

## Notes on the identity of *Hemerobius amurensis* Navás, 1929 (Neuroptera, Hemerobiidae)

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### Abstract

Issues concerning the identity of *Hemerobius amurensis* Navás, 1929 are discussed. A neotype is designated that renders this species a junior synonym of *H. marginatus* Stephens, 1836.

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### Introduction

The family Hemerobiidae is one of the most speciose taxa of Palaearctic Neuroptera. Its fauna in the southern regions of the continental part of the Russian Far East (Primorskii Krai = Primorye, southern Khararovskii Krai and southern Amurskaya Oblast) is considered well known. Ten species of the genus *Hemerobius* Linnaeus are known to occur in this region (Makarkin 1995, 2000): *H. atrifrons* McLachlan, *H. exoterus* Navás, *H. humulinus* Linnaeus, *H. japonicus* Nakahara, *H. marginatus* Stephens, *H. simulans* Walker, *H. stigma* Stephens, *H. striatus* Nakahara, *H. subfalcatus* Nakahara and *H. tristriatus* Kuwayama. *Hemerobius amurensis* Navás, 1929 was excluded from the fauna of the Russian Far East because it was known only from its original description, in which the species was reported from “Amur”. This species is mentioned only by Monserrat (1990, 2001), who assumed it was closely related to *H. harmandinus* Navás and *H. subacutus* Nakahara (Monserrat 2001). Although not explicitly stated in the original description, *H. amurensis* is believed to have been originally described from a single specimen, and this conclusion is consistent with the text of the original description. The presumed male holotype of *H. amurensis*

was originally deposited in the “Mus. Hamburg” (= Zoologisches Staatsinstitut und Zoologisches Museum der Universität Hamburg). Titschack (1933) noted that 27 type specimens of Hemerobiidae belonging to the family were housed in this Museum in the early 1930’s. All of these were destroyed during World War II (Weidner 1972). There is no indication that any specimens of this species were retained in Navás’ own collection (Monserrat 1985), or in any other collections. In this note we provide evidence that *H. amurensis* is synonymous with *H. marginatus*, and we designate a neotype in order to unambiguously fix the meaning of the name *H. amurensis*.

Venation terminology mainly follows Oswald (1993).

Type locality. When describing *Hemerobius amurensis*, Navás (1929: 50) provided the following data: “Amur, Dörries leg. 1878–80” and “Mus. Hamburg.”

The true name of the collector was probably “Dörries” – Friedrich (= Fritz) Dörries (1851–1949) – a naturalist from Hamburg, who, together with his brother Heinrich, collected butterflies and birds in Ussuriiskii Krai (= Ussuri Region) between 1877 and 1887. During the period 1878–1880 (when the specimen of *H. amurensis* was collected) they worked in three regions (Staudinger 1892; Shulpin 1936): (1) Askold (42.760 N 132.342 E), an island in the Sea of Japan near the shore of southern Primorye, 50 km southeast of Vladivostok

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(1878 to May 1879); (2) the Baranovskii fort (= present-day Baranovskii village/railway station; 43.640 N 131.934 E) on the Suifun [= Razdolnaya] River in southwestern Primorye (May 1879 to May 1880); and (3) the Kazakevichevo village (48.264 N 134.740 E) at the mouth of the Ussuri River, a right tributary of the Amur River, 20–25 km southwest of present-day Khabarovsk (1880). Therefore, it is very probable that the type locality of *H. amurensis* is indeed “Amur”, i.e., some site near Khabarovsk or the lower reaches of Ussuri River. However, the other two localities (Askold and Baranovskii) should not be excluded, because specimens collected from various localities in 1878 to 1880 could have been subsequently mixed.

### Annotated translation of the description of *Hemerobius amurensis*

To facilitate discussion of the identity of *H. amurensis*, we present below an English translation of the original Latin description of this species (comments in square brackets added by us):

“Head yellow, with yellow hairs; black spot on genae between eyes and mouth; eyes black; antennae yellow.

