

Type specimens and identity of some Chinese species of the "*Lygus* complex" (Heteroptera: Miridae)

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Twelve new combinations and three new synonymies are established for poorly known species of the *Lygus* complex from continental China and Taiwan. Two varieties in *Orthops* are upgraded to specific rank. Lectotypes of four nominal species are designated.

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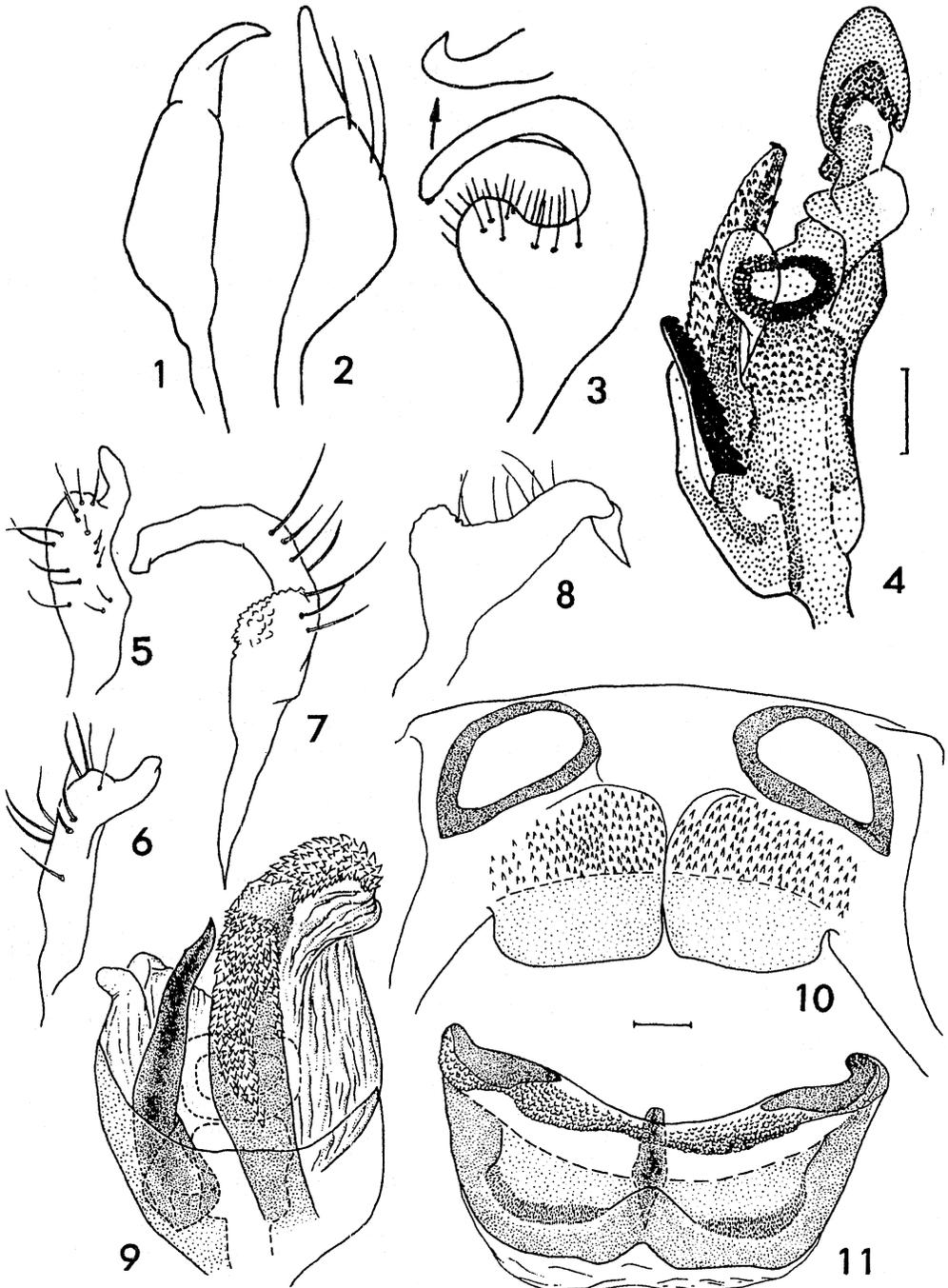
Introduction

