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The identity of *Chivinia* Shestakov (Hymenoptera: Braconidae, Braconinae), with description of a similar species from the Oriental region

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Abstract

A peculiar new species from Vietnam (*Bracon* (*Pseudochivinia) tobiasi* Long & van Achterberg, **sp. nov**.) is described and illustrated. It is included in a new subgenus *Pseudochivinia* Long & van Achterberg, **subgen. nov**., because it does not fit into the superficially similar subgenus *Chivinia* Shestakov. The new subgenus shares with *Chivinia* Shestakov the absence of vein r-m of the fore wing (resulting in the absence of a closed second submarginal cell) but can be distinguished from *Chivinia* and other subgenera of the genus *Bracon* Fabricius by the deep and crenulate medio-longitudinal depression of the first metasomal tergite and the different venation. *Bracon (Chivinia) zimini* Shestakov, 1932 is redescribed and illustrated for the first time.

Key words: *Bracon zimini*, Braconini, Chiviniini, new record, new species, new subgenus, *Pseudochivinia,* redescription, Tajikistan, Vietnam

Introduction

The Braconinae is one of the largest subfamilies of Braconidae and contains more than 188 genera with more than 2,000 described species, and the peculiar monotypic genus *Chivinia* Shestakov, 1932, with type species *Chivinia zimini* Shestakov, 1932, is a rare taxon from subfamily Braconinae originally described from East Palaearctic (Yu *et al.* 2016). *Chivinia* is distinguished from other braconine genera by having fore wing without closed second submarginal cell because of the absence of vein r-m. Based on one female wasp from Tajikistan, Shestakov (1932) named *Chivinia* as a new genus of the new tribe Chiviniini Shestakov, 1932.

Materials and methods

The holotype of the new species is deposited in the Braconidae Collection of the Institute of Ecology & Biological Resources (IEBR), Vietnam Academy of Science and Technology (VAST). Terminology used in this paper follows van Achterberg (1993), sculpture terms are based on Harris (1979), and vein terminology follows the modified Comstock-Needham system (van Achterberg 1993). For a key to the subfamilies of Braconidae see van Achterberg

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(1993) and the key to the Old World genera of the braconine wasps see Quicke (1987); for additional references and data, see Yu *et al.* (2016). For studying the morphology we used an Olympus SZ61 or SZX11 binocular microscope; the photographs were made with a Sony 6000 digital camera attached to a Nikon SMZ 800N binocular microscope and Helicon Focus® 8 stacking software. The plates were slightly processed with Adobe Photoshop CS5 to adjust the size and background.

Bracn.+number—code number indexing for Braconinae specimens in the collection at IEBR;

IEBR—Institute of Ecology & Biological Resources, Vietnam Academy of Science and Technology, Ha Noi, Vietnam;

OD—maximum diameter of posterior ocellus;

OOL—minimum ocular-ocellar line;

POL—minimum postocellar line;

NW—Northwest;

ZISP—Zoological Institute, St. Petersburg, Russia.

Taxonomy

Bracon Fabricius, 1804

Type species: *Ichneumon minutator* Fabricius, 1798 (examined).

***Diagnosis*.** Vein 1r-m of hind wing very short and straight, usually weakly oblique (Fig. 1B); scape small, without double margin at inner side apically, and ventrally as long as dorsally or shorter (Fig. 1J); clypeus without distinct dorsal carina or crest (Fig. 1E); vein 1-SR of fore wing (sub)vertical (Fig. 1A); vein 3-SR of fore wing usually developed and much shorter than vein SR1; vein r of fore wing usually gradually merging into vein 3-SR or nearly so; vein r-m of fore wing present (but absent in *Chivinia* and *Pseudochivinia*); vein 2-SR+M of fore wing medium-sized to long (Fig. 1A); lateral areas of first tergite medium-sized to wide (Figs 1I, 3C); second tergite usually without medio-basal area, if present, then third tergite without latero-basal grooves; third metasomal tergite without complete antero-lateral grooves (Fig.1I, 3F), but sometimes partly impressed (Fig. 3F); ovipositor with narrow upper valve and with dorsal nodus, lower valve with small ventral teeth.

