Notes on the cockroaches of the subfamilies Pycnoscelinae and Diplopterinae from South-East Asia with description of three new species (Dictyoptera: Blaberidae)

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Three new species of the genus *Pycnoscelus* Scudder are described: *P. gorochovi* sp. n., *P. vietnamensis* sp. n. and *P. rothi* sp. n. The male of *P. surinamensis* (Linnaeus) is described, possible original area of this species is pointed out. Data on the morphology and geographical distribution of *Diploptera punctata* (Eschscholtz) are given.

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This work is based on the material from the collection of Zoological Institute, Russian Academy of Sciences. All the examined material, including the types of new species, is deposited at the same institution. For the male genitalia, the author follows the terminology of Grandcolas (1996).

Family **BLABERIDAE** Brunner von Wattenwyl, 1865

Subfamily **PYCNOSCELINAE** Princis, 1960

Several structural characters of the abdominal apex in Pycnoscelinae are unique for the suborder Blattina and may be assumed as autapomorphies of this subfamily:

1. Hypandrium, anal plate and its appendages somewhat concealed under 6th tergite and 8th sternite, respectively.

2. Hypandrium and styli are distinctly asymmetrical. Right stylus is always large, flattened and more or less subtriangular, left stylus is small and slender, or completely absent.

3. Sclerite L1 of the male genitalia consists of two parts, distal and dorsal ones. Distal part is a comparatively large, convex and more or less sclerotized lobe, somewhat toothed apically (Figs 25-28). Dorsal part is an elongated fold, as a rule, strongly sclerotized and toothed dorsally (Figs 25-28).

4. Sclerite R3d of the male genitalia is large and protruded as compared with R2 (Figs 20, 21, 23, 24), R2 has an accessory sclerotized plate, R3v is elongate or subtriangular in shape, N is weakly sclerotized or absent.

Presently, *Pycnoscelus* is the only satisfactorily studied genus of the subfamily. The family Pycnoscelidae was established for two genera, *Pycnoscelus* and *Stilpnoblatta* Saussure & Zehntner (Princis, 1960), the latter genus marked with a sign "?". Later, the same author included *Stilpnoblatta* in Pycnoscelidae without any commentary (Princis, 1964). McKittrick (1964) reduced Pycnoscelidae in rank up to the level of subfamily. Roth (1973) included in Pycnoscelinae three genera: *Pycnoscelus* and *Stilpnoblatta*, united in the tribe Pycnoscelini, and *Proscratea* Burmeister (the monogeneric tribe Proscrateini).

The male genitalia of *Stilpnoblatta opaca* Walker are similar to those of *Pycnoscelus*, but the distal part of sclerite L1 less sclerotized; the structure of the male genitalia of *Proscratea* distinctly differs from that of *Pycnoscelus* and *Stilpnoblatta* (Roth, 1973). Thus, the systematic position of *Proscratea* should be precised in future.

Unfortunately, the structure of abdominal apex of *Stilpnoblatta* and *Proscratea* is still undescribed.

Genus **Pycnoscelus** Scudder, 1862

Pycnoscelus surinamensis (Linnaeus, 1758)
(Figs 1-6, 11, 12, 19, 20, 25, 32-34)

