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IDENTIFICATION OF THE EUROPEAN SPECIES OF *BATAKOMACRUS* (HYMENOPTERA, ICHNEUMONIDAE, ORTHOCENTRINAE)

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Identification of the European Species of *Batakomacrus* (Hymenoptera, Ichneumonidae, Orthocentrinae). Varga, O. — The present paper provides a first illustrated key containing all European species of the genus *Batakomacrus* Kolarov, 1986. A new combination is established: *Orthocentrus ambiguus* Holmgren, 1858 is transferred to *Batakomacrus* and the following synonymy is proposed: *B. ambiguus* **comb. n.** = *B. sylvicola* Humala, 2010 **syn. n.** *Batakomacrus ambiguus* is recorded for the first time from Finland, Greece, Italy, Moldova, and Spain; *B. caudatus* (Holmgren, 1858) from Belgium; *B. flaviceps* (Gravenhorst, 1829) from Greece; and *B. noyesi* Broad, 2010 from Norway and Sweden. Males of *B. ambiguus* **comb. n.** and *B. noyesi* are described and illustrated.

Key words: Darwin wasps, parasitoids, key, Europe.

Introduction

Batakomacrus Kolarov, 1986 is a small genus of comparatively rarely collected orthocentrine parasitoids (Ichneumonidae: Orthocentrinae) with only eight known species in the Neotropics and Palaearctic (Humala, 2010). *Batakomacrus* belongs to the *Orthocentrus* genus group and, together with *Picrostigeus* Förster, 1869, is characterized by the bidentate mandible, with the lower tooth clearly visible in frontal view. Nevertheless, the species of *Batakomacrus* are habitually more similar to *Stenomacrus* Förster, 1869 and were classically placed in the latter (e.g. Aubert, 1981). Kolarov (1986) described the new genus *Batakomacrus*, characterized by the twisted mandible, as in *Picrostigenus*, but with the distinctive placement of the ovipositor, which originates far anterior of the metasomal apex. The latter character is also present in the Afrotropical *Chilocyrtus propodealis* Varga, 2024 (Varga, 2024a) and at least some European species of *Stenomacrus* (Broad, 2010; Varga, 2024b), but the

presence of fore wing vein 3rs-m is not found in combination with the distinctive ovipositor morphology in these genera. Later, Broad (2010) discussed the status of *Batakomacrus* resulting in the description of a new species from the British Isles and the transfer of two species, *Stenomacrus caudatus* (Holmgren, 1858) and *S. flaviceps* (Gravenhorst, 1829), to this genus, with the former a senior synonym of *B. crassicaudatus* Kolarov, 1986. The same year, Humala (2010) described several new species from Mexico, Mongolia and Russia, and provided a key to species, which, however, was poorly illustrated and contained some errors discussed below in the present paper.

Material and Methods

This study is based on specimens deposited in the following collections:

CEUA — Entomological Collection of the University of Alicante, Spain (Santiago Bordera);
FDG — private collection of Filippo Di Giovanni, Siena (Filippo Di Giovanni);
LC — private collection of Pierre-Nicolas Libert, Somal, Belgium (Pierre-Nicolas Libert);
MUST — Museum Stavanger, Stavanger, Norway (Alf Tore Mjøs);
MZH — Natural History Museum, Helsinki, Finland (Juuso Paappanen);
MZL — Musée de Zoologie, Lausanne, Switzerland (Anne Freitag);
MZLU — Zoologiska Institutionen, Lund, Sweden (Rune Bygebjerg);
NHMUK — The Natural History Museum, London, UK (Gavin Broad);
NHRS — Naturhistoriska Riksmuseet, Stockholm, Sweden (Hege Vårdal);
NMSG — Naturmuseum St. Gallen, Switzerland (Karin Urfer);
RBINS — Royal Belgian Institute of Natural Sciences, Bruxelles, Belgium (Fons Verheyde);
SIZK — I. I. Schmalhausen Institute of Zoology, Kyiv, Ukraine (Oleksandr Varga);
UwB — Department of Biology, University of Bialystok, Poland (Agata Kostro-Ambroziak).

Images of specimens were taken with a Leica Z16 APO microscope equipped with Leica FLEXACAM C1 camera and processed by LAS Core software at SIZK, Canon EOS 70D camera equipped with Canon MP-E 65 mm Macro Lens attached to a StackShot Macro Rail system, controlled by Helicon Remote 3.8.4M and Helicon Focus 6.7.1. at CEUA, and Canon EOS R camera equipped with Canon MP-E 65mm 1–5× super-macrolens or Mitutoyo lens (5×, 10×) and mounted on a Stackshot motorised rail from Cognisys, and Canon EOS Utility software and Zerene Stacker from Zerene Systems at NRM. Morphological terminology mainly follows Broad et al. (2018). The structure of the ovipositor and sheaths used in the paper is illustrated in Figs 2, *d*, 4, *b*, 5, *c*, 6, *b*, 7, *a*.

Identification key to the European species of *Batakomacrus*

1. Females. 2
— Males (*B. karelicus* and *B. subarcticus* unknown) 7
2. Ovipositor sheath at least 0.9 × length of hind tibia. Face densely punctate on granulate background, with only traces of aciculation (Figs 5, *d*, 7, *c*). 3
— Ovipositor sheath at most 0.6 × length of hind tibia. Face weakly to strongly aciculate on smooth background (Figs 1, *f–g*, 2, *b*, 4, *e*, 6, *c*). 4
3. Propodeum with lateromedian longitudinal and posterior transverse carinae present (Fig. 5, *b*). Ovipositor sheath 0.9–1.0 × length of hind tibia, widened part of sheath about 0.7 × length of first tarsomere of hind tarsus (Fig. 5, *a*, *c*). ..... *B. karelicus*
— Propodeum with lateromedian longitudinal carinae absent (Fig. 7, *b*). Ovipositor sheath 1.4–1.5 × length of hind tibia, widened part of sheath about 1.0–1.1 × length of first tarsomere of hind tarsus (Fig. 7, *a*). ..... *B. subarcticus*
4. Ovipositor sheath with its widened part about 0.8–0.9 × length of first tarsomere of hind tarsus. Third metasomal tergite 1.2–1.3 × length of second tergite (Figs 2, *e–f*, 4, *g*). Clypeus largely granulate (Figs 2, *b*, 4, *e*). 5

