

## A NEW SUBGENUS AND SIX NEW SPECIES OF NEPOMORPHA (INSECTA: HETEROPTERA) FROM YUNNAN, CHINA

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**ABSTRACT.** – Five new species of *Micronecta* Kirkaldy, 1897b (Micronectidae), from Xishuangbanna, the extreme southwest of Yunnan Province, China are described: *M. erythra*, *M. janssoni*, *M. lobata*, *M. melanothroa* and *M. ornitheia*. Further, *Anisops pseudostali*, new species (Notonectidae) is described from the vicinity of Kunming. *Micronecta khasiensis* Hutchinson, 1940, and *M. waltoniana* Hutchinson, 1940, are removed from subgenus *Mesonecta* Poisson, 1938, and together with *M. matsumurai* Miyamoto, 1965, *M. polhemusi* Nieser, 2000, and *M. melanothroa*, new species are placed in the newly described subgenus *Unguinecta* (type species *M. polhemusi*). In addition, eight species: *Micronecta drepani* Nieser, 2000, *M. guttatostrigata* Lundblad, 1933, *M. jaczewskii* Wróblewski, 1962, *M. lemnae* Nieser, 2000 (Micronectidae), *Cercometus asiaticus* Amyot & Serville, 1843 (Nepidae), *Anisops breddini* Kirkaldy, 1901, *A. tahitiensis* Lundblad, 1934, and *Enithares stridulata* Brooks, 1948 (Notonectidae) are recorded for the first time from China. Finally, some records of species already known from China are given.

**KEY WORDS.** – China, Yunnan, Micronectidae, Nepidae, Notonectidae, new subgenus, new species, new records.

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### INTRODUCTION

This study is part of the results of a survey on the aquatic insects of Xishuangbanna, in the southwest of Yunnan province, China. The survey was a joint research project between the Raffles Museum of Biodiversity Research (National University of Singapore) and the Xishuangbanna Tropical Botanic Garden (Yunnan, China). This publication reports on the Micronectidae, Nepidae and Notonectidae collected from the area. The most interesting part of the samples is the nine species of *Micronecta* Kirkaldy.

Species of *Micronecta* are small Nepomorphan bugs with a length from less than 1 to 4 mm, but in Asia only three species actually reach a length of over 3 mm. They live in stagnant or nearly stagnant waters. Some species are very widespread. In the tropics, these are macropterous or with a significant fraction of macropterous specimens. They occur in habitats in agricultural fields as well as in marshes or stagnant ponds in stream beds, e. g. *M. quadristrigata* Breddin, 1905. Other

species have a more limited distribution, and are usually restricted to more or less stagnant waters associated with streams; such species may be predominantly brachypterous. Apparently, the *Micronecta* specimens studied in this paper mostly belong to the latter category.

The genus *Micronecta* in China has been poorly studied. According to the checklist of Jansson (1995) fifteen species occur in China, of which seven are known from Taiwan. However, Jansson overlooked the papers by Yang (1966, 1967) in which three more species were described from Taiwan. This brings the total of Chinese species to eighteen, of which ten occur in Taiwan. The basic work for the study of Chinese *Micronecta* is by Chen (1960), who incorporated thirteen of the species occurring in China in a key, and also gave short descriptions and redescriptions of four Chinese species. Subsequently, Jansson (1995) and Wróblewski (1968) cited numerous nomenclatural changes. In addition, one should consult Wróblewski (1960) who gives excellent redescriptions of two species widespread in eastern China.

Further, Miyamoto (1965) described *M. matsumurai* from Taiwan, and Lundblad (1934) described *M. hummeli* from Sichuan, which is the only reference useful for its identification. Yang (1966, 1967) described three new species from Taiwan, and presented a key to Taiwanese species in his 1967 publication. Finally, Hua (2000) mentions in his list of Chinese insects six species not incorporated in the checklist below: *M. quadristriata* is a misspelling for *M. quadristrigata*. *M. dione* Distant, 1911 and *M. proba* Distant, 1911 (both not 1910) are synonyms of *M. scutellaris*; *M. quadriseta* Lundblad, 1933c is a synonym of *M. sedula*; *M. striata* (Fieber, 1844) is a synonym of *M. siva* and *M. thyesta* Distant, 1911 (not 1910) is a synonym of *M. grisea* (Fieber, 1844) (see Jansson, 1995).

Of the nine species of *Micronecta* collected in Xishuangbanna, five are new to science. The other four species previously described are all new records for China, bringing the total number of *Micronecta* recorded from China up to twenty-seven (see checklist below). These four species newly recorded for China are known from Thailand, Vietnam, the Malay Peninsula or Java (Indonesia). This illustrates that the fauna of this southern part of Yunnan has its main affinities to tropical Southeast Asia.

In the checklist below, the province name between brackets indicates that a species has been recorded so far only from that province.

#### CHECKLIST OF *MICRONECTA* KIRKALDY, 1897 KNOWN FROM CHINA

<i>M. (Basileonecta) orientalis</i> Wróblewski, 1960	S and SE China, Japan
<i>M. (Basileonecta) scutellaris</i> (Stål, 1858)	SE China, Africa, tropical Asia
<i>M. (Basileonecta) sedula</i> Horváth, 1905	SE and E China, E. Asia
<i>M. (Basileonecta) siva</i> (Kirkaldy, 1897a)	SE and E China, tropical Asia
<i>M. (Dichaetonecta) albifrons</i> (Motschulsky, 1863)	SE China, S Asia
<i>M. (Dichaetonecta) sahlbergi</i> (Jakovlev, 1881)	SW, SE and E China, E Asia
<i>M. (Ctenonecta) jaczewskii</i> Wróblewski, 1962	SW China, Thailand, Vietnam
<i>M. (Indonectella) grisea</i> (Fieber, 1844)	SW and SE China, India to Vietnam
<i>M. (Lundbladella) guttatostrigata</i> Lundblad, 1933a	SW China, SE Asia
<i>M. (Micronecta) anatolica</i> Lindberg, 1922	E and N China, Asia
<i>M. (Micronecta) drepani</i> Nieser, 2000	SW China, Thailand
<i>M. (Micronecta) erythra</i> new species	SW China (Yunnan)
<i>M. (Micronecta) guttata</i> Matsumura, 1905	N China, Japan
<i>M. (Micronecta) hummeli</i> Lundblad, 1934	SW China (Sichuan)
<i>M. (Micronecta) hungerfordi</i> Chen, 1960	SE China (Taiwan)

<i>M. (Micronecta) janssoni</i> new species	SW China (Yunnan)
<i>M. (? Micronecta) lemnae</i> Nieser, 2000	SW China, Thailand, Malay Peninsula
<i>M. (Micronecta) lenticularis</i> Chen, 1960	SE China (Taiwan)
<i>M. (Micronecta) lobata</i> new species	SW China (Yunnan)
<i>M. (Micronecta) obtusa</i> Yang, 1966	SE China (Taiwan)
<i>M. (Micronecta) ormitheia</i> new species	SW China (Yunnan)
<i>M. (Micronecta) tuberculata</i> Yang, 1966	SE China (Taiwan)
<i>M. (Micronecta) unguiculata</i> Yang, 1967	SE China (Taiwan)
<i>M. (Micronecta) wui wui</i> Lundblad, 1933c	N China, E Asia
<i>M. (Sigmonecta) quadristrigata</i> Breddin, 1905	SE China, Iran, tropical Asia, N Australia
<i>M. (Unguinecta) matsumurai</i> Miyamoto, 1965	SE China (Taiwan)
<i>M. (Unguinecta) melanochroa</i> new species	SW China (Yunnan)

#### MATERIALS AND METHODS

Measurements are in mm and based on five specimens if available, of each sex from the series containing the holotype. They are presented as the mean (<x>), in some cases followed by the standard deviation (s) or the measurement of the holotype between brackets { }.

In *Micronecta* the ocular index is calculated as two times the synthlipsis (S) divided by the width of head across eyes (D) minus the synthlipsis:  $2S/(D-S)$ . The tarsus of the fore leg is called pala, ventrally there are two rows of bristles, the dorsal and ventral palmar bristles, the surface enclosed by these bristles is called the palm. For the hyaline mark at the base of the clavus being long or short refers to the measurement along the anteroposterior axis with hemielytra closed. Details of the stridulatory rib (the plectrum in Jansson, 1989) are not visible with normal optics and have therefore not been considered in the descriptions.

In *Anisops*, where the synthlipsis is often very narrow, the ocular index based on vertex (Nieser, 1975) is used. This is defined as two times the anterior width of vertex (V) divided by the width of head (D) minus anterior width of vertex:  $2V/(D-V)$ . These ocular indexes reduce the errors in comparing measurements of D, S and V due to imperfect orientation of the head when measuring. The lateral margin of pronotum is measured from the anterolateral angle to the humeral angle. The apex of the stridulatory comb in males of *Anisops* is towards the posterior (i.e. the concave flexor) margin of the tibia.

Structural details of *Micronecta* and the fore leg of *Anisops* were studied and drawn from microscopical slides by means of a camera lucida at magnifications of 200-400x. The head of *Anisops* was drawn by means of a camera lucida on a binocular microscope at a magnification of 16x.

For nomenclature above the species level see Štys & Jansson (1988).

The following abbreviations have been used for depositories: CAS Institute of Zoology, Academy of Sciences, Beijing, China.

NCTN Nieser Collection, Tiel, The Netherlands.

RMNH National Natural History Museum (Naturalis), Leiden, The Netherlands.

ZRC Zoological Reference Collection of the Raffles Museum of Biodiversity Research, Singapore.

## TAXONOMY

### FAMILY MICRONECTIDAE

#### *Micronecta* Kirkaldy, 1897b

#### *Micronecta (Ctenonecta) jaczewskii* Wróblewski, new record

*Micronecta (Ctenonecta) jaczewskii* Wróblewski, 1962: 178-180.

**Material examined.** – CHINA: Yunnan, Xishuangbanna, Menglun, stream near Manpao village, km 57 Menglun to Jinhong, 21 May.2000, coll. L. Cheng, 1 male, 1 female (ZRC); Xishuangbanna, Lanchang river, 24 km from Jinhong, pothole on large boulder, 10 m above river, 6 Jun.2002, coll. C. M. Yang & D. Q. Li, 20 males, 50 females, 2 larvae (ZRC). All macropterous. First record for China.

**Distribution.** – Vietnam (Wróblewski, 1962, 1967), Thailand (Nieser, 2000), SW China.

#### *Micronecta (Lundbladella) guttatostrata* Lundblad, new record

*Micronecta guttatostrata* Lundblad, 1933a: 101-102.

*Micronecta (Lundbladella) guttatostrata* - Wróblewski 1967: 240-243.

**Material examined.** – CHINA: Yunnan, Xishuangbanna, km 10 Menglun to Mengyang, 21 May.2000, coll. L. Cheng, 1 male, 1 female (ZRC); Yunnan, Morhan, stream near grazing field, 3 km from Laotian border, 23 May.2000, coll. L. Cheng, 1 male (ZRC). All brachypterous. First record for China.

**Distribution.** – Indonesia (Java), Malay Peninsula, Thailand, Vietnam (Nieser, 2002b) and SW China.

#### *Micronecta (Micronecta) drepani* Nieser, new record

*Micronecta drepani* Nieser, 2000: 278-281.

**Material examined.** – CHINA: Yunnan, Menglun, pool at waterfall 65 power station, 21 May.2000, coll. L. Cheng, 2 males macropterous, 4 larvae (ZRC). First record for China.

**Distribution.** – Thailand, SW China.

#### *Micronecta (Micronecta) erythra*, new species (Figs. 1-11)

**Material examined.** – Holotype (CAS) - brachypterous male, CHINA: Yunnan, Xishuangbanna, 119 km from Jinhong to Mengla, rocky stream, 1 Jun.2002, coll. C. M. Yang & P. Chew, YCM310.

Paratypes: same data as holotype 1 female (ZRC); Yunnan, Xishuangbanna, Mengla, 55th stream, 30 May.2002, coll. C. M. Yang & P. Chew, YCM303, 1 male (NCTN); Yunnan, Xishuangbanna, Mengla, mountain stream by waterfall, 18 May.2000, coll. L. Cheng, LC001, 1 male (ZRC); km 10 Menglun to Mengyang, 21 May.2000, coll. L. Cheng, LC014, 1 male (ZRC); Yunnan, pool at waterfall 65 power station, 21 May.2000, coll. L. Cheng, LC016, 1 male, 4 females (CAS, ZRC), 1 male, 1 female (NCTN). All brachypterous.

**Description.** - Based on brachypterous specimens in alcohol. In dorsal view a light reddish brown, shiny, rather small ovate species with its greatest width at the caudal apex of claval commissure (Fig. 1).

Dimensions. Length, male  $\langle x \rangle$  1.62, s 0.051 {1.58}, female  $\langle x \rangle$  1.54, s 0.038; width, male  $\langle x \rangle$  0.88, s 0.040 {0.86}, female  $\langle x \rangle$  0.83, s 0.014; width of head, male  $\langle x \rangle$  0.64, s 0.022 {0.62}, female  $\langle x \rangle$  0.62, s 0.013; synthlipsis, male  $\langle x \rangle$  0.31, female  $\langle x \rangle$  0.30; posterior width of an eye, male  $\langle x \rangle$  0.17, female  $\langle x \rangle$  0.18; width of pronotum, male  $\langle x \rangle$  0.63 s 0.021 {0.65}, female  $\langle x \rangle$  0.62 s 0.017; ocular index, male  $\langle x \rangle$  1.88 s 0.109 {2.00}, female  $\langle x \rangle$  1.89 s 0.080.

