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THE ORIENTAL HEMEROBIIDAE (INSECTA: NEUROPTERA) DESCRIBED BY WARO NAKAHARA

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ABSTRACT. - The type specimens of seven species of Oriental Hemerobiidae described by W. Nakahara are examined. *Neuronema nepalensis* Nakahara, 1971, is transfered to the genus *Sineuronema* Yang, 1964. The paratypes of this species are excluded from the type series as they belong to another species. The holotype of *Idiomicromus kanoi* Nakahara, 1955 is in reality a male, not a female as the author stated. Its genitalia are described. Additional material is cited for three species.

INTRODUCTION

The Hemerobiidae, commonly known as brown lacewings, are represented in all zoogeographic regions and contain about 550 species. Hemerobiids of the Oriental Region are poorly known. Most of the approximately 80 recorded species are inadequately described and need reexamination. Waro Nakahara, the famous Japanese amateur entomologist, described from the Region several species; their types are deposited at present in National Science Museum, Tokyo (NSMT). Unfortunately, Nakahara's descriptions are incomplete and contain some mistakes. The purpose of this study is to redescribe the species basing on examination of the types and additional material. Until now no additional specimens of these species have been recorded in the literature.

All wings are illustrated with the apex to right.

SYSTEMATICS

Sineuronema nepalense (Nakahara, 1971), new combination

Neuronema nepalensis Nakahara, 1971: 13, figs 16-21, 26 (partim); Monserrat, 1990: 232.

Type material. - Holotype male - Verbatim label data: "East Nepal/26 VII 1963/Jap. Lepid. Exped.", "Neuronema/nepalensis/n. sp./W. Nakahara", "Holotype", "NSMT-I-Nr./No. 3906". Condition: good,complete genitalia on one slide.

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Remarks. - Nakahara included four specimens in the type series of this species, all of them are now in the National Science Museum. However, the allotype female (No. 3909) and the paratype male (No. 3908) and female (No. 3909) are certainly not conspecific with the holotype and must be excluded from the type series. Drawings of male genitalia (Figs. 16-20) were made by the author from the holotype, and the drawing of female abdomen (Fig. 21) and the photograph of wings (Fig. 26) were taken from paratypes (Nos. 3909 and 3908 respectively) and thus referable to other species.

The species undoubtedly belongs to the genus *Sineuronema* Yang on the basis of both venational and genitalic characters.

Comprehensive redescription of this species will be given elsewhere when I deal with the Nepalese Hemerobiidae.

Hemerobius hyalinus Nakahara, 1966

Hemerobius hyalinus Nakahara, 1966: 201, figs 12-24.

Material examined. - Holotype male - Verbatim label data: "An-Maa Mts./Taichung/Formosa/Shu-Chen Chang/2-5 Apr. 1961", "type", "NSMT-I-Nr./No. 2617". Condition: relatively good, apex of abdomen missing.

Coloration. - Head yellow, genae brown. Antennae and palpi yellow. Notum brownish with yellow median stripe; lateral lobes of pronotum yellow. Thorax laterally and legs yellow. Sternites of abdomen yellow, tergites brown. Forewing membrane very pale, greyish, near the hind margin slightly darker; sagittate spots poorly defined. Crossveins of the gradate series strongly margined with brown. Longitudinal veins very pale with sparse fuscous interruptions, CuA with 3-4 dark brown short lengths. Hindwing membrane pale greyish. Veins yellowish.

Venation. - Forewing. Rs with 3 branches, distal branch with 3-4 secondary ones. Basal crossvein r-m of moderate size proximal to the fork of M. Basal crossvein between posterior branch of M and CuA and crossvein cua-cup situated far proximally to origin of CuA1 (in right wing the crossvein m-cua absent). Inner gradate series with 5 and outer gradate series with 8 crossveins. Between branches of Cu 2-3 crossveins. Marginal crossveins cua-cup and cup-a1 absent.

