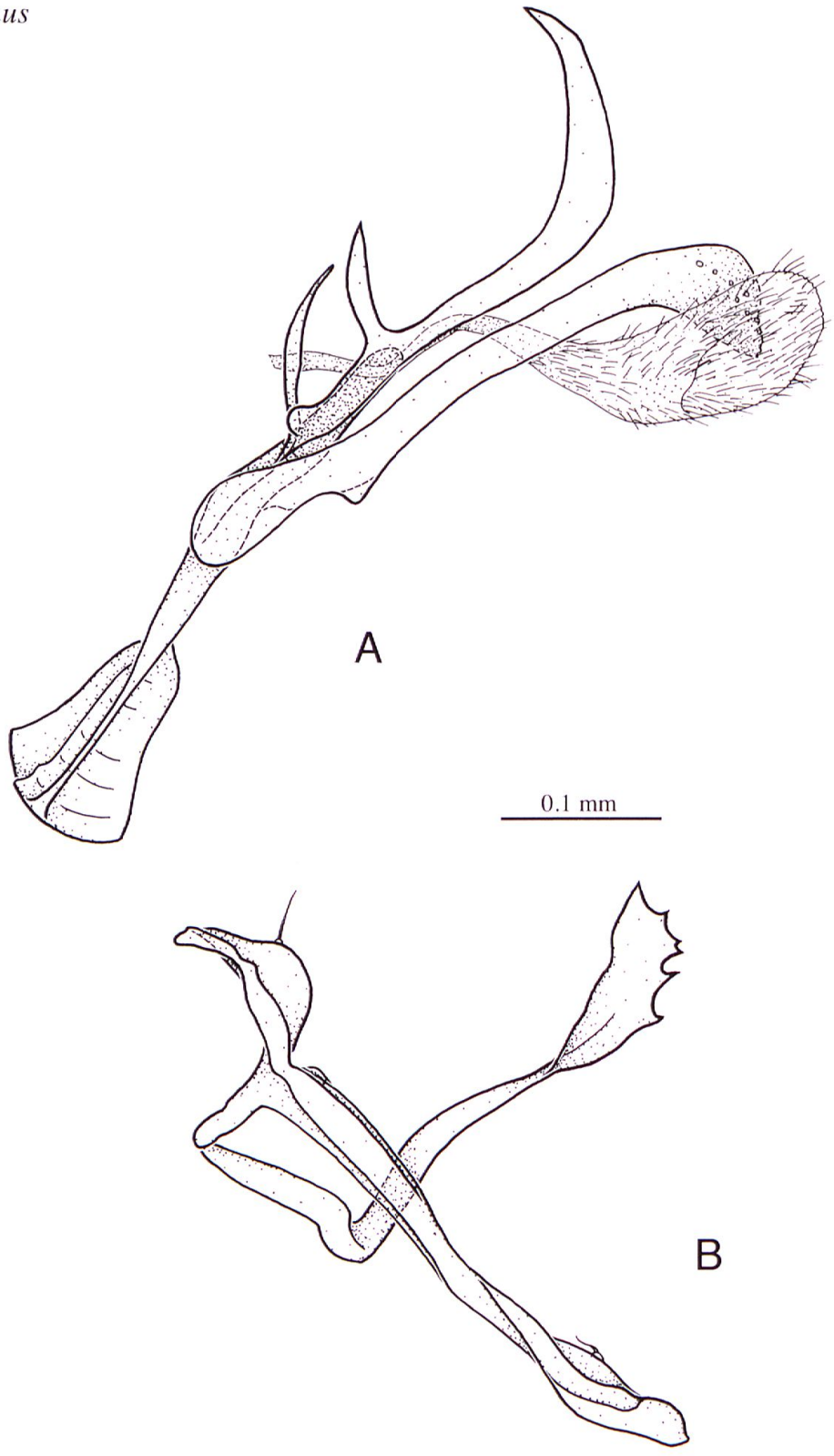


Fig. 7. *Paracacoxenus exiguus* (Duda), holotype male of junior synonym *Paracacoxenus inquilinus* (Hendel), Semmering, Austria. A, aedeagus+distal part of ejaculatory duct, left three-branched inner paraphysis, left outer paraphysis and aedeagal apodeme, left lateral view. B, left surstylus+ventral region of epandrium arm, decasternum (proximal and distal sections) and hypandrium, left lateral view.

triangle grayish microtrichose, laterally and apically rounded, about 36–48 % of frontal length; ocellar triangle slightly prominent, microtrichose, about 29–43 % of frontal length. Orbital plates grayish microtrichose, about 52–77 % of frontal length. Orbital setae black, almost in a row, distance of or3 to or1 = 150–275 % of or3 to vtm, or1 / or3 ratio = 0.98 (0.80–1.11), or2 / or1 ratio = 0.85 (0.67–1.00), postocellar setae minute, 17 (8–22) % of frontal length, ocellar setae = 55 (43–63) % of frontal length; vt index = 0.89 (0.85–1.08); vibrissal index = 0.36 (0.29–0.42). Face blackish, slightly microtrichose. Carina narrow, not prominent. Cheek almost linear, broadened, index about 7 (4–9). Eye roundish, index = 1.15 (1.07–1.19). Antennae dark brown, length to width ratio of flagellomere 1 = 0.92 (0.83–1.14). Arista short, microtrichose. Proboscis dark brown. Clypeus broad, blackish, slightly microtrichose. Palpus dark brown.

Thorax generally brownish-black, slightly microtrichose, length 1.08 (0.90–1.26) mm. 6–8 slightly irregular rows of acrostichal setulae. Only upper postpronotal seta prominent. Transverse distance of dorsocentral setae 262–433 % of longitudinal distance; dc index = 0.49 (0.45–0.53); one pair of distinct prescutellar setae present. Scutellar setae nearly equidistant; basal setae distinctly divergent; scut index = 1.27 (1.09–1.45). Sterno index = 0.88 (0.76–1.00); median katepisternal seta about 25 (19–31) % of the anterior one. Halter whitish. Legs brownish-black, first tarsal joint at least as long as tarsomeres 2–5 together, usually short preapical setae on all tibiae, short apical seta on mid tibia.

Wing hyaline, veins R_{4+5} and M parallel, length 2.14 (1.85–2.45) mm, length to width ratio = 2.13 (2.04–2.21). Indices: C = 2.76 (2.27–3.27), ac = 1.85 (1.56–2.17), hb = 0.33 (0.27–0.45), 4C = 1.15 (0.85–1.30), 4v = 2.35 (1.92–2.73), 5x = 1.47 (1.25–1.67), M = 0.74 (0.62–0.91), prox. x = 1.08 (0.85–1.33).

Abdomen brownish-black, slightly microtrichose, hind margins of median tergites very narrowly whitish; syntergite 6+7 without a spine-like process at posterolateral margin.

