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NEW TAXONOMIC DEFINITION OF THE GENUS *NEUCENTROPUS* MARTYNOV (TRICHOPTERA: POLYCENTROPIDAE)

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Abstract.—The genera *Neucentropus* Martynov and *Kyopsyche* Tsuda constitute a monophyletic group, such that *Kyopsyche* is a **new synonym** of *Neucentropus* and the type species of *Kyopsyche*, *Kyopsyche japonica* Tsuda 1942, is transferred into *Neucentropus* (**new combination**). *Neureclipsis mongolica* Schmid 1970, is transferred to *Neucentropus* as a **new synonym** of *Neucentropus mandjuricus* Martynov 1907. *Neucentropus mandjuricus* and *Neucentropus japonicus* males are diagnosed. *Kyopsyche tsukuiensis* Kobayashi 1984, is transferred to *Plectrocnemia* (**new combination**).

Key Words: Oriental Region, Palearctic Region, *Kyopsyche*, *Neureclipsis*, *Plectrocnemia*

The genus *Neucentropus* Martynov was established for *Neucentropus mandjuricus* Martynov 1907, based on a single female specimen from northeastern China (Manchuria). Martynov (1934) later associated the male of the species based on material from the Ussuri River, Russia. Tsuda (1942) established the genus *Kyopsyche* based on a Japanese species *Kyopsyche japonica* Tsuda 1942, whose male genitalia are very similar to those of *N. mandjuricus*, although their venation is different. Schmid (1970) described a Mongolian species *Neureclipsis mongolica* whose male genitalia are very similar to those of *N. mandjuricus*. Kobayashi (1984) published a second species of *Kyopsyche*, *K. tsukuiensis*. Based on characters of venation and male genitalia, *K. tsukuiensis* is a typical *Plectrocnemia* Stephens species (**new combination**) and will be excluded from further discussion. Thus, as presently constituted, *Kyopsyche* is monobasic and *Neucentropus* includes two species.

Despite the similarity of the male genitalia of the three species, *Neucentropus mandjuricus*, *Kyopsyche japonica* and *Neureclipsis mongolica*, Schmid (1970) and Tsuda (1942) did not compare them. Neither Schmid nor Tsuda mentioned Martynov's (1907, 1934) works and Schmid (1970) did not mention Tsuda's (1942) work. In his *Trichoptera Catalogus*, Fischer (1972) first noticed the confusion and listed the only then-known species of the older genus *Neucentropus*, *N. mandjuricus*, under the more recent genus *Kyopsyche*.

In 1988, 1989 and 1990, we collected many specimens of *N. mandjuricus* in southern China (Jiang-su and Jiang-xi Provinces). In this paper, we redescribe the species and discuss the status of the two similar species, *Neureclipsis mongolica* and *Kyopsyche japonica*.

MATERIALS AND METHODS

Specimens were collected by members of the Nan-jing Agricultural University and

Clemson University "Caddisfly Team" using a 15-watt BL ultraviolet light suspended before a sheet and over a funnel leading to a container of ethanol.

In this paper, we use the terminology of Hamilton (1986) for male genitalia and wing venation. The terminology for female genitalia follows that of Schmid (1980).

Voucher specimens described in this paper are deposited in the Department of Plant Protection, Nan-jing Agricultural University, Nan-jing, People's Republic of China (NAU), and the Clemson University Arthropod Collection, Clemson University, South Carolina, U.S.A. (CUAC).

DISCUSSION

We compared the venation, maxillary palpi, labial palpi and male genitalia of our specimens from southern China with Martynov's illustrations of *Neucentropus mandjuricus*, but no difference was found. We also compared the male genitalia with those of *Neureclipsis mongolica* illustrated by Schmid and found no difference. Thus, by this conclusion, not only *Kyopsyche* but now also *Neucentropus* are each monobasic.