Hindwing. Rs with 4 branches. Basal intraradial cell very long. Basal crossvein r-rs rather long. b (basal S-like crossvein between Rs and M) ending basally to the origin of Rs1. Inner gradate series with 2 crossveins, the outer with 7 ones. Marginal crossvein cup-a1 present. No crossveins between branches of Cu.

Male genitalia. - Abdomen missing, so that it is now impossible to obtain any additional data to the original description.

Remarks. - The species closely resembles externally the species of *Hemerobius japonicus* group, but is distinguished easily from them by male genitalia, as stated by Nakahara.

Psectra decorata Nakahara, 1966
(Figs. 1-3)

Annandalia decorata Nakahara, 1966: 196, text-figs. 7-11; pl. 3, fig. 3.
Psectra decorata - Monserrat, 1990: 234.

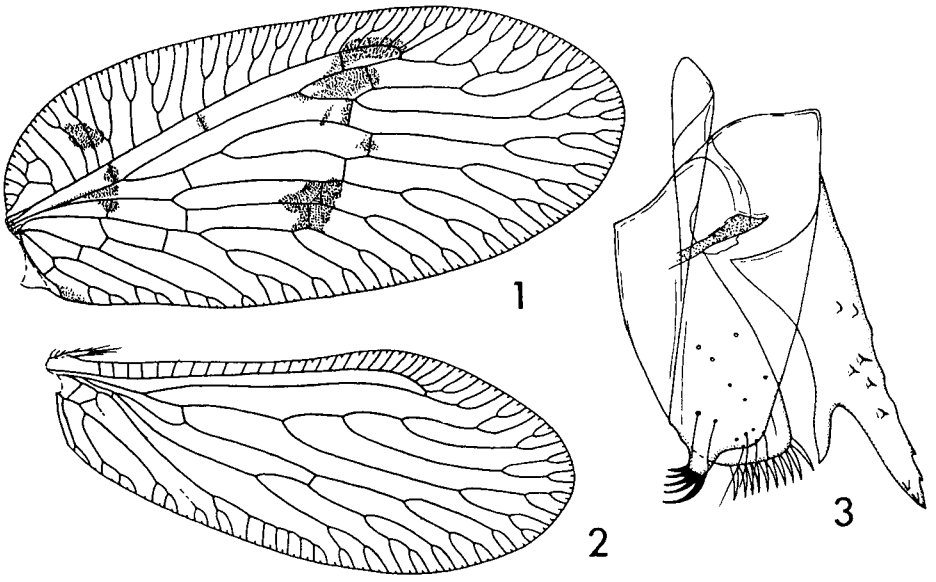
Material examined. - Holotype male - Verbatim label data: "Formosa/Kuraru/2.IV.1965/S. Miyamoto", "Holotype", "NSMT-I-Nr /No. 910". Condition: tips of antennae, left hindleg and part of right hindleg missing; left wing on one slide, genitalia on another slide.

Coloration. - Face and vertex pale brown. Genae, lateral sides of clypeus and lateral sides of vertex (beyond the eyes) dark brown. Palpi dark brown. Antennae pale yellowish with scape externally, pedicel basally externally and the first 5-6 flagellar segments basally dark brown. Thorax laterally pale yellow, dorsally dark brown; the centre and lateral lobes of pronotum brownish yellow; mesonotum and metanotum medially pale brown. Legs yellow, the fore and middle tibiae with an apical anterior spot, this especially conspicuous and large on the middle tibiae. Forewing membrane yellowish with sparse short transverse strips at dark interruptions of longitudinal veins. Several large brown spots shown in Fig. 1. Veins pale yellowish with short dark interruptions. Branches of Sc basally yellowish. Pterostigmal veins dark yellow. Hindwing pale yellowish. Veins mostly pale. Veins of pterostigma dark yellow.

Venation. - Venation of the left and right wings similar (Fig.1-2); a crossvein between branches of Sc absent in the right forewing. CuP partly developed in both hindwings.