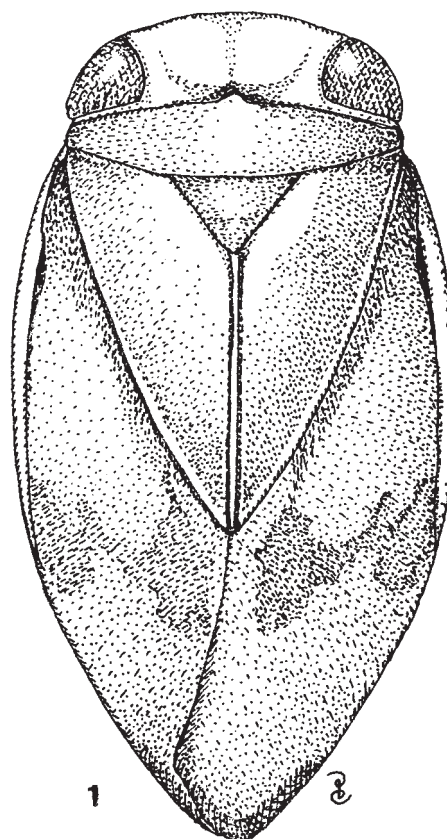


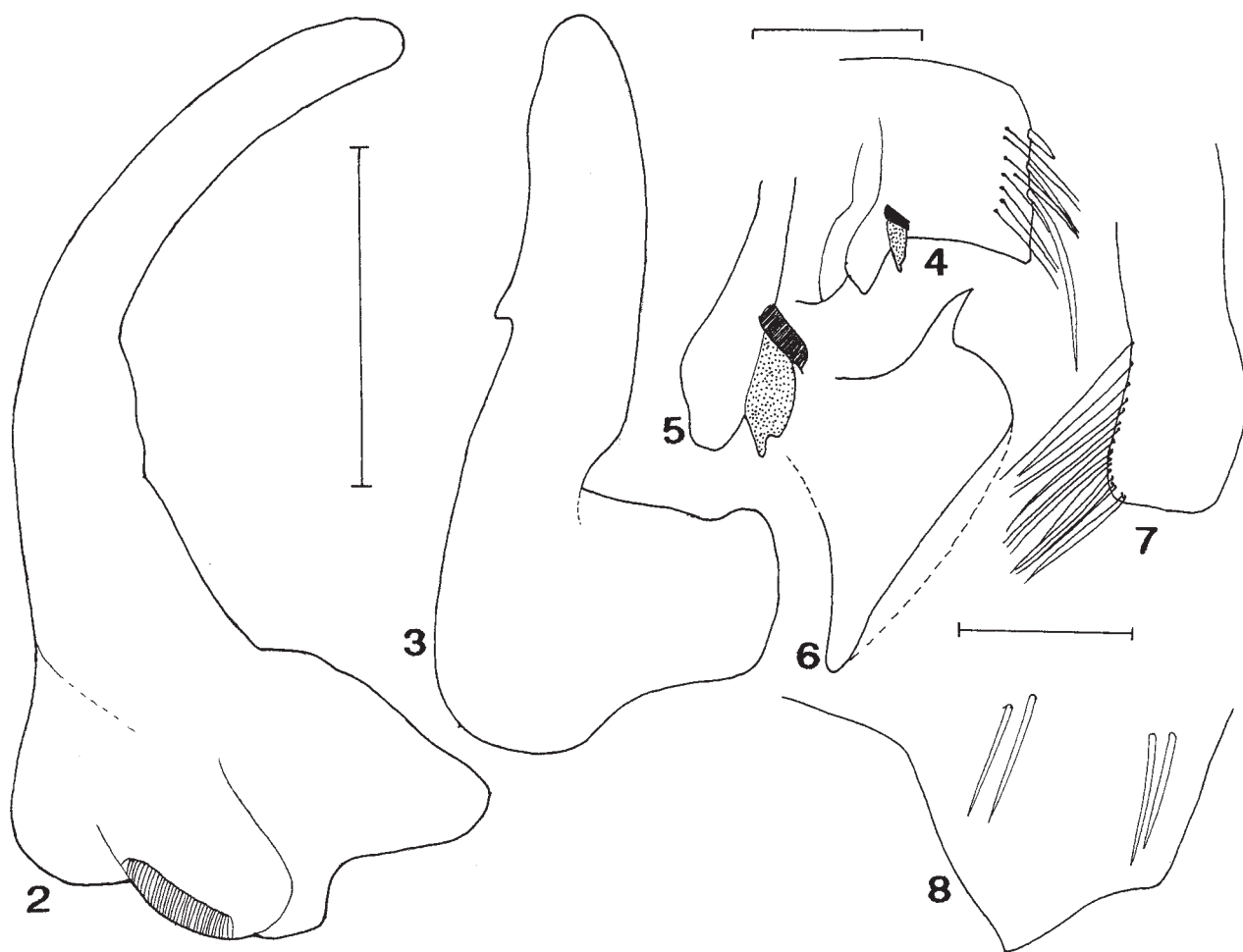
Fig. 1. *Micronecta erythra*, holotype, brachypterous male, dorsal view, body length 1.65 mm. Scale: 0.1 mm.

Colour. Dorsally reddish to light brown; head sordid yellow, eyes greyish brown. Pronotum unicolorous medium brown except for caudolateral angles and posterior margin yellow; scutellum sordid yellow. Hemielytra light brown with a reddish hue due to small red dots which are especially dense proximally on clavus, covering the hyaline mark and along costal margin; distal margin of right membrane grey, continuing in a grey stripe along posterior margin to apex of clavus; left membrane entirely grey; embolium yellowish with an ill-defined darker stripe near inner margin; no brown patches at costal margins. Venter and legs yellowish. The holotype has a pair of large blackish marks on corium just distally of the apex of clavus, one at costal margin and one at the opposite margin. In the paratypes these marks are smaller and less distinct.

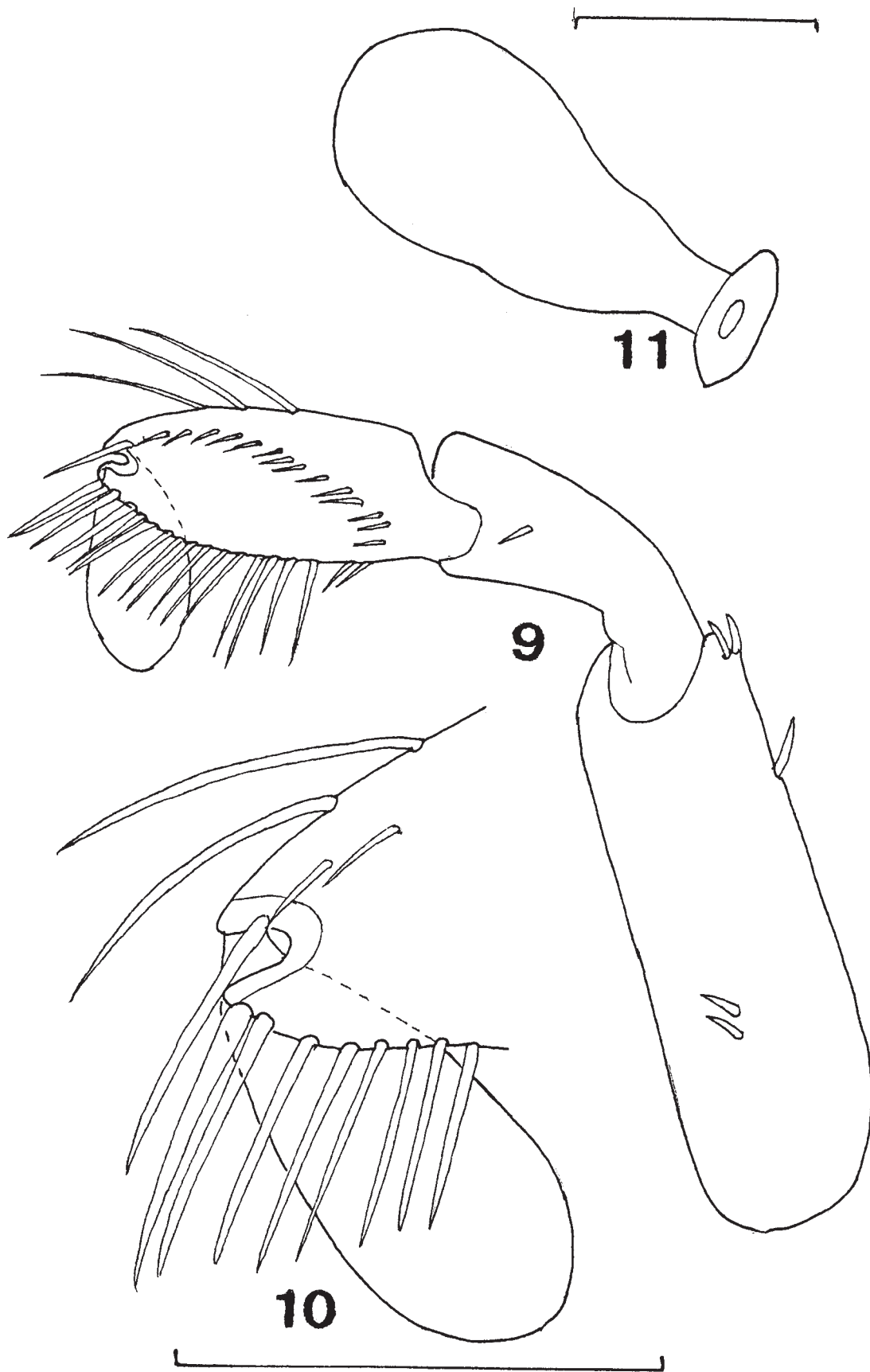
Structural characteristics. Length 1.9 times width. Width of head and pronotum subequal, synthlipsis twice (1.7-2.1) the posterior margin of an eye. Pronotum poorly developed, about four (3.8-4.3) times as wide as long, lateral margins short. Hemielytra densely but shallowly pitted on clavus and corium, with small pale spinules in most of the pits of corium. Spines laterally on abdominal segments: VI two short, one or two long (Fig. 4); VII three short, one long or two short two long;

VIII five short two very long hair-like and one or two long bristles. Pala (Fig. 9) with three dorsal bristles; upper row of palm with about 13 bristles the distal one larger; ventral row with about 18 bristles which are becoming thicker distally. Leg measurements as in table 1.

Male. Fore leg (Fig. 9), femur with two dorsoapical spines, one dorsally in apical third and two in basal half. Tibia with one spine in apical third. Palar claw clavate to urn-shaped (Fig. 10). Prestrigilar lobe (Fig. 6) well differentiated, apically acutely pointed. Strigil small (Fig. 5) subrectangular, with one comb bearing about 35 densely packed teeth; next to it there is a dark patch so that the strigil appears larger at first sight (Fig. 4). Mediocaudal lobe of seventh abdominal sternite (Fig. 8) well developed, with a blunt apex and four well defined bristles on its surface. Free lobe of left part of segment eight (Fig. 7) elongate, apical margin evenly rounded; with 17 bristles in lateroapical part which is slightly not produced. Right paramere (Fig. 2) with its shaft evenly curved, tapering in basal half, parallel-sided in apical half, apex rounded, basal process with about 30 stridulatory ridges. Left paramere (Fig. 3) with a broad shaft with a small projection halfway on the side, opposite to the basal lobe.



Figs. 2-8. *Micronecta erythra*, new species, paratype, male; 2) right paramere; 3) left paramere; 4) right part of tergite VI; 5) strigil, scale 0.05 mm; 6) prestrigilar lobe; 7) free lobe of left part of tergite VIII; 8) mediocaudal lobe of sternite VII. Scale: 0.1 mm.



Figs. 9-11. *Micronecta erythra*, new species, paratypes; 9) male, foreleg; 10) apex of male pala; 11) female, receptaculum seminis.

Table 1. Leg measurements\* of Nepomorpha in mm.

	femur	tibia	tars1	tars2	claw
<i>Anisops pseudostali</i>					
fore leg male	1.42	1.88	0.92		0.41
middle leg male	2.48	2.05	0.93	0.52	0.28
hind leg male	3.42	3.03	1.20	1.10	
fore leg female	1.45	1.70	0.63	0.39	0.41
middle leg female	2.56	2.13	0.91	0.56	0.28
hind leg female	3.68	3.16	1.25	1.26	
<i>Micronecta (M.) erythra</i>					
fore leg male	0.31	0.19	0.19		
middle leg male	0.73	0.24	0.38		0.14
hind leg male	0.50	0.44	0.50	0.20	0.13
fore leg female	0.38	0.39			
middle leg female	0.69	0.23	0.36		0.16
hind leg female	0.50	0.42	0.48	0.19	0.11
<i>Micronecta (M.) janssoni</i>					
fore leg male	0.30	0.13	0.14		
middle leg male	0.65	0.23	0.37		0.20
hind leg male	0.47	0.38	0.42	0.16	0.13
fore leg female	0.25	0.23			
middle leg female	0.64	0.23	0.35		0.20
hind leg female	0.46	0.37	0.37	0.14	0.12
<i>Micronecta (M.) lobata</i>					
fore leg male	0.31	0.16	0.18		
middle leg male	0.69	0.22	0.35		0.19
hind leg male	0.47	0.37	0.42	0.16	0.14
<i>Micronecta (M.) ornitheia</i>					
fore leg male	0.24	0.12	0.13		
middle leg male	0.59	0.20	0.27		0.20
hind leg male	0.37	0.31	0.32	0.13	0.10
fore leg female	0.21	0.20			
middle leg female	0.56	0.20	0.28		0.18
hind leg female	0.39	0.31	0.31	0.13	0.12
<i>Micronecta (Unguinecta) melanochroa</i>					
fore leg male	0.32	0.19	0.19		
middle leg male	0.73	0.24	0.38		0.14
hind leg male	0.50	0.44	0.50	0.20	0.13
fore leg female	0.39	0.39			
middle leg female	0.69	0.23	0.36		0.16
hind leg female	0.50	0.42	0.48	0.17	0.11
	femur	tibia	tars1	tars2	claw

The measurement of the fore leg in female *Micronecta* refers to the joint tibia and tarsus.