— Ovipositor sheath with its widened part about 0.4–0.5 × length of first tarsomere of hind tarsus. Third metasomal tergite 0.9–1.0 × length of second tergite (Fig. 6, *e*). Clypeus smooth and aciculate (Figs 1, *f–g*, 6, *c*). 6
5. Vertex with yellow/ivory marks (Fig. 4, *i*)..... *B. flaviceps*
— Vertex without yellow/ivory marks..... *B. caudatus*
6. Clypeus strongly aciculate, with basal transverse ridge, apically flattened (Fig. 6, *c–d*). First tergite with latero-median carinae indistinct, sometimes weakly longitudinally wrinkled on anterior 0.5 (Fig. 6, *e*)..... *B. noyesi*
— Clypeus weakly aciculate, more-or-less flat (Fig. 1, *f–g*). First tergite at least with traces of latero-median carinae on anterior 0.8 (Fig. 1, *i–k*). ..... *B. ambiguus*
7. Inner orbits yellow/ivory (Fig. 4, *d*). ..... *B. flaviceps*
— Inner orbits black (Figs 1, *c*, 3, *a–b*). 8
8. First tergite with latero-median carinae distinct (Fig. 1, *l*). Yellow colouration of malar space not extending to the level of eye (Fig. 1, *h*)..... *B. ambiguus*
— First tergite with latero-median carinae indistinct (Fig. 3, *e–f*). Yellow colouration of malar space extending to the level of eye (Fig. 3, *c–d*). 9
9. Clypeus with basal transverse ridge (Fig. 3, *d*). Second tergite granulate (Fig. 3, *f*). Gonostyles narrow (Fig. 3, *h*)..... *B. noyesi*
— Clypeus without basal transverse ridge (Fig. 3, *c*). Second tergite largely smooth (Fig. 3, *e*). Gonostyles wide (Fig. 3, *g*)..... *B. caudatus*

Taxonomy

Batakomacrus Kolarov, 1986

Diagnosis. Female. Face aciculate (Figs 1, *f–h*; 2, *b*; 4, *e*, 6, *c*) or granulate (Figs 5, *d*, 7, *c*). Subocular sulcus distinct. Clypeus from flat to weakly swollen, indistinctly separated from face; its upper edge sometimes ridged (Fig. 6, *c–d*), lower margin always truncate, thus labrum visible. Mandible not strongly twisted; lower tooth smaller and clearly visible in frontal or frontoventral view (Figs 1, *f–h*; 2, *b*; 4, *e*; 5, *d*, 6, *c*; 7, *c*). Temples short and strongly narrowed behind eyes in dorsal view. Mesoscutum densely pubescent; notauli usually absent. Epicnemial carina always present laterally. Pleural carina complete (Figs 2, *a*; 5, *a*; 6, *a*; 7, *a*). Propodeum with lateromedian longitudinal carina present (e.g. Fig. 5, *b*) or absent (Fig. 7, *b*). Fore wing with vein 3rs-m present, but sometimes partly unpigmented (Fig. 1, *b*); hind wing with nervellus intercepted below the middle, but the distal abscissa of Cu usually unpigmented. First metasomal tergite granulate, sometimes partly longitudinally wrinkled (Figs 2, *c*, 6, *e*); latero-median longitudinal carinae developed (Figs 1, *i–l*; 2, *f*; 7, *d*) to almost entirely absent (Figs 2, *e*; 4, *h*); lateral oblique grooves weak to deep. Second tergite slightly to strongly granulate. Third tergite 0.9–1.3 × length of second tergite; posterior margin straight, shallowly (Fig. 6, *e*) or rectangularly emarginate (Figs 2, *e–f*; 4, *g*). Ovipositor weakly (Figs 5, *c*; 7, *a*) to strongly (Figs 2, *d*; 4, *b*, 6, *b*) up-curved, originating far anterior of metasomal apex, capable of being hinged outwards; its sheath from about 0.5 × to 1.5 × as long as hind tibia, basal part usually flexible, apical part widened and pubescent.

Males are hardly recognizable at the genus level: the only difference from *Picrostigeus* is the smooth and shiny malar space with deep subocular sulcus (granulate, with superficial sulcus in *Picrostigeus*) and sculpture of face similar to females (aciculate on smooth background) (Figs 1, *h*; 3, *c–d*; 4, *f*). But considering the granulate

sculpture of face in females of *B. karelicus* and *B. subarcticus*, the undescribed males of these two species can potentially be easily confused with *Picrostigeus*. Male gonostyles of *Batakomacrus* sometimes clearly project far beyond the apex of the metasomal tergites, depending of the condition of the specimen when drying (Figs 1, *d*; 3, *g–h*; 4, *a*). Thus, I do not see this character proposed by Broad (2010) as reliable enough to separate males of *Batakomacrus* from *Picrostigeus*.

Batakomacrus ambiguus Holmgren, 1858 **comb. n.** (Fig. 1, *a–l*)
Batakomacrus sylvicola Humala, 2010 **syn. n.**

Material. **Type. Sweden:** Holotype ♀ of *Orthocentrus ambiguus*, Lapland (Boheman), (designated by Aubert, 1971), NHRS-HEVA000011551 (NHRS). **Non-type. Finland:** Ok, Paltamo, Itkonpuro, 7147421:526944 [64.451267°, 27.559867°], lehtokorpi puron varressa [moist, herb-rich forest next to a stream], 22.06–09.07.2023, 1 ♀ (I. Immonen & M. Laaksonen), GQ.7763 (MZH). **Greece:** Isla Lesbos, Sikaminia, 10–17.04.2011, 1 ♀ (Rojo & Pérez) (CEUA). **Italy:** Toscana — Si, Castelnuovo Berardenga, loc. Pontignano, 43°21'54" N, 11 21'57" E, trad. vineyard, Yellow pan trap — site B, 30.03.2023, 1 ♀ (F. Di Giovanni) (FDG). **Moldova:** ? Kodry, without date, 1 ♂ (SIZK). **Norway:** TRY, Senja, Storholtet, 69.18868N, 17.37885 E, Malaise trap, 07.07–07.08.2023, 1 ♀; Holman, 69.18145 N, 17.38899 E, Malaise trap, 01–31.07.2023, 1 ♀ (I. Birkeland)