Thorax yellow, yellow/dark yellow dorsally; Pronotum transverse.

Abdomen yellow, with yellow hairs; *cercis superioribus* [= ectoprocts] (fig. 26, [see Fig. 1]) elongate in dorsal view (a) [see Fig. 1.1], broaden basally, then flattened, lamina-like, slightly arched inward; in lateral view (fig. 26, b) [see Fig. 1.2]. elongate, tongue-like in form.

Legs straw-colored, hairs of same color; tibiae flattened distally, longitudinal impression line distinct.

Wings broad, with acute apex; membrane hyaline, iridescent; pterostigma hardly visible; venation with straw-colored hairs.

Forewing: Costal area basally dilated; [subcostal] veinlets near Costa forked or branched; subcostal space with 2 crossveins, basal and stigmal; 3 radial sectors [= 3 ORB's], distal one with 5 branches; most crossveins slightly ferruginous, hardly visible; 4/10 gradate crossveins from Procutitus [= Media] to Radius [= 4 crossveins in inner gradate series, 10 in outer]; Procutitus [= Media] forked at about origin of first [radial] sector [= ORB1], beyond fork of Cubitus; 2 cubital crossveins [= between CuA and CuP], or second cubital cell closed.

Hind wing pale, no dark crossveins; 4 radial sectors; 2/10 gradate crossveins [= two crossveins in inner gradate series, ten in outer].

Length of body, male, 6.5 mm; length of forewing 9.7 mm; length of hind wing 8 mm.”

### Identity of *Hemerobius amurensis*

In analyzing this description we find that the main diagnostic feature is the shape of the male ectoproct. The large size of the specimen is also important. The original description does not contain distinctive maculation or venational features (but see below). Monserrat (2001) noted that the male ectoproct of the species was unusual in lacking any dorsal projection, and thought that *Hemerobius amurensis* was similar to *H. harmandinus* Navás or *H. subacutus* Nakahara. However, the ectoprocts of both these species are distinctly pointed at the apex (see Makarkin 1993: figs 25, 32).

The description of *Hemerobius amurensis* agrees well only with the characters of *H. marginatus*, which is characterized by large size, similar male ectoproct structure, and pale coloration. Furthermore, the two species have similar venation, except for minor differences in the size and venational details. All other East Asian species strongly differ from *H. amurensis*, either in the structure of the ectoproct, or in coloration, venation, size, or by all of these characters.

Ectoproct. A lamina-like male ectoproct that is not pointed apically and that lacks projections occurs only in the subgenus *Brauerobius* Krüger (or the *marginatus* species group: Oswald 1993: 216), which consists of two or three species: the palaearctic *H. tristriatus* and *H. marginatus*, and the nearctic *H. costalis* Carpenter. The latter two species might be synonymous (Kevan & Klimaszewski 1987). *Hemerobius tristriatus* has a dark body and distinct wing patterning consisting of three dark-brown stripes, which is very different from that of *H. amurensis*. The shape of the ectoproct of *H. amurensis*, as figured by Navás (Fig. 1), is very similar to that of *H. marginatus* (see for example Killington 1937: fig. 79).

Coloration. Wing coloration and patterning is not mentioned by Navás, suggesting that the specimen he examined had neither strong coloration nor patterning. The forewings of the living imagoes of *H. marginatus* possess pale brownish patterning, which is often lost or indistinct in dried specimens, especially specimens long exposed to bright light. The body coloration of dried specimens of *H. marginatus* is mainly pale (yellowish), like that of the presumed holotype of *H. amurensis*.