Material. **China**: 2 ♂, 1 ♀, *prov. Yunnan*, Hokow (mouth of Nandinhe River near Vietnam frontier), 80 m, 5-11.VI.1956 (Huang Ke-ren); 1 ♂, *Hainan Is.*, Sin-tsun, 24-25.IV.1958 (D. Naumov); 3 larvae, Haikou, 12.I.1958 (A. Strelkov); 1 ♂, same data, but 30.IV.1958; 1 ♂, same data, but 12.V.1958; 2 larvae, same data, but 14.XI.1958; 2 ♂, 2 ♀, 4 larvae, 120 km NE of Ya Xian (Sanya), 18-30.III.1958 (A. Strelkov); 3 ♀, Lohutou, 17.XI.1958 (A. Strelkov). **Vietnam**: 1 ♀, Hanoi, 3.X.1961 (O. Kabakov); 1 ♀, 50 km N of Thai Nguyen, 300 m, 10.V.1963 (O. Kabakov); 1 ♂, N of Ha Giang, 1000 m, 4.VII.1963 (O. Kabakov); 2 ♀, 50 km N of An Khe, 5-6.XI.1979 (V. Janushev); 1 ♀, *prov. Vinh Phu*, Tam Dao, 24-26.X.1961 (O. Kabakov); 2 ♂, 20 km S of Hai Phong, 12-20.V.1986 (A. Gorochov); 3 larvae, 50 km W of Thanh Hoa, 10.I.1989 (B. Korotyaev); 1 ♀, *prov. Dac Lac*, Nature Reserve Yok Don, near Ban Don, 23-28.XI.1993 (A. Gorochov); 1 ♀, *prov. Gia Lai*, 20 km N of Kannack, Buon Luoi, 3-11.XI.1993 (A. Gorochov); 11 ♂, 1 ♀, same data, but 22.III.-10.V.1995 (A. Gorochov); 2 ♀, same data, but 2.VII.1984 (Sergeeva); 12 ♂, 2 ♀, 40 km N of Kannack, Tram Lap, 900 m, 11-24.IV.1995 (A. Gorochov); 2 ♂, 50-60 km N of Kannack, Kon Cha Rang, 1000-1200, 17.IV.1995. **Cambodia**: 1 ♀, *prov. Campot*, environs of Sihanoukville Town (= Kampong Som), 20-21.II.1998 (A. Gorochov). 2 ♀, "Annam, Song-Dinh", 11.VIII.1909 (Pliginskij). 2 ♂, 3 ♀, "Phuc Son, Annam, XI, XII. H. Rolle, Berlin, S.W.11".

Description of male (nov.). Similar to female, but body more elongate, with tegmina and wings extended beyond the end of abdomen. Head with larger eyes and accordingly smaller interocular space (Fig. 6), as compared with female (Fig. 5); light spot present on frons between eyes (Fig. 6). Fore femora and tibiae (Fig. 3) slenderer than in female (Fig. 4).

Anal plate widely rounded caudally, slightly notched on caudal margin, symmetrical (Fig. 11). Hypandrium asymmetrical (Fig. 12), with excavated right posterolateral area, acute upturned right corner, and left posterolateral angle with projection; right style large, subtrigonal (Fig. 19); left style absent. Male genitalia: sclerite L1 large, well sclerotized, weakly elongated, its posterior margin toothed (Fig. 25); L2d comparatively small, surrounded by large accessory sclerites (Figs 32-34); complex of sclerites R (R3d, R2, R3v) and N of usual blaberid-type (Fig. 20), R3v three-radial.

Length (mm): head ♂ 2.9-3.5, ♀ 2.8-3.3; pronotum ♂ 4.1-5, ♀ 4.5-5.6; elytra ♂ 15-22, ♀ 13-24. Width (mm): head ♂ 2.7-3.4, ♀ 2.8-3.3; pronotum ♂ 5.6-6.7, ♀ 6.1-7.

Notes. P. surinamensis is distributed worldwide, except the regions with temperate climate. This species is represented everywhere by parthenogenetic females: "It is the only obligatory parthenogenetic, thelytokous (usually producing only females; rarely produced males are nonfunctional) species of cockroach known..." (Roth, 1998). Nevertheless, in the collections, which were gathered in Vietnam and South China and are deposited at the Zoological Institute, St.Petersburg, the males are common. In several localities, the males prevail in number over the females.

Thus, the populations of *P. surinamensis* from Vietnam and South China are bisexual, while the populations of this species in the other parts of the world are parthenogenetic. The author supposes that this fact indicates the original area of the species, before its spread over the world. The distinct prevalence of males in several localities is attributed to the differences in the mode of life between the sexes. It may be supposed that the males of *P. surinamensis* live more openly as compared to the females; in particular, in many cases the males have been collected at light. This assumption is supported by fully developed organs of flight in males (Fig. 1) and less widened (adaptation for digging) fore tibia (Fig. 3).