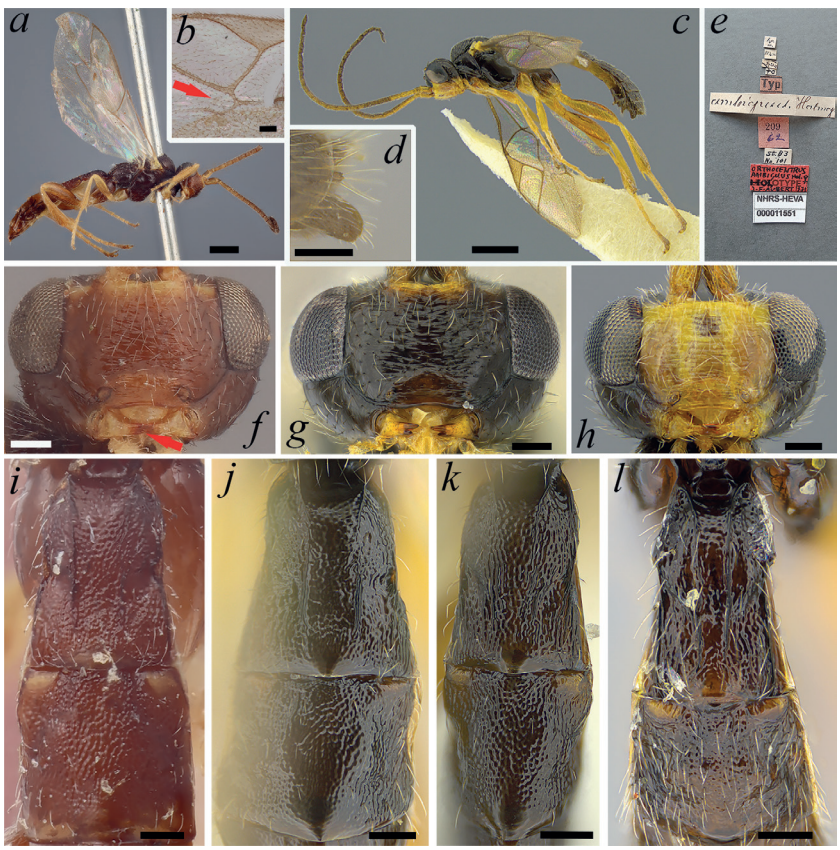

Fig. 1. *Batakomacrus ambiguus*, female: *a–b, e, f* — holotype; *c–d, g–l* — non-type specimens; *a–b, e–g, i–k* — female; *c–d, h, l* — male; *a, c* — habitus in lateral view; *b* — areolet (3rs-m arrowed with red); *d* — gonostyles; *e* — labels; *f–h* — face in frontal view (lower tooth of mandible arrowed with red); *i–l* — metasomal tergites 1–2 in dorsal view. Scale bars 0.5 mm (*a, c*), 0.1 mm (*b, d, f–l*)

(SIZK). **Spain:** P. N. Cabañeros (C. Real), Raña del Pocico, Abierto, TM 2, 13–25.04.2004, 1 ♀; 04–29.12.2004, 1 ♀; Gargantilla, Alcornocal, TM 1, 27.03–15.04.2004, 1 ♀; Gargantilla, Fresneda, TM 1, 18.11–03.12.2004, 1 ♀; Viñuelas, Melojar, TM 1, 26.03–14.04.2004, 1 ♀; 14.04–08.05.2004, 4 ♀; 08–30.05.2004, 1 }; 04–29.12.2004, 3 ♀; 29.12.2004–22.01.2005, 2 ♀; TM 2, 26.03–14.04.2004, 3 ♀; 14.04–08.05.2004, 3 ♀; 08–30.05.2004, 1 ♀; 04–29.12.2004, 2 ♀ (CIBIO) (CEUA, SIZK).

Diagnosis. Female. Face aciculate; clypeus smooth, weakly aciculate, more-or-less uniformly flat (Fig. 1, *f–g*). Antenna with 22–23 flagellomeres; first flagellomere 2.5–2.7 × as long as wide. Vertex black. Propodeum with lateromedian longitudinal and posterior transverse carinae present. First metasomal tergite 1.3–1.4 × as long as apical width, granulate; latero-median carinae present on anterior 0.8 of the tergite; median transverse impressions deep. Second tergite 0.9–1.0 × as long as apical width, granulate; second thyridia not raised (Fig. 1, *i–k*). Third tergite 0.9–1.0 × length of second tergite; posterior margin not emarginate. Ovipositor strongly up-curved; ovipositor sheath 0.5–0.6 × the length of the hind tibia, widened part of sheath about 0.4–0.5 × length of first tarsomere of hind tarsus.

Male. Sculpture of face and clypeus similar to female; face and malar space narrowly yellow (Fig. 1, *h*). First metasomal tergite 1.4–1.5 × as long as apical width, granulate; latero-median carinae distinct. Second tergite granulate (Fig. 1, *l*). Gonostyles: Fig. 1, *d*.

Distribution. Known from Sweden (Holmgren, 1858), Norway (Humala, 2015) and Russia (Humala, 2010), **first records from Finland, Moldova and South Europe (Greece, Italy and Spain)**.

Remark. Holmgren (1858) originally described this species in the genus *Orthocentrus*. Surprisingly, Aubert overlooked the concave apical margin of the clypeus, with the labrum visible in the holotype, and retained the species in this genus in his revision of the European *Orthocentrus* (1978). Later, Humala studied the orthocentrine types of Holmgren and pointed out (pers. comm.) that *O. ambiguus* is a species of *Stenomacrus* based on the shape of the clypeus. Nevertheless, after examination of the holotype of *O. ambiguus*, I found that the type female is characterized by fore wing vein *3rs-m* present (Fig. 1, *b*) in combination with the twisted mandible (Fig. 1, *f*) and distinctive placement of the ovipositor (Fig. 1, *a*). Thus, this species is transferred to the genus *Batakomacrus*. I did not study the type material of *Batakomacrus sylvicola*, but the original description of this species, especially the distinct latero-median carinae of the first metasomal tergite, leaves no doubt that *B. sylvicola* is a junior synonym of *B. ambiguus*.

The colouration of the hind coxae and femora varies from partly (South European specimens) to entirely (North European specimens) fuscous. *Batakomacrus ambiguus* has the latero-median carinae of the first tergite sometimes weak, but always visible as symmetrical traces almost reaching the distal margin of the tergite (Fig. 1, *k*).