The venation of *Neucentropus* is almost the same as that of the genus *Holocentropus* McLachlan except the second cross-vein is absent from the costal area of the fore wing in the type species of *Neucentropus* (Martynov 1934; plesiomorphy; Fig. 1) and Fork 1 of the fore wing is much shorter than in *Holocentropus* (apomorphy 1; Figs. 1, 14). The second segment of each maxillary palp has a ventral projection in *Neucentropus* (Martynov 1934; apomorphy 2; Fig. 3). The male genitalia of *Neucentropus* have narrow preanal appendages each curved mesad and tapered to an acute apex (apomorphy 3; Figs. 4, 5, 12, 13); the phallus has a pair of tiny sclerotized lobes in the apical membranes (apomorphy 4; Figs. 5, 12); and sternum IX has a pair of deep incisions laterally (apomorphy 5; Fig. 4).

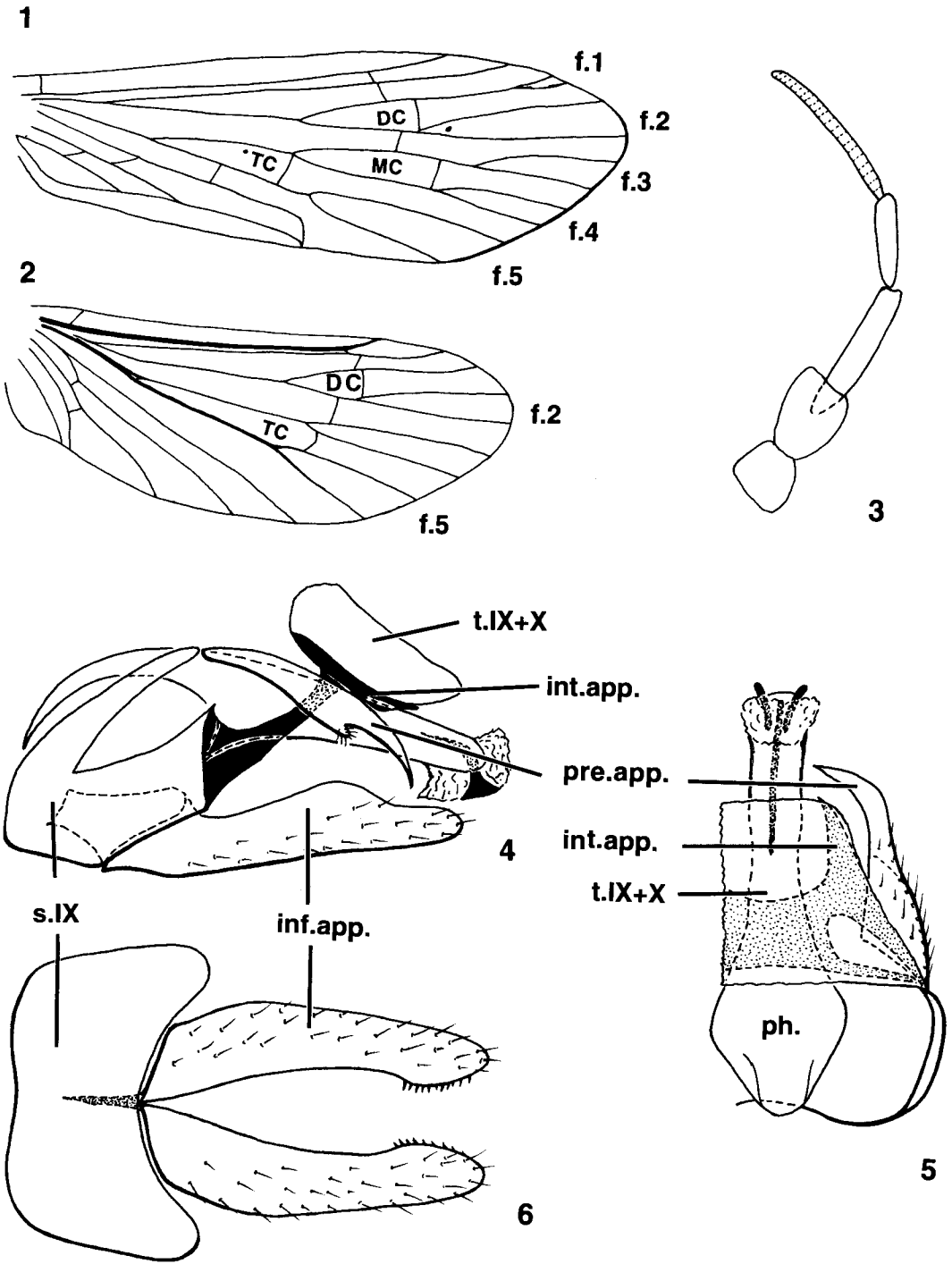
Hind wing Fork 3, present in females of *N. mandjuricus* (Fig. 8) and present appar-

