

## On the identity of *Pseudotorymus militaris* (Boheman, 1834) and *Pseudotorymus parellinus* (Boheman, 1834) (Hymenoptera: Chalcidoidea: Torymidae)

Veli Vikberg & Richard R. Askew

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The specimens of *Pseudotorymus militaris* (Boheman, 1834) in the collections of C. G. Thomson in Zoological Institute, Lund and of C. H. Boheman in Naturhistoriska Riksmuseet, Stockholm were studied. A lectotype was selected and designated for *Pseudotorymus parellinus* (Boheman, 1834) from Västergötland, Sweden. The same female was designated as a neotype for *Pseudotorymus militaris*. This made both species objective synonyms. Other females of *P. militaris* examined were from provinces Skåne, Öland, Västergötland, Bohuslän, Dalarna and southern Swedish Lapland. *Pseudotorymus bollinensis* Askew, 2002 is closely related to *P. militaris*; it is a parasitoid of a species of Cecidomyiidae (Diptera) living in seed capsules of *Geranium pratense*. The biology of *P. militaris* is unknown.

Suvun *Pseudotorymus* Masi (= *Holaspis* Mayr) lajit ovat pieniä, 2-3 mm pitkiä kiihukaisia joiden toukat elävät etupäässä äkämäsääskien toukissa. Kahden vanhan lajin yksilöt tutkittiin C. G. Thomsonin kokoelmasta Lundista ja C. H. Bohemanin kokoelmasta Tukholmasta. *Pseudotorymus parellinus* (Boheman, 1834) lajille valittiin lektotyypin Länsigöötanmaalta ja samasta naarasyksilöstä tehtiin neotyypin suvun tyyppilajille *P. militaris* (Boheman, 1834). Tämä teki lajeista toistensa objektiivisia synonyymejä. Ruotsissa *P. militaris* lajia löytyi Skoonesta eteläiseen Lappiin saakka. Englannista on kuvattu läheinen laji *P. bollinensis* Askew, 2002 minkä toukka elää kyläkurjenpolven (*Geranium pratense*) hedelmän äkämäsääskien toukissa. *P. militaris* lajin isäntää ei vielä tunneta. Kasvatukset ovat tärkeitä jotta lajien tuntomerkit selviävät kunnolla.

Veli Vikberg, Liinalammintie 11 as. 6, FI-14200 Turenki, Finland; veli.vikberg@aina.net

Richard R. Askew, 5 Beeston Hall Mews, Beeston, Tarporley, Cheshire CW6 9TZ, U.K.; olynx@btinternet.com

### Introduction

*Pseudotorymus* Masi (= *Holaspis* Mayr) is well-represented in Europe with 25 nominate species being listed by Grissell (1995). Two of them: *Torymus militaris* and *T. parellinus* were described in 1834 by C. H. Boheman from Sweden and Norway (Boheman 1834). Thomson (1976) regarded them conspecific and placed both in the genus *Holaspis* Mayr. Later *Torymus mi-*

*litaris* was designated as the type species of *Holaspis* by Ashmead (1904: 242). The name *Pseudotorymus militaris* has been used in many articles and the species has been recorded from several countries. The types of *Torymus militaris* and *T. parellinus* have not been studied before and no lectotypes have been designated for them (Grissell 1995). The purpose of this study is to clarify the taxonomy of these two species.

### Treatment of the names in literature

*Torymus militaris* Boheman, 1834: 338-339. Boheman described the species, perhaps from one female only (lectus in graminosis Scaniae mense Junii a Dom. Zetterstedt) although the number of specimens was not given. The description is rather detailed: hind femur with a small tooth (femoribus posticis subtus ante apicem dente obsolete armatis), ovipositor sheath as long as abdomen (Oviductus longitudine abdominis tenuis, teres, sub-rectus, niger, pubescens), wing veins fuscous (Alae albido-hyalinae, immaculatae, stigmatum ramuloque fuscis).