Subgenus *Chivinia* Shestakov, 1932

Type species and only known species: *Chivinia zimini* Shestakov, 1932 (examined).

***Diagnosis*.** Vein r-m of fore wing absent; vein 3-SR+SR1 of fore wing strongly curved and vein 1-R1 much shorter than pterostigma; end of sclerotized part of CU1a widened; vein cu-a of fore wing postfurcal (Fig. 1A); vein m-cu of fore wing about as long as vein 1-M; scape short and subtruncate apically (Fig. 1J); malar space long and directly narrowed ventrally (Fig. 1E); tarsal claws simple and slender (Fig. 1C); fore tarsus slightly longer than fore tibia; first metasomal tergite longer than wide apically and without medio-longitudinal depression; metasoma smooth; setose part of ovipositor sheath about as long as first tergite (Fig. 1L).

***Notes*.** *Chivinia* was treated as separate genus by Tobias (1986) despite the fact that in an earlier publication (Tobias 1968), he considered the type species only to be an aberration of *Bracon repetekiensis* Tobias, 1967. This is highly unlikely because the latter species has vein cu-a of the fore wing interstitial (distinctly postfurcal in *B. zimini*), vein SR1 of the fore wing straight (strongly curved and partly narrowed), the metasoma partly membranous dorsally (entirely sclerotized) and vein 1-R1 of the fore wing medium-sized (0.7 × as long as pterostigma versus 0.2 ×). The reduced marginal cell of the fore wing most likely indicates a relationship with the *Bracon kasachstanicus*-group but is different, because, for example, of the lost vein r-m of the fore wing. This group and *B. zimini* are known from the semi-arid parts of Central Asia. van Achterberg and Polaszek (1996) synonymized *Chivinia* with *Bracon* because of the similarity with the *B. kasachstanicus*-group. For the present we treat it as a subgenus until the phylogeny is properly studied, and because we consider the type species aberrant enough for subgeneric rank by having the vein cu-a of the fore wing postfurcal, tarsal claws simple, fore wing vein SR1 strongly curved, and fore wing vein CU1a partly widened.

***Bracon (Chivinia) zimini* (Shestakov, 1932)**
(Fig. 1)

Type material. Holotype (ZISP), female, "[Tajikistan], Khiva, 9.iv.[1]927, L. Zimin/ b. doruct sad, kosh po lutserne [= swept from lucerne/alfalfa in orchard]", "*Chivinia* n.g. *zimini* **sp. n.**, det. Shestakov", "Syntypus".