Size. The length of the male forewing (9.7 mm) reported for the presumed holotype of *H. amurensis* is large for the genus *Hemerobius*, and that of *H. mar-*

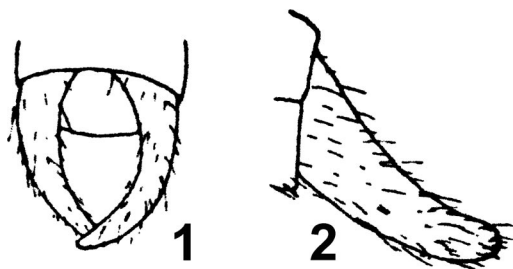


Fig. 1. *H. amurensis* Navás, 1929, apex of male abdomen, presumed holotype. 1 – dorsal view; 2 – lateral view (redrawn from Navás 1929: fig. 26).

*marginatus* from the Russian Far East is usually less, 7.6–8.9 mm (mean 8.3 mm;  $n = 25$  male specimens, arbitrary chosen from the collections of the Institute of Biology and Soil Sciences [IBSS] from Primorye). Of the eastern Asian species of *Hemerobius*, such long wings occur only in females, e.g., *H. marginatus* (maximum length 10.2 mm) and *H. simulans* (maximum length 9.6 mm). *Hemerobius marginatus* is the largest Palearctic species of *Hemerobius*, and males as large as the presumed holotype of *H. amurensis* may well exist. Moreover, the male forewing of *H. marginatus* in Europe is as long as that of *H. amurensis*, up to 10.5 mm (Kis et al. 1970).

**Venation.** We examined the venation of 386 forewings and 171 hind wings of *Hemerobius marginatus* from Primorskii Krai (right and left wings of the same specimen are often different in venational details, so both were considered together here). In the forewing, the number of ORB's is 2 (2 wings), 3 (370), 4 (14); the number of branches of the distalmost ORB is 2 (1 wing), 3 (94), 4 (271), 5 (10); the number of crossveins in the 3rd (= inner) gradate series is 4 (11 wings), 5 (348), 6 (27); the number of precubital crossveins in the 4th (= outer) gradate series is 7 (1 wing), 8 (52), 9 (294), 10 (37), 11 (2); and the number of crossveins between the branches of the CuA and CuP is always 2. In the hind wing, the number of branches of the Rs is 4 (166 wings) or 5 (5) branches; the number of precubital crossveins in the inner gradate series is 2 (155 wings) or 3 (12); the number of precubital crossveins in the outer gradate series is 7 (161 wings) or 8 (10).

The venation of the presumed holotype of *H. amurensis* falls generally within the known range for *H. marginatus*, particularly bearing in mind that the specimen is very large. However, the number of precubital crossveins in the outer gradate series of the hind wing (10) is extraordinarily large for this genus, at least for species occurring in eastern Asia. We have examined all other available species of *Hemerobius* from this region (Russian Far East, Japan, China) and have found only two specimens from Primorye that have 9 crossveins in that series (one each of *H. tristriatus* and *H. striatus*); the other species have at most 7–8 crossveins. We have only one explanation for this large number: that it is associated with the great size of the presumed holotype of *H. amurensis*.

There may also be a difference in the position of the fork of the Media between *H. amurensis* and *H. marginatus*. Navás described this fork in *H. amurensis* as being near the origin of ORB1. In *H. marginatus* this fork is located proximal to the origin of ORB1. Unfortunately, because of the loss of the specimen, we are not able to assess the extent of this possible difference.

*Hemerobius marginatus* is a very widespread Palearctic species, being distributed across the region from the Atlantic to the Pacific Ocean (see

below for details). This species is also one of most abundant hemerobiids in the “Ussuri Region” (i.e., in Primorskii Krai and southern Khabarovskii Krai). Its preferred habitats are deciduous and deciduous/coniferous forests at lower elevations (up to ~700 m). It inhabits various deciduous trees (especially maples, *Acer* spp.), but occasionally occurs on conifers or low vegetation (Makarkin 1991). Of the three possible type localities of *H. amurensis* noted above, *H. marginatus* has been recorded from two (the mouth of Ussuri River and the Razdolnaya River valley near Baranovskii), and in the former it is abundant. At present, the Isle of Askold is rarely visited by collectors; *Hemerobius marginatus* has not been recorded from there, but would not be unexpected.