*Torymus parellinus* Boheman, 1834: 372-373. Boheman described the female based on several specimens from Sweden and Norway (Habitat in Vestrogothia et Norvegia passim; in Scania ad Esperöd, Dom. Zetterstedt). It was placed with species having the hind femur without a tooth (femoribus omnibus muticis), ovipositor sheath shorter than gaster (Oviductus abdomine non nihil brevior, tenuis, teres, rectus, niger, pubescens), wing veins fuscous (Alae hyalinae, nervo marginali, stigmatumque fuscis).

G. Mayr treated both species. He (Mayr 1874: 85) placed *Torymus militaris* in his new genus *Holaspis*, characterized by dentate hind femora. *Holaspis militaris* sensu Mayr was, however, misinterpreted. Mayr's species was reared from seed capsules of *Papaver rhoeas*, the females often had almost entirely brownish yellow scapes, and the same species was later described as *Holaspis papaveris* by Thomson. Mayr (1874: 128) gives a short description of *Torymus parellinus* Boheman. He studied one of the female syntypes, which was sent to him by Stål from Stockholm, and placed the species in the genus *Torymus*, the species of which have no tooth on the hind femur. This placement was incorrect, as later shown by Ruschka (1923).

The next author to treat the species was C. G. Thomson. He worked in Lund and there could study specimens from the collection of Zetterstedt, and he also borrowed Boheman's

specimens from Stockholm. Thomson regarded *militaris* and *parellinus* as conspecific and placed them in *Holaspis* Mayr. *Holaspis militaris* (Boheman) was described by Thomson 1876: 70-71: Thomson described the female as having body length 2-3 mm and an ovipositor sheath shorter than the gaster (terebra abdomine brevior). He united *militaris* with *Torymus parellinus* Boheman, 1834:372, the latter being described as a variety of *militaris* (minor, femoribus muticis). He also gave a short description of the male. In the Swedish text he described *militaris* as frequent from Skåne to Lapland and wrote 'near Lund I have taken it only on species of *Salix*.' Because Thomson was able to study many syntypes of Boheman's species, he can be regarded as the first reviser of them.

Ruschka 1923: 404 mentioned *Holaspis parellina* Boh. when discussing *Pseudotorymus militaris* Boheman, nec Mayr. He studied the syntype in the museum in Vienna. This female now lacked the gaster, but its hind femur had a distinct tooth and was hardly different from specimens of *P. militaris* he had examined from Central Europe (Austria, Hungary and Germany).

Ruschka (1923: 402) provided the first key to the European species of *Pseudotorymus*. *P. militaris* is placed with species having the ovipositor [sheath] slightly shorter than the gaster. All subsequent authors writing about European *Pseudotorymus* have described *P. militaris* as having an ovipositor sheath slightly or distinctly shorter than the gaster:

*Pseudotorymus militaris* (Boheman); E.B. Hoffmeyer 1930: 260, 1931: 261. Mentioned only in key (Bohrer etwas kürzer als der Hinterleib).

*Pseudotorymus militaris* (Boheman); M.N. Nikolskaya 1952: 146 (English translation 1963: 147). The species was keyed (ovipositor slightly shorter than abdomen).

*Pseudotorymus militaris* (Boheman); M.N. Nikolskaya in Nikolskaya & Zerova 1978: 366 (English translation 1988: 665). The species

was keyed (ovipositor longer than 0.50 length of abdomen).

*Pseudotorymus militaris* (Boheman); M.D. Zerova & L.Y. Seryogina 1999: 3-130. Keyed (ovipositor not shorter than half abdomen), described (in Ukrainian) and figured.

*Pseudotorymus militaris* (Boheman); R.R. Askew 2002: 55. The species was misidentified. Keyed: venation pale yellow, ovipositor sheath 0.6 x gaster length (too short for *militaris*), ovipositor index about 1.

Hedqvist (2003) catalogued Swedish Chalcidoidea and listed *Pseudotorymus militaris* from Småland and Uppland. He mentioned 7 other species of *Pseudotorymus* from southern Sweden (from Skåne to Uppland).

Grissell (1995: 259) listed *Pseudotorymus parellinus* (Boheman) from Sweden, writing that the male [sic] syntypes are from Sweden and their depository is unknown.