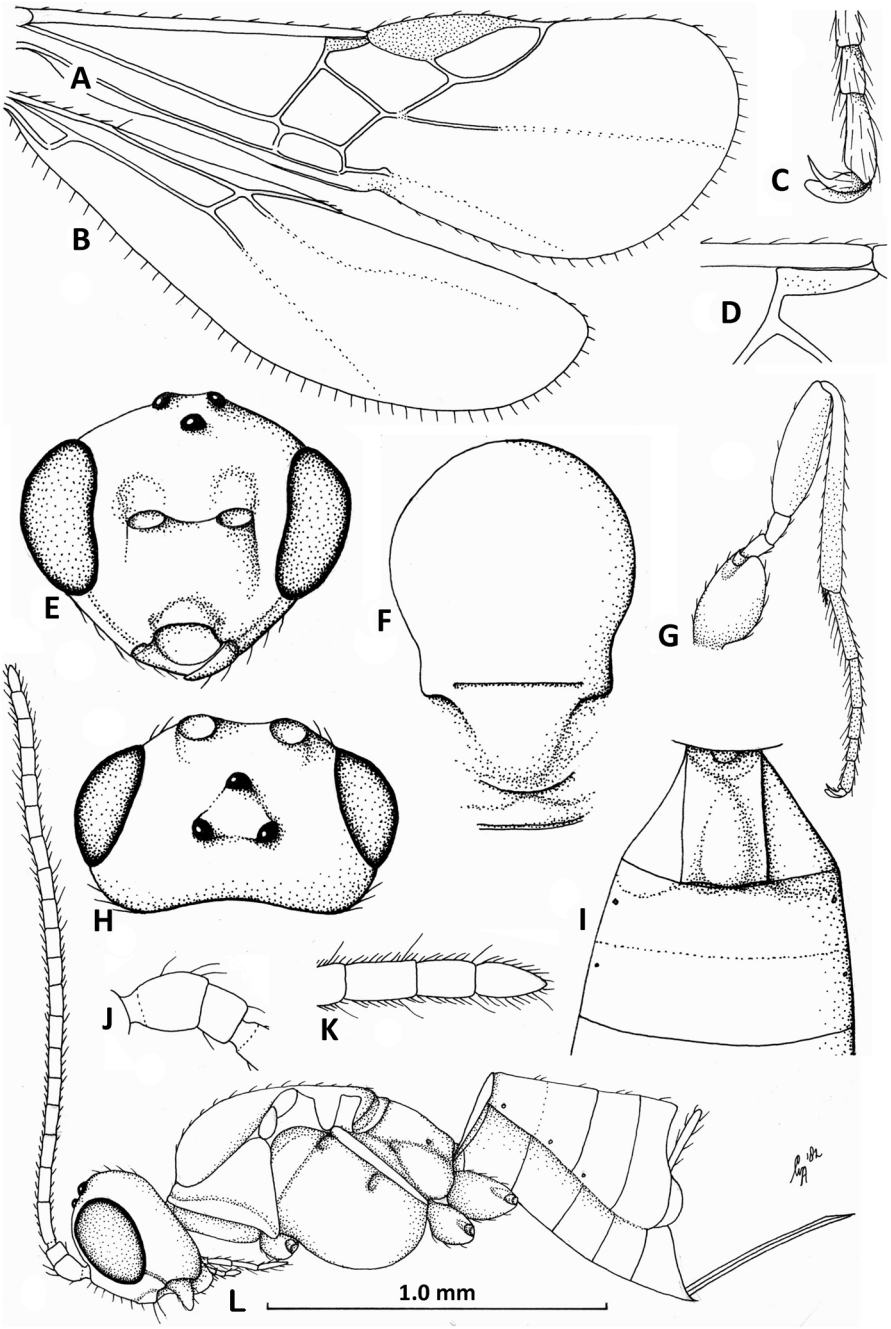

FIGURE 1. *Bracon (Chivinia) zimini* (Shestakov), holotype, female. **A** Fore wing, **B** Hind wing, **C** Outer hind tarsal claw, **D** Detail of vein 1-SR of fore wing, **E** Head anterior, **F** Meso- and metanotum dorsal, **G** Hind leg, **H** Head dorsal, **I** First-third metasomal tergites dorsal, **J** Scape and pedicel lateral, **K** Apex of antenna, **L** Habitus, lateral. A, G, L: scale-line (= 1.0 ×), C, D, J, K: 2.5 ×; E, F, H, I: 1.8 ×

Redescription. Holotype, female, length of body 1.8 mm, of fore wing 2.1 mm, of antenna 1.8 mm.

Head. Antenna with 21 antennomeres, scape ventrally somewhat shorter than dorsally (Fig. 1J); apical flagellomere without apical spine and 2.0 × longer than its maximum width (Fig. 1K); first and second flagellomeres 3.3 and 2.7 × longer than wide and first 1.2 × longer than second; penultimate flagellomere 1.5 × longer than wide;

length of maxillary palp 0.6 × as long as height of head; clypeus height: inter-tentorial distance: tentorio-ocular distance = 1: 3: 3; clypeus nearly flat and smooth, its ventral margin weakly concave; eye slightly emarginate (Fig. 1E); face rather flat and smooth; eye height: shortest distance between eyes: head width = 30: 34: 63; frons mainly flat and smooth (Fig. 1H); vertex smooth and convex, with rather short setae; shortest distance between posterior ocelli: maximum diameter of elliptical posterior ocellus: shortest distance between posterior ocellus and eye = 15: 7: 20; temples directly narrowed behind eyes and eye 2.6 × as long as temple in dorsal view (Fig. 1H); malar suture shallow and long (Fig. 1E); malar space 0.8 × basal width of mandible and head directly narrowed below eyes.