This paper includes lectotype designations, new synonymies, and changes of status or combination for some poorly known species of the *Lygus* complex from continental China and Taiwan. It is based on examination of type specimens and additional material in the following collections (abbreviations and curators in parentheses): Finnish Zoological Museum, Helsinki (FZMH, L. Huldén and A. Jansson); United States Natural History Museum, Smithsonian Institution, Washington, D.C. (USNM, T.J. Henry); Zoological Institute, St.Petersburg (ZISP); Naturhistoriska Riksmuseet, Stockholm (NHRS, P. Lindskog); Deutsches Entomologisches Institut, Eberswalde (DEIC, E. Groll); Hungarian Natural History Museum, Budapest (HNHM, T. Vásárhelyi). Type specimens from FZMH, DEIC and HNHM were examined (and lectotypes designated) by M.D. Schwartz, those from ZISP and NHRS by I.M. Kerzhner. The type labels added by the authors of this paper are not cited. The syntypes of *Lygus disciger* and *L. sauteri* examined by us will be designated as lectotypes in a paper of N. Lu and L.-y. Zheng currently in press; we do not cite the labels added by these authors. In the FZMH labels, "Mus. Zool. H.fors Spec. typ." is abbreviated as MZH. All measurements are in mm.

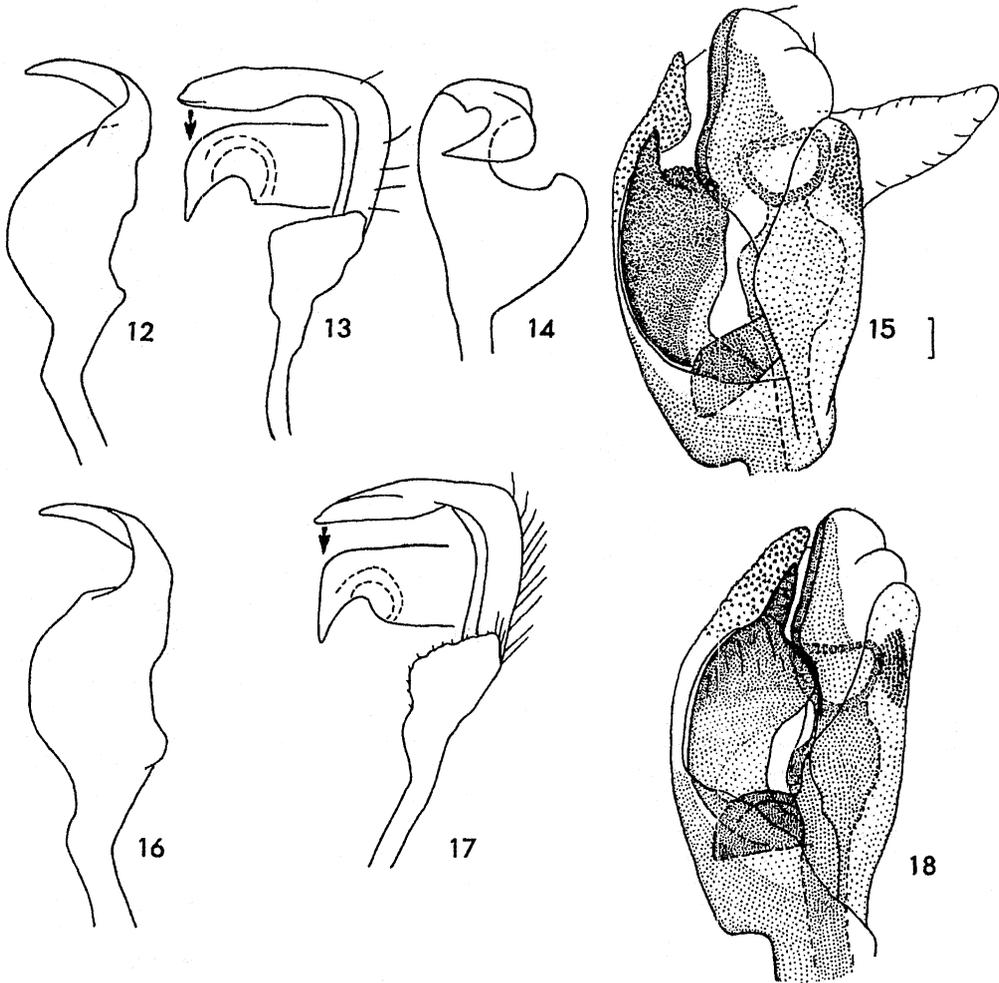
Taxonomic part

Heterolygus trivittulatus (Reuter, 1906) = *Lygus scutellatus* Lindberg, 1934 (junior secondary homonym of *Orthops scutellatus* Uhler, 1877 and junior primary homonym of *Lygus scutellatus* Distant, 1884), **syn. n.** = *Lygus lindbergi* Hsiao, 1942 (new name for *scutellatus* Lindberg, 1934) = *Lygus lindbergi* Stichel, 1958 (again as a new name for *scutellatus* Lindberg, 1934). The holotype of *Lygus scutellatus* Lindberg, a male labelled "Kina, S. Kansu", "Sven Hedins Exp. Ctr. Asien, Dr. Hummel", "12/9", "Spec. typ. *L. scutellatus* Lindberg", "Typus", "*Lygus scutellatus* n. sp. Håk. Lindb. det." (NHRS) was compared with a large series of paralectotypes of *Lygus trivittulatus* (ZISP).

