

# Description of a remarkable new species of *Hebecnema* Schnabl, 1889 (Diptera, Muscidae) from Sweden

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*Hebecnema brodina* sp. n. is described from Sweden and compared to similar species of *Hebecnema* Schnabl, 1889 from the Palaearctic Region. Whilst the hitherto known *Hebecnema* species from the European part of the Palaearctic Region are all dark coloured, the new species is characterized by a reddish-brown body and yellow legs. Additionally, *H. brodina* differs from similar species e. g. by the length and numbers of setae on palpi and legs and by the colour of the calypters. With this publication the number of *Hebecnema* species recorded from Europe is raised to seven.

Key words: Diptera, Muscidae, *Hebecnema*, *Hebecnema brodina*, new species, Sweden.

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## Introduction

The genus *Hebecnema* Schnabl, 1889 belongs to the subfamily Mydaeinae and is a small genus within the family of Muscidae (Diptera). According to Wang & Feng (2010) about 23 *Hebecnema* species are known worldwide, but 43 *Hebecnema* species including some synonyms are listed in the presently available version of Systema Dipterorum (Pape & Thompson 2013). The last registrations of *Hebecnema* species in Systema Dipterorum, however, are based on descriptions from 2003 (*Hebecnema marioara* Shinoga, 2003) and 2006 (*Hebecnema humeralis* Couri, Pont & Penny, 2006) respectively. At least five species of the genus from China (Feng 2009; Wang & Fen 2010) are not considered in the currently available version of the website although they were described before the last update of Systema Dipterorum at June 13th in 2013. Thus in total at least forty-eight species, including few synonyms, are recorded worldwide. Only six of these *Hebecnema* species were listed in the Catalogue

of Palaearctic Diptera (Pont 1986) and these are the only recorded from European countries in the latest version of Fauna Europaea (Pont 2013).

When studying non-identified Muscidae of the entomological collection of the Swedish Museum of Natural History, Stockholm a *Hebecnema* male with remarkably yellowish to reddish-brown body and legs was detected. The male had been collected 1920 in Sweden and differs significantly from the known European species which are all dark brown or blackish coloured. A key to ten *Hebecnema* species from China was recently published by Xue & Tian (2014). An attempt to identify from this key *Hebecnema* species, to which the male could be somehow related, failed due to the fact that the taxonomic features of the specimen did not fit to the combinations provided in the key. The specific body colour and also differences in taxonomic characters support the assumption that the male represents a hitherto unknown species, which is described below as *Hebecnema brodina* sp. n.

## Material and methods

Keys to the Muscidae of the Palaearctic Region (Hennig 1964) and to the Muscidae of Central Europe (Gregor *et al.* 2016) were used for identification. Standard terminologies as applied in the Manual of Central European Muscidae (Gregor *et al.* 2016) are used for the description. External morphological features were examined using a ZEISS Stemi 2000-C stereomicroscope, for illustrations an AxioCam ERc5s camera and for further processing Helicon Focus 6 and Adobe Photoshop CS2 have been applied. Body length was measured in millimeters (mm).