Mesosoma. Length of mesosoma 1.4 × its height (Fig. 1L); pronotum smooth and with submedial groove; mesopleuron smooth and largely glabrous; episternal scrobe deep; metapleuron smooth; notauli entirely absent, also anteriorly (Figs 1F, L); mesoscutum smooth, and with setae along imaginary notaulic courses; scutellar sulcus shallow, narrow and virtually smooth (Fig. 1F); scutellum smooth and flat; propodeum smooth and its spiracle small, situated behind middle of propodeum (Fig. 1L).

Wings. Fore wing (Fig. 1A): r: 3-SR+SR1: 2-SR= 5: 19: 11; 1-SR+M straight, 1.1 × longer than 1-M; m-cu straight; angle between 1-SR and C+SC+R about 75° (Fig. 1D); cu-a narrowly but distinctly postfurcal; end of sclerotized part of CU1a widened (Fig. 1A). Hind wing: SC+R1 : 2-SC+R : 1r-m : 1-M : M+CU = 28 : 3 : 9 : 46 : 20 (Fig. 1B).

Legs. Length of hind femur, tibia and basitarsus 3.2, 8.5 and 5.5 × longer than their maximum width, respectively; hind femur rather compressed; hind tibial spurs 0.2 × as long as hind basitarsus; hind tarsus long setose ventrally (Fig. 1G).

Metasoma. Length of first tergite 1.4 × its apical width, surface smooth and its median area convex; lateral grooves of first tergite smooth (Fig. 1I); second suture absent; medially second tergite 0.8 × as long as third tergite; second–seventh tergites smooth; setose part of ovipositor sheath 0.1 × as long as fore wing; hypopygium medium-sized and apically acute (Fig. 1L).

Colour. Brownish yellow; antenna (except annellus), stemmaticum and hind telotarsus blackish; mesosternum, hind femur ventrally, apical half of hind tibia, hind tarsus (except telotarsus), middle of mesoscutal lobes first and second tergites (except laterally), third–fifth tergites (except apically) and ovipositor sheath more or less dark brown; wing membrane hyaline; pterostigma and veins dark brown but basal 0.7 of vein C+SC+R of fore wing and basal veins of hind wing yellowish.

Biology. Unknown, but collected from alfalfa in an orchard.

Male. Unknown.

Distribution. Tajikistan.

Subgenus *Pseudochivinia* Long & van Achterberg, subgen. nov.

Type species, monotypic: *Bracon (Pseudochivinia) tobiasi* Long & van Achterberg, **sp. nov.** Name derived from "pseudes" (Greek for false) and the generic name *Chivinia* because it is only superficially similar.

***Diagnosis*.** Vein r-m of fore wing absent; vein 3-SR+SR1 of fore wing nearly straight and vein 1-R1 much longer than pterostigma; end of sclerotized part of CU1a narrow; vein cu-a of fore wing interstitial; vein m-cu of fore wing 0.3 × as long as vein 1-M (Fig. 3I); scape short and subtruncate apically; malar suture absent; malar space long and subparallel-sided in anterior view (Fig. 3B); tarsal claws with rather large lobe (Fig. 3H); first metasomal tergite much shorter than wide apically and with crenulate medio-longitudinal depression; metasoma largely sculptured (Fig. 3F); setose part of ovipositor sheath about as long as first tergite (Fig. 3G).

***Notes*.** Despite its superficial similarity to the subgenus *Chivinia* Shestakov, it is not closely related to this taxon as shown by the differences in the diagnoses. Obviously, the loss of vein r-m of the fore wing occurred at least twice in the subfamily Braconinae and, therefore, we propose the new subgenus.