Terminalia (Figs 1–8, 13A–D, 14A–D). Epandrium (Figs 1A,B, 5A,B, 13A–D) microtrichose, except for the anteroventral region, with no lower, and ca. 3 upper setae, ventral lobe fused to surstylus. Cercus (Figs 1A,B, 5A,B, 13A–D) ventrally positioned, laterally connected to epandrium by membranous tissue, covered with setae, microtrichose, without ventral lobe. Surstylus (Figs 1B, 5B) without prensisetae, bearing ca. 2 outer setae on central membranous area and no inner setae, not microtrichose, completely fused to ventral lobe of epandrium. Decasternum (Figs 3A, 6A, 7B, 13A–D) divided into two sections, which clearly articulate with each other through a membranous strip on anteroventral margin of the proximal section, which is flattened, square-shaped in dorsal view, posterodorsally with a pair of lateral arms, distally fused to the surstyli; distal section (ventral process of Grimaldi, 1990: 76–78 [fig. 424], 78) a rod-shaped L, proximally bifid, distally flattened dorsoventrally, expanded laterad, marginally serrate and fused to dorsocentral region of aedeagus. Hypandrium (Figs 3A, 6A, 7B, 13A–D, 14A–D) longer than epandrium, anterior margin strongly convex, somewhat circular in posterior view; posterior hypandrial process absent; «dorsal arch» is formed by a complex, two-sectioned decasternum; gonopods not recognizable, fused to each other and to anterior very end of hypandrium (Fig. 2A). Aedeagus (Figs 2B, 3A,B, 6B, 7A, 13A–D, 14A–D) completely membranous, oval-shaped in dorsal and ventral

inquilinus

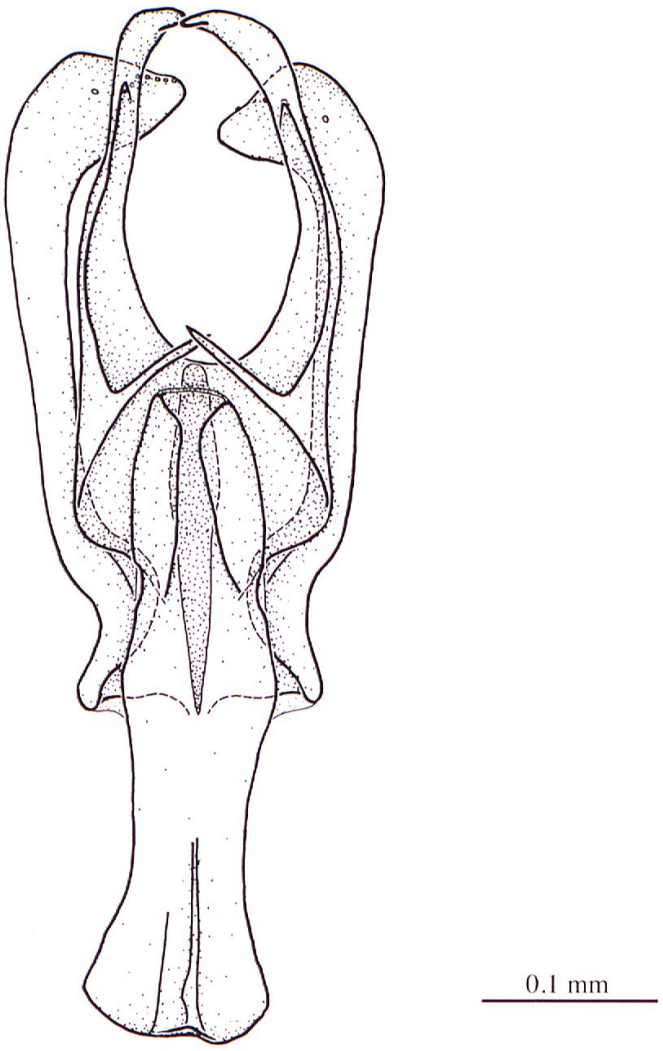
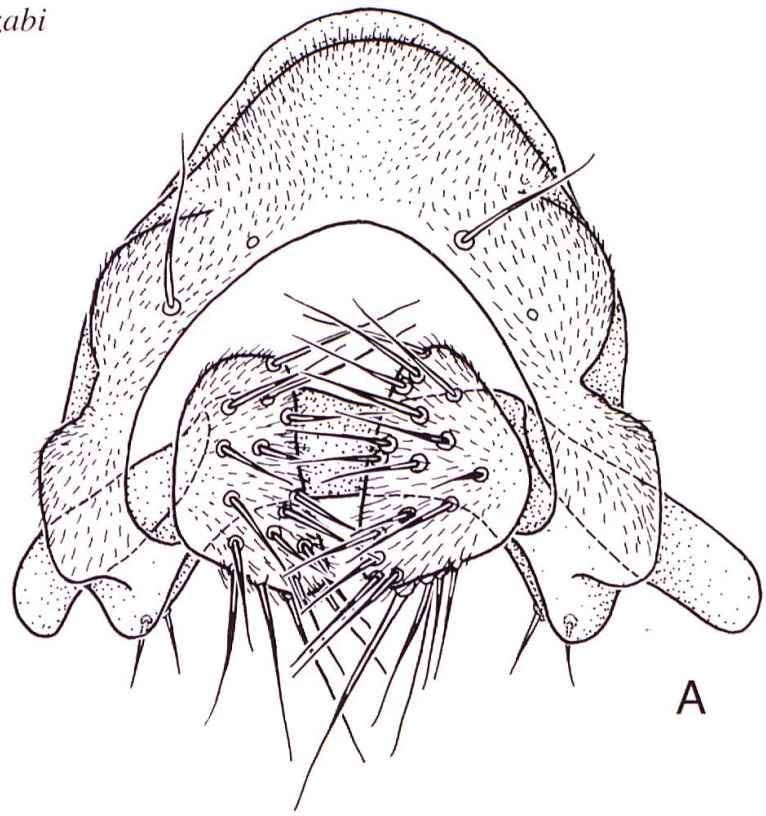


Fig. 8. *Paracacoxenus exiguus* (Duda), holotype male of junior synonym *Paracacoxenus inquilinus* (Hendel), Semmering, Austria. Three-branched inner paraphyses, outer paraphyses, and aedeagal apodeme, dorsal view.