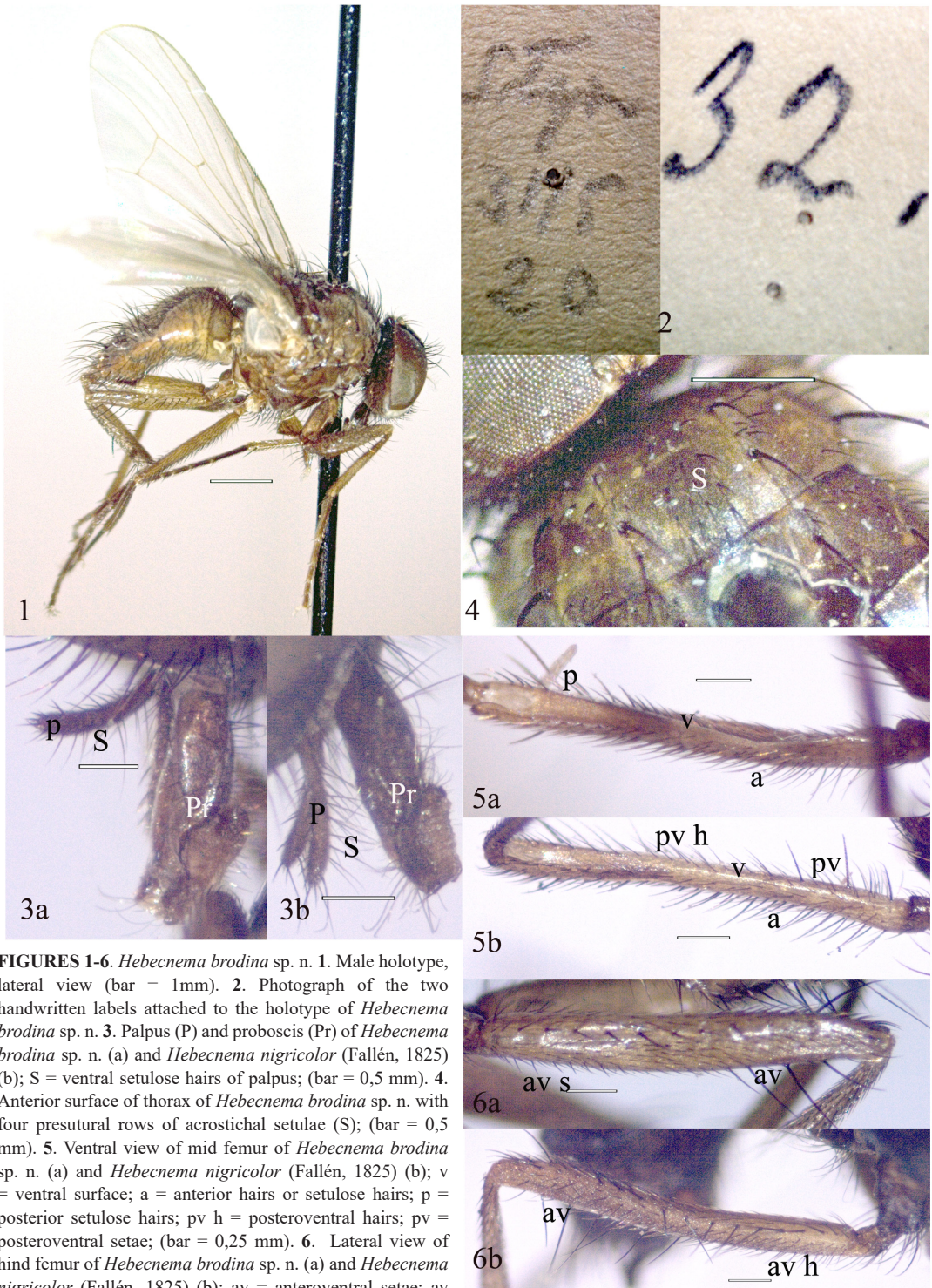
### *Hebecnema brodina* sp. n.

**Material examined:** Male holotype (Figure 1). The specimen is well-preserved, only the right antenna is lacking. Four labels are fixed to the staging pin. The locality label (Figure 2) with handwritten information reads “Stgn 31/5 20”. Another small label, handwritten as well, shows the number “32”. The third label (printed) reads: “Coll. Karl-Herman Forsslund (sic) (FRLS), 1900-1973, NHRS Stockholm, Swedish Museum of Natural History” and the fourth label bears a printed registration number “NHRS-BYWS 000002585”. Based alone on the handwritten information it is practically not feasible to define the site of collecting. But the handwriting and the arrangement of the locality label are identical with the label, which was found with the previously described *Mydaea forsslundi* Zielke, 2017 and which by the help of colleagues of the Swedish Museum of Natural History could be translated to the locality details “Sweden: Ludvika, Brunnsvik, Storgården (WGS 60.2008-15.1242), leg. K.-H. Forsslund” (Zielke, 2017). Thus, the holotype of *Hebecnema brodina* sp. n. is assigned to the same locality with the 31.V.1920 as date of collecting and it will be deposited in the collection of the Department of Entomology of the Swedish Museum of Natural History, Stockholm.