Male genitalia.- Genitalia have been broken and preserved on one slide as two isolated pieces one of which is shown in Fig. 3. Another piece is very folded. The only additional information I was able to obtain is the following: cataprocessus apically with 10 pale stout bristles. Lateroprocessus with several fine long hairs and apically with 5 stout black bristles.

Distribution. - Taiwan.



Figs. 1-3. *Psectra decorata*, male. 1, forewing; 2, hindwing; 3, genitalia.

Psectra siamica Nakahara & Kuwayama, in Nakahara, 1960
(Figs. 4-5)

Psectra siamica Nakahara, 1960: 11; pl. 3, fig. 6; Nakahara & Kuwayama, 1961: 261, figs 1 A-D; Monserrat, 1990: 235.

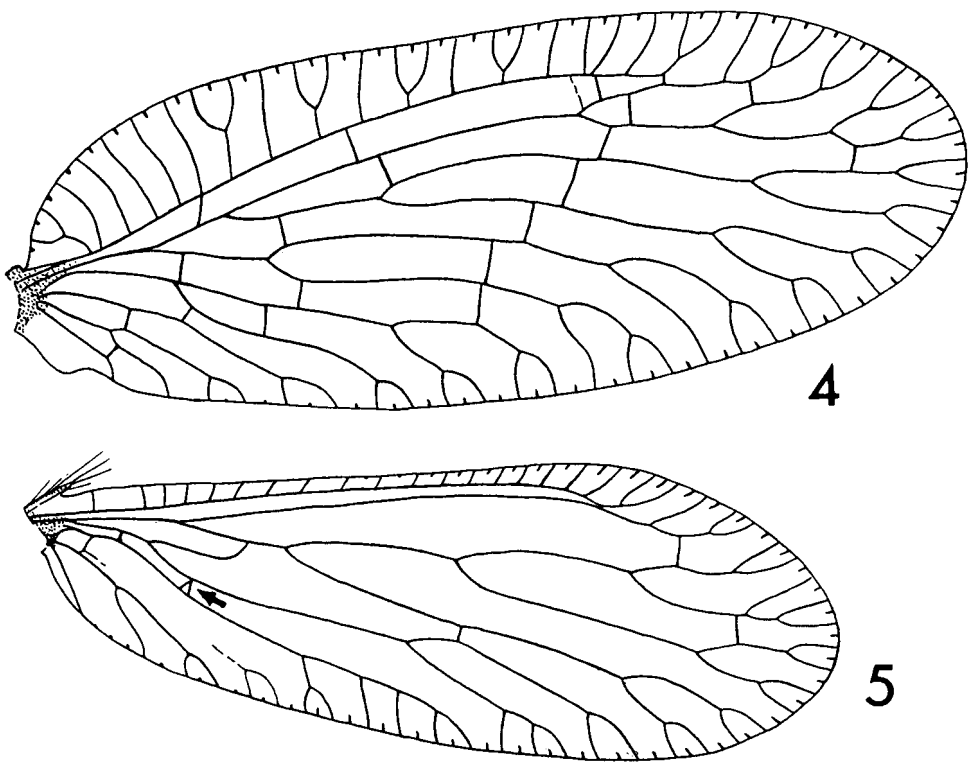
Type material examined. - Holotype female - Verbatim label data [three identical labels attached to slides]: "Psectra siamica/n. sp./Ciang Mai/Thailand/16.II.1958/M. Ikoma". Condition: poor, the specimen is broken and deposited on three slides: 1, female abdomen; 2, wings: forewings lack bases and have strongly broken apices, left hindwing folded, right hindwing broken, parts missing; 3, head, part of prothorax with forelegs, one of midlegs with part of mesothorax and one of hindlegs with part of metathorax.

Additional (non-type) material examined - Female (?) - "Singapore/(at light on boat)/11 July 1952/ S. Asahina"; "Psectra / siamica / Nak. et Kuwayama/W. Nakahara/1961"; "NSMT-I-Nr./No. 863". Abdomen missing.

Venation (based on the non-type, Singapore specimen). - Venation of both fore and hind wings almost identical (Figs. 4-5) except for an additional crossvein between M and CuA present only in left hindwing (shown by an arrow in Fig. 5).