Graham and Gijswijt (1998: 101) mention *Torymus parellinus* Boheman in their account of *Torymus frater* Thomson, 1876. They examined a female in the Boheman collection (NR) standing under *T. parellinus* and labelled "Dv" [Dovre, Norway]. They wrote that this specimen cannot be regarded as a syntype because the type locality should be Vestrogothia. Their comment was not correct because Boheman described *T. parellinus* also from Norway. The specimen from Dovre was identified as *Torymus frater* and evidently Boheman's syntypes included females of both *Pseudotorymus* and *Torymus*. Hege Vårdal informs us that this female is still present in NR, Stockholm under *Torymus frater*

#### **Selection of a lectotype for *Torymus parellinus* Boheman**

In November 2006 author VV visited Naturhistoriska riksmuseet, Stockholm. At that time 7 females were there under the name *Holaspis militaris* in C.H. Boheman's collection. Only one female was from a locality mentioned in the original description of *Torymus parellinus*.

This female, from Västergötland, collected by Boheman, is hereby designated as a lectotype of the species. It is labelled "V.G., Bhn." (printed labels), Loan no. 1245/06. The female is pinned through the posterior mid-lobe of the mesoscutum obscuring most of the mid-lobe (diameter of pin 0.29 mm, length 29 mm, the specimen only 4 mm below the top); otherwise the specimen is in good condition.

#### **Description of the lectotype female of *Torymus parellinus***

Colour. Head green, with bluish-violet reflections behind eyes and on lower lateral face. Scape metallic, greenish blue, radicle pale brown. Pedicel dark, metallic, its apex narrowly reddish brown, anellus dark, flagellum pale brownish. Mandible pale brown, apically dark brown, teeth blackish. Palpi brown. Pronotum green, mesoscutum green, with lateral lobes bluish medially, mesoscutellum, metanotum and propodeum green. Mesopleuron green, slightly coppery in places. Coxae and femora metallic green, the femora very narrowly pale at apices; tibiae dark and mostly metallic, only bases and apices narrowly testaceous; front tarsus pale brown, mid- and hind tarsi with proximal third of basitarsi whitish, thereafter pale brown. Forewing venation pale testaceous. Gaster dorsally blue-green, apical margins of terga violet. Ovipositor sheath black. Body about 2.3 mm, ovipositor sheath 0.80 mm.

Head in front view 1.25x as broad as high, height 1.45x height of eye, eye height almost equal to distance separating eyes. Head in dorsal view 2.33x as broad as long, as broad as mesoscutum; temples strongly narrowing behind eyes, their length 0.25x length of eye; POL 2.03-2.16x OOL, OOL 1.23-1.30x as long as ocellar diameter. Occipital carina distinct. Mouth 2.17x as wide as malar space, malar space 0.31x length of eye. Antenna with scape 0.60x as long as height of eye, 0.88x as long as width of eye; pedicel plus flagellum very slightly (1.01x) longer than breadth of head; pedicel

in dorsal view 1.57x as long as wide, in lateral view almost as long (0.85x) as anellus plus F1; anellus 0.94x as long as broad; all funicle segments somewhat transverse and subequal in length, each with a single transverse row of sensilla; F1 slightly transverse (length:breadth = 0.80), F7 strongly transverse (length:breadth = 0.60), F7 1.33x broader than F1; clava 1.85x as long as broad, not quite as long as F5-F7 and hardly broader than apex of funicle.

Mesosoma in dorsal view 1.5x as long as broad; mesoscutum with mid-lobe about as long as its maximum breadth; notauli deep; scutellum 1.33x as long as broad, anterior three-quarters finely reticulate, punctures separated at front of scutellum by little more than a diameter, posterior quarter of scutellum rather shiny with engraved linear sculpture and lacking punctures but not sharply demarcated from rest of scutellum, whole scutellum rather evenly and slightly convex. Propodeum medially 0.30x as long as scutellum, with very fine medial keel and a row of 12 small anterior foveae, medially densely longitudinally striate-reticulate, laterally finely striate; spiracles prominent, distinctly raised and large, major diameter 0.38x as long as median length of propodeum, separated from metanotum by 0.7x length of minor diameter. Hind coxa with about 6-7 hairs on dorsal surface basally; hind femur 4.5x as long as wide with a relative prominent ventral tooth, hind tibia 7.8x as long as apically wide.