views, brush-shaped in lateral view, dorsoventrally flattened, microtrichose, and fused to the dorsoventrally flattened end of distal section of decasternum. Two pairs of paraphyses (Figs 3B, 4A,B, 7A, 8, 13A–D, 14A–D). Outer paraphysis (Fig. 3B) longer than epandrium, apically enlarged, triangle-shaped and turned ventrad in lateral view, with a curved row of ca. 11 outer setulae, linked both to lateral inner margin (gonopods) of hypandrium medially, and to posterolateral region of aedeagal apodeme, by membranous tissue. Inner paraphysis (Figs 3B, 7A) slightly longer than outer paraphysis, strongly sclerotized, bare, anteriorly fused to mediolateral surface of aedeagal apodeme, trifurcate, distal branch longer and abruptly turned dorsalwards, median branch shorter, also pointed dorsad, anterior branches pointed backwards and distally connected to each other by a membranous strip embracing submedian region of L-shaped distal section of decasternum (Figs 2B, 6B). Aedeagal apodeme (Figs 3B, 4A,B, 7A, 8) slightly longer than aedeagus, dorsoventrally flattened, strongly

sp. *aff. kaszabi*



0.1 mm

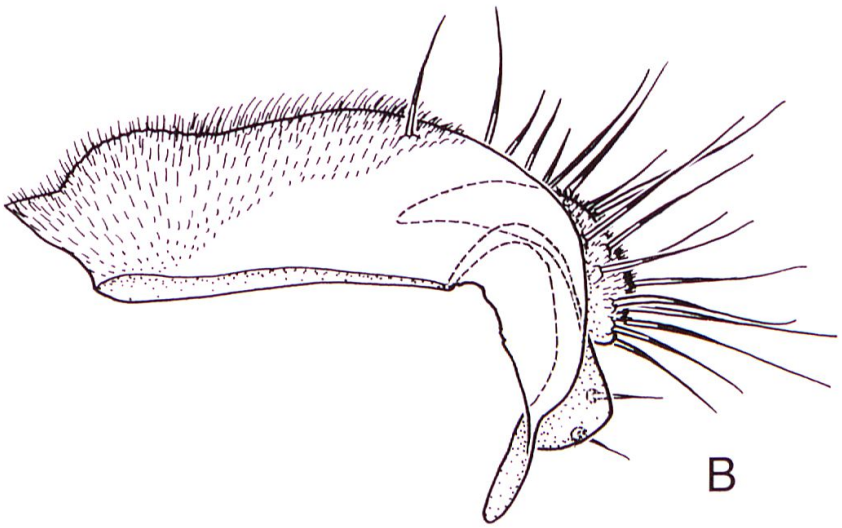


Fig. 9. *Paracacoxenus* sp. *aff. kaszabi* sp. nov., male holotype, Schmelz, Parco Nazionale dello Stelvio, Bolzano province, Trentino-Alto Adige region, Italy. A, epandrium, cerci, surstyli, and decasternum, dorsal view. B, epandrium, left cercus and left surstylus, left lateral view.

sclerotized, laterally fused to anterior region of inner paraphysis. Ventral rod apparently absent, probably turned backwards and fused (Figs 3B, 4A,B, 8) to posteroventral region of aedeagal apodeme.

♀ (4 specimens measured).

Measurements: Frontal length 0.36 (0.30–0.49) mm; frontal index = 1.18 (1.00–1.45), top to bottom width ratio = 1.23 (1.13–1.45). Frontal triangle about 29–37 % of frontal length; ocellar triangle about 25–32 % of frontal length. Orbital plates about 58 % of frontal length. Distance of or3 to or1 = 225–275 % of or3 to vtm, or1 / or3 ratio = 0.98 (0.92–1.00), or2 / or1 ratio = 0.87 (0.78–1.00), postocellar setae = 14 (7–17) % of frontal length, ocellar setae = 52 (42–58) % of frontal length; vt index = 1.01 (0.89–1.11); vibrissal index = 0.33 (0.25–0.36). Cheek index about 5 (4–6). Eye index = 1.10 (1.06–1.15). Thorax length 0.98 (0.78–1.22) mm. Transverse distance of dorsocentral setae 300 % of longitudinal distance; dc index = 0.44 (0.38–0.50); scut index = 1.17 (1.08–1.75), sterno index = 0.86 (0.83–0.91), mid katepisternal seta about 16–30 % of anterior one. Wing length 2.00 (1.64–2.63) mm, length to width ratio = 2.14. Indices: C = 2.63 (2.38–3.00), ac = 1.95 (1.45–2.33), hb = 0.32 (0.29–0.36), 4C = 1.16 (1.07–1.30), 4v = 2.27 (2.10–2.40), 5x = 1.55 (1.25–1.80), M = 0.71 (0.67–0.75), prox. x = 1.01 (0.92–1.13).

Terminalia. Not examined.

Distribution. Poland, Austria, Switzerland, British Isles, Italy (new record).

Biology. Many specimens of *P. guttatus* Hardy & Wheeler were collected on *Pinus contorta* infested with stem rust (McAlpine 1968: 524). This association may also apply to the European species.

Comments. After examining the male terminalia of *Paracacoxenus exiguus*, we propose a new interpretation on the origin of some elements of the male terminalia of *Cacoxenus argyreator* illustrated by Bächli *et al*. (2004: 56, figs 125, 126). We now believe the element they named «aedeagus» resulted from the almost complete fusion between the distally sclerotized section of the decasternum and the membranous aedeagus, which remained membranous and hairy at the ventrodistal tip, and the sclerite they named «dorsal arch» would represent the proximal section of the decasternum. Grimaldi (1990: 76–78) offers further commentary on the structure often named the dorsal arch. We agree with Grimaldi that that structure has developed in various ways, from different elements, in different genera of Drosophilidae. It seems that the dorsal arch present in several groups of species of the *Drosophila tripunctata* radiation (Throckmorton 1975) such as in the *calloptera*, *cardini*, *guarani* and *tripunctata* groups, has originated from the fusion of the lateral lobes of the gonopods and not from the decasternum itself, as it seems to occur, for instance, in the species belonging to the genera *Amiota*, *Cacoxenus*, *Leucophenga*, *Lordiphosa*, *Paracacoxenus* and *Phortica*. In the above *Drosophila* species groups the decasternum simply rests above and adjacent to the dorsal arch and apparently does not articulate with it.