Bracon (Pseudochivinia) tobiasi Long & van Achterberg, sp. nov.

(Figs 2–3)

Type material. Holotype (IEBR), female, "Bracn. 987", "NW Vietnam: Hoa Binh, Mai Chau, Pa Co, 1000m, forest, [collected with] sweep [net], 12.x.2009, K.D. Long".

***Diagnosis*.** Antenna with 30 flagellomeres (32 antennomeres); apical flagellomere short, accuminate; flagellomeres longer than wide, with 4 placodes; scape stout, shorter ventrally than dorsally; eye glabrous; in dorsal view, head transverse; temple weakly roundly narrowed posteriorly (Fig. 3A); frons with median prominence, deeply depressed laterally (Fig. 3A, B); clypeal sulcus separated from face, clypeus without a transverse carina or crest dorsally (Fig. 3A, B); malar suture absent; notauli slightly depressed anteriorly, mostly absent (Fig. 3D); mesoscutum flat posteriorly; scutellar suture narrow, straight, weakly crenulate; median area of metanotum without dorsal carina; propodeum smooth, with mid-longitudinal lamella-like protuberance posteriorly (Fig. 3E); hind tarsal claw simple, with rather large basal lobe (Fig. 3H); fore wing vein 1-SR short, angle between veins 1-SR and C+SC+R more than 80°; vein cu-a vertical, interstitial; pterostigma widened; discal cell strongly narrowed distally; hind wing vein 1r-m much shorter than vein SC+R1; vein 1-SC+R curved apically; apex of vein C+SC+R with one long stright bristle; laterope absent; first metasomal tergite with wide developed antero-median crenulate groove; postero-lateral groove crenulate (Fig. 3C); second metasomal suture narrow, sparsely crenulate (Fig. 3F); second metasomal second tergite without medio-basal triangular area, largely rugolose-striate; third-fourth metasomal tergites and fifth tergite basally longitudially striate; remaider of tergites coriaceous; hypopygium short, largely sclerotized and sharply pointed at apex, sparsely setose (Fig. 3G); ovipositor sheath much shorter than hind tibia, with dense oblique setae throughout; ovipositor straight, smooth dorsally, with a strongly pre-apical dorsal nodus, and ventral valve distinctly pre-apically serrate.

FIGURE 2. Lateral habitus of *Bracon* (*Pseudochivinia) tobiasi* Long & van Achterberg, **sp. nov.**, holotype, female.

Description. Holotype, female, body length 3.5 mm, fore wing length 3.9 mm, antenna 3.2 mm, ovipositor sheath 0.5 mm (Fig. 2).

Head. Antenna with 30 flagellomeres; terminal flagellomere acuminate; scape longer dorsally than ventrally, 1.5 × as long as, its maximum width, and 1.5 × as long as pedicellus; second flagellomere almost as long as third flagellomere, and 2.3 × their width; middle antennomere 1.25 × as long as wide; subterminal flagellomere as long as terminal; in dorsal view, head width 1.8 × its median length; head slightly roundly narrowed behind eyes (Fig. 3A); height of eye 1.4 × as long as temple; ocelli rather small, in high triangle, POL : OD : OOL : lateral side = 4 : 4 : 12; in lateral view eye 1.1 × temple (Fig. 3A); in frontal view, face width 1.8 × length of face and clypeus combined; clypeus straight and emarginated ventrally (Fig. 3B); clypeal suture absent; malar suture absent; malar space 0.9 × basal width of mandible; width of hypoclypeal depression 0.9 × distance from edge of depression to eye; distance between tentorial pits as long as distance from pit to eye (Fig. 3B).