Female. Receptaculum seminis urn-shaped (Fig. 11).

Macropterous form unknown.

**Etymology.** – Erythros (Greek adjective meaning reddish or red) referring to the reddish hue on the hemielytra.

**Comparative notes.** – This new species is structurally similar to *M. hummeli* Lundblad (1934) from northeast Sichuan, which has a virtually identical male fore leg, a similar free lobe of left part of segment eight, and is of the same size. However, the right paramere of *M. hummeli* is apically hooked and not evenly curved, and the left paramere is of the same general shape but has a distinct wide incision below the small projection on the shaft, more or less as in *M. ornitheia* new species (Fig. 33), see also under that species. The right paramere of *M. erythra* has a somewhat similar shape as in *M. drepani* Nieser, 2000 from Thailand, which has a left

paramere of the same type but without the small projection halfway the shaft. Moreover, *M. drepani* has a large trowel-shaped palmar claw, and is somewhat larger (male length 1.9–2.1).

***Micronecta (Micronecta) janssoni*, new species**  
(Figs. 12–21)

**Material examined.** – Holotype (CAS) - macropterous male, CHINA: Yunnan, Xishuangbanna, 119 km from Jinghong to Mengla, rocky stream, 1 Jun.2002, coll. C. M. Yang & P. Chew, YCM310.

Paratypes, same data as holotype, 14 males, 19 females (CAS, ZRC), 6 males, 6 females (NCTN); in addition, 31 larvae were collected. Yunnan, Xishuangbanna, Mengla, 55th stream, 30 May.2002, coll. C. M. Yang & P. Chew, YCM303 (ZRC); Yunnan, Xishuangbanna, waterfalls near Mengyuan, 1 Jun.2002, coll. C. M. Yang & P. Chew,

YCM309, 1 male (ZRC); Yunnan, Xishuangbanna, Menglun, Man-Er stream, 11 Jul.2001, coll. H. M. Liu, ME3-004F, 1 female (ZRC); Mengla, river by Jing Meng Yuan village near Mengyuan, 24 May.2000, coll. L. Cheng, LC033, 1 male, 5 females (ZRC). All macropterous.

**Description.** – Macropterous form, based on specimens in alcohol. In dorsal view, generally a medium reddish brown, medium sized, broadly ovate species with its greatest width at the level of the caudal apex of claval commissure.

**Dimensions.** Length, male  $\langle x \rangle$  2.03, s 0.047 {2.03}, female  $\langle x \rangle$  2.02 s 0.051; width, male  $\langle x \rangle$  1.02, s 0.044 {1.01}, female  $\langle x \rangle$  1.02, s 0.023; width of head, male  $\langle x \rangle$  0.78, s 0.014 {0.78}, female  $\langle x \rangle$  0.78, s 0.011; synthlipsis, male and female  $\langle x \rangle$  0.38; posterior width of an eye, male and female  $\langle x \rangle$  0.22; width of pronotum, male  $\langle x \rangle$  0.84, s 0.021, female  $\langle x \rangle$  0.83, s 0.011; ocular index, male  $\langle x \rangle$  1.86, s 0.058 {1.90}, female  $\langle x \rangle$  1.91, s 0.099.

**Colour.** Dorsally generally medium reddish brown; head yellowish with an orange to reddish spot placed medially between eyes, eyes castaneous, rostrum dark brown to blackish. Pronotum unicolorous medium brown except for caudolateral angles and posterior margin narrowly yellow; scutellum reddish. Hemielytra medium reddish brown to light brown in distal part of corium, with poorly differentiated slightly darker patches as follows: one to three on clavus, one proximally on corium, a zigzag band halfway corium and one proximally on right membrane. Distal part of right membrane transparent, smoky, with closed hemielytra blackish due to underlying left membrane; embolium reddish, near inner margin with a thin blackish stripe, which may be interrupted; no brown patches at costal margins; hyaline mark at base of clavus short, about 0.12 long, V-shape obscured by reddish marking. Thorax and abdomen ventrally dark brown to greyish black. Legs pale yellowish with some small dark brown to blackish marks, notably in distal half of pala, distal edge of middle tarsus, and the fringe of swimming hairs and claws of hind tarsus.

**Structural characteristics.** Length two times width (length/width males 2.03/1.02, females 2.02/1.02). Head slightly narrower than pronotum, synthlipsis 1.7 times as wide as the posterior margin of an eye. Pronotum well developed, dorsally convex with well developed lateral margins, 2.5 times as wide as long (W/L: male 0.84/0.33, female 0.83/0.33). Hemielytra beset with numerous spinules, especially dense and distinct in distal half of corium. Spines laterally on abdominal segments: VI two short, two long (Fig. 18); VII three or four short, two long; VIII five short two very long hair-like. Pala (Fig. 13) with three dorsal bristles; upper row of palm with about 16 bristles which are gradually becoming larger distally; ventral row with about 20 bristles, the distal 12 much larger than the proximal ones. Leg measurements as in table 1.

**Male.** Fore leg (Fig. 13): femur with two apical spines, one in apical third and two in basal half; tibia with three spines in apical third; paler claw a simple clavate flap (Fig. 14). Prestrigilar lobe (Fig. 21) well differentiated, apical part

tongue-like, obtusely rounded; strigil (Figs. 18, 19) oval, with a distinct stalk and one comb with about 90 densely packed teeth. Mediocaudal lobe of seventh abdominal sternite (Fig. 15) short, with an acute apex and four rather weak bristles on its surface. Free lobe of left part of segment eight (Fig. 20) elongate, gradually broadening towards apex, apical margin sinuate; with about 17 bristles in latero-apical part. Right paramere (Fig. 16) with a broad shaft and a hooked apex, beset with three tooth-like structures, basal process with about 40 stridulatory ridges. Left paramere (Fig. 17) rather broad with a small notch halfway the shaft and about three faint transverse grooves.

**Female.** Fore leg with the same set of spines as male; paler claw bristle-like, distinctly more strongly developed than the bristles in the palmar rows. Receptaculum seminis urn-shaped (Fig. 12).

Brachypterous form unknown.

**Etymology.** – This species is named in honour of the late Dr. Antti Jansson for his outstanding contributions to the taxonomy and biology of Corixoidea.

**Comparative notes.** – This species does not run in the key to continental SE Asian species (Nieser, 2000) because of the claw of the intermediate leg being about half as long as its tibia (couplet 15). The right paramere with its toothed apical part distinguishes this species from all other Asian *Micronecta* species. The following characters place this species in subgenus *Micronecta*: four bristles on the median lobe of seventh abdominal sternite, the shape of the left paramere, and the relatively large, clavate, paler claw of the male.

#### *Micronecta* (?*Micronecta*) *lemnae* Nieser, new record

*Micronecta lemnae* Nieser, 2000: 281-282.

**Material examined.** – CHINA: Yunnan, Xishuangbanna, Menglun, Man-Er stream, 11 Jul.2001, coll. H. M. Liu, ME3-005F, 2 males, 1 female, 2 larvae, brachypterous (ZRC). First record for China.

**Distribution.** – Thailand and West Malaysia (Nieser, 2000, 2002b), SW China.

**Remark.** – This species is provisionally placed in the subgenus *Micronecta*. Together with the related *M. pumilio* Lundblad, 1933a, it does not fit well in any of the described subgenera.

#### *Micronecta* (*Micronecta*) *lobata*, new species (Figs. 22-31)

**Material examined.** – Holotype (ZRC) - brachypterous male, dissected, parts glued on card, CHINA: Yunnan, Xishuangbanna, Menghai, Mengkuan River, Km 57 Dalou to Menghai road, 19 May.2000, coll. L. Cheng (LC006).

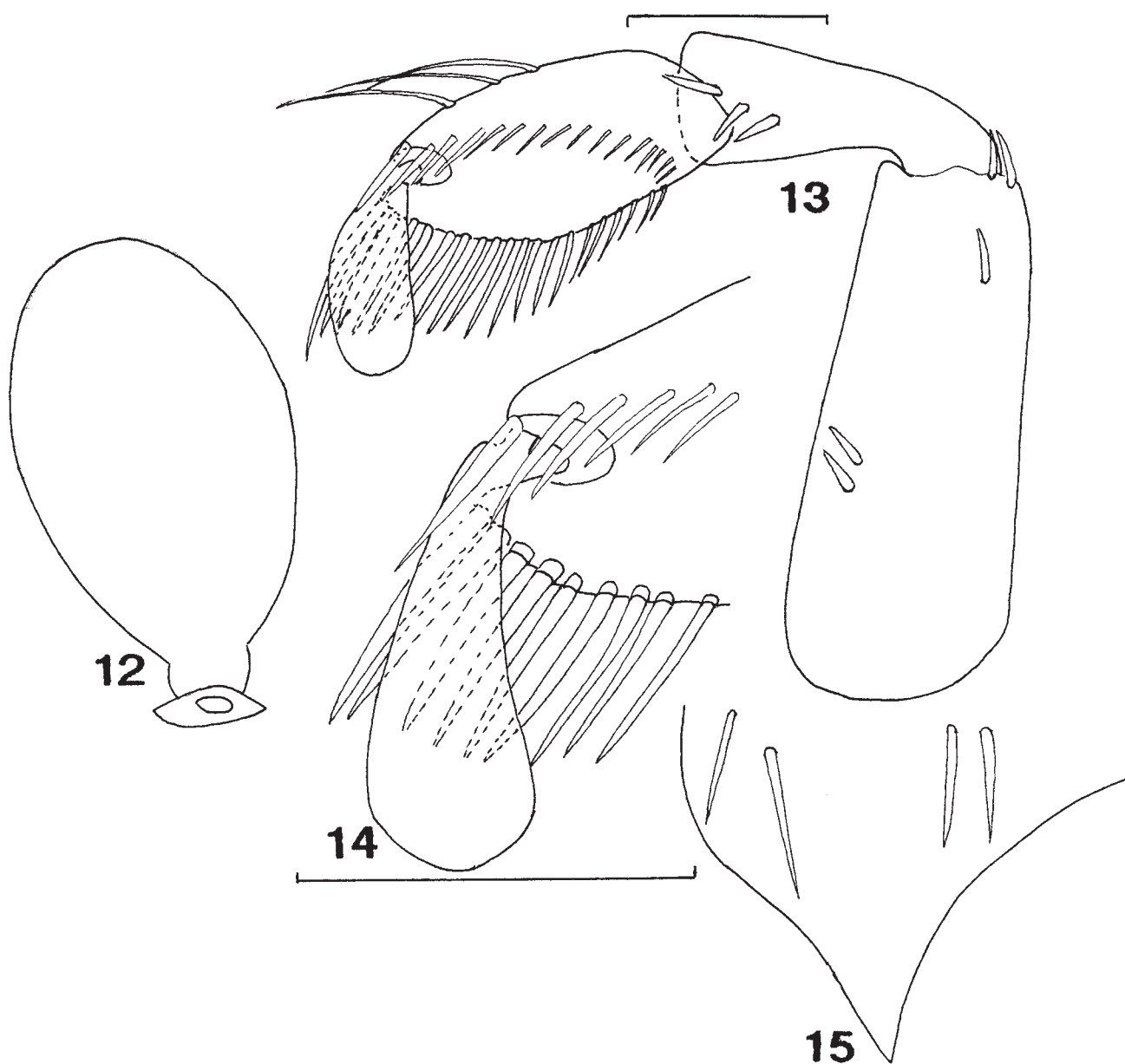
**Description.** – In dorsal view a light brown, shiny, medium sized ovate species, with its greatest width about one third of the length of claval commissure anteriorly of its caudal tip.

**Dimensions.** Male (holotype only), length 2.10, width 1.04, width of head male 0.76, synthlipsis 0.36, posterior width of an eye 0.21, width of pronotum 0.80, ocular index 1.8.

**Colour.** Dorsally light brown; head light brown, eyes castaneous. Pronotum unicolorous light brown, yellowish band along posterior margin poorly differentiated; scutellum light brown. Hemelytra light brown; hyaline stripe at base of clavus rather short; corium mid way with a broad but indistinct dark transverse band; embolium yellowish with a greyish stripe at base and a brownish stripe at level of the dark transverse band; caudal margin of right membrane and

lateral half of left membrane smoky grey. Venter medium greyish brown, legs yellowish.

**Structural characteristics.** Body twice as long as wide. Pronotum very slightly wider (1.05) than head; synthlipsis 1.7 times the posterior margin of an eye. Pronotum poorly developed, four times as wide as long, lateral margins short. Hemelytra shiny, densely and distinctly pitted on clavus and corium, with very small spinules in most of the pits of corium. Spines laterally on abdominal segments: VI left side three short, one long; right side two short one long and one additional thin and intermediate (Fig. 27); VII three short, one long; VIII four short, two very long bristle-like, and an additional one short bristle-like. Pala (Fig. 25) with three dorsal bristles; upper row of palm with 12 bristles; ventral row with 23 bristles, distally only slightly thicker than proximally. Leg measurements as in table 1.