Liistonotus melanostoma Reuter, 1906, **comb. n.** (*Liocoridae*) = *Lygus minutus* Hsiao, 1941, **syn. n.** Both species were described from Sichuan. The holotype of *L. melanostoma* (ZISP), a female labelled "Sichuan, Tashuivan' - Lyuigupin, Potanin, 21.X.93" [in Russian] and "*Liocoridae melanostoma* Reut. n. sp. Typ." [Reuter's handwriting] was compared with 1 ♂ and 1 ♀ of *L. minutus* from Sichuan identified by N. Lu based on examination of the holotype; they are undoubtedly conspecific. The male genitalia are illustrated (Figs 1-4); the structure of vesica is very peculiar. The species does not belong either to *Liocoridae* in which it was placed originally, or to *Orthops*



Figs 1-11. 1-4. *Liistonotus melanostoma* (Reuter), male genitalia: 1, 2, left paramere (1, interior lateral view; 2, dorsal view); 3, left paramere, dorsal view; 4, vesica, view with secondary gonopore in front. 5-11. *Liocoridae mutabilis* Reuter, genitalia, male, Mt. Omei, Sichuan, China (5-9) and female, Sheng Nong Jai Nature Reserve, China (10, 11): 5, 6, right paramere (5, lateral view; 6, dorsal view); 7, 8, left paramere (7, lateral view; 8, dorsal view); 9, vesica, view with secondary gonopore in back; 10, sclerotized rings; 11, posterior wall. Scales: 0.1 mm.



Figs 12-18. *Lygocoris* (*Lygocoris*) spp., male genitalia. 12-15, *L. glaucus* (Hsiao), paratype: 12, right paramere, lateral view; 13, 14, left paramere (13, dorsal view; 14, interior lateral view); 15, vesica, view with secondary gonopore in back. 16-18, *L. longipennis* (Reuter): 16, right paramere, lateral view; 17, left paramere, dorsal view; 18, vesica, view with secondary gonopore in back. Scale: 0.1 mm.

in which *L. minutus* was tentatively placed by Kerzhner (1988). It shares with *Liistonotus xanthomelas* Reuter, 1906 (extreme south of Gansu), the only species of this genus known from the holotype female (ZISP) only, the high, strongly convex ventrally, shining body; black convex scutellum; brown, fine spines of tibiae without dark spots at their bases, and some peculiarities of coloration (abdomen black or blackish in contrast to yellow pronotum and ventral side of thorax; antennal segment 1 with brown longitudinal stripe on inner side, segments 2-4 black, base of segment 3 narrowly

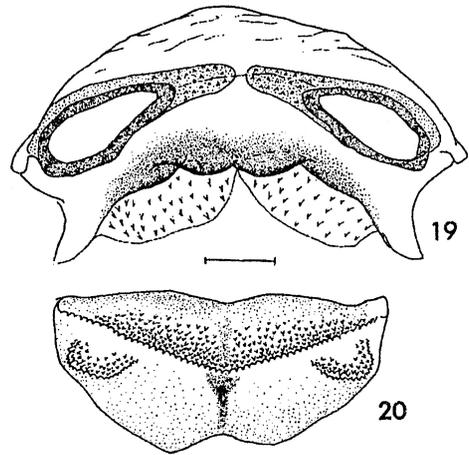
pale). An unidentified female from N Sichuan (ZISP) slightly smaller than *melanostoma*, is nearly identical to *melanostoma* in the coloration of head, but to *xanthomelas* in the coloration of hemelytra. Undoubtedly, they are closely related species. We transferred therefore *melanostoma* to *Liistonotus*.