**Description.** *Head.* Ground-colour predominantly yellowish-brown and whitish-grey dusted. Eyes virtually bare, only with few and very short hairs. Diameter of anterior ocellus

slightly larger than diameter of posterior ocelli. Shortest distance between eye margins barely half as broad as diameter of anterior ocellus. Frons in posterior half flattened. Fronto-orbital plates very narrow and throughout touching, only a very short triangular section of frontal vitta at anterior part of frons. Parafacial strongly inflated, in profile not visible. Upper mouth margin in profile slightly behind profrons. Genal depth below lowest eye margin about twice the width of postpedicel. Fronto-orbital plates and parafacials at level of basis of antennae very little greyish dusted and slightly shining; upper half of surface of gena bare, dull light grey dusted, post-occipital surface shining brown to blackish-brown. Antennal segments brown with little grey pollinosity, anterior margin of pedicel and dorsal surface of basal part of postpedicel up to insertion of arista slightly orange-yellowish. Postpedicel about three times as long as broad and also three times as long as pedicel. Arista yellow, about 2.5 times as long as length of postpedicel, the longest hairs almost 1.5 times as long as width of postpedicel. About anterior half of fronto-orbital plate with four strong inclinate frontal setae and at least four interstitial setae only slightly shorter than frontal setae, at middle of frons and near to anterior ocellus one or two fine short hairs. Parafacial bare. Vibrissal setae lacking, only scars are left. However the width of the diameter of the scars supports the assumption that the vibrissals were about twice as strong as the longest surrounding peristomal setae. Gena only at lower surface with dark setae, post-occipital surface covered with shorter dark setae. Proboscis (Figure 3a) brownish, slightly stout, labella broader than width of proboscis, mentum slightly greyish dusted, at some point of view slightly shining. Palpus (Figure 3a) brown, slender, about as long as mentum, most of the ventral setae of palpus approximately as long as diameter of palpus, with the exception of about two setulose hairs in basal half which are about three times as long as the diameter.

*Thorax.* Ground-colour predominantly reddish-brown and shining. When viewed from behind scutum partly very weakly greyish dusted and without any clearly defined dark marking; when viewed from anterior a faint median longitudinal



**FIGURES 1-6.** *Hebecnema brodina* sp. n. **1.** Male holotype, lateral view (bar = 1mm). **2.** Photograph of the two handwritten labels attached to the holotype of *Hebecnema brodina* sp. n. **3.** Palpus (P) and proboscis (Pr) of *Hebecnema brodina* sp. n. (a) and *Hebecnema nigricolor* (Fallén, 1825) (b); S = ventral setulose hairs of palpus; (bar = 0,5 mm). **4.** Anterior surface of thorax of *Hebecnema brodina* sp. n. with four presutural rows of acrostichal setulae (S); (bar = 0,5 mm). **5.** Ventral view of mid femur of *Hebecnema brodina* sp. n. (a) and *Hebecnema nigricolor* (Fallén, 1825) (b); v = ventral surface; a = anterior hairs or setulose hairs; p = posterior setulose hairs; pv h = posteroventral hairs; pv = posteroventral setae; (bar = 0,25 mm). **6.** Lateral view of hind femur of *Hebecnema brodina* sp. n. (a) and *Hebecnema nigricolor* (Fallén, 1825) (b); av = anteroventral setae; av h = anteroventral hair-like setae; av s = short anteroventral setulae; (bar = 0,25 mm).

stripe on the presutural part of mesonotum, slightly darker brown than the reddish-brown ground colour. Scutellum at extreme apex with a small yellowish patch between and slightly anterior of the two apical setae. Pleura yellowish-brown and shining, only at some anterior points of view very little greyish-white dusted. Mediotergite (metanotum) predominantly shining brownish with little pruinosity. Anterior and posterior spiracle yellowish. Scutum covered, rather sparsely, with short, setulose black hairs. Dorsocentrals 2-3 + 4, all well developed; acrostichals 0 + 1, presutural acrostichal hairs in four rows on the faint median longitudinal stripe (Figure 4), the hairs of the outer rows stronger and at least twice as long as the small setulae of the inner rows, surface between median stripe and rows of presutural dorsocentrals bare; pronotal lobe with two strong setae, the outer one slightly longer than the inner seta; two notopleural seta almost equally long, no additional hairs on notopleuron; prealar seta absent; two intra-alar setae. Prosternum, proepimeral area, meron, anepimeron and katepimeron bare. Katepisternum haired, katepisternals 2+2, the lower anterior one distinctly weaker than the other ones and not very much longer than the longest hairs of the katepisternum. Anepisternum predominantly haired on the posterior surface, anterior part bare, posterior margin with a row of about 4 long setae and several shorter interstitial hairs. Scutellum with black setulose hairs, apical and lateral setae about three times as long as basal and subapical setae, ventral and lateral surfaces bare.