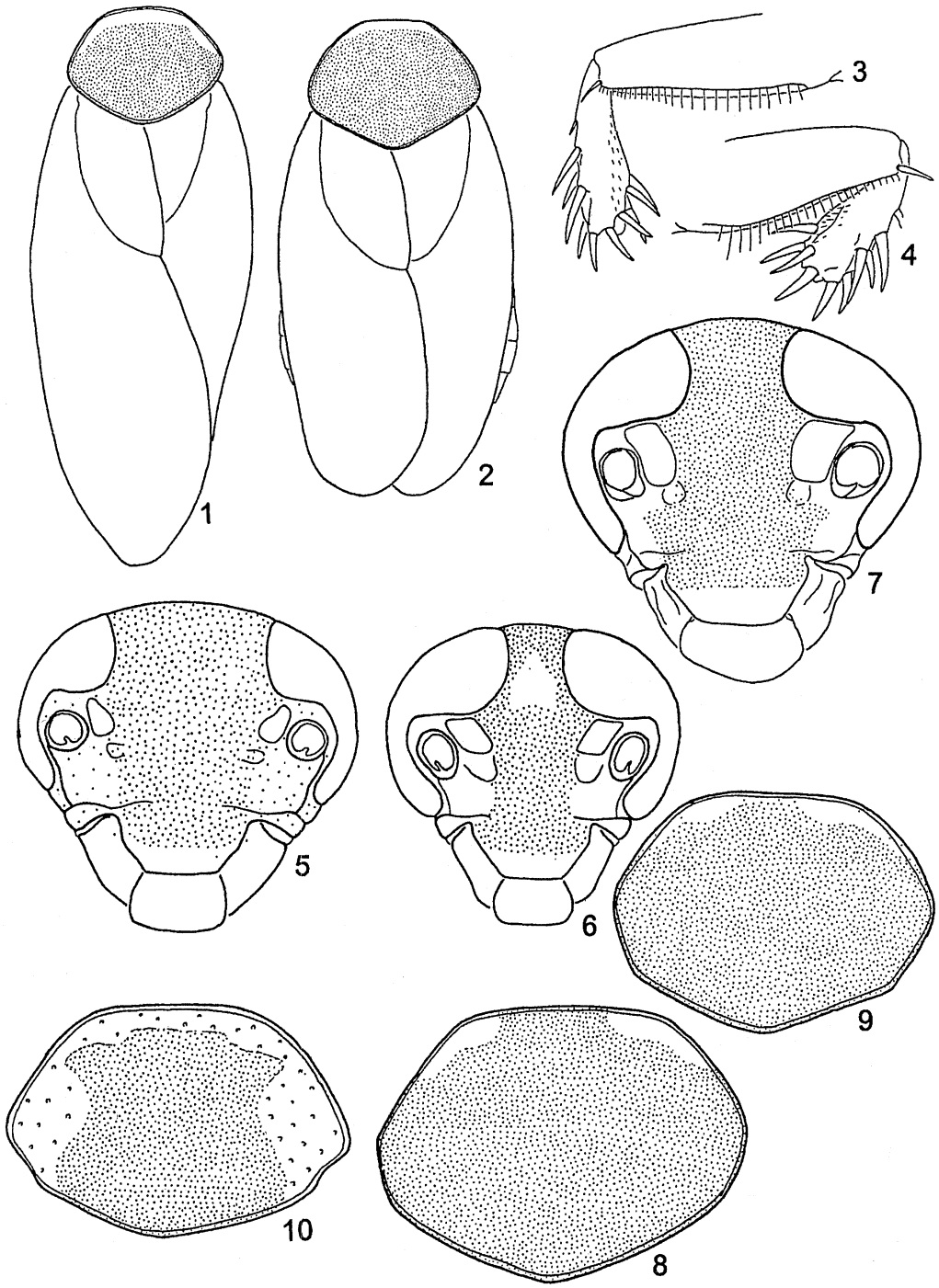
The female has, as a rule, somewhat abbreviated tegmina and wings (Fig. 2) and clearly widened fore tibia (Fig. 4). Noteworthy, solitary females with fully developed organs of flight, similar to male in the appearance, were found in series of *P. surinamensis* from Vietnam and South China.

Three new species described below represent a distinct group in the genus *Pycnoscelus*. These species are united by the peculiar shape of the anal plate: asymmetrical with distinct emargination on the right posterolateral angle (Figs 13, 14, 16). In *P. gorochovi* and *P. vietnamensis* this feature is strongly expressed, while the shape of anal plate of *P. rothi* is intermediate between the above-mentioned species and the other representatives of the genus with more or less symmetrical anal plate. According to the review of *Pycnoscelus* by Roth (1998), asymmetrical anal plate is not found in other species of this genus.