Liocoridea mutabilis Reuter, 1903 = *Lygus szechuanensis* Hsiao, 1941, **syn. n.** *Liocoridea mutabilis* var. *testacea* Reuter, 1903 = *Lygus szechuanensis* var. *ruficephalus* Hsiao, 1941, **syn. n.** Paratypes of *Lygus szechuanensis* examined and labelled: 1 ♂ "Mt. Omei, Szechuen China, 4400 ft", "D.C. Graham

coll, 8.20.34"; 1 ♂ "O-Er, 26 mi N [of] LiFan, 9000 ft, 1933", "Szechuen, China, D.C. Graham". Additional specimens labelled, in Hsiao's handwriting as "paratypes" of *szechuanensis* but not listed in Hsiao (1941) examined and labelled: 1 ♀ "nr. Mupin, China, 2-8000 ft", "D.C. Graham collector, July.14-15.1929"; 1 ♀ "near Muping, 13,000-14,000 ft, July.1.1929"; 1 ♂, "Mt. Omei, 19.ix.1938, K.F. Chen" (USNM). Paratypes of *Lygus szechuanensis* var. *ruficephalus* examined and labelled: 1 ♂, "O-Er, 26 mi N [of] LiFan", "Szechuen, China, D.C. Graham"; 1 ♂ [abdomen missing], "near Muping, 000-000 ft, July, 1929", "D.C. Graham collector"; 1 ♂, "Mt. Omei, 15.ix.1938, H.F. Chen" (USNM). Some of the examined specimens of *L. szechuanensis* were from Moupin [= Baoxing, Sichuan, China], the type locality of *Liocoridea mutabilis*. Based on the genitalia of both sexes (Figs 5-11), *Lygus szechuanensis* and variety were identical in every feature to those of *Liocoridea mutabilis* from Darjeeling (FZMH).

Lygocoris (Apolygus) biannulatus (Poppius, 1915), **comb. n. (Lygus)**. Holotype female of *Lygus biannulatus* Poppius examined and labelled: "Formosa, Sauter", "Takao, 1907.", "*Lygus biannulatus* n. sp." [Poppius' handwriting], "Typus" (HNHM) (Carvalho, 1980). Specimen remounted from card to point and was too teneral to dissect. According to Carvalho (1980), this species does not belong to *Lygus*. It has the body structure of *Apolygus*: head with concave posterior margin, complete basal carina, and short antecular region and black tibial spines with black spots at base. Not mentioned by Carvalho (1980) is the dark apex of the tylus and juga. Measurements of holotype: body length 4.45; body width 1.90; vertex width 0.36; head width 1.08; antecular length 0.30; eye height 0.55; eye width 0.36; antennal segments length 1, 0.48; 2, 1.38; 3, approx. 0.57; 4, approx. 0.45; pronotum length 0.98; pronotum width 1.73; corium length 2.00; cuneus length 0.75; claval commissure length 0.88; labium approx. 1.45, reaching apex of mesocoxa.

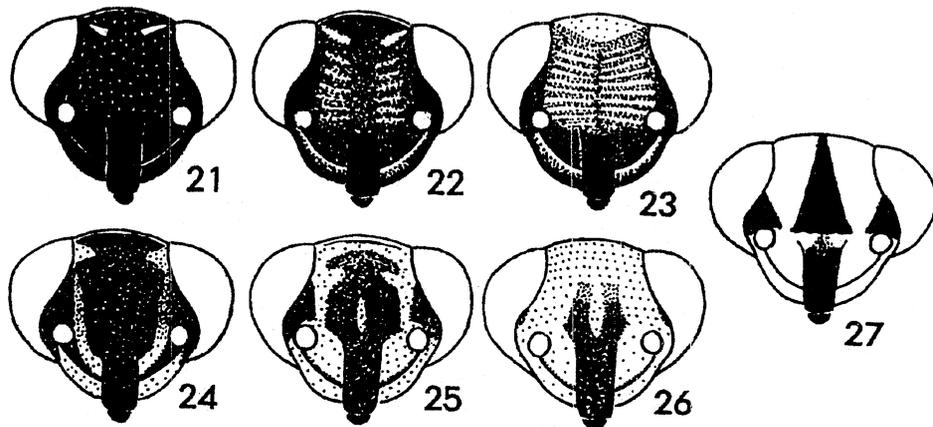
Lygocoris (Lygocoris) glaucus (Hsiao, 1941), **comb. n. (Adelphocoris)**. Examination of a male paratype received from USNM enabled us to clarify the systematic position of this species. It is closely related to *L. longipennis* Reuter, 1906. Both species have similar structure of the male genitalia including the short spicula of vesica strongly inflated at base (Figs 12-18).



Figs 19-20. *Lygocoris (Neolygus) matsumurae* (Poppius), holotype, female genitalia: 19, sclerotized rings; 20, posterior wall. Scale: 0.1 mm.

Lygocoris (Neolygus) disciger (Poppius, 1915), **comb. n. (Lygus)**. Syntype female examined and labelled: "Fuhosho, Formosa, H. Sauter", "7.ix", "*Lygus disciger* n. sp.", "MZH No. 10176, *Lygus disciger* Poppius" (FZMH). Examination of the female genitalia demonstrated that the dorsal structure is absent suggesting that the subgeneric placement is *Neolygus*. Additionally the vertex has a complete basal carina and the tibiae are with brown spines without dark spots at the spine bases.