Batakomacrus caudatus (Holmgren, 1858) (Figs 2, *a–f*; 3, *a, c, e, g*)

Material. **Type.** Lectotype ♀ of *Orthocentrus caudatus*, without locality and date (Boheman), (designated by Aubert, 1971), NHRS-HEVA000011909 (NHRS). **Non-type. Belgium:** Leper, De Triangel, 50.8418, 2.8838, Malaise A, 14–28.05.2022, 1 ♀; 28.05–18.06.2022, 7 ♀; 18.06–02.07.2022, 3 ♀; 15–29.10.2022, 1 ♀; 50.8427, 2.8840, Malaise B, 14–28.05.2022, 1 ♀; 28.05–18.06.2022, 3 ♀; 18.06–02.07.2022, 1 ♀; (F. Verheyde) (RBINS, SIZK); Somal, sur fenêtre, in-

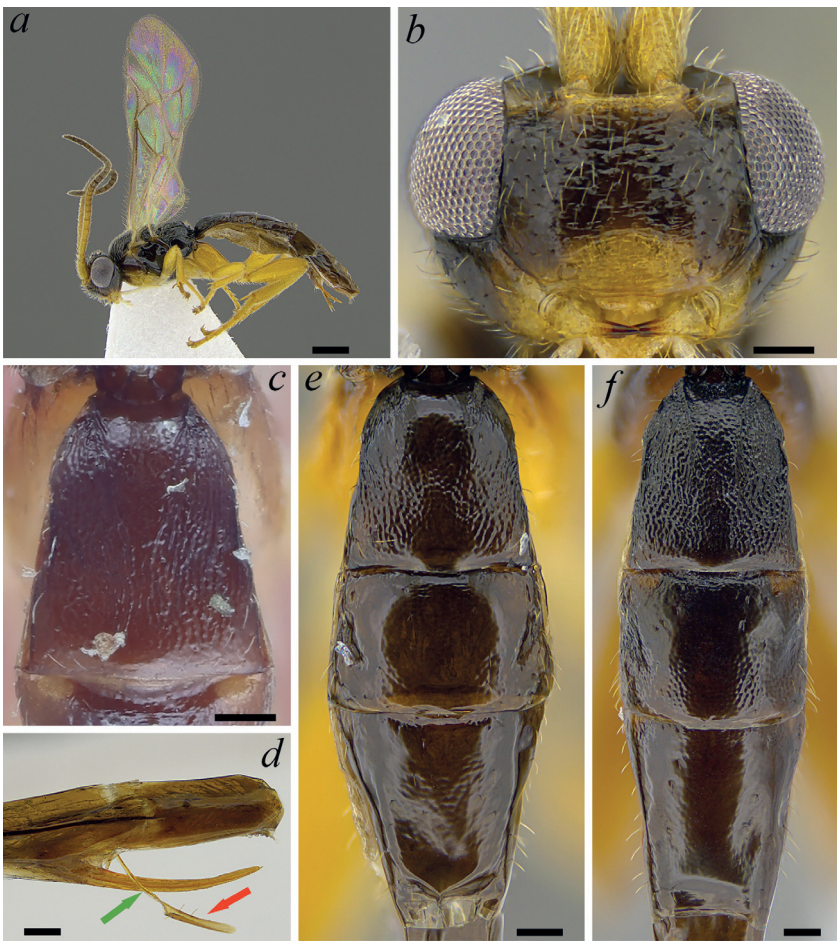

Fig. 2. *Batakomacrus caudatus*, female: *a* — habitus in lateral view; *b* — face in frontal view; *c* — first metasomal tergite in dorsal view (lectotype); *d* — ovipositor and sheaths in lateral view (basal flexible part of sheath arrowed with green and apical widened part arrowed with red); *e–f* — metasomal tergites 1–3 in dorsal view. Scale bars 0.5 mm (*a*), 0.1 mm (*b–f*)

térieur maison, 27.07.2011, 1 ♀ (P.-N. Libert) (LC). **Italy:** Trentino-Alto Adige, Valle San Nicolò, Rock Glacier Cima Uomo, 25.08.2020, 1 ♀ (S. Ornaghi & B. Valle); Toscana — Si, Castelnuovo Berardenga, loc. Pontignano, 43°21'54"N, 11 21'57"E, trad. vineyard, Yellow pan trap — site B, 30.03.2023, 1 ♂ (F. Di Giovanni) (FDG). **Norway:** TRY, Senja, Storholtet, 69.18868N, 17.37885E, Malaise trap, 07.07–07.08.2023, 1 ♀; Holman, 69.18145N, 17.38899E, Malaise trap, 01–31.07.2023, 1 ♀ (I. Birkeland); AAI, Evje & Hornnes, Breidalsli, 58.53019N, 7.76284E, Malaise trap, 29.06–07.08.2021, 1 ♀ (L. Breistol). **Poland:** Podlasie Voivodeship, Biebrza National Park, Grobla Honczarowska, mineral island Pogorzały, oak-linden-hornbeam forest, Malaise trap, 13.06.2007, 1 ♀; 17.08.2008, 1 ♂, 1 ♀ (A. Kostro-Ambroziak) (SIZK). **Spain:** P. N. Cabañeros (C. Real), Gargantilla, Alcornocal, TM 1, 27.03–15.04.2004, 1 ♀; 15.04–07.05.2004, 2 ♀; TM 2, 15.04–07.05.2004, 2 ♀; 07–29.05.2004, 1 ♀; 05–26.02.2005, 1 ♀; Viñuelas, Melojar, TM 1, 14.04–08.05.2004, 1 ♀; 08–30.05.2004, 1 ♀; TM 2, 14.04–08.05.2004, 1 ♀ (CIBIO) (CEUA). **Sweden:** Skåne, Linnebjär, 53°43'57.1N, 13 17'58.9E, 29.07.2014, 1 ♀, MZLU00058754 (C. Hansson) (MZLU). **Switzerland:** CH/SG, Eggersriet, Eggtobel, 753'764/257'289, 13–27.09.2023, Malaise trap, 1 ♀ (L. Vinciguerra & K. Urfer) (NMSG); Auvernier, 19.08.1962, 1 ♀ (J. de Beaumont) (MZL). **Ukraine:** (3 ♀ published in Varga, 2024 c); Ivano-Frankivsk Region, Mochary, mixed forest, 48.838785N, 24.585124E, 09.05.2024, 1 ♀ (O. Varga) (SIZK).