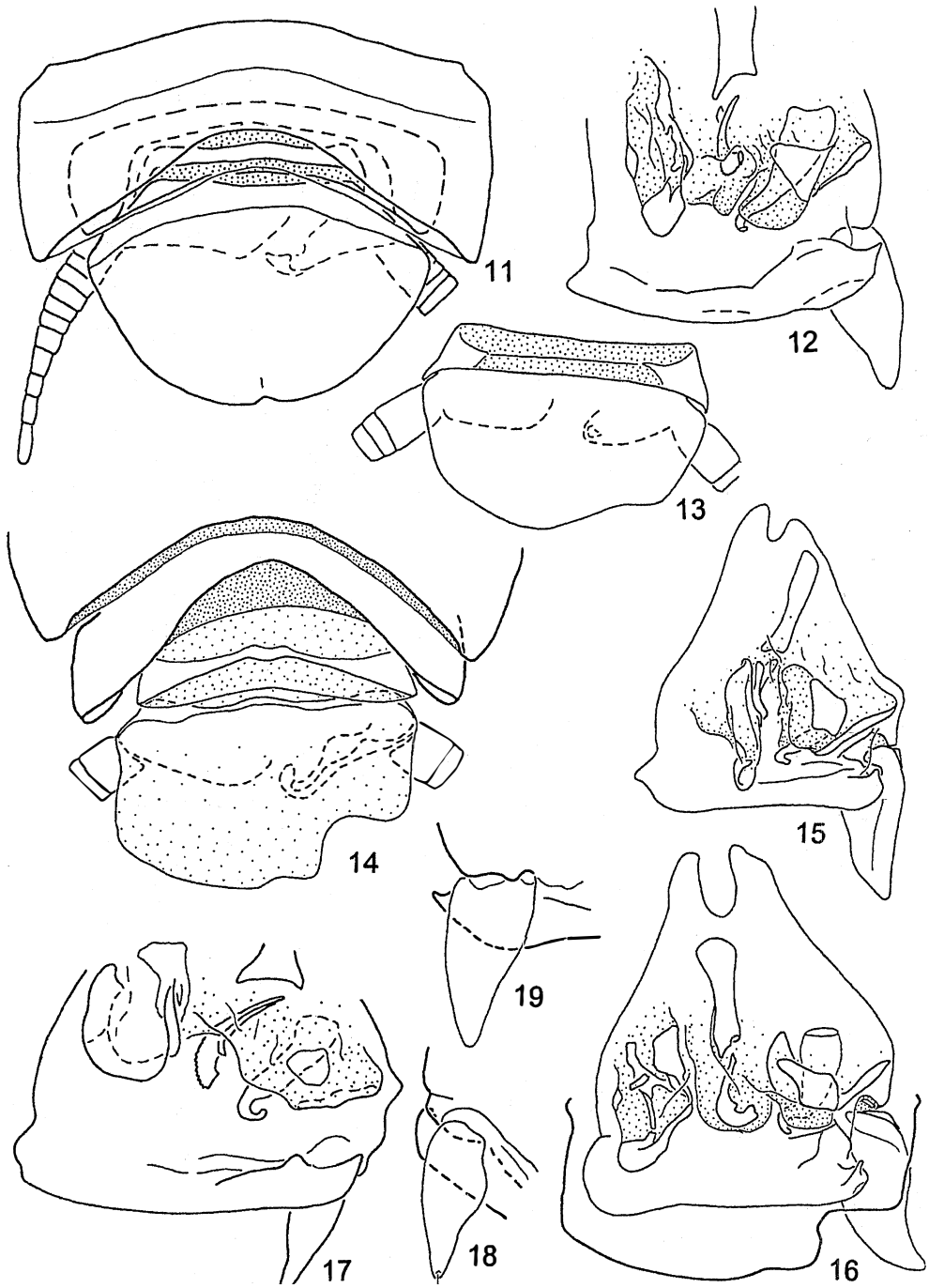
Pycnoscelus gorochovi sp. n.
(Figs 9, 14, 15, 21, 22, 27, 28, 29-31)

Holotype. ♂, **Cambodia**, *prov. Campot*, env. of Sihanoukville (= Kampong Som), 14-21.II.1998 (A. Gorochov).

Description. Male. Facial part of head, vertex and eyes black; other parts of head, antennae,



Figs 1-10. Genus *Pycnoscelus*. **1-6,** *P. surinamensis* (L.) (1, 3, 6, male; 2, 4, 5, female); **7, 8,** *P. vietnamensis* sp. n.; **9,** *P. gorochovi* sp. n.; **10,** *P. rothi* sp. n. Body outline (1, 2); fore femur and tibia (3, 4); head (5-7); pronotum from above (8-10). Dotted area shows dark colour.