Lygocoris (Neolygus) matsumurae (Poppius, 1915), **comb. n. (Lygus)**. Holotype female of *Lygus matsumurae* Poppius examined and dissected with following labels: "Taihorinsho, Formosa, H. Sauter", "7.xi.", "Poppius det.", "♀", "Typus", "*Lygus matsumurae* n. sp." [Poppius' handwriting] (DEIC) (Gaedike, 1971). Measurements of holotype: body length 3.60; body width 2.00; vertex width 0.33; head width 0.93; antecular length 0.28; eye height 0.55; eye width 0.30; antennal segments length 1, 0.55; 2, 1.50; 3, 4, missing; pronotum length 0.90; pronotum width 1.60; corium length 2.05; cuneus length 0.83; claval commissure length 0.83; labium 1.55, reaching apex of mesocoxa. Placed in *Lygocoris (Neolygus)* based on the following structure: brown tibial spines; female genitalia with ovate sclerotized rings (Fig. 19); inter-ramal lobes widely separated and not constricted at the base as in *Apolygus*; and dorsal structure absent; with large, plate-like lateral lobe without medial bifurcation (Fig. 20).



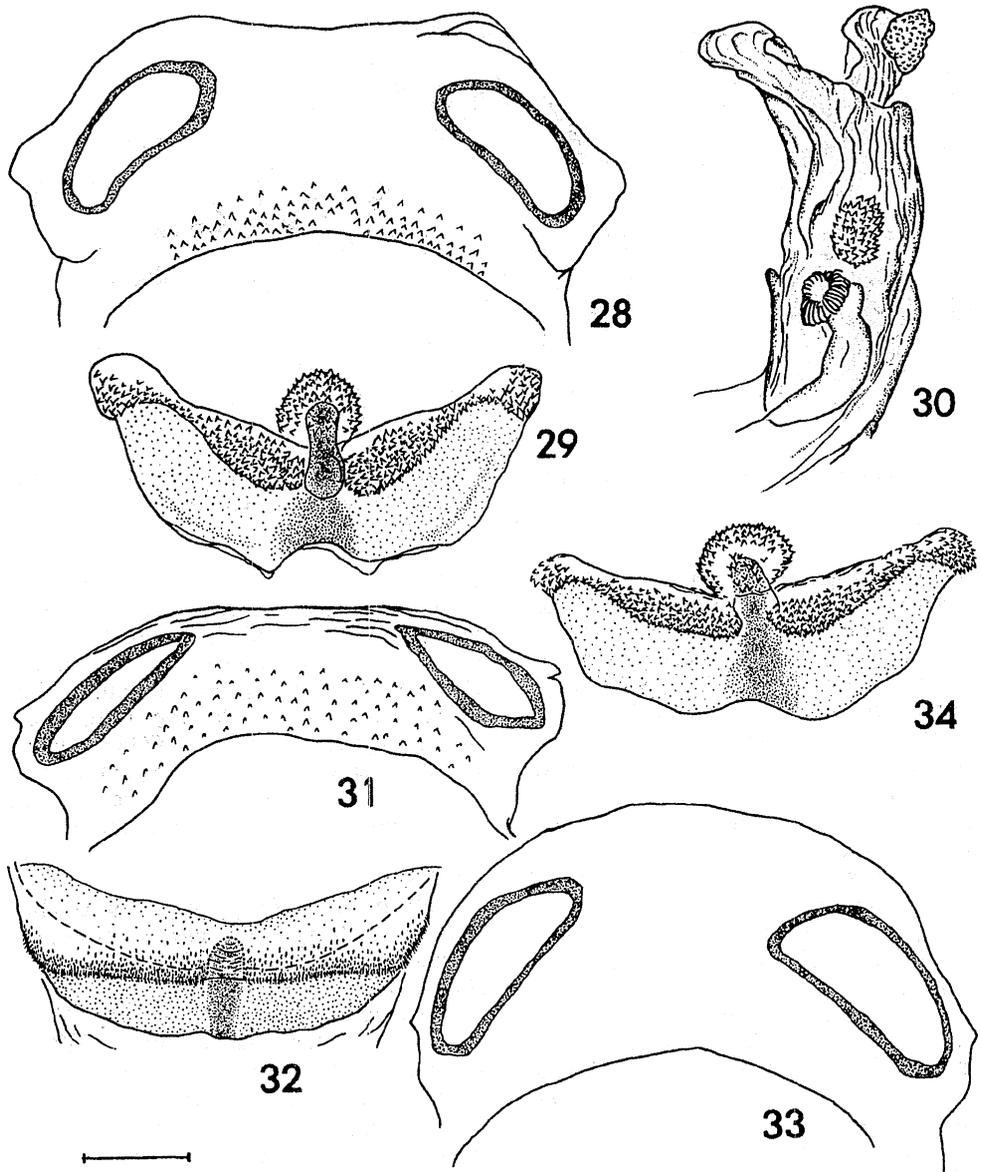
Figs 21-27. *Orthops* spp., head, anterior view. 21-23. *O. ferrugineus* (Reuter): 21, ♂, from Sichuan; 22, ♂ from Gansu; 23, ♀, lectotype. 24-26. *O. udonis* (Matsumura): 24, dark ♂; 25, normal ♂; 26, normal ♀. 27. *O. vitticeps* (Reuter), ♀, lectotype.