Figs. 12-15. *Micronecta janssoni*, new species, paratypes, 12) female, receptaculum seminis; 13) male, foreleg; 14) apex of male pala; 15) male, mediocaudal lobe of sternite VII. Scale: 0.1 mm.



Male. Fore leg (Fig. 25): femur with two dorsoapical spines, one dorsally in apical third and two in basal half; tibia with a bristle about half way of dorsal margin and one near apicodorsal angle; paler claw elongate, nearly parallel-sided (Fig. 26). Prestrigilar lobe (Fig. 29) well differentiated, medio-apical projection short with a blunt tip. Right side of sixth tergite with very few submarginal bristles (Fig. 27). Strigil (Fig. 28) small, subcircular, with one comb with about 60 densely packed teeth. Mediocaudal lobe of seventh abdominal sternite (Fig. 31) well developed, with an acute apex and five well defined bristles on its surface. Free lobe of left part of segment eight (Fig. 30) elongate, nearly parallel-sided, apical margin shallowly and broadly indented; without bristles in lateroapical part which is not produced. Aedeagus without specialized teeth. Right paramere with its shaft widened in apical half and constricted just before its apex, basal process strongly projecting laterally, with about 20 stridulatory ridges which are based on the medial side of the process (Figs. 22, 23). Left paramere (Fig. 24) with a broad shaft and an irregular shape.

Female and macropterous form unknown.

**Etymology.** – Lobatus (Latin adjective, meaning lobate) refers to the strongly developed basal process on right paramere.

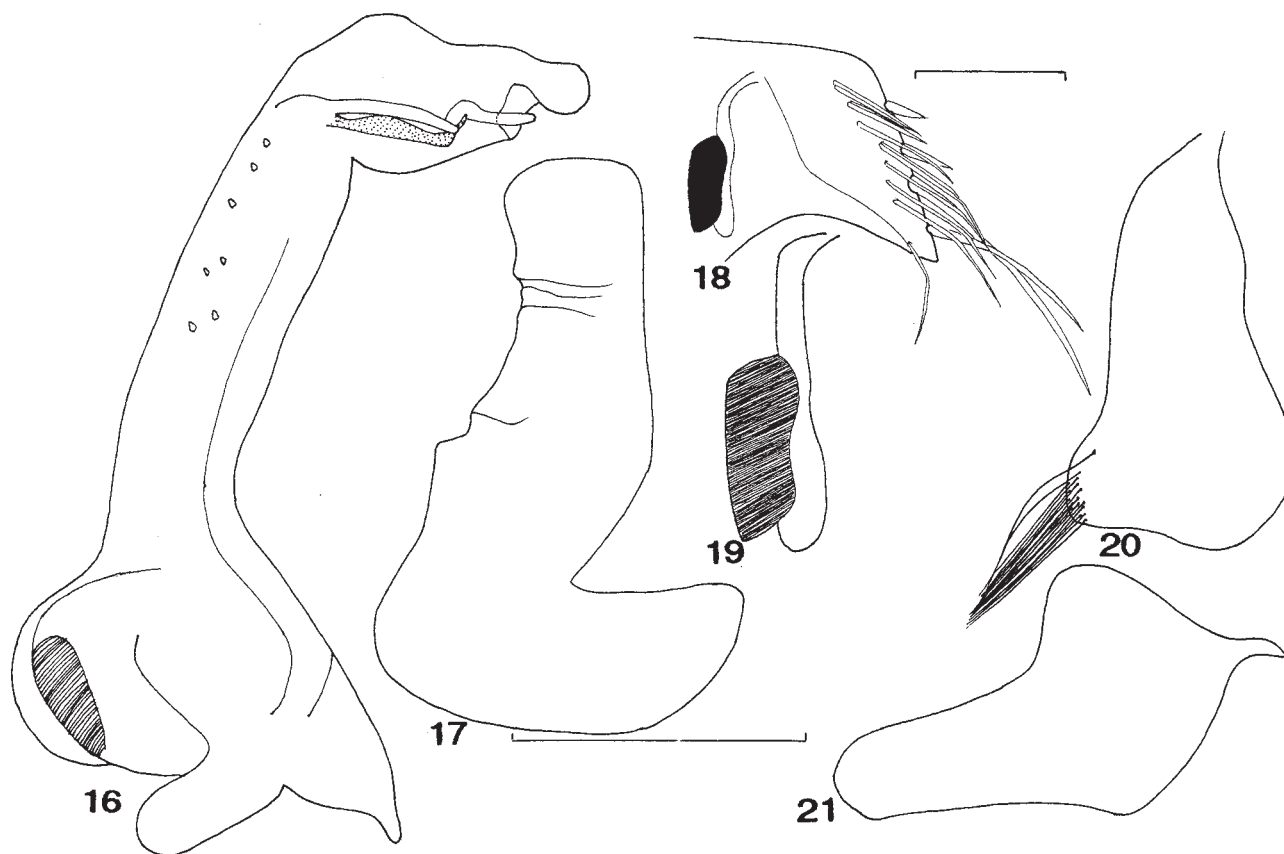
**Comparative notes.** – The left paramere is similar to that of *M. johorensis* Fernando, 1964 and *M. dentifera* Nieser, 2002a,

but its apical lobe is broader. In addition, *M. johorensis* and *M. dentifera* are smaller (length 1.8 or less), and have the right paramere either with a narrow parallel shaft (*M. dentifera*) or basally broader and tapering towards apex (*M. johorensis*). This new species does not run well in the key to SE Asian species by Nieser (2000). In view of the apical lobe of the left paramere one could end in couplet 14: *M. johorensis* (see above), or in couplet 18: *M. ludibunda* Breddin, 1905 and *M. malayana* Leong, 1966, which have the shafts of both parameres narrowly parallel-sided and hemielytra with distinct, reticulate or longitudinally striped patterns.

***Micronecta (Micronecta) ornitheia*, new species**  
(Figs. 32-41)

**Material examined.** - Holotype (CAS) - macropterous male, CHINA: Yunnan, Xishuangbanna, Mengla, 55th stream, 30 May.2002, coll. C. M. Yang & P. Chew (YCM303).

Paratypes (adults only) - Same data as holotype, 4 males, 13 females (CAS, ZRC), 3 males, 3 females (NCTN); Yunnan, Xishuangbanna, 119 km from Jinghong to Mengla, rocky stream, 1 May.2002, coll. C. M. Yang & P. Chew, 1 male (ZRC); Yunnan, Xishuangbanna, forest stream, 9 km from Mengla road to Menglun, 18 May.2000, coll. L. Cheng (LC003), 5 males, 13 females (ZRC), 2 males, 4 females (NCTN); Xishuangbanna, Menglun, stream near Manpao village, km 57 Menglun to Jinghong, 21 May.2000, coll. L. Cheng, 4 males, 2 females, 1 larva (ZRC), 1 male (NCTN); km 10 Menglun



Figs. 16-21. *Micronecta janssoni*, new species, paratype, male; 16) right paramere; 17) left paramere; 18) right part of tergite VI; 19) strigil, scale: 0.05 mm; 20) free lobe of left part of tergite VIII; 21) prestrigilar lobe. Figs. 16-18, 20-21, scale: 0.1 mm.

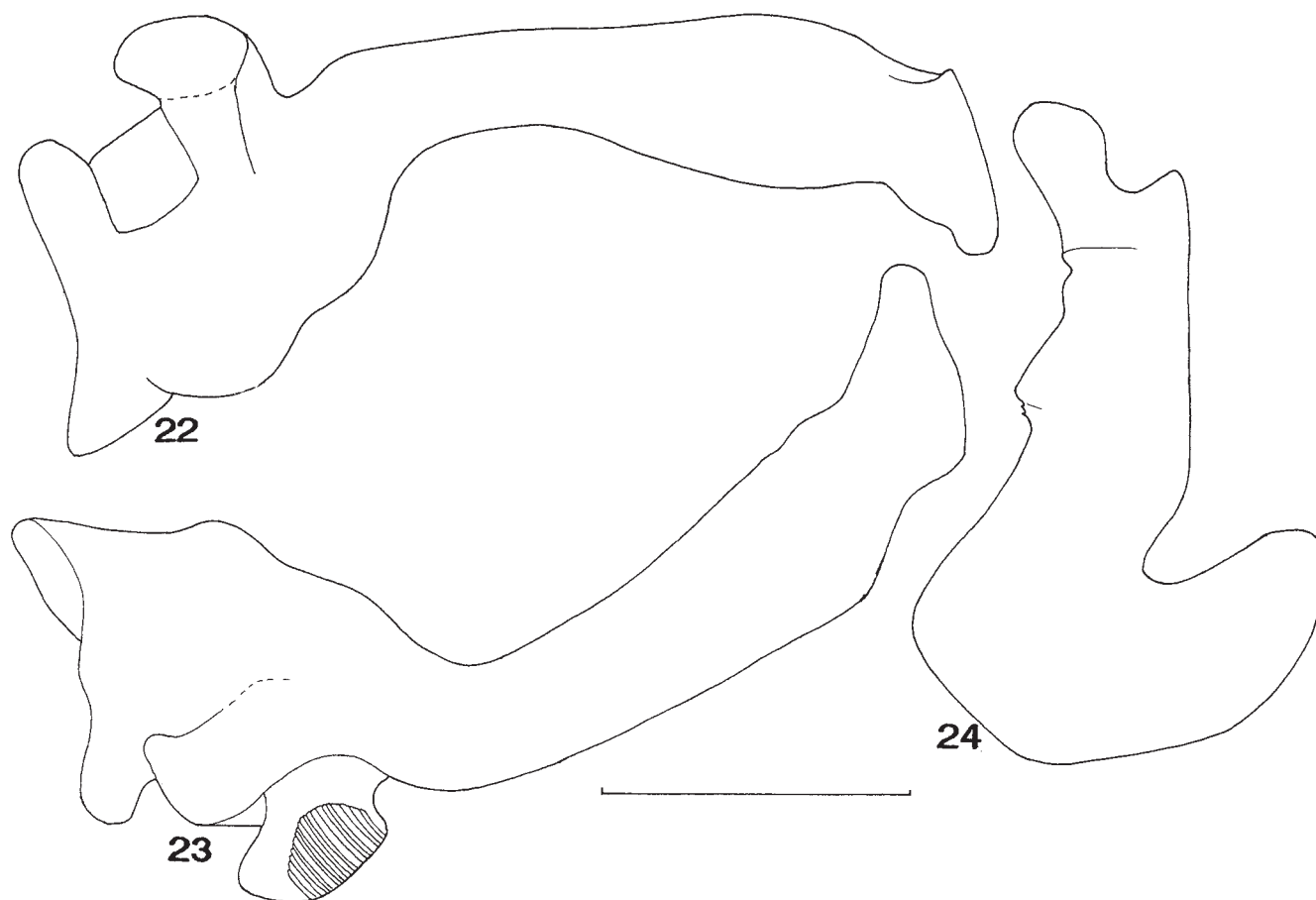
to Mengyang, 21 May.2000, coll. L. Cheng (LC014), 1 male (ZRC); Menglun, small waterfall near 55 power station, 21 May.2000, coll. L. Cheng (LC015), 10 males, 9 females (ZRC), 4 males 4 females (NCTN); pool at waterfall 65 power station, 21 May.2000, coll. L. Cheng (LC016), 25 males, 14 females (CAS, ZRC), 8 males, 8 females (NCTN); Xishuangbanna, clear forest stream, km 13 Menglun to Mengyang, 22 May.2000, coll. L. Cheng (LC018), 1 male, 4 females (ZRC); Yunnan, Morhan, ditch by rice field near army base, 2 km from Laotian border, 23 May.2000, coll. L. Cheng (LC021), 3 males, 2 females (ZRC); Yunnan, Shangyong, river by roadside, Dalongha village, 23 May.2000, coll. L. Cheng (LC025), 1 male (ZRC); Mengla, river by Jing Meng Yuan village near Mengyuan, 24 May.2000, coll. L. Cheng (LC033), 7 males 4 females (ZRC), 3 males 2 females (NCTN). All macropterous.

**Description.** – Macropterous form, based on specimens in alcohol. In dorsal view, generally a light brown, small, elongate ovate species with its greatest width at the level of the caudal apex of claval commissure.

**Dimensions.** Length, male  $\langle x \rangle$  1.75, s 0.031 {1.78},  $\langle x \rangle$  female 1.78 s 0.048; width, male  $\langle x \rangle$  0.77, s 0.018 {0.79}, female  $\langle x \rangle$  0.80, s 0.027; width of head, male  $\langle x \rangle$  0.63, s 0.011 {0.64}, female  $\langle x \rangle$  0.65, s 0.012; synthlipsis, male and female  $\langle x \rangle$  0.30; posterior width of an eye, male  $\langle x \rangle$  0.19, female  $\langle x \rangle$  0.20; width of pronotum, male  $\langle x \rangle$  0.68, s 0.021, female  $\langle x \rangle$  0.71, s 0.008; ocular index, male  $\langle x \rangle$  1.82, s 0.11 {1.76}, female  $\langle x \rangle$  1.75, s 0.06.