Figs 11-19. Genus *Pycnoscelus*, structures of abdominal apex of male. **11**, **12**, **19**, *P. surinamensis* (L.); **13**, **17**, **18**, *P. rothi* sp. n.; **14**, **15**, *P. gorochovi* sp. n.; **16**, *P. vietnamensis* sp. n. Apex of abdomen from above (11, 13, 14); hypandrium and male genitalia from above (12, 17); hypandrium and male genitalia from above, and outline of anal plate (16); right style from below (18, 19). Dotted area shows membranous parts.

mouthparts, maxillary and labial palpi yellowish brown. Pronotum from above blackish, except for small yellow area at anterior margin (Fig. 9). Most of tegmina dark brown, their anterior margin (presumably, costal field) and apex lighter, yellowish. Thorax and abdomen from below, and legs brownish yellow; tibial spines and, partly, tibia and tarsi slightly darker, brownish.

Head with interocular space about 0.7 times the distance between ocellar spots; interval between antennal sockets about 2.3 times the length of scapus. Pronotum subpentagonal, slightly asymmetrical (Fig. 9); its surface smooth with moderately expressed punctation. Tegmina and wings fully developed. Anteroventral margin of fore femur only with small piliform spinules.

Anal plate trapezoidal, with large emargination on right posterolateral angle, asymmetrical (Fig. 14). Hypandrium asymmetrical (Fig. 15), similar to that of *P. surinamensis*, but projection on left posterolateral angle displaced from caudal margin; right style large, left style absent. Male genitalia: sclerite L1 large, well sclerotized, distinctly elongated, its posterior margin toothed (Figs 27, 28); L2d comparatively small, surrounded by large accessory sclerites (Figs 29-31); complex of sclerites R (R3d, R2, R3v) and N similar to that of *P. surinamensis* (Fig. 21), R3v three-radial (Fig. 22).

Female unknown.

Length (mm): head 2.4; pronotum 3.5; elytra 14. Width (mm): head 2.4; pronotum 4.7.

Comparison. The coloration of pronotum of *P. gorochovi* is similar to that in some specimens of *P. janetscheki* Bey-Bienko. The new species differs from *P. janetscheki* and other species of *Pycnoscelus* (Roth, 1998) in the asymmetrically emarginated anal plate, shape of hypandrium and right style.

Pycnoscelus vietnamensis sp. n.
(Figs 7, 8, 16, 23, 36)

Holotype. ♂, **Vietnam**, *prov. Gia Lai*, 20 km N of Kannack, Buon Luoi, 5.IV.1995 (A. Gorochov).

Description. Male. Similar to *P. gorochovi*, but larger. Coloration similar to that of *P. gorochovi*, but slightly darker; pronotum with two small yellow areas at anterolateral angles of pronotum (Fig. 8); anterior margin of tegmina (presumably, costal field) nearly translucent in basal 2/3. Head with interocular space approximately equal to distance between ocellar spots; interval between antennal sockets about 2.3 times the length of scapus (Fig. 7).

Anal plate similar to that of *P. gorochovi* (Fig. 16). Hypandrium asymmetrical (Fig. 16), similar to that of *P. gorochovi*, but projection on left posterolateral angle indistinct; right style large, left style absent. Male genitalia similar to those of *P. gorochovi* (Figs 23, 36), but sclerite L1 more rounded (Fig. 36).

Female unknown.

Length (mm): head 2.6; pronotum 4.2; elytra ~17 (tegmina and wings broken apically). Width (mm): head 2.6; pronotum 5.4.

Comparison. *P. vietnamensis* is similar to *P. gorochovi*, but differs from the latter in the shape of hypandrium (indistinct projection on the left posterolateral angle), right style and sclerite L1 of the male genitalia, details of coloration and larger size. The deeply emarginated anal plate distinguishes this species from the other representatives of the genus, except for *P. gorochovi*.