***Orthops ferrugineus* (Reuter, 1906), stat. n.** (= *kalmi* var. *ferruginea* Reuter, 1906). Lectotype of *Lygus kalmi* var. *ferruginea* Reuter (designated here): female labelled: "Sichuan, Tatszinlu, 22.VI.93, Potanin" [in Russian], "*Lygus kalmi* L. var. *ferrugineus* Reut. n. v. Typ." [Reuter's handwriting] (ZISP); paralectotypes examined: 8 ♀ from Sichuan (ZISP). A male from Tatszinlu identified by Reuter (1906) as *L. kalmi* var. *thoracicus* Westh. also belongs to *O. ferrugineus*. The species is represented in ZISP also by 1 ♂ and 10 ♀ from S Gansu and NW Sichuan. It is closely related to *O. udonis* (Matsumura, 1917) from Siberia, Far East of Russia, Japan and Korea, but differs in the distinct reddish coloration of pronotum and hemelytra. In the male from Tatszinlu, the head is black to dark brown with two small oblique yellow spots on vertex. In the male from Gansu and all females examined, the clypeus or its apex and the ventral side of head below eyes are black, the remainder of head, except yellow spots on vertex or its hind margin, is red or brownish red, usually with more or less radiant pattern on frons (Figs 21-23). In *O. udonis*, males with predominantly black head (Fig. 24) are very rare and even in them genae and jugae are yellow; in most males and all females also lateral parts of frons and the entire vertex are yellow (Figs 25, 26). It is possible that *O. udonis* is a northern subspecies of *O. ferrugineus*, but there is no material at hand from Central and North China to test this hypothesis.

***Orthops vitticeps* (Reuter, 1906), stat. n.** (= *kalmi* var. *vitticeps* Reuter, 1906). Lectotype

of *Lygus kalmi* var. *vitticeps* Reuter (designated here): female labelled: "Sich., r. Fubianho, Mardan - Lianhok., Potan., 7.VIII.93" [in Russian], "*Lygus kalmi* L. var. *vitticeps* Reut. n. v. Typ." [Reuter's handwriting] (ZISP). In addition to the lectotype, 4 paralectotypes from Sichuan (ZISP) were examined. Based on the coloration of head having a triangular black stripe from the base of clypeus to the hind margin of vertex (Fig. 27) we suggest separate species status for this taxon. Males unknown.

***Prolygus bakeri* (Poppius, 1915), comb. n.** (*Lygus*). Lectotype of *Lygus bakeri* Poppius (designated here): male labelled "Taihorinsho, Formosa, H. Sauter"; "7.ix", "*Lygus bakeri* n. sp." [Poppius' handwriting], "MZH No. 10267, *Lygus bakeri* Poppius" (FZMH); paralectotypes examined and labelled (FZMH): 1 ♀, "Tainan, Formosa, H. Sauter", "7.viii", "MZH No. 10268"; 1 ♀ [same as lectotype], "MZH No. 10266"; 2 ♂, 4 ♀, "Los Banos, P.I., Baker" [♂ "126", ♀ "125", ♀ "398"]. Carvalho (1980) noted 4 specimens (not syntypes) in HNHM and Gaedike (1971) noted 3 syntypes in DEIC. Measurements of dissected male from Los Banos (with "126" label in USNM): body length 3.35; body width 1.45; vertex width 0.28; head width 0.95; antecocular length 0.20; eye height 0.55; eye width 0.33; antennal segments length 1, 0.45; 2, 1.63; 3, 0.85; 4, approx. 0.55; pronotum length 0.75; pronotum width 1.30; corium length 1.75; cuneus length 0.56; claval commissure length 0.68; labium approx. 1.50, reaching apex of metacoxa. Head with short antecocular region,



Figs 28-34. *Prolygus* spp., genitalia. 28-30. *P. bakeri* (Poppius), female, Mt. Makiling, Luzon (28, 29) and male, Los Banos, Philippines (30): 28, sclerotized rings; 29, posterior wall; 30, vesica, view with secondary gonopore in front. 31-32. *P. kirkaldyi* (Poppius), holotype, female: 31, sclerotized rings; 32, posterior wall. 33-34. *P. tainanensis* (Poppius), lectotype, female: 33, sclerotized rings; 34, posterior wall. Scale 0.1 mm.