sp. *aff. kaszabi*

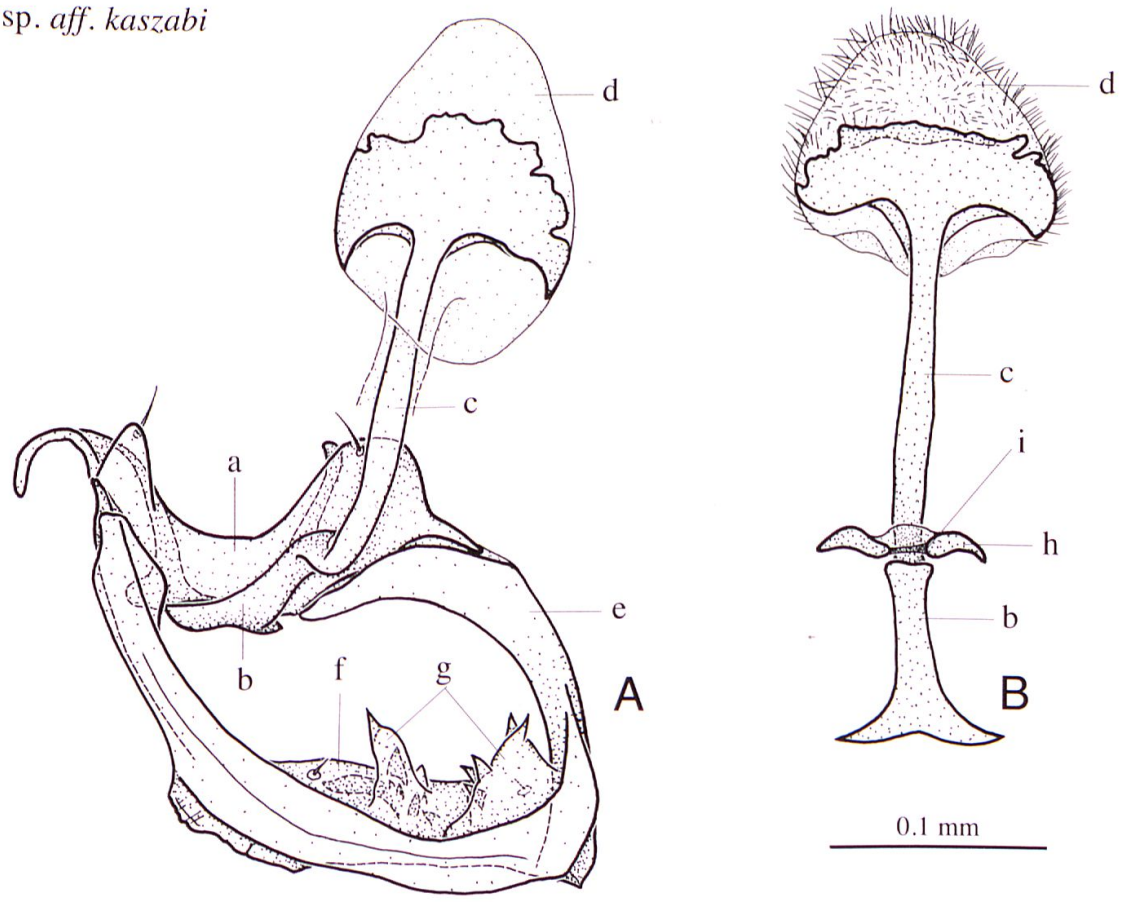


Fig. 10. *Paracacoxenus* sp. *aff. kaszabi* sp. nov., male holotype, Schmelz, Parco Nazionale dello Stelvio, Bolzano province, Trentino-Alto Adige region, Italy. A, surstyli, hypandrium+gonopods, decasternum (proximal and distal sections), and outline of aedeagus, oblique posterior view. B, proximal branches of inner paraphyses, distal section of decasternum+aedeagus, dorsal view. (a, proximal section of decasternum [«dorsal arch»], b and c, distal section of decasternum; d, aedeagus; e, hypandrium; f, fused gonopods; g, warts; h, proximal branch of left inner paraphysis; i, membranous strip connecting proximal branches of inner paraphyses and embracing distal section of decasternum).

Paracacoxenus sp. *aff. kaszabi* sp. nov.

(Figs 9–12, 13E, 14E)

Cacoxenus spec. nov.: Bächli 2008: 164 [distribution].

Diagnosis. Small, brownish-black flies; frons velvety black but frontal triangle and orbital plates grayish microtrichose; cheek linear, narrower than in *C. exiguus* (index about 9–10, ranging 8–14); mesonotum almost blackish, without spots; syntergite 6+7 without a spine-like process at posterolateral margin; distal section of decasternum well-developed, single, mostly rod-shaped, sinuate, distally plate-shaped, marginally dentate, and fused to dorsocentral surface of aedeagus; gonopods indistinct, remarkably warty, fused to each other and to very anterior region of hypandrium, bearing 2 lateral setulae; aedeagus membranous, hairy, triangular in dorsal and ventral views; two pairs of paraphyses, inner paraphysis strongly sclerotized, hepta-branched.