ently in both sexes of *K. japonica* (since Tsuda did not mention any venational sexual dimorphisms, Fig. 15) but absent in the males of *N. mandjuricus* (Fig. 2), varies in females of *N. mandjuricus* from about one-half to one-third of the length of Cell R5. The presence of hind wing Fork 3 in *Kyopsyche* and female *N. mandjuricus* is probably secondary, since it occurs in Polycentropodidae more than once. For example, it is fused (absent) in most *Plectrocnemia* species but present in *Plectrocnemia tortosa* Banks (Li and Morse, in press). Other venational differences (Figs. 1, 2, 7, 8, 14, 15), apparently all *Kyopsyche* autapomorphies, include the facts that the second cross-vein in the costal area of the fore wing is present in *Kyopsyche* and absent in *Neucentropus*, the crossvein cu2-1a is present in *Neucentropus* and absent in *Kyopsyche*, and each hind wing Sc is complete to the wing margin in *Neucentropus* but incomplete in *Kyopsyche* beyond the sc-r1 crossvein.

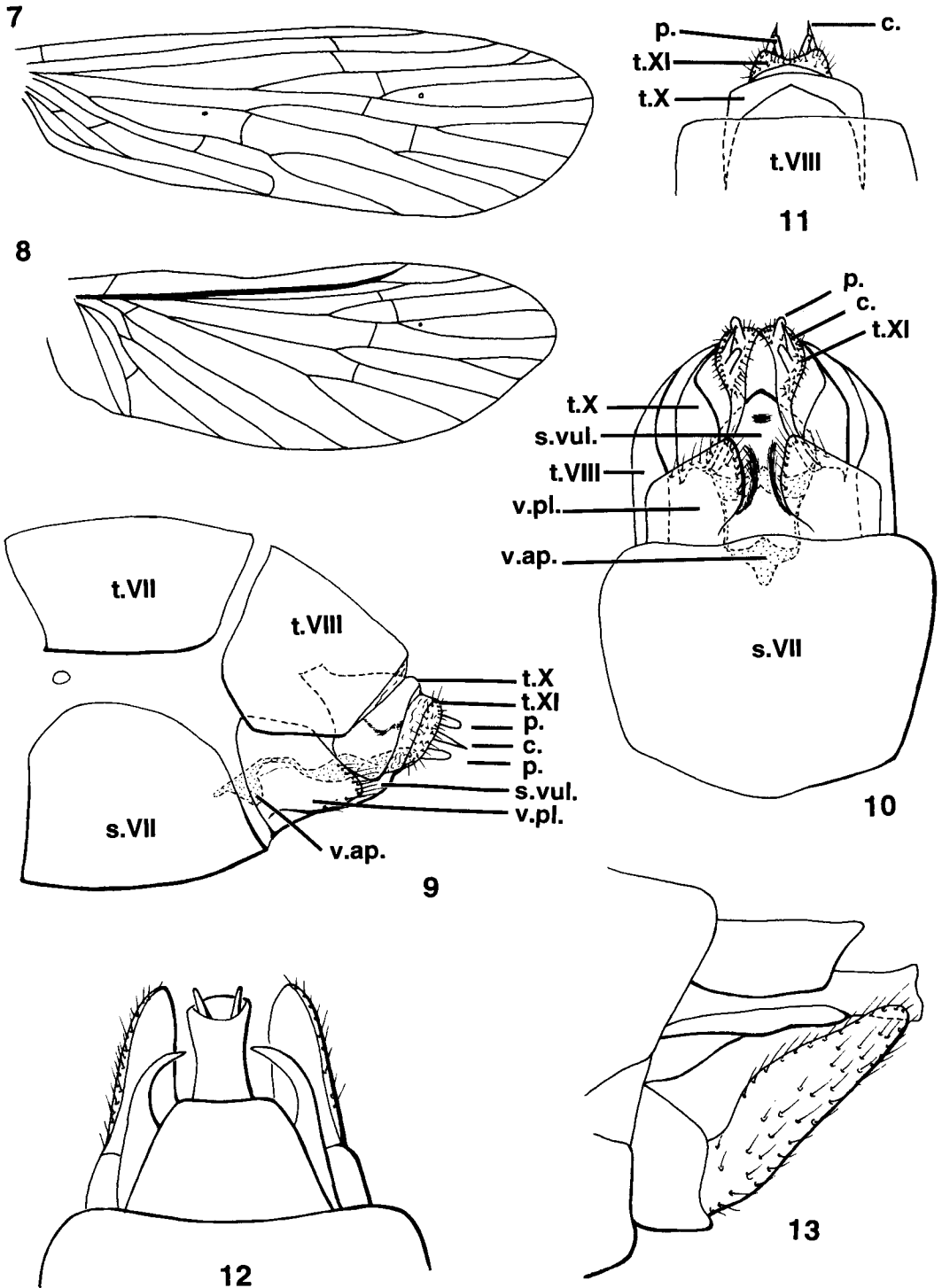
Although the venation of the genera *Neucentropus* and *Kyopsyche* is different, the male genitalia of the two genera are very similar. According to Tsuda's (1942) illustrations, the males of *Kyopsyche* also have synapomorphies 1, 3, and 4 of *Neucentropus*. Apomorphies 2 and 5 might also be present in *Kyopsyche*, but Tsuda did not illustrate these, such that further study is needed.