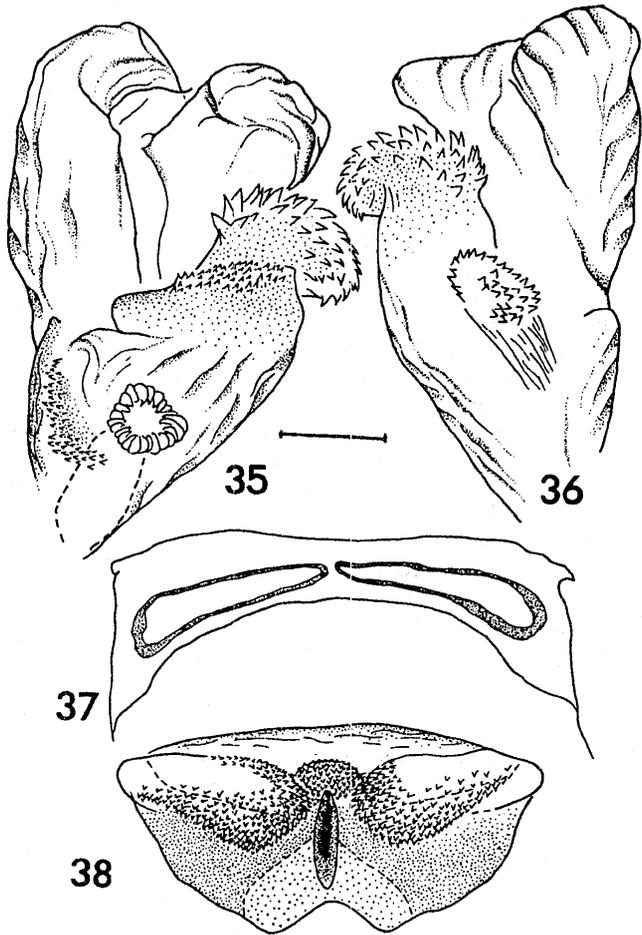
large eyes, concave posterior margin, complete basal carina, and long second antennal segment. Male genitalia near *P. femoralis* (Poppius) (see Carvalho, 1987, Figs 15-17), except without the vesical spicula (Fig. 30). Female genitalia with ovate sclerotized rings and a field of minute spinules anteromedial to the rings (Fig. 28). Posterior wall with in-

ter-ramal lobe deeply incised and with prominent spinules near lateral margin of inter-ramal sclerite and near medial structure. Dorsal structure membranous, with rounded apex and covered with prominent spinules (Fig. 29).

Prolygus kirkaldyi (Poppius, 1915), **comb. n.** (*Lygus*). The female holotype of *Lygus*

kirkaldyi, labelled: "Taihorinsho, Formosa, H. Sauter", "7.ix.", "*Lygus kirkaldyi*, n. sp." [Poppius' handwriting] (DEIC). Measurements of holotype: body length 3.80; body width 1.85; vertex width 0.39; head width 0.85; anteocular length 0.26; eye height 0.45; eye width 0.21; antennal segments length 1, 0.38; 2, 1.35; 3, approx. 0.68; 4, missing; pronotum length 0.78; pronotum width 1.40; corium length 1.93; cuneus length 0.60; claval commissure length 0.78; labium 1.33, reaching middle of mesocoxa. Carvalho (1987) established the genus *Prolygus* for Oriental and Australian species related to the American genus *Dagbertus* Distant, 1904. Eventhough Carvalho (1987) stated that *Prolygus* was distinguished from *Dagbertus* by the absence of a subapical prolongation on the left paramere, he included three species (*kandanus* Carvalho, *maai* Carvalho, and *nakanaiensis* Carvalho) in *Prolygus* which had such a structure. Miyamoto (1975) documented the presence of the subapical prolongation in *kirkaldyi*. The holotype of *kirkaldyi* was dissected and compared with species of *Prolygus* and *Dagbertus*. Kelton (1955, Figs 90, 91) documented a narrow sclerotized bar connecting the sclerotized rings and an ovoid membranous dorsal structure of the posterior wall in *D. fasciatus* Reuter and *D. olivaceus* Reuter. The female genitalia of *kirkaldyi* were not of this form (Figs 31, 32) nor were they similar to those of *bakeri* and *tainanensis* (see below). As currently conceived, the structure of the left paramere and sclerotized rings do not allow unequivocal generic placement, accordingly this and the next species from Taiwan placed by Miyamoto (1975) in *Dagbertus* are tentatively transferred here to *Prolygus* primarily based on their distribution. A definitive placement of this and other "Lygus complex" species in *Prolygus* requires critical diagnosis of the genus and is beyond the scope of the present work.