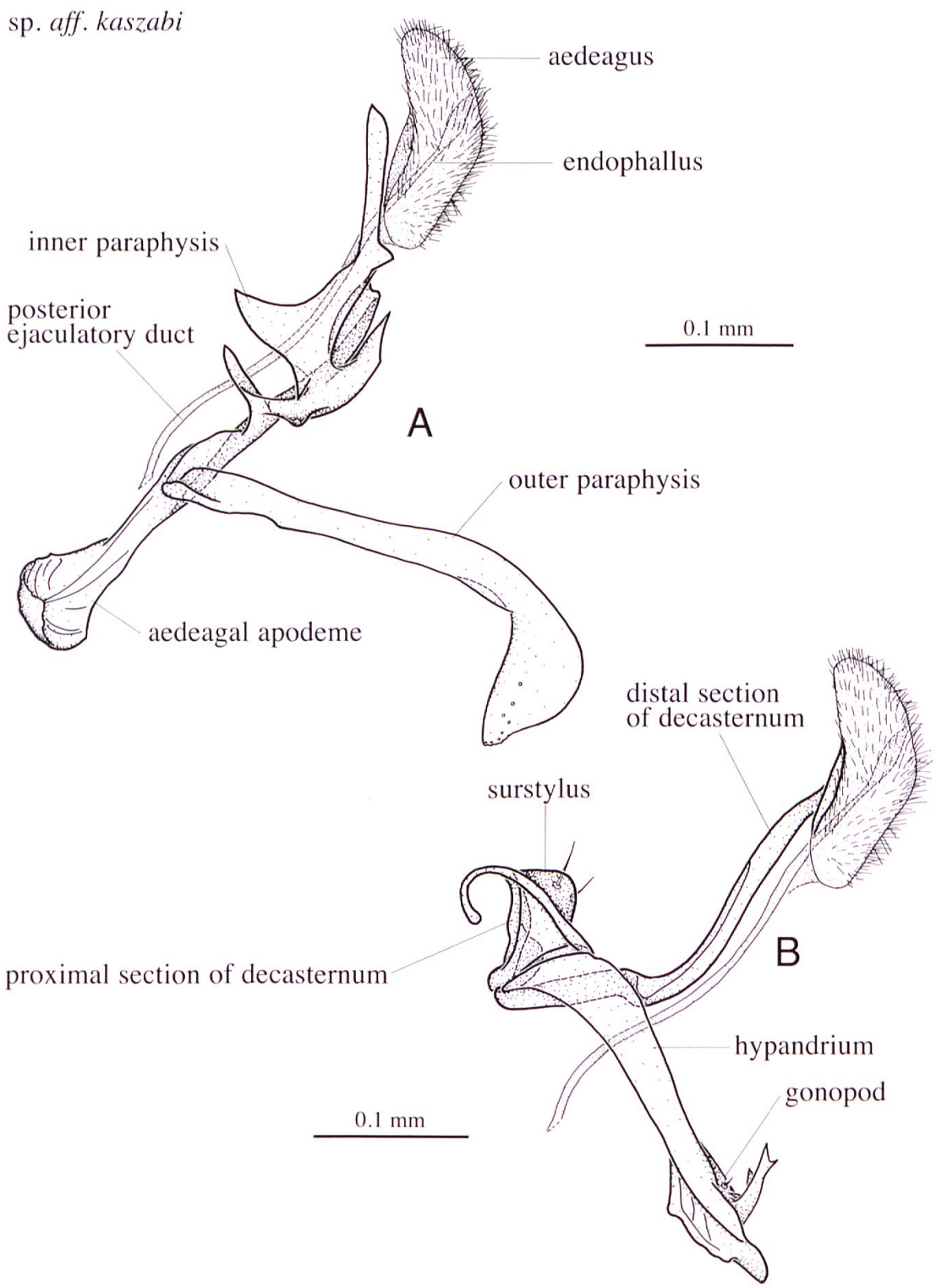


Fig. 11. *Paracacoxenus* sp. *aff. kaszabi* sp. nov., male holotype, Schmelz, Parco Nazionale dello Stelvio, Bolzano province, Trentino-Alto Adige region, Italy. A, aedeagus+distal part of ejaculatory duct, left hepta-branched inner paraphysis, left outer paraphysis and aedeagal apodeme, left lateral view. B, left surstylus+ventral region of epandrium arm, decasternum (proximal and distal sections), aedeagus+distal part of ejaculatory duct, hypandrium and gonopod, left lateral view.

Material examined (33 ♂♂, 3 ♀♀):

HOLOTYPE male, labelled: «Schmelz 940 m 2 / 31.V.–11.VI.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // [abdomen in plastic tube filled with glycerin and attached to the pin] // HOLOTYPE [large red label] // terminalia / illustrated and / photographed // Paracacoxenus / sp. aff. kaszabi sp. nov. / Bächli & Vilela det. / 2007», ZMUZ.

PARATYPES (9 ♂♂, 3 ♀♀; ZMUZ, the last specimen MHNG):

1 ♂: «Schmelz 940 m 2 / 31.V.–11.VI.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // PARATYPE // Paracacoxenus / sp. aff. kaszabi sp. nov. / Bächli & Vilela det. / 2007»; 1 ♂: «Schmelz 940 m 2 / 31.V.–11.VI.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // PARATYPE // Paracacoxenus / sp. aff. kaszabi sp. nov. / Bächli & Vilela det. / 2007»; 1 ♂: «Schmelz 940 m 2 / 31.V.–11.VI.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // PARATYPE // Paracacoxenus / sp. aff. kaszabi sp. nov. / Bächli & Vilela det. / 2007»; 1 ♂: «Schmelz 940 m 2 / 31.V.–11.VI.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // PARATYPE // Paracacoxenus / sp. aff. kaszabi sp. nov. / Bächli & Vilela det. / 2007»; 1 ♂: «Schmelz 940 m 4 / 27.VI.–4.VII.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // PARATYPE // Paracacoxenus / sp. aff. kaszabi sp. nov. / Bächli & Vilela det. / 2007»; 1 ♂: «Schmelz 940 m 4 / 27.VI.–4.VII.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // PARATYPE // Paracacoxenus / sp. aff. kaszabi sp. nov. / Bächli & Vilela det. / 2007»; 1 ♂: «Schmelz 940 m 5 / 4.–13.VII.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // PARATYPE // Paracacoxenus / sp. aff. kaszabi sp. nov. / Bächli & Vilela det. / 2007»; «Schmelz 940 m 6 / 13.–25.VII.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // PARATYPE // Paracacoxenus / sp. aff. kaszabi sp. nov. / Bächli & Vilela det. / 2007»; 1 ♂: «Schmelz 940 m 7 / 25.VII.–1.VIII.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // PARATYPE // Paracacoxenus / sp. aff. kaszabi sp. nov. / Bächli & Vilela det. / 2007»; 1 ♀: «Schmelz 940 m 1 / 21.–31.V.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♀ // PARATYPE // Paracacoxenus / sp. aff. kaszabi sp. nov. / Bächli & Vilela det. / 2007»; 1 ♀: «Schmelz 940 m 8 / 1.–8.VIII.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♀ // PARATYPE // Cacoxenus / sp. aff. kaszabi sp. nov. / Bächli & Vilela det. / 2007»; 1 ♀: «Helv. ZH 650m / Zürich-Zürichberg / 12.V.1998 / leg. B.Merz // ♀ // Cacoxenus / exiguus D. / G. Bächli det. // PARATYPE // Paracacoxenus / sp. aff. kaszabi sp. nov. / Bächli & Vilela det. / 2007».

Other material examined (22 ♂♂; ZMB):

2 ♂♂: «Schmelz 940 m 0 / 17.–21.V.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / sp. aff. kaszabi sp. nov. / Bächli & Vilela det. / 2007»; 9 ♂♂: «Schmelz 940 m 1 / 21.–31.V.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / sp. aff. kaszabi sp. nov.