Diagnosis. Female. Face aciculate; clypeus granulate, weakly swollen (Fig. 2, *b*). Antenna with 21–24 flagellomeres; first flagellomere 2.5–2.6 × as long as wide. Vertex black. Propodeum with lateromedian longitudinal and posterior transverse carinae present. First metasomal tergite 1.2–1.3 × as long as apical width, granulate; latero-median carinae weakly present at most on anterior 0.5 of tergite; median transverse impressions weak. Second tergite 0.6–1.0 × as long as apical width, slightly granulate; second thyridium not raised. Third tergite 1.2–1.3 × length of second tergite; posterior margin usually rectangularly emarginate (Fig. 2, *c, e–f*). Ovipositor strongly up-curved (Fig. 2, *d*); ovipositor sheath 0.5–0.6 × length of hind tibia, widened part of sheath about 0.8–0.9 × length of first tarsomere of hind tarsus (Fig. 2, *a*).

Male. Sculpture of face and clypeus similar to female; face, malar space and gena partly ivory/yellow (Fig. 3, *a, c*). First metasomal tergite 1.4–1.5 × as long as apical width, weakly granulate; latero-median carinae from indistinct to weakly visible on anterior 0.4 (Fig. 3, *e*). Gonostyles: Fig. 3, *g*.

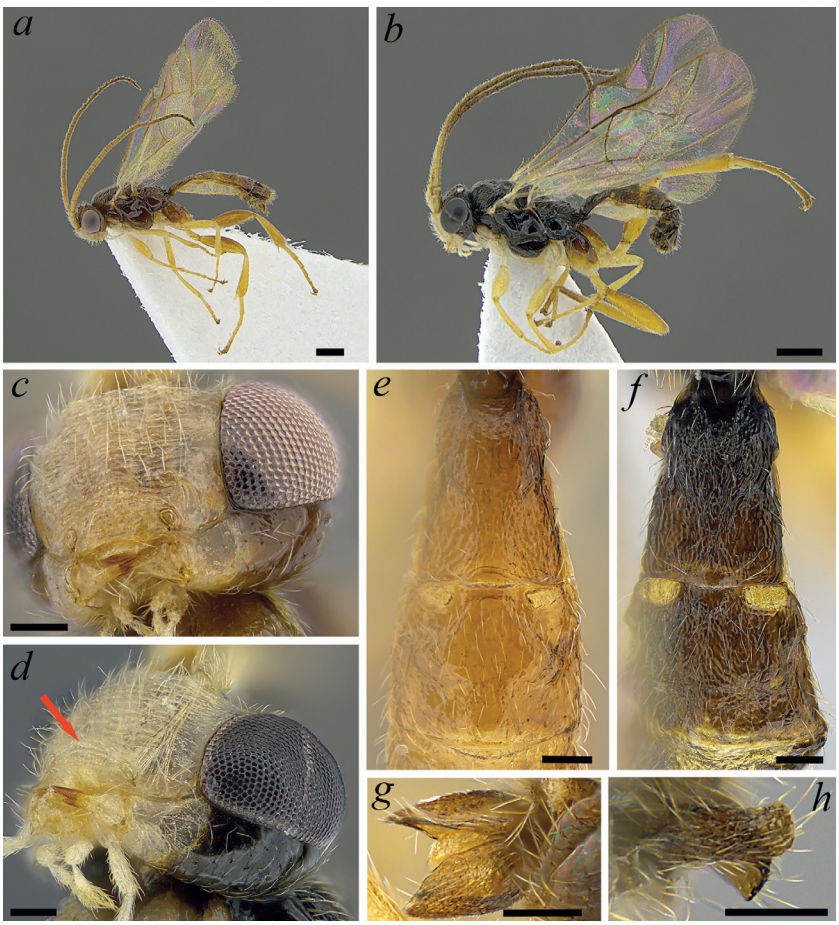

Fig. 3. *Batakomacrus* spp., male: *a, c, e, g — B. caudatus*; *b, d, e, f, h — B. noyesi*; *a–b* — habitus in lateral view; *c–d* — face in frontolateral view (basal ridge of clypeus arrowed with red); *e–f* — metasomal tergites 1–2 in dorsal view; *g–h* — gonostyles. Scale bars 0.5 mm (*a–b*), 0.1 mm (*c–h*)

Distribution. Holarctic (e.g. Broad, 2010; Humala, 2010), **first records from Belgium**.

Remark. Typical specimens of this species have the malar space, clypeus, upper margin of face and eye orbits below the antennal sockets, scape and pedicel yellow, and hind legs reddish-yellow (Fig. 2, *a–b*), while two specimens from high altitudes (Italian Alps and Ukrainian Carpathians) have a dark face, clypeus, antenna, hind coxa and femur. In addition, these specimens have more granulate sculpture of the propodeum in comparison to the typically smooth propodeum in paler specimens and more strongly defined median transverse impressions on the first tergite. Nevertheless, I treat these two specimens as just a high-altitude dark form of *B. caudatus* until fresh specimens suitable for barcoding are collected. The specimens from Belgium have more developed carinae of the first tergite on the relatively more strongly granulate background (Fig. 2, *f*), but otherwise are typical. All Spanish specimens in the collection of CEUA, previously identified as *B. caudatus*, belong to *B. ambiguus*. The record of *B. caudatus* from Spain in this study is based on previously unidentified specimens.

Batakomacrus flaviceps (Gravenhorst, 1829) (Fig. 4, *a–i*)