Length of forewing. - Female (?) - 4.1 mm.

Distribution. - Thailand, Singapore.



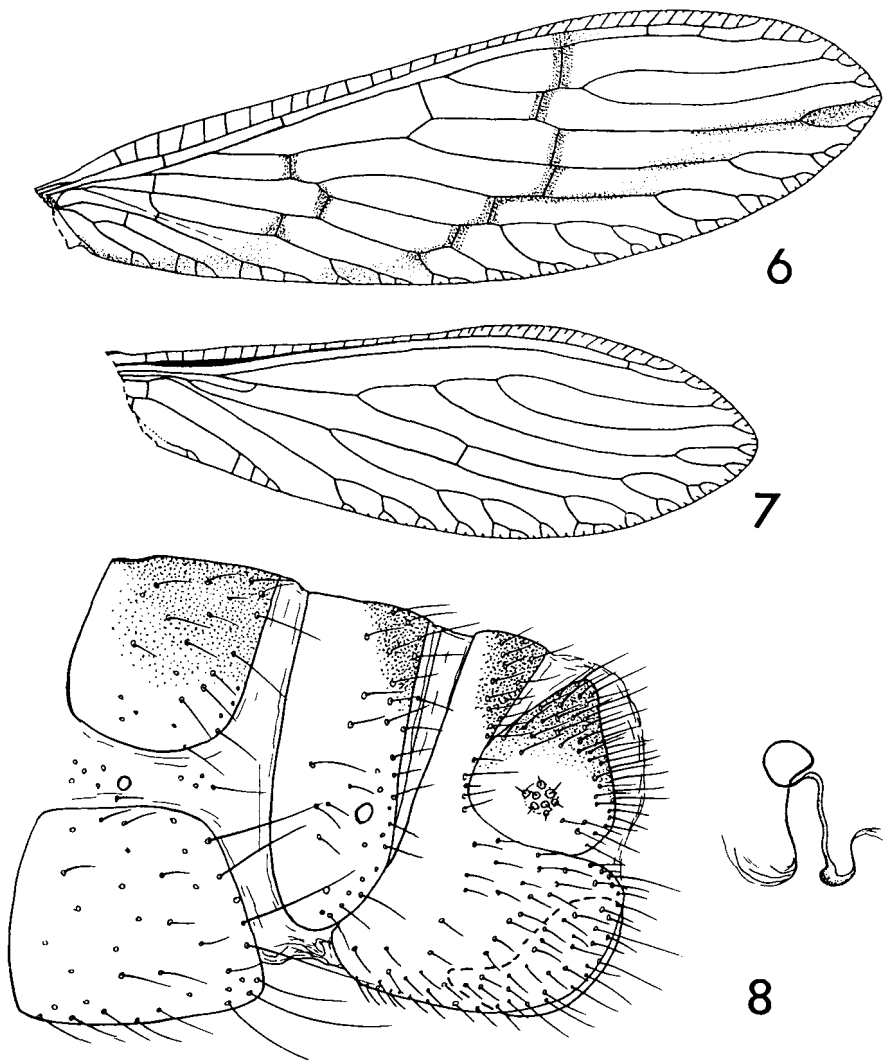
Figs.4, 5. *Psectra siamica*. 4, forewing; 5, hindwing. An additional crossvein is indicated by an arrow.

Remarks. - The species has been cited (Nakahara, 1960; Monserrat, 1990) as described by Nakahara and Kuwayama in 1961. However, the description of the species referred to "*Psectra siamica* Nakahara & Kuwayama" is presented in the paper of W.Nakahara (1960) where the single known female was designated as holotype. Thus, W. Nakahara and S. Kuwayama must be considered as the authors, who described this species in 1960.

Zachobiella striata Nakahara, 1966
(Figs. 6-8)

Zachobiella striata Nakahara, 1966: 198; pl. 3, fig. 4; New, 1988: 363; Monserrat, 1990: 242.