sp. *aff. kaszabi*

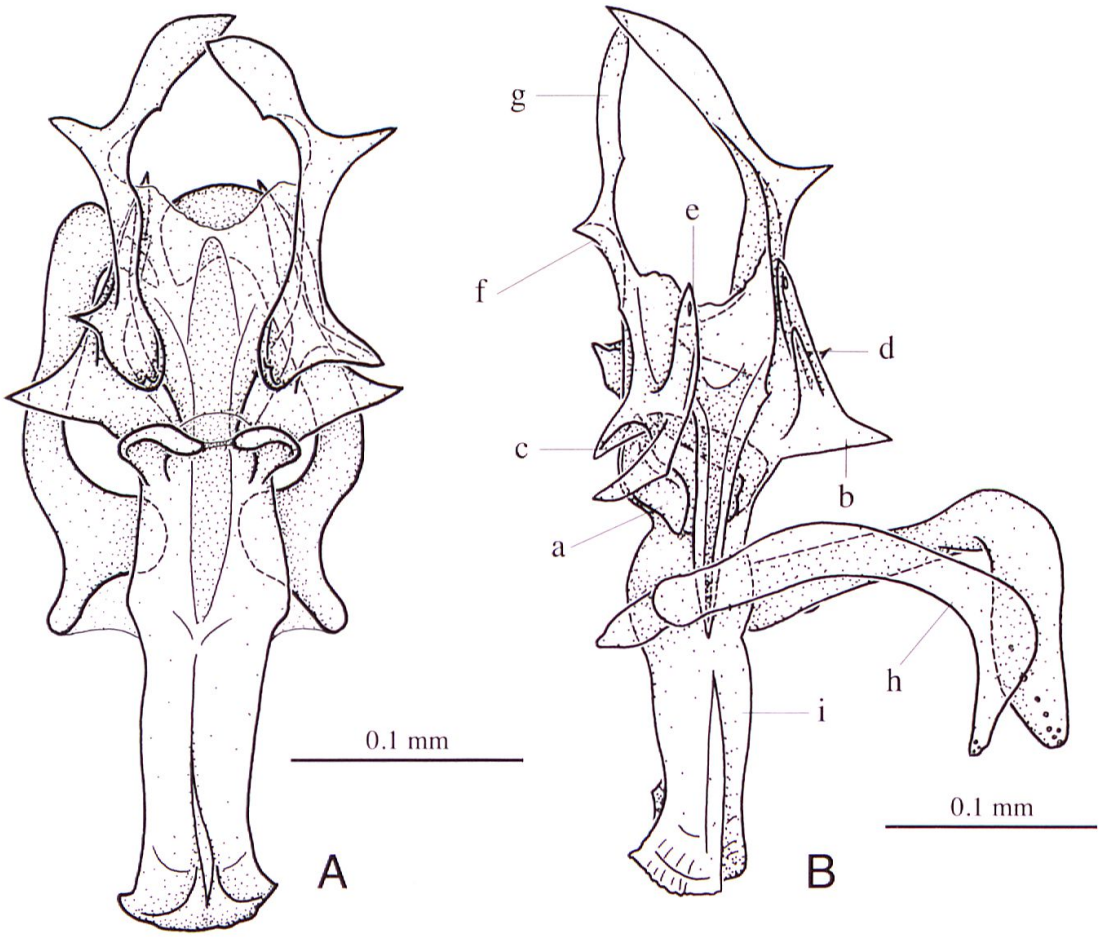
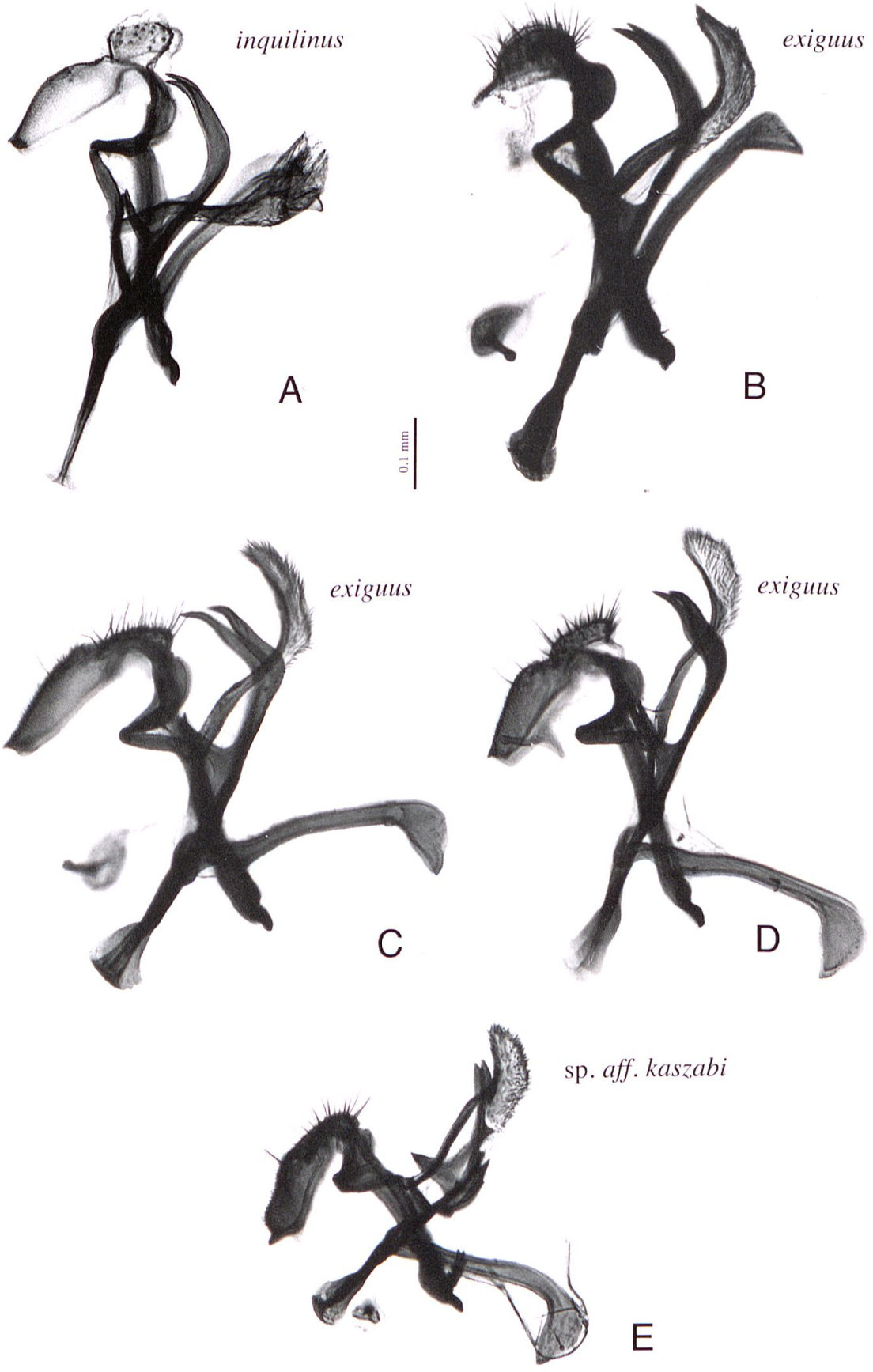


Fig. 12. *Paracacoxenus* sp. *aff. kaszabi* sp. nov., male holotype, Schmelz, Parco Nazionale dello Stelvio, Bolzano province, Trentino-Alto Adige region, Italy. Outer paraphyses, hepta-branched inner paraphyses and aedeagal apodeme. A, dorsal view. B, idem, oblique posterior view. (a-g, inner paraphysis branches [a, proximal; b, subproximal; c, mediodorsal; d, submedioventral; e, medioventral; f, subdistal; g, distal]; h, outer paraphysis; i, aedeagal apodeme).

Fig. 13. Photomicrographs of male terminalia of two species of *Paracacoxenus*, left lateral view. A, *Paracacoxenus exiguus*, holotype of junior synonym *Paracacoxenus inquilinus*, Semmering, Austria; B, *Paracacoxenus exiguus*, ordinary specimen, Leuk-Brentjong, Wallis, Switzerland; C, *Paracacoxenus exiguus*, paralectotype, Habelschwerdt, Poland; D, *Paracacoxenus exiguus*, ordinary specimen, 11.–27.VI.2005, Gomagoi, Parco Nazionale dello Stelvio, Bolzano province, Trentino-Alto Adige region, Italy; E, *Paracacoxenus* sp. *aff. kaszabi* sp. nov., holotype, Schmelz, Parco Nazionale dello Stelvio, Bolzano province, Trentino-Alto Adige region, Italy. The figures A through D show four subsequent steps of aedeagus and paraphyses extrusion; note especially the angle between inner and outer paraphyses, which increases from A through D, and the angle formed by the articulation between proximal and distal sections of decasternum, which decreases from A through D.