From the discussion above, noting at least three uniquely shared synapomorphies, the two genera *Neucentropus* and *Kyopsyche* constitute a monophyletic group for which there is no reason to keep them as monobasic genera.

This result supports Fischer's (1972) suggestion that *Neucentropus* and *Kyopsyche* should be one genus. However, because *Neucentropus* was described prior to *Kyopsyche*, his action is not consistent with the Principle of Priority (International Union of Biological Sciences 1985). Therefore, we consider *Kyopsyche* a junior synonym of *Neucentropus*.



Figs. 1-6. Male adult of *Neucentropus mandjuricus*. 1, Right fore wing, dorsal. 2, Right hind wing, dorsal. 3, Left maxillary palp, ventral. 4, Male genitalia, right lateral. 5, Male genitalia, dorsal, right side omitted. 6, Male genitalia, ventral. Abbreviations: DC = discoidal cell; f.1 = Fork 1; f.w = Fork 2; f.3 = Fork 3; f.4 = Fork 4; f.5 = Fork 5; inf. app. = inferior appendage; int. app. = intermediate appendage; MC = median cell; ph. = phallus; s.IX = sternum IX; pre. app. = preanal appendage; TC = thyridial cell; t.IX+X = tergum IX+X.



Figs. 7-13. Characters of *Neucentropus mandjuricus* and *N. japonicus*. 7-11, Female adult of *N. mandjuricus*. 7, Right fore wing, dorsal. 8, Right hind wing, dorsal. 9, Female genitalia, left lateral. 10, Female genitalia, ventral. 11, Female genitalia, dorsal. 12-13, Male adult of *N. japonicus* (redrawn from Tsuda 1942, figs. 22a-

In conclusion, the newly defined genus *Neucentropus* includes *N. mandjuricus* Martynov and *N. japonicus* (Tsuda) (**new combination**). Genus *Kyopsyche* is a **new synonym** of *Neucentropus*. *Neureclipsis mongolica* Schmid should be transferred to *Neucentropus* and is a **new synonym** of *Neucentropus mandjuricus* Martynov.

Neucentropus Martynov

Neucentropus Martynov 1907: 18. Type species: *Neucentropus mandjuricus* Martynov. By monotypy.