Type material examined. - Holotype female - Verbatim label data: "Nakaspa/Nr. Mizuho/Formosa/ 28.XI.1932/K. Baba"; "Zachobiella/striata n. sp./W.Nakahara"; "Holotype"; "Waro Nakahara/Collection II"; "NSMT-I-Nr./ No. 3808". Condition: thorax and legs mostly missing, otherwise complete (wings on two slides).



Figs. 6-8. *Zachobiella striata*, female. 6, forewing; 7, hindwing; 8, apex of abdomen and spermatheca.

Paratype female - Verbatim label data: "Iriomote Is./Upper Nakara River/Mar. 12, 1964/Y. Miyatake"; "Zachobiella/striata n. sp./W. Nakahara"; "Paratype"; "Waro Nakahara / Collection"; "NSMT-I-Nr./ No. 3709". Condition: quite good, one of the middle legs and one of the hind legs missing, otherwise complete.

Additional, non-type, material examined - Female: Taiwan, Chihsinliao, Chayi Hsien, 15 April 1965 (T. Saigusa).

Venation (based on the non-type, Taiwan specimen). - Left and right fore and hind wings identical (Figs. 6-7).

Length of forewing. - Female - 6.1 mm.

Female genitalia. - Ectoproct subtriangular; callus cerci with 7-8 trichobothria; tergite IX with very large ventral extension; sternite IX (gonapophyses laterales) relatively small, uncoloured, without hairs; subgenitale membranous and poorly defined; spermatheca apically curved and somewhat expanded.

Distribution. - Taiwan, Ryukyu Is.

Remarks. - This species belongs to the group of narrow-winged species which includes also *Z. pallida* Banks (Australia) and *Z. jacobsoni* Esben-Petersen (Sumatra). Female genitalia of *Z. pallida* were described by New (1988). Their structure closely resembles that of *Z. striata*, especially in shape of tergite IX and the small gonapophyses laterales.

Micromus kapuri (Nakahara, 1971)
(Figs. 9-11)

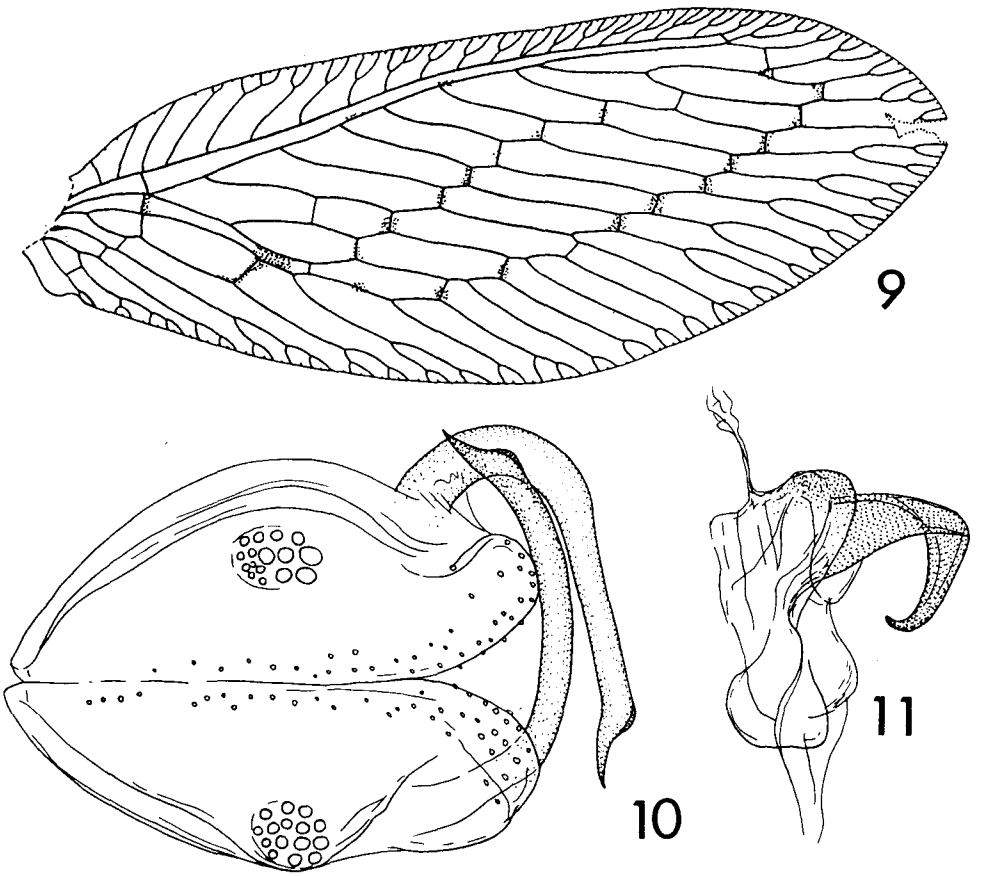
Eumicromus kapuri Nakahara, 1971: 11, figs 4-5; Ghosh & Sen, 1977: 289.
Micromus kapuri - Monserrat, 1990: 228.