**Colour.** Dorsally generally light brown; head yellowish with an elongate orange spot medially between eyes, eyes castaneous; pronotum unicolorous light brown except for caudolateral angles and posterior margin narrowly yellow. Hemielytra light brown with irregular reddish markings on costal third of corium, most distinctly in apical half, in addition, indistinct slightly darker reddish brown to brown patches on corium and membrane, some of which form a broken transverse zigzag band halfway corium; embolium with a longitudinal dark greyish stripe, two medium brown patches at costal margins, one just caudally of nodal furrow and one at base of membrane; hyaline mark at base of clavus short, about 0.1 long not V-shaped and marked with reddish. Thorax and abdomen ventrally and legs yellowish, in male most of abdomen medium brown and aedeagus blackish, in female ovipositor with brown marks; dorsal scent glands black.

**Structural characteristics.** Ratio length/width of body males 2.3, females 2.2. Head slightly narrower than pronotum, synthlipsis 1.5 times as wide as the posterior margin of an eye. Pronotum well developed, dorsally convex with well developed lateral margins; 2.4 times as wide as long (W/L male 0.68/0.28, female 0.71/0.30). Spines laterally on abdominal segments: VI two short, one long, one very long (Fig. 34); VII three short, two long, one very long; VIII five



Figs. 22-24. *Micronecta lobata*, new species, holotype, male; 22) right paramere; 23) right paramere, medial view; 24) left paramere. Scale: 0.1 mm.

short two very long hair-like. Pala (Fig. 39) with three dorsal bristles; upper row and ventral row of palm each with about 17 bristles; the apical two bristles of both upper and lower row are somewhat thicker than the remaining bristles in their row. Leg measurements as in table 1.

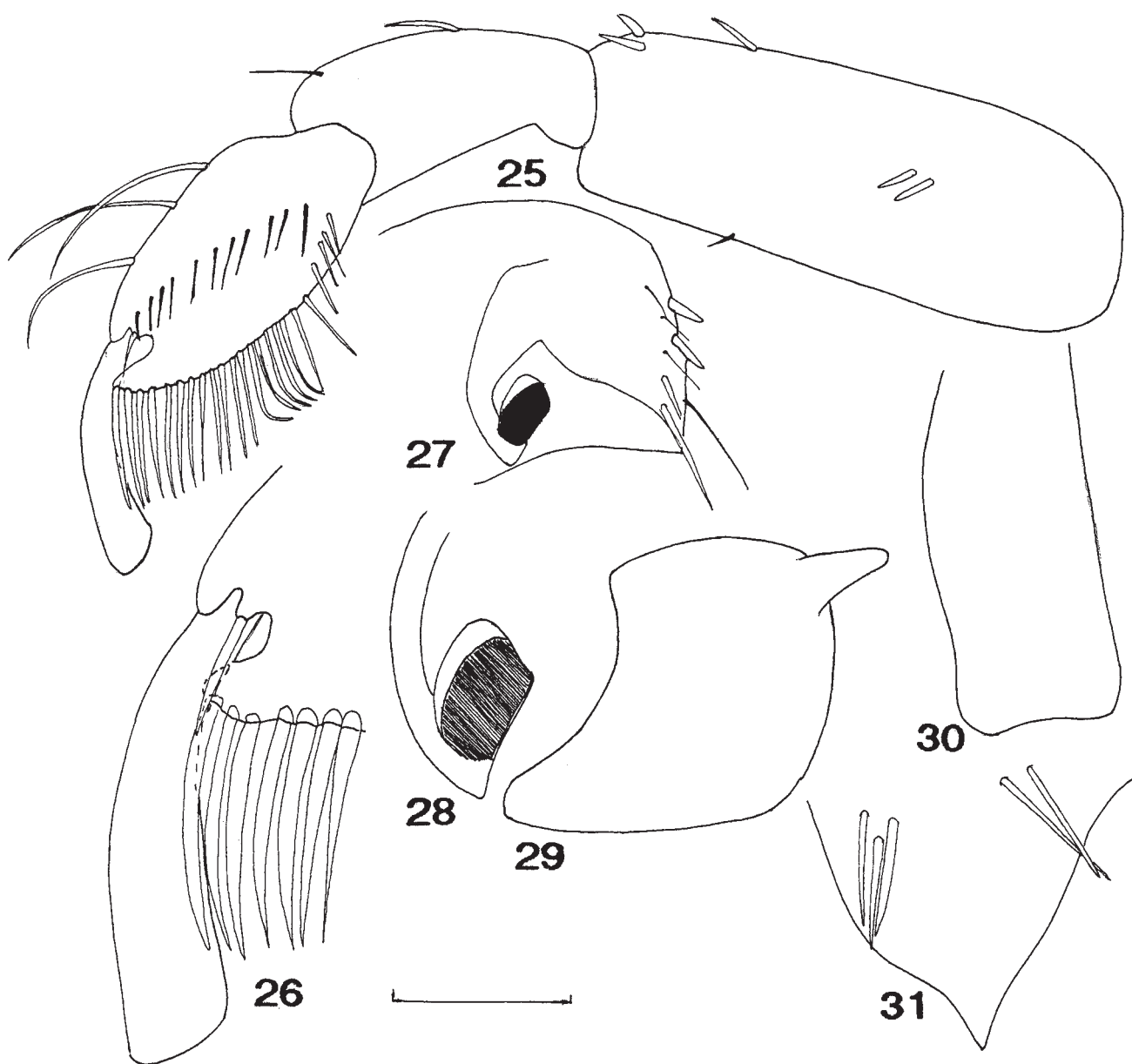
Male. Fore leg (Fig. 39): femur with two apical spines, one in apical third and two in basal half; tibia with three spines in apical third. Palar claw a simple clavate flap (Fig. 40). Prestrigilar lobe (Fig. 36) well differentiated; strigil (Figs. 34, 35) oval, with a distinct stalk and one comb with about 55 densely packed teeth. Median lobe of seventh abdominal sternite (Fig. 41) short, with an acute apex and three to four rather weak bristles on its surface. Free lobe of left part of segment eight (Fig. 38) elongate, gradually broadening towards apex; with about 18 bristles in lateroapical part. Right

paramere (Fig. 32) with a widened apex, vaguely reminding a bird head, basal process with about 30 stridulatory ridges. Left paramere broad with a distinct notch in basal part (Fig. 33).

Female. Fore leg with the same set of spines as male; palar claw bristle-like, distinctly more strongly developed than the bristles in the palmar rows. Receptaculum seminis club-shaped (Fig. 37).

Brachypterous form unknown.

**Etymology.** – *Ornithios* (Greek adjective: from a bird, bird-like) refers to the characteristic apical part of the right paramere which is vaguely resembling a bird head.



Figs. 25-31. *Micronecta lobata*, new species, holotype, male; 25) foreleg; 26) apex of pala, scale: 0.05 mm; 27) right part of tergite VI; 28) strigil, scale: 0.05 mm; 29) prestrigilar lobe; 30) free lobe of left part of tergite VIII; 31) mediocaudal lobe of sternite VII. Figs. 25, 27, 29-31, scale: 0.1 mm.

**Comparative notes.** – With the key to SE Asian species (Nieser, 2000) this species might run to *M. poci* Wróblewski, 1967, from Vietnam, which is slightly smaller (length 1.55-1.72 for males and 1.61-1.78 for females), and its right paramere is with a different shape: with the shaft broader in its middle part, the apical part less widened, and with a notch at its base. The left parameres of *M. ornitheia*, *M. poci*, *M. hummeli* Lundblad, 1934, from China (Sichuan) and *M. singhpruthii* Lundblad, 1933b, from India (Punjab) are quite similar, but the latter two have the apex of the right paramere hooked and not widened. The only species with a similar right paramere is *M. sanctaecatherinae* Hutchinson, 1940, from India and Sri Lanka. However, this species is larger (length 2.2-2.4), and has reddish spots on pronotum and hemielytra, moreover, it has a totally different left paramere with a widened tip giving it a club-shaped appearance.

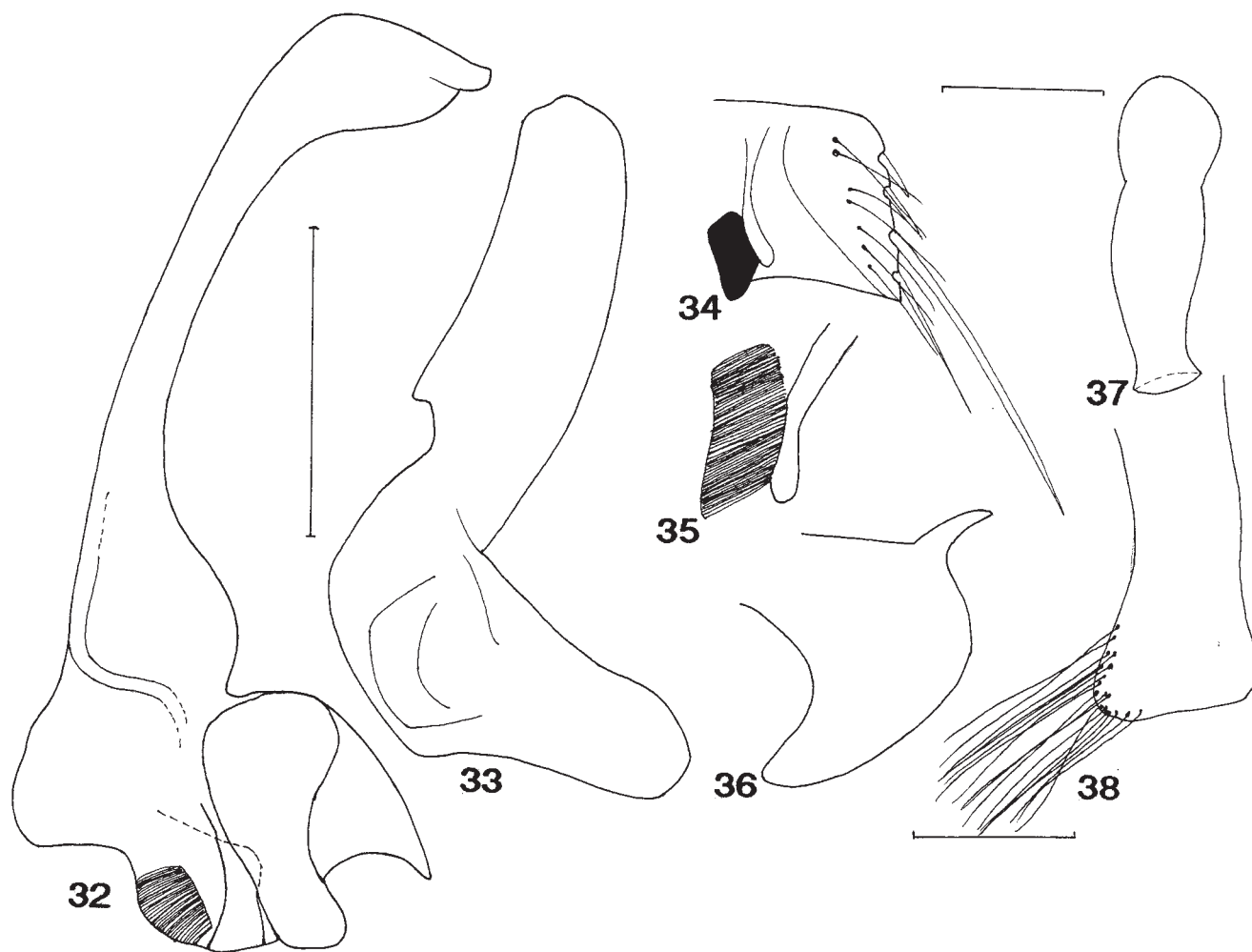
### *Micronecta (Unguinecta)*, new subgenus

**Type species.** – *Micronecta polhemusi* Nieser, 2000.

**Description.** – Medium sized *Micronecta*. Length, males 2.1-2.8, females 2.5-3.0; rostrum with transverse sulcations; ocelli

absent; antennae three segmented, with the last segment largest and swollen; pronotum posteriorly convex; scutellum exposed; hemielytra with sparse pale pubescence, embolar groove without nodal furrow; fore tibia and pala in males separate, in females fused; in both sexes, apical bristle of ventral palar row strongly developed into a secondary claw on the pala (Fig. 50); claw of hind leg placed apically on tarsal segment two; seventh abdominal sternite with two stout long hairs. Male: prestrigilar lobe with a broadly rounded medial apex (Fig. 46); strigil present; free lobe of left part of segment eight with a slightly produced laterocaudal angle and left parameres with a long and narrow, apically tapering shaft (Fig. 43). Usually dark coloured except for *M. waltoniana*. Males have a row of small spines along ventral (flexor) margin of the fore femur except for *M. khasiensis*. Moreover, the right parameres have a generally similar shape with a slightly curved, over most of its length more or less parallel, shaft with an obtusely pointed apex.

**Species included.** – *Micronecta (Unguinecta) polhemusi* Nieser, 2000, from Thailand and the Malay Peninsula (type species); *M. (U.) khasiensis* Hutchinson, 1940, from India (Assam) and Vietnam; *M. (U.) matsumurai* Miyamoto, 1965, from China (Taiwan); *M. (U.) melanochoa*, new species,



Figs. 32-38. *Micronecta ornitheia*, new species, paratypes; 32-36 male; 32) right paramere; 33) left paramere; 34) right part of tergite VI; 35) strigil, scale: 0.05mm; 36) prestrigilar lobe; 37) female, receptaculum seminis; 38) male, free lobe of left part of tergite VIII. Figs. 32-34, 36-38. scale: 0.1 mm.