Material. **Non-type. Greece:** Isla Lesbos, Sikaminia, Malaise trap, 17–25.03.2001, 4 ♀; 10–17.04.2001, 6 ♀; 17–24.04.2001, 2 ♀, 03–10.05.2001, 6 ♀ (Rojo & Pérez) (CEUA, SIZK). **France:** environs de Rouen, 11.05.1955, 1 ♀ (J. Aubert) (MZL). **Spain:** P. N. Cabañeros (C. Real), Raña del Pocico, Abierto, TMo 1, 26.03–14.04.2004, 1 ♀; 14.04–08.05.2004, 1 ♀; 08–28.05.2004, 5 ♂; 04–29.12.2004, 1 ♂; 18.03–12.04.2005, 3 ♂; TM 1, 26.03–13.04.2004, 1 ♀; 22.01–04.02.2005, 1 ♀; TMo 2, 26.03–14.04.2004, 1 ♂, 1 ♀; 14.04–08.05.2004, 4 ♀, 1 ♀; 08–28.05.2004, 9 ♂, 2 ♀; 17.11–04.12.2004, 1 ♂; 04–29.12.2004, 3 ♂, 2 ♀; TM 2, 13–25.04.2004, 1 ♀; 25.04–08.05.2004, 3 ♂; Gargantilla, Fresneda, TM 1, 15.04–07.05.2004, 3 ♀; 07–29.05.2004, 2 ♀; 21.01–05.02.2005, 1 ♀; 26.02–09.03.2005, 1 ♀; 19.03–13.04.2005, 1 ♀; TM 2, 15.04–07.05.2004, 1 ♀; 05–26.02.2005, 1 ♀; Viñuelas, Matorral, TM 1, 26.03–14.04.2004, 1 ♀; 04–29.12.2004, 1 ♀; 04–25.02.2005, 1 ♀; Viñuelas, Melojar, TM 1, 14.04–08.05.2004, 1 ♀; 08–30.05.2004, 1 ♀; 03–25.02.2005, 1 ♀; TM 2, 26.03–14.04.2004, 2 ♀; 03–25.02.2005, 1 ♀ (CIBIO) (CEUA). **Ukraine:** (1 ♀ published in Varga, 2024 c).

Diagnosis. Female. Face weakly aciculate in upper half; clypeus granulate, weakly swollen (Fig. 4, *e*). Antenna with 21–23 flagellomeres; 1st flagellomere 2.7–2.9 × as long as wide. Vertex with yellow or ivory marks (Fig. 4, *i*). Propodeum with lateromedian longitudinal and posterior transverse carinae present. First metasomal tergite 1.2 × as long as apical width, granulate; latero-median carinae absent; median transverse impressions weak (Fig. 4, *h*). Second tergite 0.7–0.8 × as long as apical width, weakly granulate; second thyridium not raised. Third tergite 1.2–1.3 × length of second tergite; posterior margin usually rectangularly emarginate (Fig. 4, *g*). Ovipositor strongly up-curved; ovipositor sheath 0.5–0.6 × length of hind tibia, widened part of sheath about 0.8–0.9 × length of first tarsomere of hind tarsus (Fig. 4, *b*).

Male. Sculpture of face and clypeus similar to female, but more strongly aciculate; face, malar space, gena partly and orbits up to vertex ivory/yellow (Fig. 4, *c–d, f*). First metasomal tergite 1.4–1.5 × as long as apical width, granulate; latero-median carinae present on anterior 0.4 (Fig. 4, *d*). Gonostyles: Fig. 4, *a*.

Distribution. Europe (Broad, 2010; Yu et al., 2016), **first record from Greece**.

Remark. This species is generally very similar to *B. caudatus*, but clearly differs by the more abundant yellow colouration of head, especially in males. In addi-

Fig. 4. *Batakomacrus flaviceps*: *a, c–d, f* — male; *b, e, g–i* — female; *a* — gonostyles; *b* — ovipositor and sheaths in lateral view; *c* — habitus in lateral view; *d* — head, mesosoma and first metasomal tergite in dorsal view; *e–f* — face in frontal view; *g* — metasomal tergites 2–3 in dorsal view; *h* — first metasomal tergite in dorsal view; *i* — head and mesoscutum in dorsal view. Scale bars 0.5 mm (*c*), 0.1 mm (*a–b, d–i*)

tion, *B. flaviceps* has only slightly angulate nervellus in the hind wing compared to strongly angulate in *B. caudatus*. Broad (2010) also pointed that *B. flaviceps* has comparatively smaller areolet in the fore wing and not rectangularly emarginate posterior margin of the third tergite (rectangularly emarginate in *B. caudatus*). I found the shape and size of the areolet to be variable even in specimens from the same locality. Furthermore, the posterior margin of the third tergite in all the studied specimens of *B. flaviceps* is clearly rectangularly emarginate, while in some specimens of *B. caudatus* this emargination is weakly developed. It seems, that the visibility and shape of this emargination sometimes depends of the condition of the specimen when drying (e. g. metasoma strongly compressed laterally).

Batakomacrus karelicus Humala, 2010 (Fig. 5, *a–e*)

Material. **Ukraine:** (1 ♀ published in Varga, 2024 c).

Diagnosis. Female. Face punctate on a granulate background, with only traces of aciculation; clypeus granulate, basally swollen (Fig. 5, *d*). Vertex black. Antenna with 20–21 flagellomeres; first flagellomere 3.5–3.6 × as long as wide. Propodeum with lateromedian longitudinal and posterior transverse carinae present (Fig. 5, *b*). First metasomal tergite 1.3–1.4 × as long as apical width, strongly granulate, weakly longitudinally wrinkled on posterior half of tergite; latero-median carinae absent; median transverse impressions distinct. Second tergite 0.9 × as long as apical width, strongly granulate; second thyridium weakly raised (Fig. 5, *e*). Third tergite 0.9–1.0 × length of second tergite; posterior margin not emarginate. Ovipositor weakly upcurved; ovipositor sheath 0.9–1.0 × length of hind tibia, widened part of sheath about 0.7 × length of first tarsomere of hind tarsus (Fig. 5, *a, c*).