Material examined. - Right wings on one slide with the following label: "Eumicromus / kapuri n. sp. / Holotype male / Assam / Cherrapunji 4400 ft./ (Ind. Mus.)". Condition: forewing almost complete, hindwing incomplete. Male genitalia on another slide with the following label: "Eumicromus / kapuri n. sp. / Holotype male / Cherrapunji, Assam / S. W. Kemp / Ind. Mus."

Coloration. - Forewing membrane very pale yellow, somewhat darker near the hind margin (in the anal and cubital areas) . Longitudinal veins pale with sparse fuscous interruptions. Crossveins mostly rather fuscous. Most crossveins of the outer gradate series are conspicuously margined with brownish; crossveins of intermediate gradate series are almost not margined with fuscous. Between M and CuA a brownish spot at the inner gradate series of crossveins. Hindwing mostly pale.

Venation. - Forewing venation as in Fig. 9.

Hindwing incomplete and partly folded. Rs with 6 branches; r-rs oblique, placed about midway between the beginnings of Rs1 and Rs2; b ending at beginning of Rs1. Inner and outer gradate series with 6 and 9 crossveins respectively.



Figs. 9-11. *Micromus kapuri*, male. 9, forewing; 10, ectoprocts, dorsal; 11, gonarcus, lateral.

Male genitalia (based on two genitalia parts on one slide). - Ectoproct with strongly incurved, not serrate, apically pointed process (Fig. 10). Callus cerci with 15-16 trichobothria of different sizes. Gonarcus with arcessus bent downwards at middle of its length (Fig. 11).

Length of forewing. - Male - 6.8 mm.

Distribution. - North India.