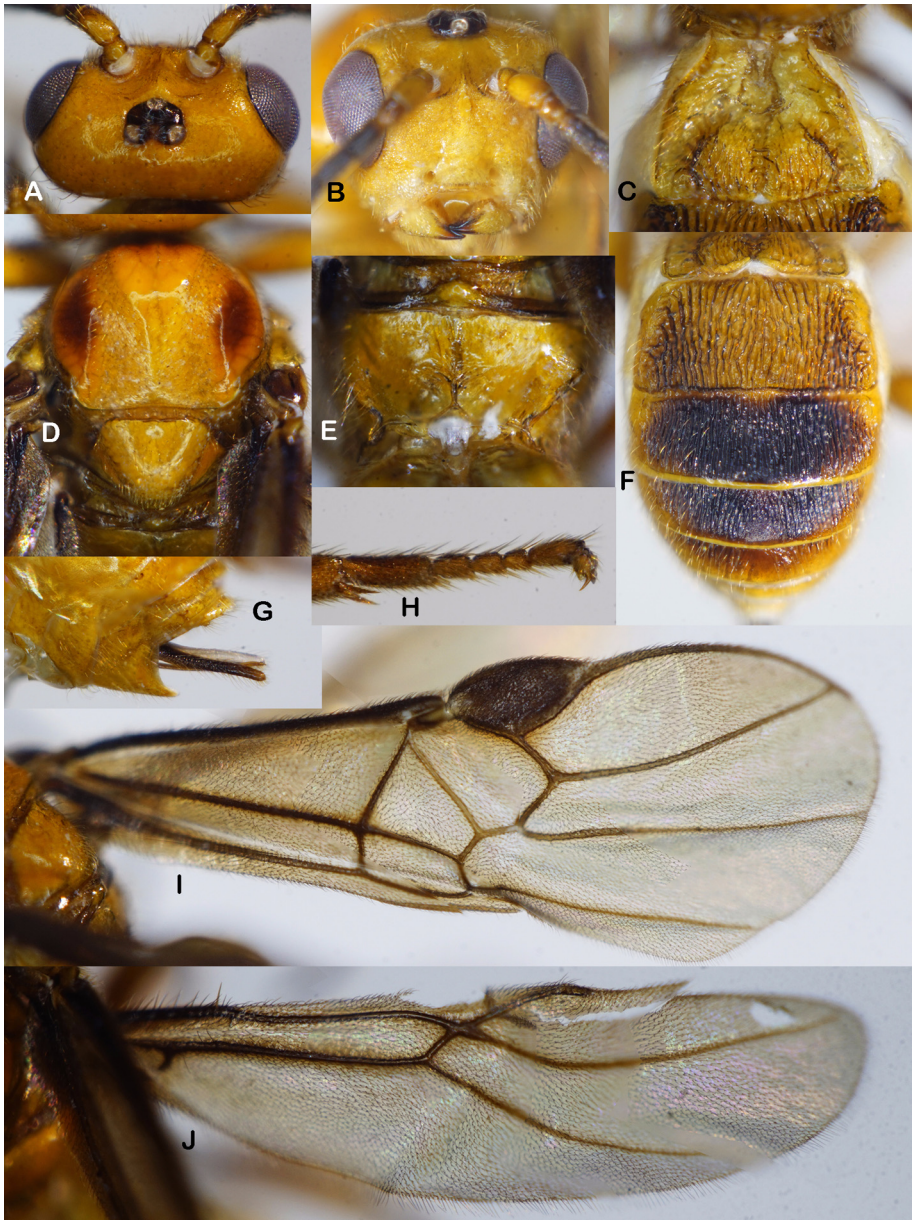

FIGURE 3. *Bracon (Pseudochivinia) tobiasi* Long & van Achterberg, **sp. nov.**, holotype, female. **A** Head, dorsal, **B** Head, frontal, **C** First metasomal tergite, **D** Mesonotum, **E** Propodeum, **F** Second-fifth metasomal tergites, **G** Hind tarsus, **H** Apex of metasoma, lateral, **I** Fore wing, **J** Hind wing.

Mesosoma. Length 1.4 × its height; mesoscutum robust, in lateral view, roundly elevated above pronotum; notauli mostly absent but shallow anteriorly and widely flat posteriorly (Fig. 3D); propleuron smooth; mesopleuron smooth to coriaceous; mesonotum mostly shiny, smooth with short pubescence; prescutellar depression narrow, deep, weakly crenulate; metanotum without carina; propodeum with median carina posteriorly, lateral areas of propodeum coriaceous (Fig. 3E).