inquilinus
A
0.1 mm
exiguus
B
exiguus
C
exiguus
D
sp. *aff. kaszabi*
E

/ Bächli & Vilela det. / 2007»; 2 ♂♂: «Schmelz 940 m 2 / 31.V.–11.VI.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / sp. aff. kaszabi sp. nov. / Bächli & Vilela det. / 2007»; 2 ♂♂: «Schmelz 940 m 3 / 11.–27.VI.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / sp. aff. kaszabi sp. nov. / Bächli & Vilela det. / 2007»; 3 ♂♂: «Schmelz 940 m 4 / 27.VI.–4.VII.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / sp. aff. kaszabi sp. nov. / Bächli & Vilela det. / 2007»; 1 ♂: «Schmelz 940 m 5 / 4.–13.VII.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / sp. aff. kaszabi sp. nov. / Bächli & Vilela det. / 2007»; 1 ♂: «Gomagoi 1220 m 1 / 21.–31.V.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / sp. aff. kaszabi sp. nov. / Bächli & Vilela det. / 2007»; 1 ♂: «Trafoi 1630 m 3 / 11.–27.VI.2005 / Lange & Ziegler leg. // ITALY: Trentino / Prov. Bolzano / P.N. [Parco Nazionale] dello Stelvio // ♂ // Paracacoxenus / sp. aff. kaszabi sp. nov. / Bächli & Vilela det. / 2007».

Type locality. Schmelz, Parco Nazionale dello Stelvio, Bolzano province, Trentino-Alto Adige region, Italy.

Description. ♂ (5 specimens measured).

In general very similar to *C. exiguus*, but more or less differing in some metric characters: frontal length 0.34 (0.32–0.34) mm; frontal index = 1.21 (1.18–1.25), top to bottom width ratio = 1.34 (1.24–1.44). Frontal triangle about 35–42 % of frontal length; ocellar triangle about 30–35 % of frontal length. Orbital plates about 65–75 % of frontal length. Distance of or3 to or1 = 200–225 % of or3 to vtm, or1 / or3 ratio = 1.01 (0.91–1.11), or2 / or1 ratio = 0.88 (0.80–1.00), postocellar setae = 13 (10–16) % of frontal length, ocellar setae = 0.54 (0.45–0.60) % of frontal length; vt index = 0.95 (0.92–1.00); vibrissal index = 0.29 (0.20–0.38). Cheek narrow, index about 10 (8–14). Eye index = 1.16 (1.12–1.17). Length to width ratio of flagellomere 1 = 0.88 (0.83–1.00).

Thorax length 1.01 (0.96–1.06) mm. Transverse distance of dorsocentral setae 300–400 % of longitudinal distance; dc index = 0.45 (0.32–0.56). scut index = 1.21 (1.15–1.28); sterno index = 0.86 (0.81–0.93), median katepisternal seta about 21–23 % of the anterior one.

Wing length 1.96 (1.92–2.00) mm, length to width ratio = 2.06 (2.04–2.11). Indices: C = 2.58 (2.21–3.00), ac = 1.81 (1.71–2.00), hb = 0.36 (0.29–0.43), 4C = 1.06 (0.92–1.27), 4v = 1.99 (1.79–2.36), 5x = 1.38 (1.33–1.60), M = 0.63 (0.57–0.73), prox. x = 0.85 (0.79–1.00).

Terminalia (Figs 9–12, 13E, 14E). Epandrium microtrichose, except for the anteroventral region, with no lower, and ca. 2 upper setae, ventral lobe fused to surstylus. Cercus ventrally positioned, somewhat triangle-shaped in posterior view (Fig. 9A), laterally connected to epandrium by membranous tissue, covered with setae, microtrichose, without ventral lobe. Surstylus without prensisetae, bearing ca. 2 outer setae (Fig. 9B) on central membranous area and no inner setae, not microtrichose, completely fused to ventral lobe of epandrium. Decasternum divided into two sections (Fig. 10A), which clearly articulate with each other through a membranous strip on anteroventral margin of the proximal section, which is flattened,