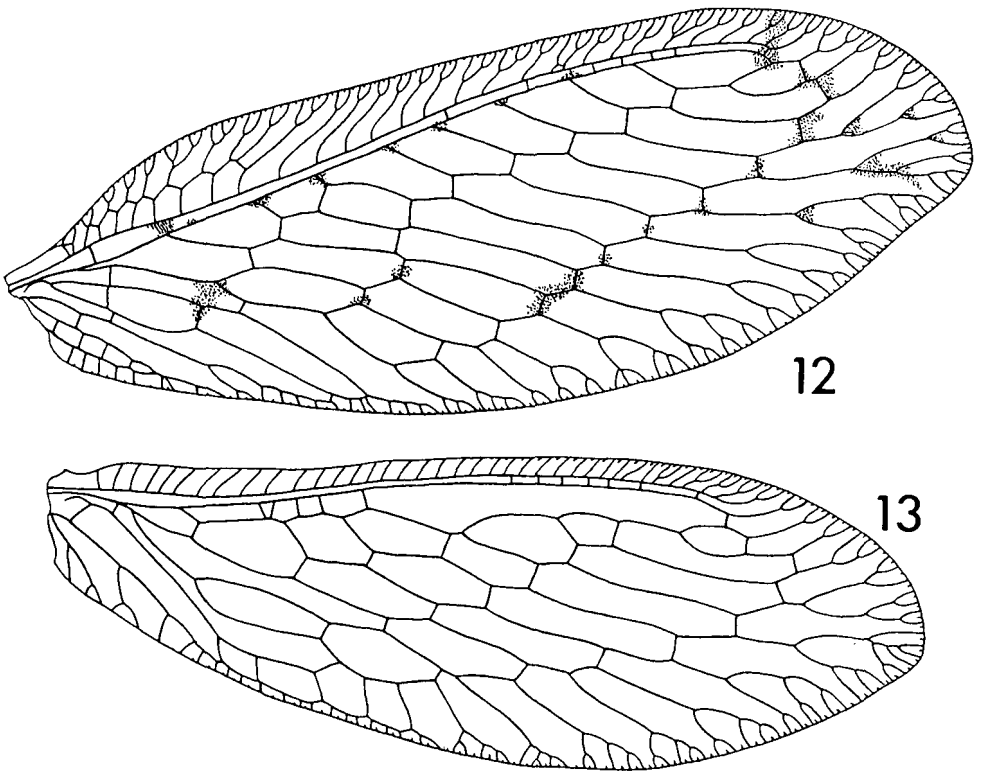
Remarks. - Nakahara mentioned that the holotype is "preserved in alcohol in the collection of the Zoological Survey of India, Calcutta." I do not know if the remnant parts of the holotype are at present in that collection or not.

Micromus kanoi (Nakahara, 1955)

(Figs. 12-18)

Idiomicromus kanoi Nakahara, 1955: 8; pl. 1, fig. 2; Nakahara, 1960: 37; Nakahara, 1966: 199.
Micromus kanoi - Monserrat, 1990: 183.

Type material examined. - Holotype male [not female] - Verbatim label data: "Formosa/T. Kano", "Idiomicromus/kanoi n. g. et n. sp./[Type]/W. Nakahara"; "NSMT-I-Nr. / No. 3863". Condition: poor,



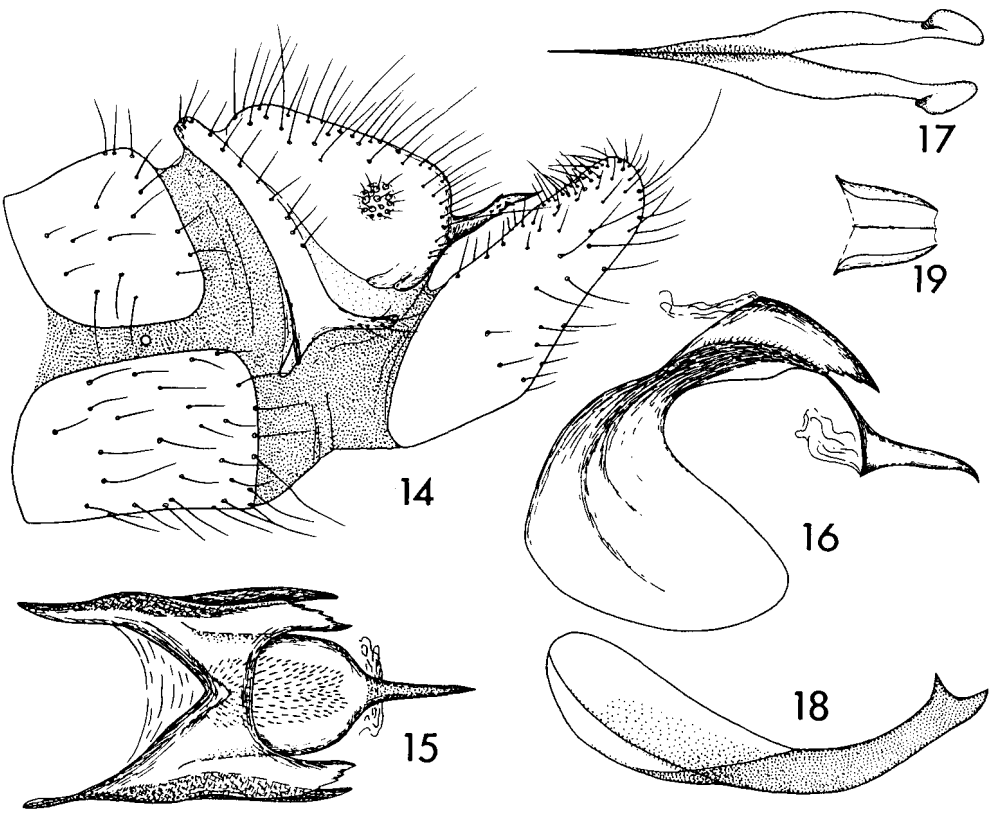
Figs. 12, 13. *Micromus kanoi*, male. 12, forewing; 13, hindwing.