We believe that the evidence presented above strongly supports that conclusion that the species *H. amurensis* and *H. marginatus* are synonymous. We formally propose this synonymy here. Furthermore, because the presumed holotype of *H. amurensis* is no longer extant, below we designate a neotype for it that is intended to meet the twin objectives of fixing its interpretation and rendering it a junior subjective synonym of *H. marginatus*.

## Synoptic data and citations

### *Hemerobius marginatus* Stephens, 1836

*Hemerobius marginatus* Stephens, 1836: 109.

*Hemerobius amurensis* Navás, 1929: 50, fig. 26 (original description); Monserrat 1990: 219 (listed); Monserrat 2001: 68 (taxonomic notes), syn. n.

Neotype (by present designation). Male (Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia [ZIPS]), examined by Vladimir Makarkin.

Type locality. Russia: Khabarovskii Krai: suburb of Khabarovsk (town): Bychikha (village) (48.305 N 134.847 E).

Date and Collector. 21. 6. 1982 (V.N. Makarkin). Verbatim label data [bracketed information added]: (1) transliterated/translated from Russian: “Khabarovsk/Bychikha, listv [enye]. der[ev'ya]. [= deciduous trees]/i[= and] kustarn[iki]. [= brushwood] 21. 6. [19]82 /Makarkin”; (2) “Neotype [typed] *Hemerobius/amurensis* Navás, 1929/design[ated by]. Makarkin et/Monserrat” [red rectangle, handwritten by Arkady S. Lelej]; (3) “*Hemerobius/marginatus* Stephens/Det[ermined by]. V. Makarkin, 2007” [white rectangle, typed].

Notes. We have selected for the neotype of *Hemerobius amurensis* a male specimen of *Hemerobius marginatus* formerly contained in the collections of the IBSS (now transferred to the ZIPS) and collected near the most probable original type locality of *Hemerobius amurensis* (i.e., Kazakevichevo)].

Distribution. (after Aspöck et al. 2001, many smaller papers and our data; new records are asterisked): **Europe:** Austria, Belarus, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, Germany, Great Britain, Hungary, Ireland, ?Italy,

Latvia, Liechtenstein, Lithuania, Montenegro, Norway, Poland, Romania, Russia (Murmanskaya Oblast, \*Arkhangelskaya Oblast, Karelia, Komi, St.-Petersburg, Leningradskaya Oblast, \*Novgorodskaya Oblast, \*Pskovskaya Oblast, \*Tverskaya Oblast, Moskovskaya Oblast, Bryanskaya Oblast, Kirovskaya Oblast, Ul'yanovskaya Oblast, Samarskaya Oblast, \*Tatarstan, Bashkortostan, Stavropolskii Krai, Chechnya, Chelyabinskaya Oblast), Slovakia, Slovenia, ?Spain [after Navás, 1905:18, the record needs confirmation], Sweden, Switzerland, Ukraine (Chernigovskaya Oblast, Crimea, \*Dnepropetrovskaya Oblast, Ivano-Frankovskaya Oblast, Kharkovskaya Oblast, Kievskaya Oblast, Lvovskaya Oblast, Ternopolskaya Oblast, Zakarpatskaya Oblast); **Transcaucasia**: Azerbaijan, Georgia; **Asia**: Russia (\*Tyumenskaya Oblast, Novosibirskaya Oblast, Krasnoyarskii Krai, \*Tuva, Buryatia, Chitinskaya Oblast, Yakutia, Kamchatka, Khabakovskii Krai, Primorskii Krai, Sakhalin I., Kuril Is. (\*Paramushir I., Kunashir I., Shikotan I.)), Mongolia, China (Inner Mongolia), Japan (Hokkaido, Honshu, \*Kyushu).

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