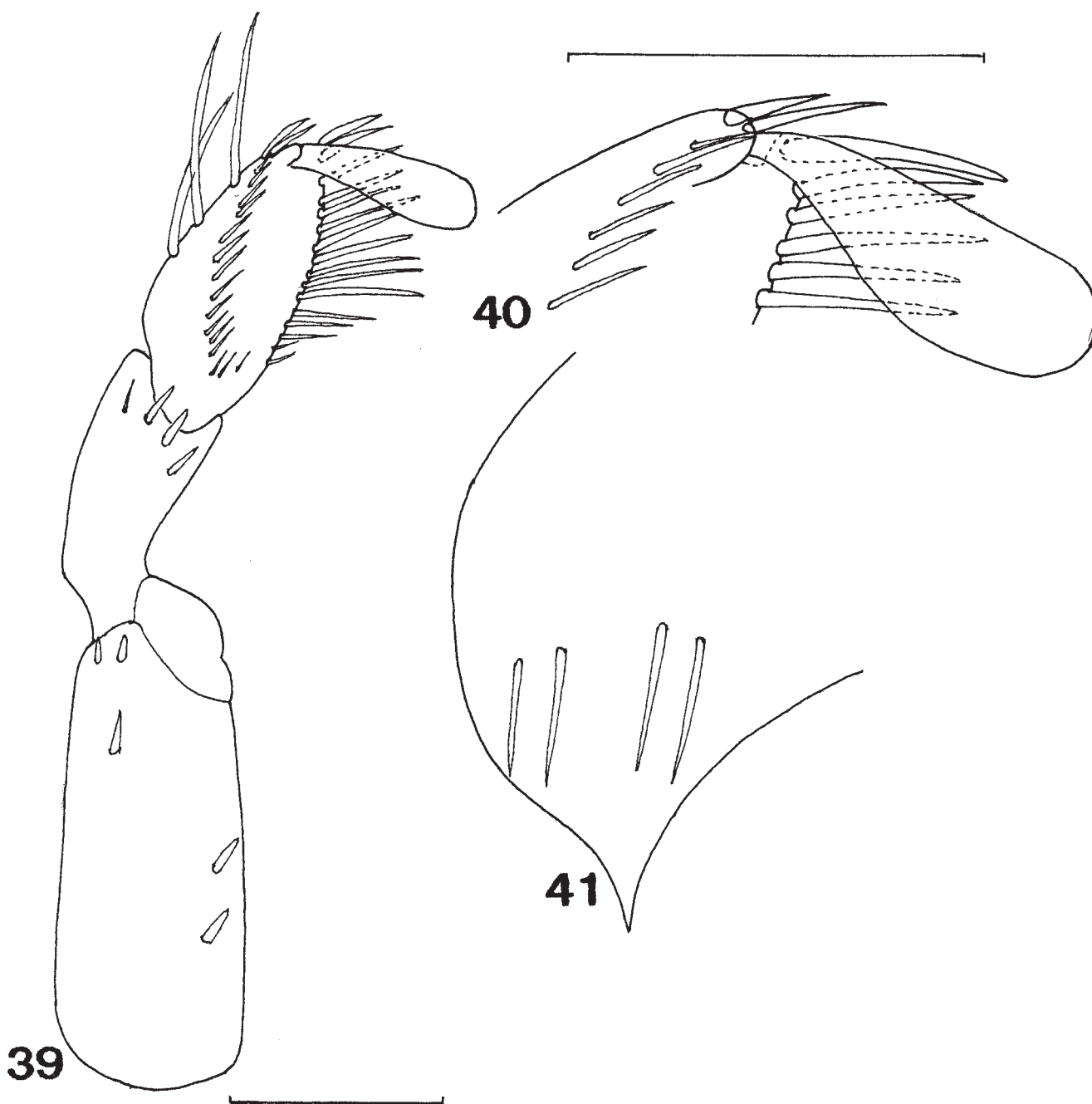
from China (Yunnan); and *M. (U.) waltoniana* Hutchinson, 1940 from India (Assam).

**Etymology.** – *Unguinecta* [unguis (Latin: nail or claw) + necta (Greek suffix: swimmer)], means “clawed swimmer”, referring to the distinctly developed secondary claw on the pala.

**Discussion.** – In *Micronecta* the truly reliable characters for specific identification and delimitation of subgenera are the male sexual characters, which will be emphasized below.

Poisson (1938) established the monotypic subgenus *Mesonecta* to include *Micronecta (Mesonecta) pilosa* Poisson,

1938 from Madagascar. *Mesonecta* was based on the following characters: claw of male pala flanked with a secondary claw; free lobe of left part of segment eight evenly rounded apically; both parameres with sharp apical points. Hutchinson (1940) added *M. khasiensis* and *M. waltoniana* to the subgenus *Mesonecta* without indicating on which characters the classification was based. However, in his key to subgenera he mentioned the characters of the secondary palar claw, inner angle of free lobe of left part of tergite VIII obtusely rounded, and seventh sternite with two large bristles, adding that the status of the last character is unknown in *M. pilosa*. Wróblewski (1962) pointed out that the only character connecting these three species is the secondary palar claw but left them in the subgenus *Mesonecta*.



Figs. 39-41. *Micronecta ornitheia*, new species, paratype, male; 39) fore leg; 40) apex of pala; 41) mediocaudal lobe of sternite VII. Scale: 0.1 mm.

In our opinion, *Mesonecta* has to be restricted to its single original species, *M. (M.) pilosa* which differs from the subgenus *Unguinecta* in the following characters: The left paramere of *M. pilosa* has a broad, slightly sinuate shaft which has a wide truncate apex pointing to one side; the right paramere has a narrow, straight shaft with a sharply pointed apex; the free lobe of left part of segment eight is evenly rounded. Consequently in *Mesonecta* both parameres and the free lobe of left part of segment eight are of entirely different types compared to those of *Unguinecta*. In addition, *M. pilosa* has a light colour, a length of 4 mm, and its hemielytra are quite densely beset with black bristles, whereas the species of *Unguinecta* measure 2-3 mm and have sparse pale bristles on the hemielytra, except in *M. polhemusi* where the bristles are pale but more dense. Therefore, we conclude that *Mesonecta* is a different subgenus.

Yang (1967) described *M. unguiculata* from Taiwan in which the male also has a secondary palar claw. Compared to the species of *Unguinecta*, this species differs in being distinctly smaller (length of male 1.6); having a broad left paramere; a different type of prestigilar lobe with an obtuse but distinct process pointing medially; and four large bristles on seventh abdominal sternite. In our opinion, in spite of the secondary palar claw, the four large bristles on seventh abdominal sternite and the male sexual characters place this species in subgenus *Micronecta*. Yang (1967) correctly placed *M. unguiculata* in the subgenus *Micronecta*. We consider that *M. unguicula* is closely related to *M. (M.) lenticularis* Chen, 1960, which is commonly distributed in Taiwan, instead of *M. matsumurai* as indicated by Yang (1967).

***Micronecta (Unguinecta) melanochroa*, new species**  
(Figs. 42-50)

**Material examined.** – Holotype (ZRC) - macropterous male, CHINA: Yunnan, Xishuangbanna, Lancang river, 24 km from Jinghong, potholes on large boulder, 10 m above river, 6 Jun.2002, coll. C. M. Yang & D.Q. Li.

Paratypes, same data as holotype, 1 male (teneral, NCTN), 1 female (ZRC). All macropterous.

**Description.** – Macropterous form, based on specimens in alcohol. In dorsal view, a dark brown, medium sized, rather parallel-sided species, with its greatest width just anteriorly of the caudal apex of claval commissure.

Dimensions (measurements of the holotype mentioned first). Length, male 2.31-2.38, female 2.32; width, male 1.09 (paratype not measured), female 1.05; width of head, male 0.83-0.82, female 0.82; synthlipsis, male 0.42-0.40, female 0.43; posterior width of an eye, male 0.25-0.22, female 0.21; width of pronotum, male 0.92-0.90, female 0.90; ocular index, male 2.05-1.90, female 2.21.

Colour. Dorsally generally dark brown; head yellowish, eyes castaneous, rostrum dark brown to blackish; clypeal area light to medium brown. Pronotum unicolorous medium brown except for caudolateral angles and posterior margin broadly

(0.1) yellow; scutellum brown. Hemielytra medium brown but, when closed, appearing dark brown due to the underlying dark grey abdominal dorsum, without darker patches; distal margin of right membrane yellowish; embolium yellowish to light brown with a thin blackish stripe near inner margin; without brown patches at costal margins; hyaline mark at base of clavus short, about 0.12 long, its V-shape obscured by reddish marking. Thorax and abdomen ventrally dark greyish brown. Legs pale yellowish with some small dark brown marks, notably in distal half of pala and at distal edge of middle tarsus.

Structural characteristics. Length 2.1-2.2 times width. Head slightly narrower than pronotum, synthlipsis 1.7-2.0 times as wide as the posterior margin of an eye. Pronotum well developed, dorsally convex with well developed lateral margins, 2.3-2.4 times as wide as long. Hemielytra smooth with only sparse and small pale spinules, mostly in distal half of corium. Spines laterally on abdominal segments: VI two short, three long and a long bristle (Fig. 44); VII five short, three long; VIII three short two very long hair-like on left part, and five short two very long hair-like on right part. Pala (Fig. 49) with five dorsal bristles; upper row of palm with about 18 bristles the distal one somewhat larger; ventral row with about 32 very fine bristles, the distal one conspicuously larger than the proximal ones, developed into a secondary claw. Leg measurements as in table 1.

Male. Fore leg (Fig. 49): femur with two apical spines, of which one very small, and one in apical third, three spines in basal half; in addition, there are some very small spines along ventral margin, several of which were represented by scars only in the microscopic slide of the paratype; tibia with three long spines in apical third; palar claw triangular (Fig. 50). Prestigilar lobe (Fig. 46) poorly differentiated, apically broadly rounded. Strigil (Figs. 44, 45) oval, with a distinct stalk and one comb with about 50 densely packed teeth. Median lobe of seventh abdominal sternite (Fig. 47) well developed, with a rounded apex and two bristles on its surface. Free lobe of left part of segment eight (Fig. 48) elongate, apical margin sinuate; with about 22 bristles in lateroapical part which is slightly produced. Right paramere (Fig. 42) with its shaft somewhat swollen in the middle and with a blunt apex, basal process with about 20 stridulatory ridges. Left paramere (Fig. 43) with a narrow shaft.

Female. Palar claw bristle-like, twice as thick as the apical bristle in ventral row.

Brachypterous form unknown.

**Etymology.** – *Melanochroa* (Greek adjective, meaning of dark colour) refers to the dark colour of this species.

**Comparative notes.** – This species is closely related with the other species of subgenus *Unguinecta*: *M. khasiensis*, *M. matsumurai*, *M. polhemusi*, and *M. waltoniana*. In males the triangular palar claw of *M. melanochroa* is distinctive, in *M. khasiensis* and *M. waltoniana* the male palar claw is narrow, virtually parallel-sided (Hutchinson, 1940: Figs. 171, 180);

in *M. matsumurai* it is narrowly clavate (Miyamoto, 1965: ppl. 43 fig. c) and in *M. polhemusi* clavate (Nieser, 2000: Fig. 21); in addition, the last two species have only about 23 bristles in ventral palmar row. The right paramere of *M. matsumurai* is more slender, and the right paramere of *M. polhemusi* has a distinct bulge at the base of the shaft. *M. khasiensis* and *M. waltoniana* have the shaft of the right paramere parallel-sided, not slightly swollen in the middle. With the key to SE Asian species (Nieser, 2000) *M. melanochoa* might run to *M. khasiensis*.

FAMILY NEPIDAE

*Laccotrephes* Stål, 1866

*Laccotrephes grossus* (Fabricius)

*Nepa grossa* Fabricius, 1787: 277.  
*Nepa kohlii* Ferrari, 1888: 180-181.  
*Laccotrephes grossus* - Lundblad 1933a: 21 (synonymizes *L. kohlii* with *L. grossus*); Polhemus 1995: 15 (checklist, distribution); Polhemus & Keffer 1999: 3.

**Material examined.** – CHINA: Yunnan, Xishuangbanna, Mekong basin, Mengkuan river, 19 May.2000, coll. H. H. Tan, 1 male (ZRC).