***Prolygus nigriclavus* (Poppius, 1915), comb. n. (*Lygus*).** See the note under the preceding species.



Figs 35-38. *Sabactus sauteri* (Poppius), male, Chip Chip, Taiwan (35, 36) and female, Taihorinsho, Taiwan (37, 38): 35, vesica, view with secondary gonopore in front; 36, vesica, reverse view; 37, sclerotized rings; 38, posterior wall. Scale 0.1 mm.

***Prolygus niger* (Poppius, 1915), comb. n. (*Lygus*).** Lectotype of *Lygus niger* Poppius (designated here): female labelled: "Mt Makiling, Baker", "*Lygus niger* n. sp." [Poppius' handwriting], "MZH No.10185, *Lygus niger* Poppius" (FZMH); paralectotype examined and labelled (FZMH): 1 ♀ "Fuhosho, Formosa, H. Sauter", "*Lygus niger* n. sp.", "MZH No.10186, *Lygus niger* Poppius". Lu and Zheng (in press) examined a female syntype (DEIC) and stated that the species apparently did not belong to the genus *Lygus* (s. str.). Based on the small body size, small anteocular region of head, and large eyes this species is placed in *Prolygus*.

***Prolygus tainanensis* (Poppius, 1915), comb. n. (*Lygus*).** Lectotype female designated by

Carvalho (1980) (specific name misspelled as "*taivanensis*") examined (dissected and remounted from card to point, here) with the following labels: "Formosa, Sauter", "Tainan, 909.II"; "*Lygus tainanensis* n. sp." [Poppius' handwriting], "typus" (HNHM). Measurements of lectotype: body length 3.75; body width 1.71; vertex width 0.38; head width 0.90; anteocular length 0.23; eye height 0.51; eye width 0.25; antennal segments length 1, 0.43; 2, 1.48; pronotum length 0.83; pronotum width 1.48; corium length 1.95; cuneus length 0.70; claval commissure length 0.75; labium approx. 1.55, just surpassing metacoxa. Based on the brown metatibial spines, the complete basal carina, the female genitalia (Figs 33, 34) (especially the rounded and constricted dorsal structure of the posterior wall) this species is placed in *Prolygus*.

Sabactus sauteri (Poppius, 1912), **comb. n.** (*Lygus*). Syntype female examined and labelled: "Chip Chip, Formosa, Sauter II 07-09", "*Lygus sauteri* n. sp. B. Poppius det.", "MZH No. 9932 *Lygus sauteri* Popp." (FZMH). Original description (Poppius, 1912) stated five specimens from Chip Chip were deposited in FZMH and DEIC. Lu & Zheng (in press) mentioned two additional specimens (1 ♂ and 1 ♀) which were not conspecific with the lectotype. We concur with their conclusion. Three other "syntypes" were reported by Gaedike (1971). The lectotype designation by Carvalho (1980) of a male from "Ching Ching" [sic] in HMNH is not acceptable because Budapest was not mentioned under depositories in the original description. Examination of the syntype, a topotypic male (USNM), and a pair of specimens from Taihorinsho (FZMH) revealed that this species is rather more closely related to *Sabactus* Distant. The features which place the species are the shining dorsum, bright coloration, small size, membrane of the vesica with a lobal sclerite of strong spinules (Figs 35, 36), attenuated apex of the right paramere, and structure of the sclerotized rings and posterior wall (Figs 37, 38).

Taylorilygus ornaticollis (Reuter, 1908), **comb. n.** (*Lygus*). Holotype female of *Lygus ornaticollis* Reuter examined with the following labels: "Schmiedekn. Java, 1902", "Spec. typ.", "*Lygus ornaticollis* n. sp. Reuter [Reuter's handwriting]", "MZH No. 10302, *Lygus ornaticollis* Reut." (FZMH). The original description (Reuter, 1908) was based on a "unicum spec." from Java, therefore the type des-

ignation for a female from Formosa by Carvalho (1980) is not acceptable. The straw colour, six longitudinal lines on the pronotum, red scutellum, and long setose antenna place this species in *Taylorilygus*.

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