Kyopsyche Tsuda 1942: 259, 263; Fischer 1972: 53 (synonym by implication, in that Fischer listed *Neucentropus mandjuricus* as a species of *Kyopsyche*). **New synonym**. Type species: *Kyopsyche japonica* Tsuda. Original designation.

Included species.—*Neucentropus mandjuricus* Martynov, 1907; *Neucentropus japonicus* (Tsuda 1942), **new combination**.

Description.—Maxillary palpi each with first segment short and stout; second segment slightly longer than first, about same thickness, with long and broad ventral projection; third segment more slender, slightly longer than first and second segments combined; fourth segment about as long as second; fifth longest, length slightly less than that of last two segments combined (Fig. 3).

Spur formula: 3, 4, 4.

Wing venation: Fore wings (Figs. 1, 7, 14) each with or without second cross-vein in costal area; with Forks 1, 2, 3, 4 and 5, and with discoidal, median and thyridial cells (DC, MC, and TC, respectively); Fork 1 rather short, one-half to one-third as long as its stem; crossvein 1a-2a present, crossvein cu2-1a present or absent. Hind wings (Figs. 2, 8, 15) each with Forks 2 and 5 and with DC and TC, Sc complete to wing mar-

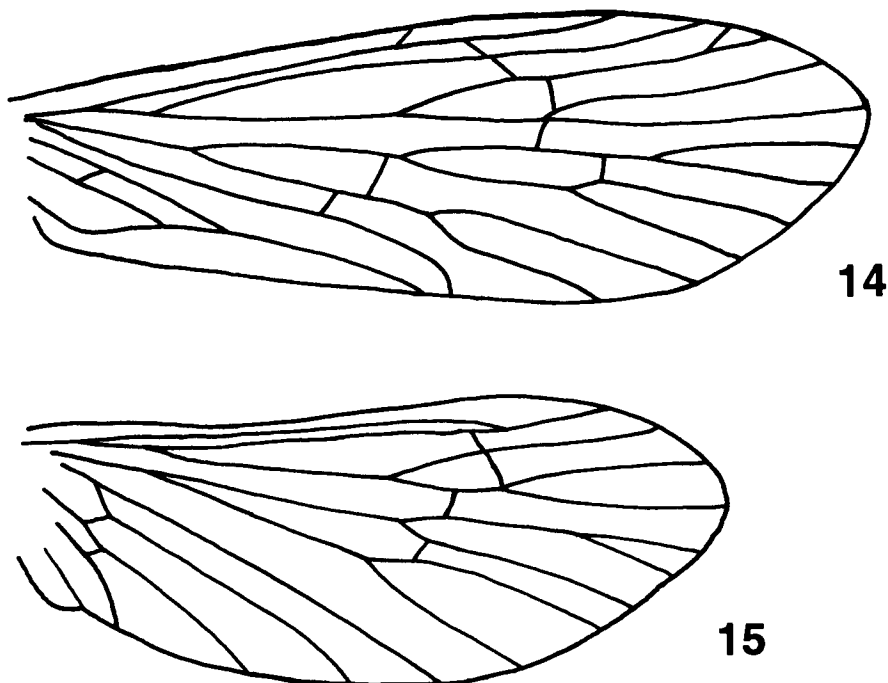
gin or incomplete beyond sc-r1 crossvein, and Fork 3 present or absent.

Male genitalia: Tergum IX+X (t.IX+X) broad and truncate apically in dorsal view, with intermediate appendages (int.app.) underneath (Figs. 4, 5). Preanal appendages (pre.app.) narrow, apically acute, curved mesad (Figs. 4, 5, 12, 13). Sternum IX (s.IX) broad, slightly concave in middle of posterior margin in ventral view (Fig. 6); divided by deep posterior triangular incision on each side, posterior point of dorsal part articulating with base of its preanal appendage, ventral part connected with tergum IX+X by pair of narrow bridges (Figs. 4, 5). Inferior appendages (inf.app.) each one-segmented, simple, without any projections; broadly convex on dorsal margin at middle in lateral view (Figs. 4, 13); curved mesad slightly at apex (Fig. 6). Phallus (ph.) simple sclerotized tube, broad at base, membranous at apex, with pair of small sclerotized lobes in apical membrane (Figs. 5, 12).