Pycnoscelus rothi sp. n.
(Figs 10, 13, 17, 18, 24, 26, 35)

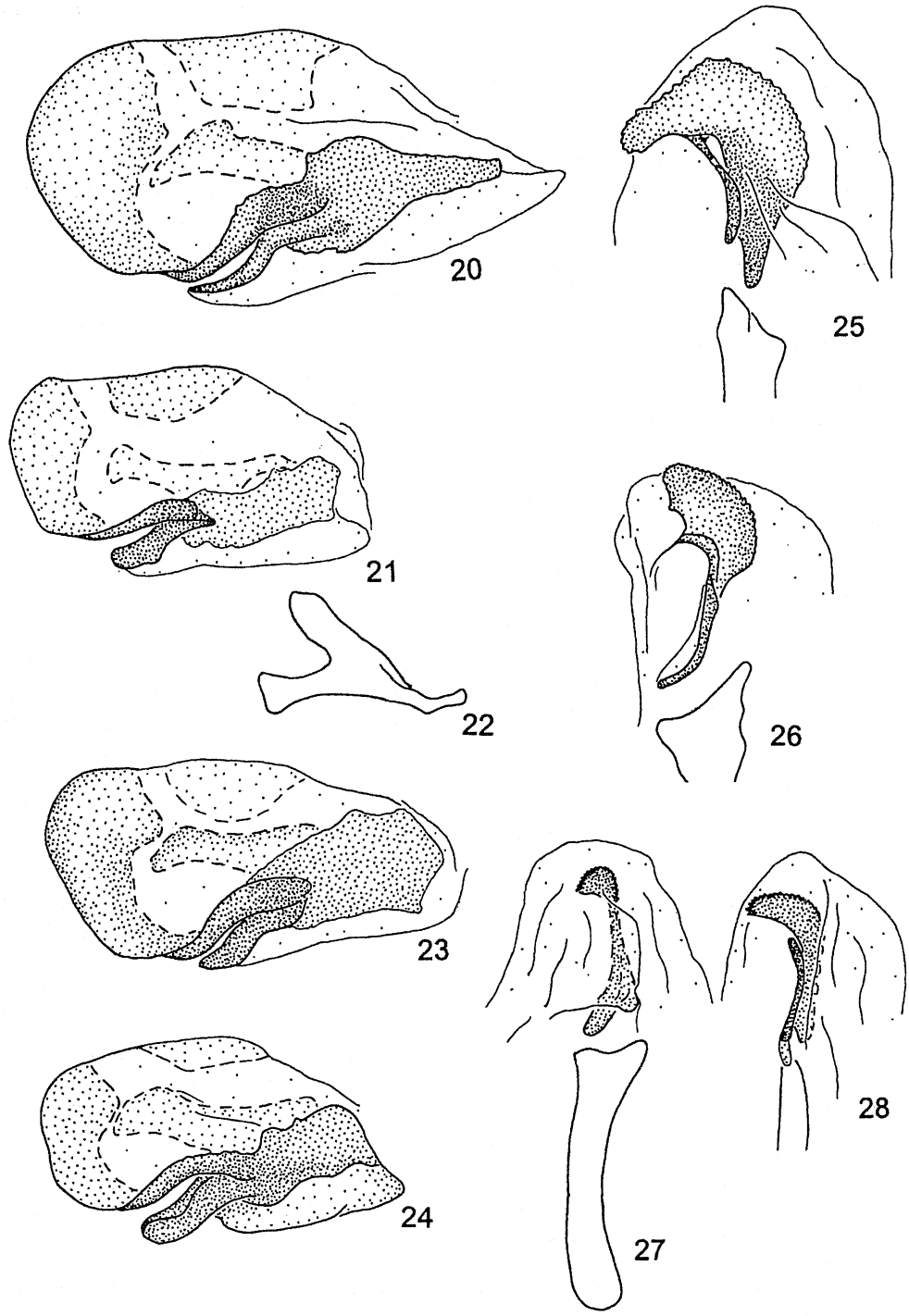
Holotype. ♂, **Cambodia**, *prov. Campot*, env. of Sihanoukville (= Kampong Som), 14-21.II.1998 (A. Gorochov).

Description. Male. Facial part of head, vertex and eyes black, except for yellowish band on vertex between eyes; other parts of head, antennae, mouthparts, maxillary and labial palpi yellowish brown. Pronotum from above blackish, except for yellowish lateral and anterior parts covered with numerous brownish dots (Fig. 10). Tegmina similar to those of *P. vietnamensis*: brownish, with translucent anterior margin and with more or less distinct blackish stripe along *R*. Thorax and abdomen from below, and legs brownish yellow, sometimes blackish; tibial spines reddish.