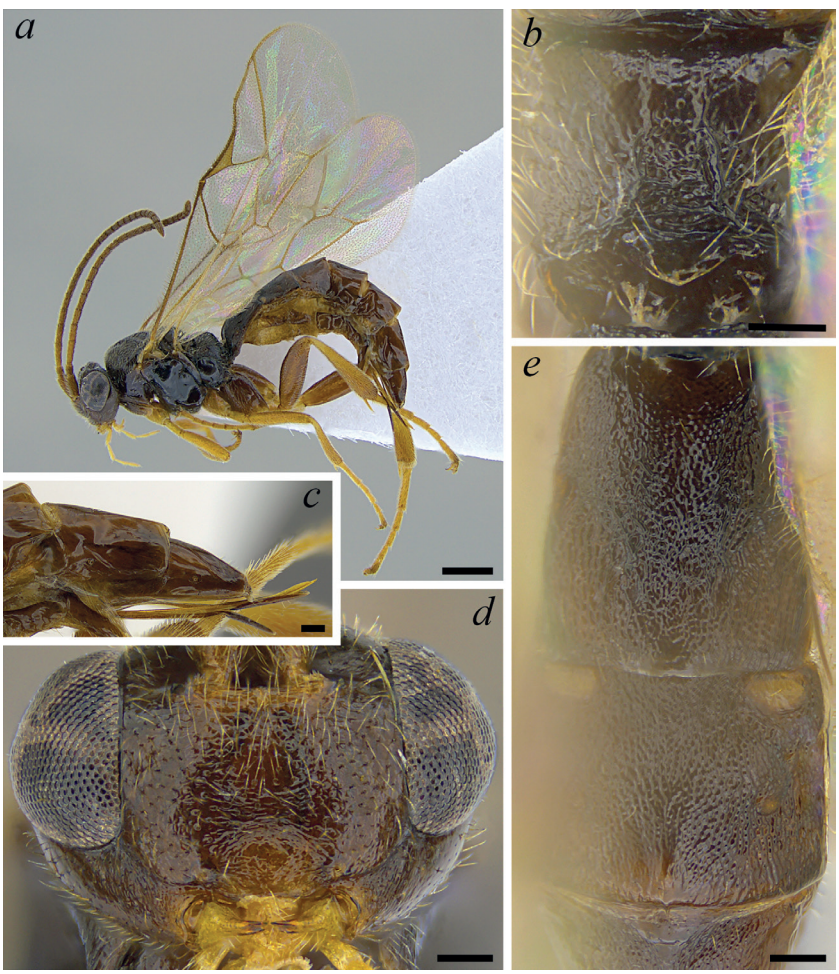

Fig. 5. *Batakomacrus karelicus*, female: *a* — habitus in lateral view; *b* — propodeum in dorsal view; *c* — ovipositor and sheaths in lateral view; *d* — face in frontal view; *e* — metasomal tergites 1–2 in dorsal view. Scale bars 0.5 mm (*a*), 0.1 mm (*b–e*)

Male. Unknown.

Distribution. Currently known only from Norway (Humala, 2015), Russia (Humala, 2010), and Ukraine (Varga, 2024 c).

Batakomacrus noyesi Broad, 2010 (Figs 3, *b, d, f, h*, 6, *a–e*)

Material. **Non-type. Norway:** HOY, Fitjar, Færøysun, Øvre, 59.9657N, 5.3633E, 22.06–11.07.2023, 1 ♀ (T. C. Hestenes) (SIZK). **Sweden:** Skåne, Kranke, Stensoffan, 55°41'30.5N, 13 27'00.5E, 07.06.2014, 1 ♂, MZLU00058767 (C. Hansson) (MZLU). **Ukraine:** (1 ♀ published in Varga, 2024 c).

Diagnosis. Female. Face aciculate; clypeus aciculate, with basal transverse ridge, apically flattened (Fig. 6, *c–d*). Vertex black. Antenna with 23–26 flagellomeres; first flagellomere about 2.8–3.1 × as long as wide. Propodeum with lateromedian longitudinal and posterior transverse carinae present. First metaso-

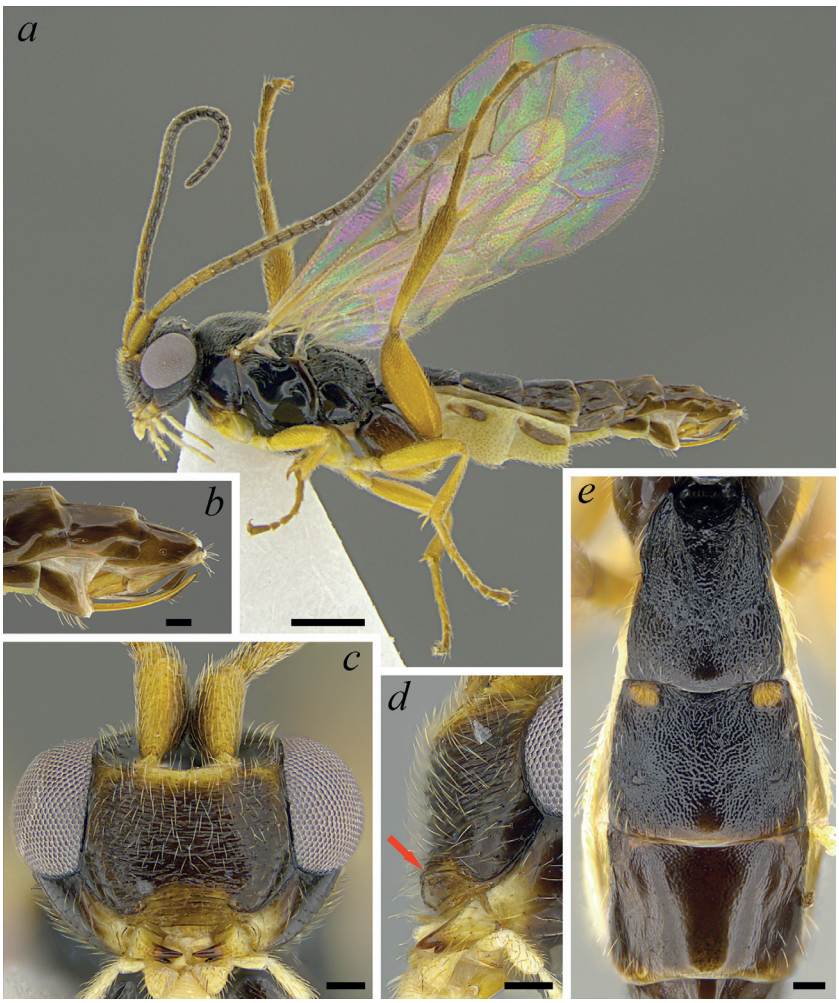

Fig. 6. *Batakomacrus noyesi*, female: *a* — habitus in lateral view; *b* — ovipositor and sheaths in lateral view; *c* — face in frontal view; *d* — face in lateral view (basal ridge of clypeus arrowed with red); *e*— metasomal tergites 1–3 in dorsal view. Scale bars 0.5 mm (*a*), 0.1 mm (*b–e*)

mal tergite 1.3–1.4 × as long as apical width, strongly granulate, sometimes longitudinally wrinkled on anterior 0.5 of tergite; latero-median carinae indistinct; median transverse impressions deep. Second tergite 0.9–1.0 × as long as apical width, strongly granulate; second thyridium raised. Third tergite 0.9–1.0 × length of second tergite; posterior margin slightly emarginate (Fig. 6, *e*). Ovipositor strongly up-curved; ovipositor sheath 0.5 × the length of the hind tibia, the widened part of sheath about 0.4–0.5 × the length of the first tarsomere of hind tarsus (Fig. 6, *a*–*b*).