**Distribution.** – India, Sri Lanka, Thailand, Vietnam, West Malaysia, Sumatra, China, Japan.

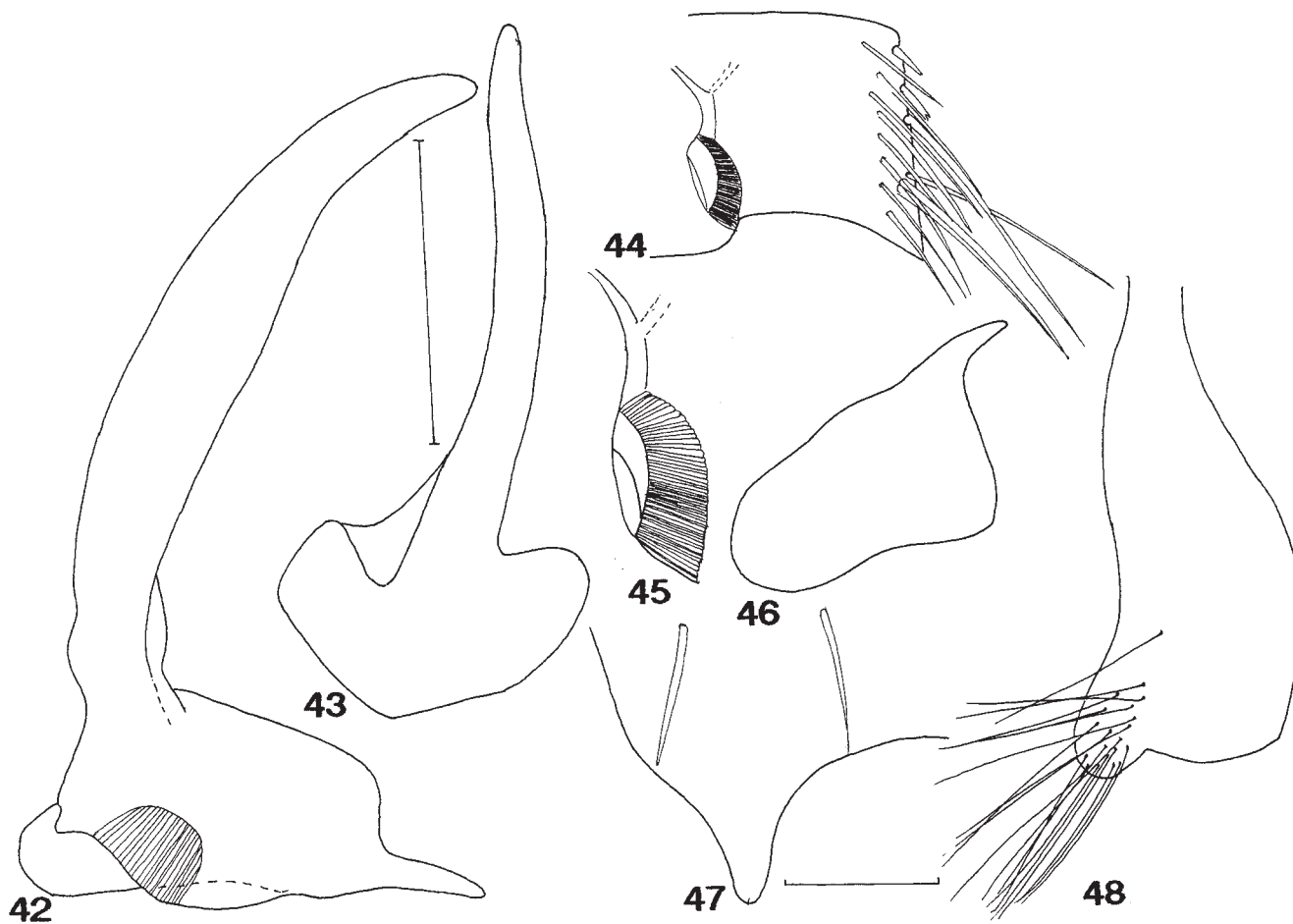
*Laccotrephes pfeiferiae* (Ferrari)

*Nepa pfeiferiae* Ferrari, 1888: 187.  
*Laccotrephes robustus* - Lundblad 1933a: 26-27; Polhemus 1995: 15 (partim).  
*Laccotrephes pfeiferiae* - Polhemus & Keffer 1999: 2-3.

**Material examined.** – CHINA: Yunnan, Simao, Mekong basin, 22 May.2000, coll. H. H. Tan, 1 female (ZRC); CHINA: Yunnan, Baoshan, Irawaddy basin, Gaoligong mountain, 28 May.2000, coll. H. H. Tan, 1 female (ZRC).

**Distribution.** – Burma, Thailand, West Malaysia, Sumatra, Java, S China including Taiwan.

**Remarks.** – Until recently *L. pfeiferiae* was considered to be a synonym of *L. robustus* Stål, 1871. Polhemus & Keffer



Figs. 42-48. *Micronecta melanochoa*, new species, paratype, male; 42) right paramere; 43) left paramere; 44) right part of tergite VI; 45) strigil, scale: 0.05 mm; 46) prestigilar lobe; 47) mediocaudal lobe of sternite VII; 48) free lobe of left part of tergite VIII. Figs. 42-44, 46-48, scale: 0.1 mm.

(1999) separated these species again, presented differential characteristics for the five species in the *L. grossus*-group occurring in the Malay Archipelago, and stated that *L. robustus* is restricted to the Philippines, and other records of *L. robustus* actually refer to *L. pfeifferiae*.

***Cercotmetus* Amyot & Serville, 1843**

***Cercotmetus asiaticus* Amyot & Serville, new record**

*Cercotmetus asiaticus* Amyot & Serville, 1843: 441.  
*Cercotmetus asiaticus* - Lansbury 1973: 89-92 (redescription).

**Material examined.** – CHINA: Yunnan, Xishuangbanna, Mengkuan River, 19 May.2000, coll. H. H. Tan, 1 male, 4 larvae (ZRC); Yunnan, Xishuangbanna, Man-Er stream, Mengla (21.4°N, 101.5°E), 11 Jul.2001, coll. H. M. Liu, 1 female (ZRC); Yunnan, Manchang stream, 63 km from Jinghong to Menglun, 30 May.2002, coll. C. M. Yang & P. Chew, 1 female; Yunnan, Xishuangbanna,

67 km from Mengla, 1 Jun.2002, coll. C. M. Yang & P. Chew, 2 females; Yunnan, Xishuangbanna, Mangle stream, by paddy field, 4 Jun.2002, coll. C. M. Yang & L. Gao, 3 larvae. First record for China.

**Distribution.** – Sundaland, Thailand (Lansbury, 1973), SW China.

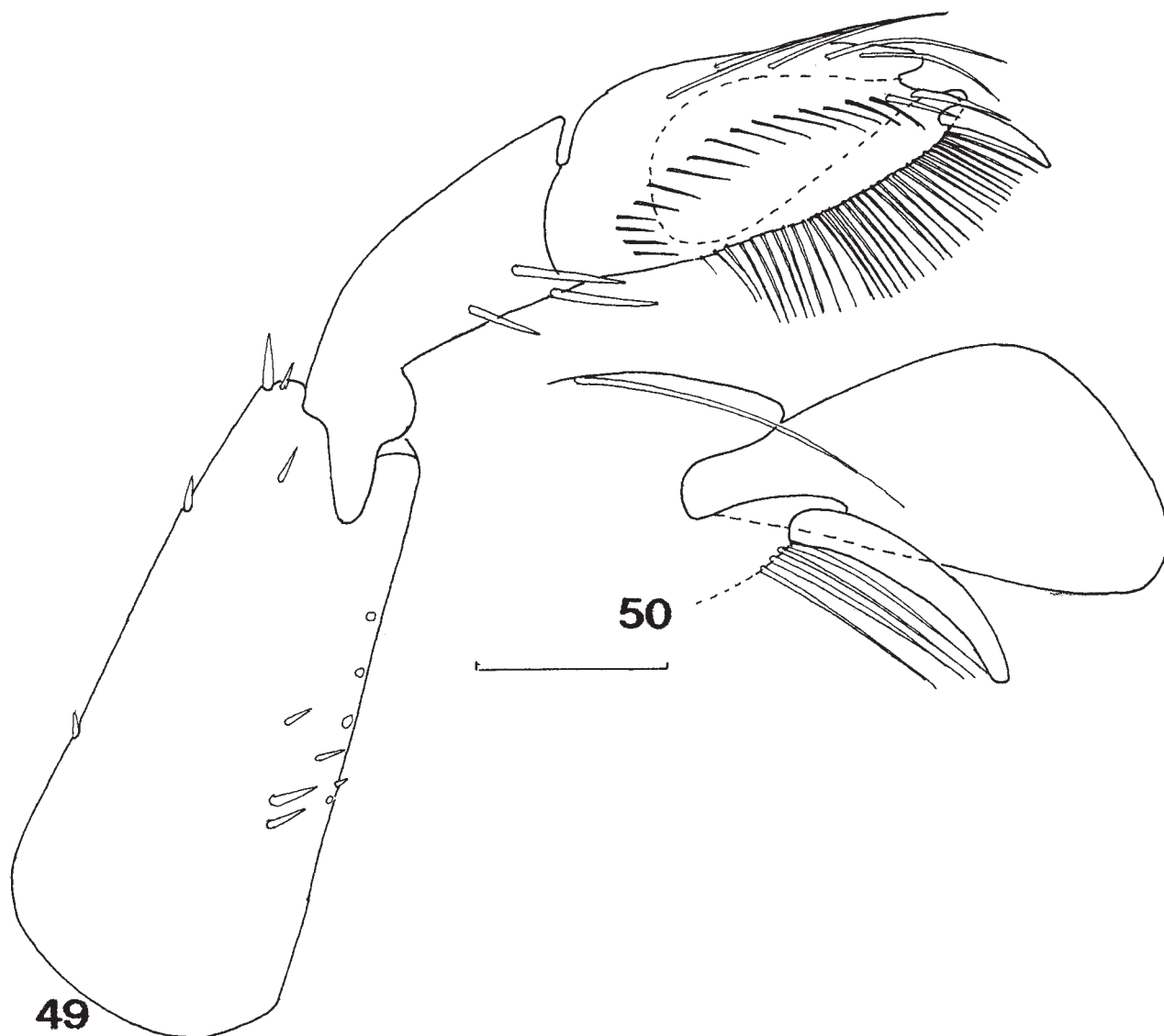
***Ranatra* Fabricius, 1790**

***Ranatra lansburyi* Chen, Nieser & Ho**

*Ranatra lansburyi* Chen, Nieser & Ho, 2004: 89.

**Material examined.** – CHINA: Yunnan, Xishuangbanna, Mengla (21°4'N 101°5'E), stream QD2, 11 Jul.2001, coll. H. M. Liu, 1 male, (paratype, ZRC).

**Distribution.** – China (Yunnan), Thailand (Chiang Mai).



Figs. 49-50. *Micronecta melanothroa*, new species, paratype, male; 49) foreleg; 50) apex of pala. Scale: 0.05 mm.



**Ranatra sterea** Chen, Nieser & Ho

*Ranatra sterea* Chen, Nieser & Ho, 2004: 98-99.

**Material examined.** – CHINA: Yunnan, Baoshan (25° 1'N 99° 1'E), Irawaddy basin, Gaoligong mountain, 28 Sep.2000, coll. H. H. Tan, 2 females (holotype, ZRC, paratype NCTN).

**Distrinution.** - China (Yunnan).

**Ranatra unicolor** Scott

*Ranatra unicolor* Scott, 1874: 452.

*Ranatra unicolor* - Lansbury 1972: 312-314 (redescription).

**Material examined.** – CHINA: Yunnan, Lijiang, Yangtze basin, Lashihai lake, 25 May.2000, coll. H. H. Tan, 1 male (det. I. Lansbury); Yunnan, Dali, Mekong basin, Jianhu lake, 25 May.2000, coll. H. H. Tan, 1 male (det. I. Lansbury).

**Distribution.** – Japan, China, southern Russia, Central Asia, Caucasus, Saudi Arabia, Iran, Iraq (Chen et al., 2004).

FAMILY NOTONECTIDAE

**Anisops Spinola, 1837**

**Anisops breddini** Kirkaldy, new record

*Anisops breddini* Kirkaldy, 1901a: 5-6.

*Anisops breddeni* Brooks, 1951: 439-441 (misspelling, redescription).

*Anisops breddini* - Nieser, 2004: 85 (synonymy).

**Material examined.** – CHINA: Yunnan, Xishuangbanna, Mengkuan River, 19 May.2000, coll. H. H. Tan, 1 male (det. I. Lansbury); Menglun, Lily pond, botanical garden, 25 May.2000, coll. L. Cheng, 3 larvae IV-V (ZRC); Xishuangbanna, pool near power station, 6 Jun.2002, coll. C. M. Yang, 1 female (ZRC). First record for China.

**Distribution.** – India, Sri Lanka, Burma, Thailand, Vietnam, West Malaysia, Indonesia (Java, Sulawesi, New Guinea), and SW China.

**Anisops kuroi** Matsumura

*Anisops kuroi* Matsumura, 1915: 109.

*Anisops batillifrons* Lundblad, 1933c: 463-464.

*Anisops batillifrons* - Brooks 1951: 420-423 (redescription).

*Anisops kuroiwai* - Miyamoto, 1964: 67-68 (misspelling, synonymizes *A. batillifrons* with *A. kuroi*).

**Material examined.** – CHINA: Yunnan, Xishuangbanna, Mengkuan River, 19 May.2000, coll. H. H. Tan, 2 males, 2 females (ZRC); Nanian River, 19 May.2000, coll. H. H. Tan, 1 male (ZRC); Xishuangbanna, Lanchang River, 24 km from Jinghong, potholes on boulder, 10 m above river, 6 Jun.2002, coll. C. M. Yang & D. Q. Li, 2 males, 2 females (ZRC).

**Distribution.** – From India and Sri Lanka through Indochina and the southern part of China to West Malaysia, North

Borneo, The Philippines and S Japan (Miyamoto, 1964; Nieser & Chen, 1991; Nieser, 2004).

**Anisops pseudostali**, new species

(Figs. 51-53)

**Material examined.** – Holotype (NCTN, to be transferred to RMNH) - macropterous male, CHINA: Yunnan Prov., 10 km NE Kunming, Jindian water reservoir, ca. 200x750m, edges flooded grassland, 27 Aug.1989, coll. P. Chen & N. Nieser.

Paratypes: 2 macropterous females, same data as holotype (NCTN); Yunnan Prov., Baoshan on road from Fengqing to Baoshan, 23 May.2000, coll. Y. X. Cai & H. H. Tan, THH0085, 1 male (ZRC).

**Description.** – Macropterous form, based on pinned specimens which have been stored in alcohol. A large, whitish, rather parallel-sided species with its greatest width posteriorly of the caudal apex of scutellum.