Forewing with lengths of costal cell: marginal vein: postmarginal vein: stigmal vein as 167: 120: 28: 15 in left wing, 168: 112: 24: 15 in right wing. Postmarginal vein 1.6-1.9x as long as stigmal vein. Stigma shortly petiolate, closer to postmarginal vein than its height. Costal cell 8.4-9.9x as long as wide, with a row of 9 setae on upper surface in apical one-third, lower surface with one almost complete row of setae. Basal fold with 6 setae, basal cell bare, except 3-4 setae near submarginal vein, closed below apically by 3-4 setae. Speculum relatively small, not extending much beyond base of

marginal vein, closed below except near basal lower corner and with some hairs on undersurface behind parastigma.

Gaster excluding ovipositor sheath slightly shorter than mesosoma; first tergum with apex weakly incised, occupying 0.4x gaster length; apex of hypopygium at about 0.7x gaster length. Ovipositor sheath 0.78x as long as gaster and 1.20x as long as hind tibia.

Measurements (in mm). Head width 0.70, head height 0.56, head length 0.30. POL 0.17, OOL 0.08, median ocellus breadth 0.06. Eye 0.38 x 0.26, scape 0.23, mouth width 0.26, malar space 0.12.

Mesosoma 1.05. Mesocutum width 0.70. Mesocutellum 0.44 x 0.33. Hind femur 0.65, hind tibia 0.66-0.67, outer spur 0.06, inner spur 0.10, hind tarsomeres (mediodorsal lengths) 0.22, 1.15, 0.09, 0.05 and 0.10, hind tarsus 0.61. Forewing 2.13 x 0.95 (left), 2.12 x 0.93 (right).

Gaster 1.02, width 0.50, height 0.70. Ovipositor sheath 0.80.

In the key in Askew (2002) the lectotype female of *P. parellinus* runs to *P. bollinensis* Askew, 2002. These two species are closely related but not conspecific. *P. bollinensis* female is more blue-green, gaster violet-blue, the mesoscutellum (viewed in profile) is not evenly curved, the hind part being clearly more strongly convex than the front part, and the scutellum of *P. bollinensis* ranges from 1.0 to 1.27x (mean 1.16, n=10) as long as broad (1.33x in *parellinus*). Additionally, in *P. bollinensis* the stigma is closer to the postmarginal vein and the uncus is usually longer than in *parellinus*. The sculpture of the medial part of the propodeum is also different in the two species, it being less longitudinally reticulate but weaker and more shiny in *P. bollinensis*. The tip of the hypopygium is at about 0.6x gaster length in *P. bollinensis*.

#### **Selection of a neotype for *Torymus militaris* Boheman**

Seven females standing under the name *Holaspis militaris* in NR; Stockholm were borrowed

by author VV in November 2006; two of the females bear printed labels "Thoms." in addition to labels Bhn (=Boheman) indicating that Thomson had studied at least these two specimens. Nine females standing under the name *Pseudotorymus militaris* (Boheman) were borrowed from Thomson's collection in Lund in January 2010 by author RRA. No specimens of the species could be found in Zetterstedt's collection in ZI, Lund. Thus no syntypes of *Torymus militaris* Boheman can be found in ZI, Lund or NR, Stockholm. In order to fix the name of the type species of the genus, a neotype must be selected from this material and designated. Of the sixteen females examined, one from Lp. m. has the ovipositor sheath as long as the gaster, and one from Öland has a sheath 1.12x as long as its gaster. All of the remaining fourteen females have an ovipositor sheath shorter than the gaster (0.72-0.82x as long as gaster), and we regard them as conspecific and representing *Holaspis militaris* (Boheman) sensu Thomson. The lectotype female of *Torymus parellinus* Boheman from Vestgothnia (=Västergötland) is selected and hereby designated as the neotype of *Torymus militaris* Boheman. This designation makes the two species objective synonyms: *Pseudotorymus militaris* (Boheman, 1834) = *Pseudotorymus parellinus* (Boheman, 1834), syn. confirmed.