Wings. Length of fore wing 2.7 × as long as its maximum width; angle between veins 1-SR and C+SC+R more than 80°; vein 1-SR+M straight; vein r omitting before middle of pterostigma (Fig. 3I); vein 1-R1 1.65 × pterostigma; pterostigma broad, length of pterostigma 1.9 × its width; vein r 0.8 × as long as vein 2-SR; r : 2-SR : 3-SR+SR1 = 10 : 12 : 62; r : 2-SR : 2-RS+M = 10 : 12 : 7; vein cu-a mostly interstitial (Fig. 3I). Length of hind wing 3.75 × as long as its maximum width; hind wing vein M+CU : 1-M : 1r-m = 14 : 45 : 6; vein 1r-m : SC+R1 = 16 : 5 (Fig. 3J).

Legs. Middle basitarsus 3.3 × as long as its width; and 0.55 × tarsal segments 2–4 combined; hind femur robust,

0.6 × as long as hind tibia; hind femur, tibia, basal tarsus 2.9, 7.85 and 3.25 × their maximum width, respectively; hind basitarsus 0.2 × hind tibia; and 0.6 × tarsal segments 2–4 combined (Fig. 3H); tarsal claws simple, with rather large basal lobe (Fig. 3H).

Metasoma. Metasoma 0.9 × as long as head and mesosoma combined; length of first tergite 0.6 × as long as its maximum width (Fig. 3C); first metasomal tergite with wide and deep antero-median depression, and posterior-dorsal groove crenulate, dividing tergite into two parts; postero-lateral groove wide and sparsely crenulate (Fig. 3C); second tergite without medio-basal area, largely rugose-striate (Fig. 3F); second metasomal suture straight, finely crenulate; tergite length of second tergite 0.6 × its basal width, and 1.3 × third tergite; second and third tergites with partly impressed antero-lateral grooves (Fig. 3F); third-fourth tergites entirely and fifth tergite basally evenly and densely striate; remaining tergites coriaceous; hypopygium short, sclerotized acute, with sparse setae; ovipositor sheath densely setose, 1.8 × as long as hind basitarsus, and 0.1 × fore wing.

Colour. Body reddish yellow; scape and pedicellus yellow; flagellum dark brown; stemmaticum black; all legs yellow; wing veins yellowish brown; wing membrane yellow; third-fourth metasomal tergites yellowish brown, yellow laterally; ovipositor sheath brown; ovipositor yellow.

Male. Unknown.

Biology. Unknown.

Distribution. NW Vietnam (Hoa Binh).

Etymology. Named in honour of the late Prof. Vladimir Ivanovich Tobias (1929-2011), a great braconidologist working for a large part of his life in the Former Soviet Union.

Key to separate subgenera *Bracon (Chivinia)* and *Bracon (Pseudochivinia)*

1a. Malar suture present (Figs 1E, L); vein 1-R1 of fore wing much shorter than pterostigma (Fig. 1A); notauli entirely absent (Fig. 1F); fourth hind tarsomere slightly shorter than telotarsus (Fig. 1C, G); hind tarsal claw slender (Fig. 1C); length of first tergite 1.4 × its apical width, surface smooth; second metasomal suture absent (Fig. 1I).Tajikistan . . . . . *Bracon* (*Chivinia*) *zimini* Shestakov

b- Malar suture absent (Fig. 3B); vein 1-R1 of fore wing distinctly longer than pterostigma (Fig. 3I); notauli depressed anteriorly (Fig. 3D); fourth hind tarsomere distinctly shorter than telotarsus; hind tarsal claw rather larger (Fig. 3H); length of first tergite 0.6 × its apical width, surface largely sculptured; second metasomal suture deep, crenulate (Fig. 3F). Vietnam. . . . . *Bracon* (*Pseudochivinia*) *tobiasi* Long & van Achterberg, **sp. nov.**

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