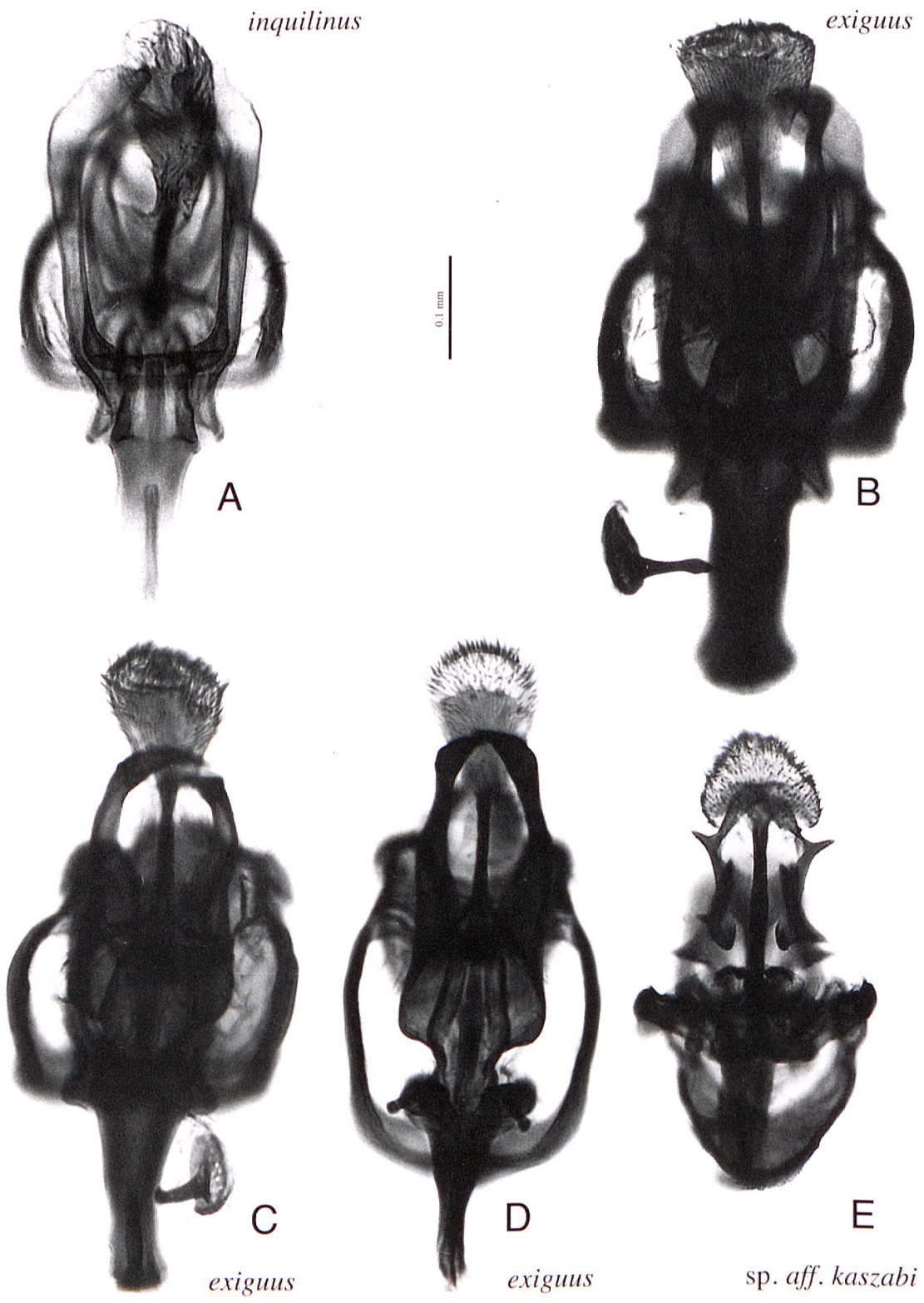


Fig. 14. Photomicrographs of male terminalia of two species of *Paracacoxenus*, dorsal view. A, *Paracacoxenus exiguus*, holotype of junior synonym *Paracacoxenus inquilinus*, Semmering, Austria; B, *Paracacoxenus exiguus*, ordinary specimen, Leuk-Brentjong, Wallis, Switzerland; C, *Paracacoxenus exiguus*, paralectotype, Habelschwerdt, Poland; D, *Paracacoxenus exiguus*, ordinary specimen, 11.–27.VI.2005, Gomagoi, Parco Nazionale dello Stelvio, Bolzano province, Trentino-Alto Adige region, Italy; E, *Paracacoxenus* sp. *aff. kaszabi* sp. nov., holotype, Schmelz, Parco Nazionale dello Stelvio, Bolzano province, Trentino-Alto Adige region, Italy.

rectangle-shaped in dorsal view, distally fused to the surstyli; distal section (ventral process of Grimaldi, 1990: 76, 77 [fig. 424], 78) sinuate rod-shaped, proximally bifid, distally flattened dorsoventrally, widely expanded laterad, marginally crested and fused to dorsomedian region of aedeagus. Hypandrium longer than epandrium, anterior margin strongly convex in posterior view; posterior hypandrial process absent; «dorsal arch» is formed by a complex, two-sectioned decasternum (Figs 10Aa,b,c); gonopods (Fig. 10Af) fused to each other and to anterior very end of hypandrium, remarkably warty (Figs 10Afg, 11B, 13E), bearing two lateral setulae. Aedeagus completely membranous, triangle-shaped in dorsal and ventral views (Fig. 14E), brush-shaped in lateral view, dorsoventrally flattened, microtrichose, and fused to the dorsoventrally flattened end of distal section of decasternum. Two pairs of paraphyses (Figs 11A, 12A,B, 13E, 14E). Outer paraphysis (Fig. 13E) longer than epandrium, apically enlarged, triangle-shaped and turned ventrad in lateral view, with a curved row of ca. 8 outer setulae, articulated both with lateral inner margin (gonopods) of hypandrium medially, and with posterolateral region aedeagal apodeme. Inner paraphysis (Fig. 13E) as long as outer paraphysis, strongly sclerotized, bare, mediolaterally fused to aedeagal apodeme, hepta-branched (Figs 11A, 12AB), distal branch (Figs 11A, 12A, 12Bg) long, slightly turned dorsad and inwards, subdistal branch (Figs 11A, 12A, 12Bf) short, pointed laterad, mediodorsal branch (Figs 11A, 12A, 12Bb) wide, triangle-shaped, pointed lateral and dorsad, medioventral branch (Figs 11A, 12A, 12Be) pointed backwards, submedioventral branch short slightly pointed inwards (Fig. 12Bd), subproximal branch wide, ventral, turned laterad (Figs 11A, 12A, 12Bc), proximal branches (Figs 10Bh, 11A, 12A, 12Ba) pointed dorsalwards and distally connected to each other by a membranous strip embracing submedian region of distal section of decasternum. Aedeagal apodeme (Figs 12A, B, 13E, 14E) as long as aedeagus, dorsoventrally flattened, strongly sclerotized, laterally fused to anterior region of inner paraphysis. Ventral rod apparently absent, probably turned backwards and fused to posteroventral region of aedeagal apodeme (Figs 12A, B).

♀ (3 specimens measured).

Measurements: Frontal length 0.37 (0.32–0.41) mm; frontal index = 1.28 (1.15–1.41), top to bottom width ratio = 1.30 (1.15–1.41). Frontal triangle about 29–37 % of frontal length; ocellar triangle about 25–32 % of frontal length. Orbital plates about 58 % of frontal length. Distance of or3 to or1 = 225–275 % of or3 to vtm, or1 / or3 ratio = 1.02 (0.92–1.13), or2 / or1 ratio = 0.80 (0.67–0.92), postocellar setae = 18 (11–22) % of frontal length, ocellar setae = 53 (52–54) % of frontal length; vt index = 0.93; vibrissal index = 0.35 (0.22–0.44). Cheek index about 9 (8–10). Eye index = 1.12 (1.07–1.15). Thorax length 1.03 (0.85–1.12) mm. Transverse distance of dorsocentral setae 300 % of longitudinal distance; dc index = 0.54 (0.50–0.60); scut index = 1.34 (1.24–1.50), sterno index = 0.81 (0.76–0.86), mid katepisternal seta about 21–25 % of anterior one. Wing length 2.24 mm. Indices: C = 2.6 (2.29–2.80), ac = 1.71 (1.67–1.75), hb = 0.29 (0.21–0.33), 4C = 1.16 (1.07–1.27), 4v = 2.19 (2.00–2.36), 5x = 1.37 (1.29–1.43), M = 0.68 (0.64–0.77), prox. x = 0.92 (0.91–0.93).

Terminalia. Not examined.

Distribution. Italy (South Tyrol); Switzerland (Canton Zürich: 1 ♀)

Comments. Of all known *Paracacoxenus* species *P. kaszabi* Okada is the most similar to *P.* sp. *aff. kaszabi* sp. nov. The former is apparently a widespread species, originally described from Mongolia but subsequently recorded eastwards to Far East Russia (Toda *et al.* 1996). The main difference between *P. kaszabi*, based on its original description, and *P.* sp. *aff. kaszabi* sp. nov., is the cheek index (broad, index about 5–7 in *P. kaszabi* and narrow, index about 9–10 in *P.* sp. *aff. kaszabi* sp. nov.). There may also be differences in the complex internal features of the male terminalia, especially regarding the remarkable multi-branched inner paraphysis. We feel, however, that it is impossible to compare our drawings to those of Okada (1973: 272, fig. 4) and Máca (1980: 340, fig. 1), because of the different interpretations each author gave to the sclerotized structures and connections located in different focal planes. Actual re-examination of the terminalia of the *P. kaszabi* holotype is needed to further explore these differences.

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