#### **Variation in females of *Pseudotorymus militaris* (Boheman) from Sweden**

The 14 females which we regard as representing *Pseudotorymus militaris* come from the following regions: Skåne, Öland, Västergötland (also female from K.K. = Kinnekulle), Bohuslän, Dalarna (Dlc = Dalecarlia) and a more northerly region (Lp. m. = Lapponia meridionalis or southern Swedish Lapland). These specimens bear our identification labels. They have the following characters:

Body length 2.0-2.9 mm. Head in dorsal view 2.25-2.33 as wide as long, with temple 0.25-0.30 as long as eye. POL/OOL 2.08-2.22,

OOL/OD 1.14-1.19. Pedicel + flagellum 1.01-1.11x as long as head width. Mesosoma/gaster 1.01-1.12. Mesoscutellum 1.23-1.32x as long as wide. Postmarginal vein 1.6-2.1x as long as stigmal vein. Ovipositor sheath/ hind tibia 1.13-1.33, sheath/gaster 0.72-0.84. Tip of hypopygium at 0.63-0.71x level of gaster length. The microsculpture of the propodeum is variable: the median carina may be absent or weakly represented, and there can be several weak, irregular, longitudinal carinae mesially.

Some characters show considerable variation and it may be that what we consider to be a single species, *P. militaris*, is, in fact, an aggregate of cryptic species. Further study should involve rearing of specimens from their hosts. Reared series can yield much useful information on intraspecific variation. Males of *Pseudotorymus* appear to be less useful than females in providing characters of specific value, but this is another field that should be more thoroughly explored.

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Hege Vårdal helped author VV in studying the collection of Boheman in Naturhistoriska Riksmuseet in October-November 2006 and arranged a loan of the female specimens of *Holaspis militaris*. She gave us later information about other specimens in her care. Roy Danielsson loaned the females of *Pseudotorymus militaris* from Thomson's collection in Zoological Institute, Lund. He gave further information about the old labels of insects. Pekka Malinen took the photographs of the neotype female *P. militaris* and a paratype female of *P. bollinensis*.

### Images and Illustrations

Female of *Pseudotorymus militaris* (Boheman) in lateral view (the neotype from Västergötland, Sweden). Photograph taken by Pekka Malinen.

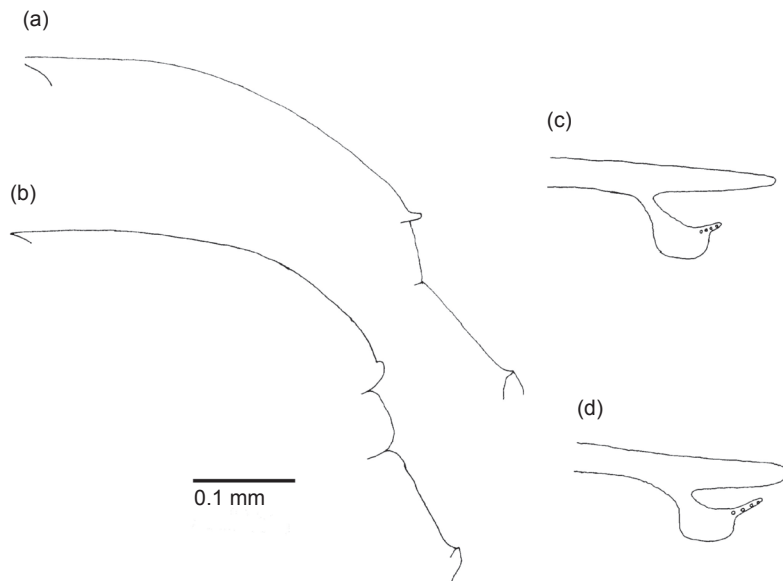


Female of *Pseudotorymus bollinensis* Askew in lateral view (paratype from Cheshire). Photograph taken by Pekka Malinen.



(a-b) Silhouette of mesoscutellum, metanotum and propodeum. (a) *Pseudotorymus militaris* (Boheman), neotype. (b) *P. bollinensis* Askew, paratype.

(c-d) Postmarginal and stigmal veins of forewing. (c) *Pseudotorymus militaris* (Boheman), neotype. (d) *P. bollinensis* Askew, paratype.



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