Male. I found one male from Sweden not associated with a female, which I believe could be the unknown male of *B. noyesi*. It is generally similar to *B. caudatus* (Fig. 3, *b*), but has the clypeus clearly ridged basally (Fig. 3, *d*) and a more strongly sculptured first tergite with deep median transverse impressions (Fig. 3, *f*). The gonostyles are more narrowed and apically rounded compared to those of *B. caudatus* (Fig. 3, *h*).

Distribution. United Kingdom (Broad, 2010) and Ukraine (Varga, 2024 c), **first records from Norway and Sweden**.

Batakomacrus subarcticus Humala, 2010 (Fig. 7, *a*–*d*)

Material. **Non-type. Ukraine:** (1 ♀ published in Varga, 2024c); Ivano-Frankivsk Region, Gorgany, near m. Vysoka, felling, 48.612617, 24.131279, Malaise trap, 16–23.07.2022, 1 ♀; Gorgany, m. Vysoka, 1535 m, 48.6123310, 24.1019810, subalpine zone, Malaise trap 1, 27.05–04.06.2024, 1 ♀; 1498 m, 48.6123586, 24.1046265, subalpine zone, Malaise trap 2, 04–18.06.2024, 1 ♀; 1452 m, 48.6134652, 24.1028948, forest edge, Malaise trap 3, 04–18.06.2024, 1 ♀; 1502 m, 48.6122866, 24.1046366, subalpine zone, Malaise trap 4, 04–18.06.2024, 1 ♀; 1461 m, 48.6132231, 24.1038790, forest edge, Malaise trap 6, 13–27.07.2024, 1 ♀ (O. Varga) (SIZK).

Diagnosis. Female. Face punctate on a granulate background, with only traces of aciculation; clypeus granulate, weakly swollen (Fig. 7, *c*). Vertex black. Antenna with 22–24 flagellomeres; first flagellomere 3.7–4.0 × as long as wide. Propodeum with lateromedian longitudinal absent, posterior transverse carina weak to almost indistinct (Fig. 7, *b*). First metasomal tergite 1.0–1.4 × as long as apical width, weakly granulate, longitudinally wrinkled; latero-median carinae weakly defined centrally; median transverse impressions deep. Second tergite 0.7–0.8 × as long as apical width, weakly granulate; second thyridium not raised (Fig. 7, *d*). Third tergite 0.9–1.0 × length of second tergite; posterior margin not emarginate. Ovipositor weakly up-curved; ovipositor sheath 1.4–1.5 × length of hind tibia, widened part of sheath about 1.0–1.1 × length of first tarsomere of hind tarsus (Fig. 7, *a*).

Remark. According to the original description, the type series have the first tergite 1.0–1.1 × as long as apical width, while the Ukrainian specimens have a slenderer metasoma, with the first tergite 1.3–1.4 × as long as the apical width. The mandibles in this species are more strongly twisted than in other species, thus the lower tooth is not visible in frontal view (Fig. 7, *c*), only in frontoventral view.

Distribution. Germany (Riedel et al., 2021) Norway (Humala, 2015), Russia (Humala, 2010), and Ukraine (Varga, 2024 c).

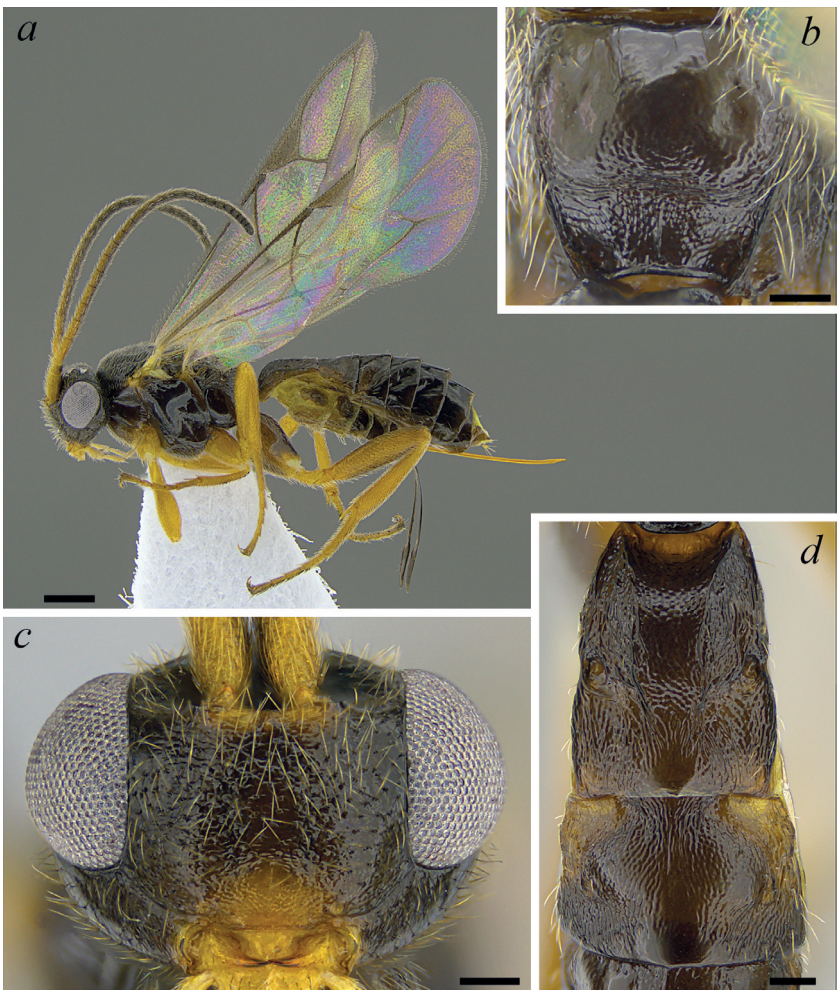

Fig. 7. *Batakomacrus subarcticus*, female: *a* — habitus in lateral view; *b* — propodeum in dorsal view; *c* — face in frontal view; *d* — metasomal tergites 1–2 in dorsal view. Scale bars 0.5 mm (*a*), 0.1 mm (*b–d*)

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