*Wing.* Membrane hyaline, cross-veins not infusate (Figure 1). Tegula brownish, basicosta yellowish-brownish, veins predominantly yellowish. Costa ventrally with and dorsally without a parallel row of fine setulae behind the anterior spinule-setulae, costal spine distinct but not prominent, about twice as long as surrounding bristles. Radial node and radial veins dorsally and ventrally bare. Vein  $M_1$  straight, diverging slightly from vein  $R_{4+5}$ . Cross-vein r-m about at the level where vein  $R_1$  enters costa; distal cross-vein dm-cu somewhat oblique and only slightly sinuous. Calypters purely whitish transparent, lower calypter longer than upper one. Haltere knob whitish-yellow, stem pale yellow.

*Legs* including coxae, trochanters and tarsomeres all with yellow ground colour; coxae and trochanters with brownish tinge; fore femur at basal third and dorsal surface all along the femur brownish darkened and slightly greyish dusted; hind tarsomeres darker due to dark yellowish ground-colour and black setulae. Pulvilli and claws of about equal size, approximately as long as corresponding tarsomeres 5. Fore femur with a complete row of posterodorsal setae, a row of posteroventrals and on the upper dorsal half below the posterodorsals a row of posterior setae; posterodorsal setae at distal half about as long as depth of femur at basal half slightly shorter, length of setae of posterior row shorter and of anteroventral row distinctly longer than depth of femur; surface between posterior and anteroventral rows densely covered with setulose hairs not as long as the posterior setae. Fore tibia without posterior seta, ventral surface along the tibia with semi-erected hairs, dorsal surface with usual setulae. Ventral surface of basal half of mid femur without elongated or conspicuous hairs or setae (Figure 5a), distal half with an irregular row of short posterior setae and with several short posteroventral setae at distal third, preapically one short anterodorsal and two strong and long dorsal to posterodorsal setae. Mid tibia with two posterior setae, clearly longer than diameter of tibia. Hind coxa bare on posterior surface. Hind femur (Figure 6a) with complete row of anterodorsal setae, slightly longer than depth of femur; at distal third about four long anteroventrals more or less distinctly longer than depth of femur and at basal half of femur with a row of very short, almost spine-like anteroventral setulae; preapically one strong posterodorsal seta. Hind tibia with one anterodorsal and two anteroventral setae, all distinctly longer than diameter of tibia, the distance between the two anteroventrals shorter than diameter of tibia.

*Abdomen.* Ground-colour shining yellow to reddish-brown (Figure 1), tergites 1+2 and 3 laterally yellow, dorsally brownish-yellow, posterior tergites darker, more reddish-brown. When viewed from behind, all tergites slightly greyish-white dusted, distal half of syntergite 1+2 with a large brownish triangular-shaped median

patch and tergite 3 with a weak, not well-defined, median tan coloured stripe, not reaching the margins of the tergite. All tergites with complete rows of marginal setae, distinctly long only on tergites 4 and 5, which also are marked by complete rows of long discal setae. Sternites 1 to 5 yellow and shining; sternite 1 bare.

**Male genitalia.** Hypopygium not conspicuously protruding. The species is clearly distinguished by morphological characters from other species of the genus. The identification does not depend on comparison of characters of male terminalia. Therefore, to avoid damage on the only available specimen of this new species, extraction of the genitalia has not been undertaken.

**Measurements.** Length of body about 5,5 mm; length of wing about 5 mm.

**Female** not known.

**Etymology** The species is named after Yngve Brodin, curator at the Department of Entomology of the Swedish Museum of Natural History, Stockholm. I want to acknowledge and express my thanks for the continuous support of my studies on Muscidae.

The species name *brodina* is an adjective to the female name *Hebecnema*.