Dimensions (the holotype is the larger male). Length, male 9.00-9.48, female 9.41-9.61; width of head, male 2.12-2.13, female 2.16-2.23; humeral width of pronotum male 2.53-2.60, female 2.57-2.70; anterior width of vertex, male 0.53-0.54, female 0.59-0.60; synthlipsis, male 0.33-0.37, female 0.38-0.40; ocular index based on vertex, male 0.67-0.68, female 0.74-0.75.

Colour. Dorsally sordid white to pale yellowish, eyes greyish brown; apex of abdomen brown, shining through the hyaline wings. Ventrally head pale yellow, fourth rostral segment black; thoracic venter yellowish with variable darker patches; abdomen blackish except for median keel and connexiva yellow. Legs pale yellow, anterior face of middle femur with a broad, longitudinal brown stripe.

Structural characteristics. In dorsal view the outline of the head is trapezoid with posterior margin V-shaped, lateral margins virtually straight and converging anteriorly, anterior margin almost straight, and vertex not or only very slightly protruding. Width of head 0.8 times the humeral width of pronotum and about four times the anterior width of vertex (3.7-4.0). Along median axis, length of head two thirds the median length of pronotum (0.59-0.63). Labrum elongate, slightly longer than its width at base (0.33/0.30), without obvious pilosity, apex obtuse. Frontal surface of third rostral segment with long procumbent hairs, more strongly developed in males than in females. Median length of pronotum 1.3-1.5 times the length of an eye; humeral width of pronotum slightly less than twice its median length (1.8-1.9). Surface of pronotum smooth without impressions or carinae; its lateral margins diverging posteriorly, slightly over half as long as median length (0.54-0.59); posterior margin strongly sinuate. Length of leg segments as in table 1.

Male structural characteristics. Synthlipsis two thirds the anterior width of vertex (0.66). Tylus bare, with a semicircular transverse depression around a wart-like tubercle medially at base of labrum. Rostral prong (Fig. 51) about half as long as third rostral segment, with base originating about halfway and apex pointed. Stridulatory comb on fore tibia (Figs. 52,

53) consisting of 16 teeth of roughly the same size. Fore tarsus without small pegs on its inner surface.

Female structural characteristics. Synthlipsis two thirds the anterior width of vertex (0.63-0.68). Except for sexual characters females are identical with males.

**Etymology.** – The name *pseudostali* refers to its similarity to *A. stali* Kirkaldy, 1904.

**Comparative notes.** – *Anisops pseudostali* is very similar to *A. campbelli* Brooks, 1951 (India and Burma) and *A. stali*, a widespread species occurring from Australia through Indonesia and the Philippines to S. Japan (Okinawa) and S. China (Guangdong, Taiwan) (Nieser & Chen, 1991; Liu & Zheng, 1991). Males of *A. stali* have proximally on the middle tibiae a projection beset with thickly-set stout setae, this projection is lacking in males of *A. pseudostali*. In addition, the vertex of *A. stali* males has a short cephalic projection anteriorly on vertex, which is lacking in *A. pseudostali*. Females of *A. stali* lack the procumbent hairs on frontal

surface of third rostral segment, which are present in females of *A. pseudostali* though distinctly less developed than in males. *Anisops A. campbelli* is smaller than *A. pseudostali*, length of males 7.3-8.1, length of females 8.1-8.4. In addition, the basal teeth of the stridulatory comb in *A. campbelli* are much smaller than the apical teeth, whereas in *A. pseudostali* the difference between basal and apical teeth is only slight (Fig. 53).

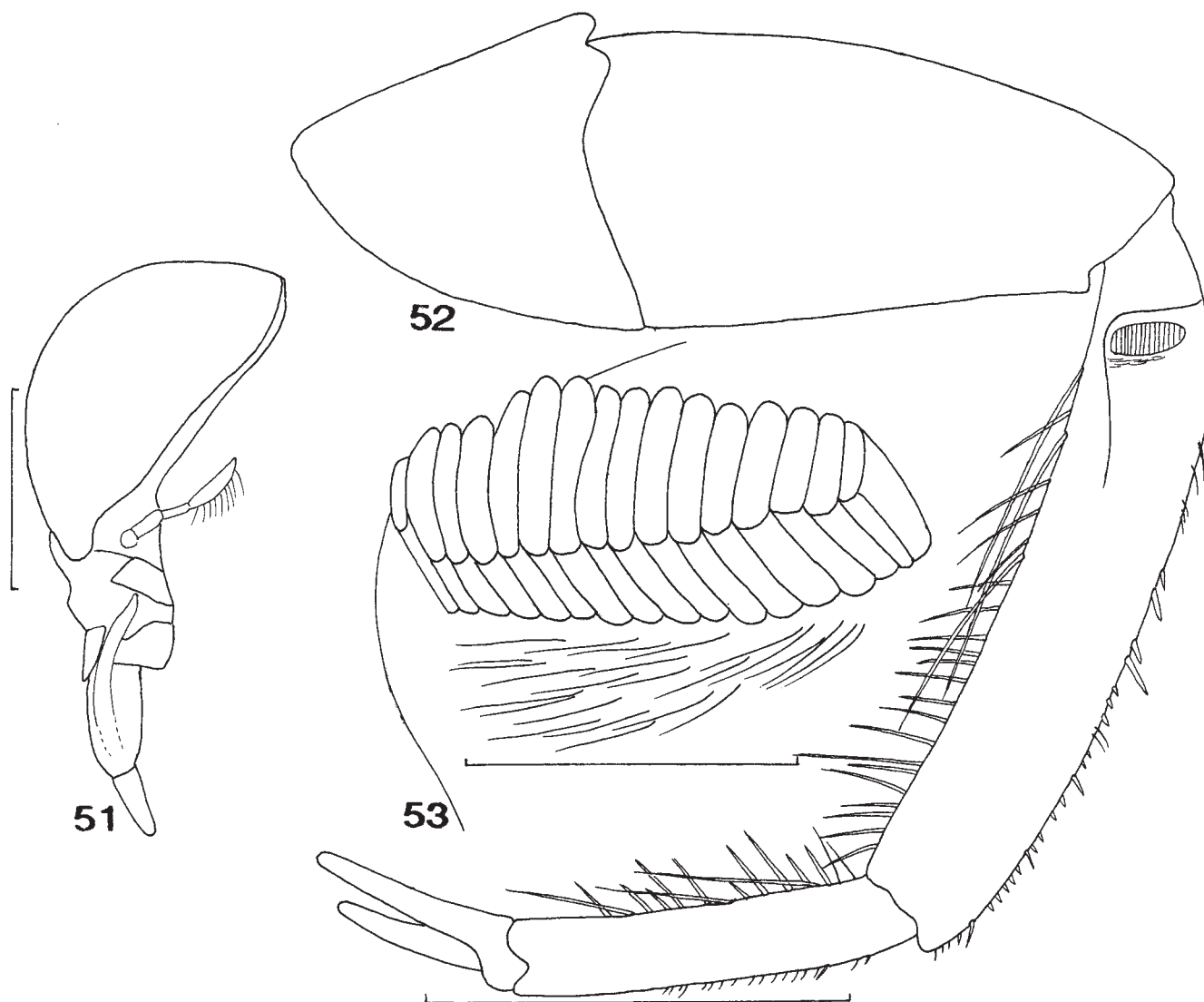
#### *Anisops tahitiensis* Lundblad, new record

*Anisops tahitiensis* Lundblad, 1934: 121-123.

*Anisops tahitiensis* - Brooks 1951: 376-378 (redescription); Lansbury 1964: 217-218 (distribution, discussion of variability).

**Material examined.** – CHINA: Yunnan Prov., Xishuangbanna County, Km 10 from Menglun to Mengyang, 21 May.2000, coll. L. Cheng, 1 male (ZRC). First record for China.

**Distribution.** – From Andaman Islands, Vietnam, SW China and Peninsular Malaysia through Malesia to Australia, Tahiti, Guadalcanal and Okinawa (Lansbury, 1964; Nieser, 2004).



Figs. 51-53. *Anisops pseudostali*, new species, holotype, male; 51, head in lateral view; 52) foreleg; 53) tibial comb; 51 and 52, Scale: 1 mm.

***Enithares Spinola, 1837******Enithares ciliata* (Fabricius)**

*Notonecta ciliata* Fabricius, 1798: 524-524.

*Enithares ciliata* - Lansbury 1968: 413-416 (redescription, synonymy).

**Material examined.** – CHINA: Yunnan, Menglun, Botanic garden, lily pond, 20 May.2000, coll. L. Cheng, 1 female, 1 larva (ZRC); same data, pool, 24 May.2000, coll. L. Cheng, 4 males, 1 female, 1 larva (CAS, ZRC) (all det. I. Lansbury). First record for Yunnan.

**Distribution.** – Mauritius, Bhutan, India, Sri Lanka, SE Asia, SE and SW China (Lansbury, 1968; Liu & Zheng, 1991).

***Enithares sinica* (Stål)**

*Notonecta sinica* Stål, 1854: 241.

*Enithares sinica* - Lansbury 1968: 378-380 (redescription).

CHINA: Yunnan, Xishuangbanna, Mekong basin, Dalou, Nanian River at border between China and Myanmar, 19 May.2000, coll. L. Cheng, 1 male (ZRC); same, coll. Y. X. Cai & H. H. Tan, 4 larvae; Mekong basin, Mengkuan River, 19 May.2000, coll. Y. X. Cai & H. H. Tan, 1 males, 4 females (CAS, ZRC); Yunnan, Xishuangbanna, 13 km road from menglun to Mengyan, 22 May.2000, coll. L. Cheng, 3 males, 1 female, 1 larva (CAS, ZRC); Yunnan, Baoshan (25.1°N 99.1°E) Irawaddy basin, Gaoligong mountain, 28 Nov.2000, coll. H. H. Tan, 1 male, 1 females (ZRC) (all det. I. Lansbury).

**Distribution.** – China except for the NE and NW, Japan, Vietnam, Laos (in Natural History Museum at Vienna, Austria, H. Zettel personal communication).

***Enithares stridulata* Brooks, new record**

*Enithares stridulata* Brooks, 1948: 37-38.

*Enithares stridulata* - Lansbury 1968: 366-368 (redescription).

**Material examined.** – CHINA: Yunnan, Xishuangbanna, 29 km from Menghai to Dalou, stream by rice field, 19 May.2000, coll. L. Cheng, 1 male (ZRC); Yunnan, Menglun, clear flowing creek, 21 May.2000, coll. L. Cheng, 1 female (ZRC); Yunnan, Menglun, pool at waterfall, 21 May.2000, coll. L. Cheng, 3 females, 21 larvae (CAS, ZRC); Yunnan, Xishuangbanna, 13 km from menglun to mengyang, clear forest stream, 22 May.2000, coll. L. Cheng, 1 male, 2 females, 5 larvae (ZRC); Yunnan, mekong basin, Simao, ca. 2 km from Ning'er to Yuanjiang stream, 21 May.2000, coll. Y.X. Cai & H.H. Tan, 1 male, 2 larvae (ZRC); Yunnan, Xishuangbanna, Mengmoe stream, 30 May.2002, coll. C.M. Yang & P. Chew, 1 male, 2 females, 1 larva (ZRC); Yunnan, Xishuangbanna, Mengka, 55th stream, 30 May.2002, coll. C.M. Yang & P. Chew, 1 male (ZRC), 1 male (NCTN); Yunnan, Xishuangbanna, Mengka, Power station, canal from stream, 31 May.2002, coll. C.M. Yang & P. Chew, 1 male, 2 females, 1 larva (ZRC); Yunnan, Xishuangbanna, Mengka, waterfalls near Mengyuan, 1 Jun.2002, coll. C.M. Yang & P. Chew, 3 males, 5 females, 2 larvae (CAS, ZRC), 1 male, 1 female (NCTN); Yunnan, Man-Zhang stream, 12 Apr.2001, coll. H. M. Liu, 2 males (ZRC); Yunnan, Man-Er stream, 11 Jul.2001, coll. H. M. Liu, 1 male (ZRC). New record for China.

**Distribution.** – Thailand, Laos, Vietnam, SW China.

***Nychia Stål, 1859******Nychia sappho* Kirkaldy, new record**

*Nychia marshalli* var. *sappho* Kirkaldy, 1901b: 809-810.

*Nychia sappho* - Lansbury 1985: 4-9 (redescription, synonymy).

**Material examined.** – CHINA: Yunnan, Menglun, Xishuangbanna Tropical Botanic garden, Lily pond, botanical garden, 25 May.2000, coll. L. Cheng, 2 males, 2 females, brachypterous, 5 larvae (CAS, ZRC). First record for China.

**Distribution.** – N Australia, Papua New Guinea, Indonesia, Philippines, Thailand, Burma, SW China.

**Remarks.** – *Nychia limpida* Stål, 1859, was described from Whampoa island, Guangdong, China. It is known only by the holotype which is such a poor condition that, according to Lansbury (1985: 1-2) "It is impractical to propose *N. limpida* as a prior name for species described post 1859. The relationship of *limpida* to other species of *Nychia* must remain speculative until additional material is available from mainland China."

**ACKNOWLEDGEMENTS**

Thanks are due to Dr. I. Lansbury, Oxford, England for identifying part of the material and to H. Zettel, Vienna, Austria and an anonymous reviewer who made valuable comments on the manuscript. Yang would like to thank H. M. Liu, director of the Xishuangbanna Tropical Botanic Gardens (Yunnan) and his staff for their cooperation and support during our field work in Xishuangbanna. She is grateful to D. Li (NUS) for logistic arrangements in Yunnan, to Lanna Cheng, Pony Chew, D. Li, Matthew Lim and H. H. Tan for collecting material and to P. K. L. Ng for his interest and support on this project.

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