covered with dust; flagellar segments of antennae, and part of right hindleg missing; left wings on one slide, genitalia in glycerin in microvial pinned below specimen.

Additional material examined - Female.- " An-Maa Mts./Taichung/Formosa/Shu-Chen Chang/2-5 Apr. 1961", "Idiomicromus/kanoi/Nakahara /W. Nakahara", "NSMT-I-Nr./No. 3864"

Coloration. - (based on non-type female because the holotype male is densely covered with dust). Face and genae bright yellow, vertex dark yellow, slightly brownish. Antennae and palpi yellow. Pronotum and mesonotum variegated with light brown to dark yellow; metanotum almost entirely dark brown. Thorax laterally mostly yellow. Legs dark yellow; fore and middle tibiae anteriorly with two dark brown spots; hind tibiae pale yellow. Forewing membrane pale yellowish grey with numerous inconspicuous brownish grey sagittate spots forming greyish background. Maculations are shown in Fig. 12. Longitudinal veins mostly pale yellowish with short dark brown interruptions longer on the radial vein. Crossveins dark brown at spots, otherwise pale. Hindwing membrane pale greyish yellow. Veins pale yellowish. The anterior 3-4 crossveins in both gradate series dark brown and slightly margined with brownish.

Venation. - Forewing. Between basal branches of Sc 5-8 crossveins. Between Sc and R 1 basal and 3-6 apical crossveins. Rs with 6 (female) or 8 (male) branches, distal branch with 1-2 secondary ones. M and Cu not closely associated. Female left wing with CuP reduced basally. Inner gradate series with 4 crossveins (male left wing with 5); intermediate gradate series with 7 (female) or 9 (male) crossveins; outer gradate series with 9-11 crossveins.



Figs. 14-19. *Micromus kanoi*, male. 14, apex of abdomen, lateral; 15, gonarcus, dorsal; 16, same, lateral; 17, parameres, dorsal; 18, same, lateral; 19, hypandrium internum, dorsal.

Hindwing. Rs with 5 branches. Inner gradate series with 3 crossveins; intermediate gradate series with 6-7 crossveins, one of them in right male wing double; outer gradate series with 8-10 crossveins.

Male genitalia. - Tergite IX narrow, its posteroventral and anteroventral angles produced as narrower processes, the former bearing several fine setae. Ectoproct ventrally with a rather long catoprocessus bearing about 10 dentate projections and apically pointed. Callus cerci with about 15 trichobothria. Sternite IX long and stout. Gonarcus with large lateral wings. Entoprocessus laterally serrate, with acute apex. Arcessus basally very broad covered with numerous minute setae, with ventral projection in lateral view, apically pointed and bent slightly downwards. Parameres fused anteriorly, posteriorly with an acute tooth-like projection directed upwards. Hypandrium internum trapezoidal in dorsal view.

Length of forewing. - Male - 10.0 mm, female - 10.6 mm.

Distribution. - Taiwan.

Remarks. - This species is very closely related to *M. yunnanus* Navas distributed in China (Yunnan, Tibet) and may be even conspecific with it. These species share unique character, the presence of three gradate series of crossveins in the hindwing.

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