Female genitalia: Tergum VIII (t.VIII) larger than ventral plates (v.pl.; Fig. 9), truncate in dorsal view (Fig. 11). Pair of ventral plates subrectangular, transverse in ventral view (Fig. 10), and median triangular sclerite (vulvar scale, s.vul.) extending between ventrolateral margins of tergum X (t.X). Transverse tergum X short dorsomesally (Fig. 11), longer laterally (Fig. 9), with pair of anterolateral apodemes reaching middle of tergum VIII (Figs. 9, 11). Segment XI (t.XI) short, transverse, attached to ventral edge of tergum X, with short acute cercus (c.) and two obtuse papillae (p.) on posterior margin of each side. Vaginal apparatus (v.ap.) having short anterior sclerite with anteromesal hump and posteromesal hump and transverse posterior sclerite above vulvar scale (Figs. 9, 10).

←

b). 12, Male genitalia, dorsal. 13, Male genitalia, left lateral. Abbreviations: c. = cercus; p. = papilla; s. vul. = vulvar scale; s.VII = sternum VII; t.VII = tergum VII; t.VIII = tergum VIII; t.X = tergum X; t.XI = tergum XI; v. pl. = ventral plate.



Figs. 14–15. Wings of *Neuentropus japonicus*. 14, Right fore wing, dorsal. 15, Right hind wing, dorsal.

Neuentropus mandjuricus Martynov
(Figs. 1–11)

Neuentropus mandjuricus Martynov 1907: 19, figs. 1–2 (female); Martynov 1934: 243–244, 338, figs. 175, 176a–c (male and female).

Neureclipsis mongolica Schmid 1968: 10, figs. 8–9 (male and female). **New synonym.**

Kyopsyche mandjuricus: Fischer 1972: 53.

Diagnosis.—Very similar to the only other species in the genus, *N. japonicus* (Tsuda); however, the venation is slightly different: in *N. mandjuricus*, each fore wing lacks a second cross-vein in the costal area and has crossvein cu2-1a (Fig. 1); each hind wing has Sc complete to the wing margin and each hind wing of males lacks Fork 3 (Fig. 2). The male genitalia of *N. mandjuricus* are almost the same as those of *N. japonicus* except that the preanal appendages each have a short, setose ventral process at the middle of the ventral edge in *N. mandjuricus* (Fig. 4).

Material examined.—100 ♂, Chang-jiang (Yangtze) River, Nan-jing, Jiang-su Province, 6 June 1989, You-wen Li (NAU); 43 ♂, 36 ♀, Hong-ze, Jiang-su Province, 24 September 1988, Chang-hai Sun (33 ♂, 26 ♀ NAU; 10 ♂, 10 ♀ CUAC); 2 ♂, Chang-he River, Buo-yang, Muo-dao-shi, Jiang-xi Province, 6 June 1990, 30 m elevation, John C. Morse & Lian-fang Yang (NAU).

Distribution.—Widely distributed in Jiang-su and Jiang-xi Provinces of southern China (Oriental Biogeographic Region); northeastern China, southern Ussuri region of Russia, and Mongolia (Palearctic Biogeographic Region).

Neuentropus japonicus (Tsuda),
new combination
(Figs. 12–15)

Kyopsyche japonica Tsuda 1942: 264–265, figs. 21–22a–b (♂ described).

Diagnosis.—In *N. japonicus*, each fore wing (Fig. 14) possesses a second cross-

vein in the costal area and has no cu2-1a crossvein, each hind wing (Fig. 15) apparently has Fork 3 present in both sexes and the apex of Sc does not meet the wing margin, being not evident beyond the Sc-R1 crossvein (note that it is not indicated whether these are male or female wings). In the male genitalia, there is no setose lobe on the ventral edge of each preanal appendage (Fig. 13). Female specimens were included in the type series, but were not described other than to say that "middle leg of female strongly broadened."

Material examined.—None.

Distribution.—Japan.

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