**Diagnosis.** The conspicuously yellowish- to reddish-brown colour of the body (Figure 1) clearly distinguishes *Hebecnema brodina* from all *Hebecnema* species known from the western Palaearctic Region as they are dark brown or blackish coloured. *Hebecnema nigricolor* (Fallén, 1825) is the only species of this group, which has predominantly yellow legs like *H. brodina*. However, both species are not only differentiated by the body-colour but also by other taxonomic characters. For example, the palpus of *H. nigricolor* has several long setulose hairs present on the ventral surface, which are about three times as long as the diameter of the palpus (Figure 3b); the corresponding setae of *H. brodina* are much shorter, at most slightly longer than the width of palpus (Figure 3a). The wing membrane of *H. nigricolor* has a distinct brownish tinge and the calypter is usually distinctly yellow to orange-yellow or brownish, whereas the wing of *H. brodina* has no brownish tinge and the calypters are purely whitish transparent (Figure 1). There

are six dense rows of fine presutural acrostichal hairs at *H. nigricolor*, which are about as long as length of postpedicel, the hairs of the outer rows are only slightly longer than those of the inner rows; *H. brodina* has only four rows of sparse presutural setulose acrostichal hair (Figure 4), the setulae of the two inner rows are only about half as long as the setulose hairs of the outer rows. The anterior surface of mid femur of *H. nigricolor* is covered with semi-erected setulose hairs, many of which almost as long as or longer than depth of femur, the posterior surface is haired with about equally long but finer hairs, there is also a row of posteroventral setulose hairs on femur with about three stronger setae in basal half, two of which as long as depth of femur or longer (Figure 5b). The ventral surface of the femur of *H. brodina* is almost bare, anterior and posterior surfaces are haired, but there are no distinctly elongated hairs and setae (Figure 5a). Hind femur of *H. nigricolor* (Figure 6b) has a complete row of anteroventrals consisting of five or six long setae at about the distal half and of short hairs in the remaining basal part of the femur, the long setae distinctly longer than depth of femur, the shorter hairs at most half as long as depth of femur. Hind femur of *H. brodina* (Figure 6a) has not a complete row of anteroventrals, but there are four or five long anteroventral setae at distal third and a separated row of very short almost spine-like anteroventral setae in basal half of femur.

## Discussion

The six species of the genus *Hebecnema* recorded from the Palaearctic Region by Pont in 1986 are also all known from Europe. *Hebecnema anthracina* Stein, 1908 is confined to the island of Madeira (Portugal), but the other five species have been recorded from a large number of European countries and are partly also known from several North African and Asian countries of the Palaearctic Region as well as from adjacent Oriental and Nearctic Regions. All species are dark brown or blackish. Only one species, *H. nigricolor*, has distinct yellow femora and tibiae. Concerning the bright body colour *H. brodina* is not only an

exception to the European *Hebecnema* species. It seems that there are in general not many reddish species of the genus *Hebecnema* known, and most of them have dark markings. One species with a yellow abdomen, *Hebecnema arcuatiabdomina* (Feng & Fan, 2001) is listed for example from China. This species was originally described as *Helina* but was assigned to *Hebecnema* by Wang (2013). *H. arcuatiabdomina* originates like almost all other *Hebecnema* species described from China from the province of Sichuan, which is also considered as part of the Oriental Region. The species clearly differs from *H. brodina* by the dark colour of thorax and the brown calypter as listed in the key by Xue & Tian (2014). Other reddish *Hebecnema* species are recorded for example from New Guinea and from the New Georgia Group respectively by Vockeroth (1972), who described from these localities *Hebecnema rufula* and *Hebecnema gressitti*. Both species are marked by extensively reddish thorax and a dull or a dark yellow abdomen. But *H. rufula* differs from *H. brodina* among others by dark brown scutellum and most of pleura, brownish calypters, dark brown knob of haltere and darker legs; the thorax of *H. gressitti* is predominantly black, with the postpronotal callus and scutellum reddish to yellowish. And Couri *et al.* (2006) described from the Afrotropical Region *Hebecnema humeralis* from Madagascar, a species with entirely yellow abdomen but with a brown mesonotum contrasting with the yellow pronotum.

Five of the *Hebecnema* species known from Europe have been described between 1823 and 1830, and *H. anthracina* from Madeira is the youngest one, originating from 1908. Since then no valid species of *Hebecnema* were detected in the western part of the Palaearctic Region. *H. brodina* is now the seventh species of the genus recorded from Europe and very likely also from the Palaearctic Region.

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