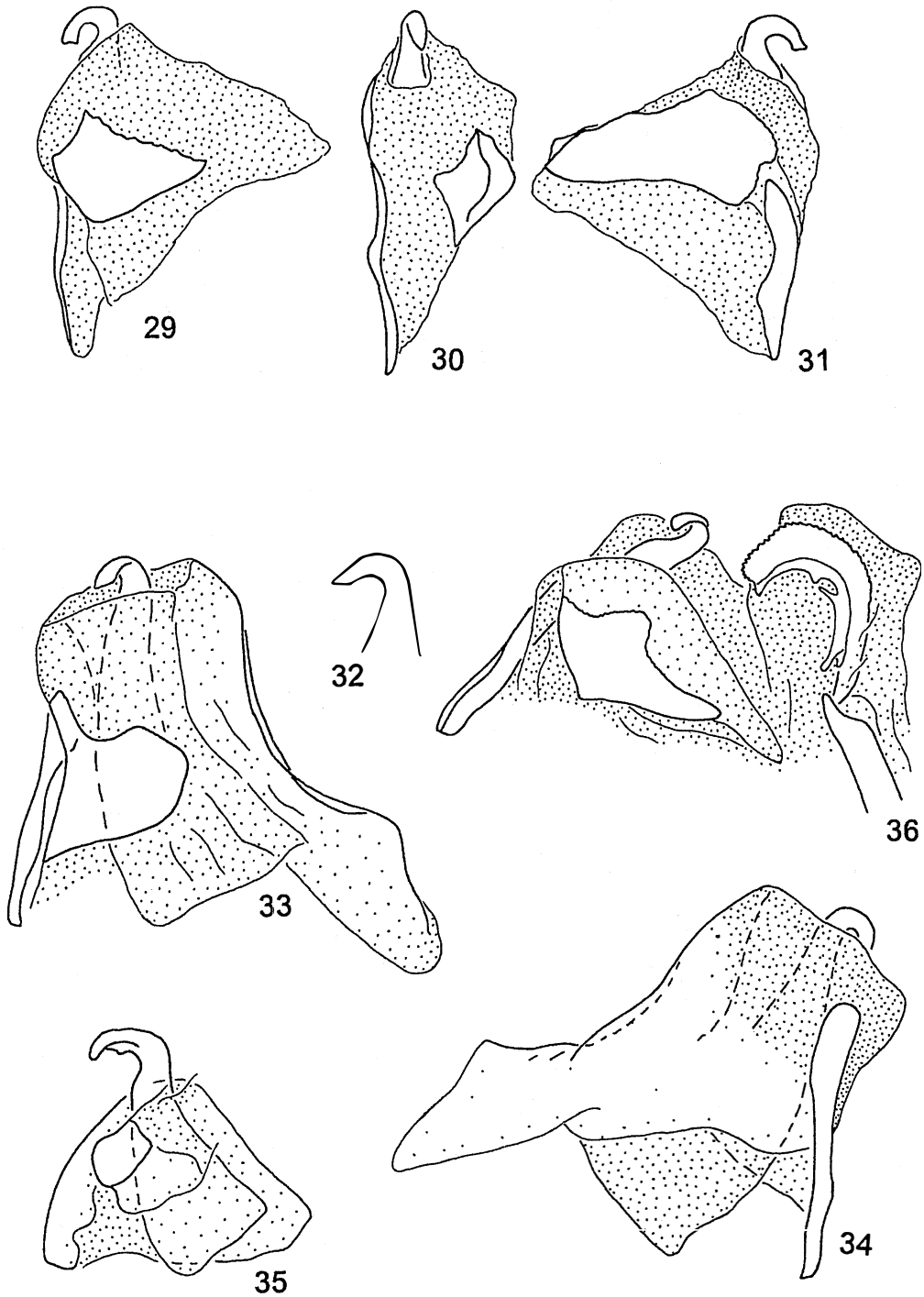
Head with interocular space about 1.3 times the distance between ocellar spots; interval between antennal sockets about 2.3 times the length of scapus. Pronotum as in Fig. 10, with sparse and distinct punctation. Tegmina and wings fully developed. Anteroventral margin of fore femur only with small piliform spinules.

Anal plate trapezoidal, with small emargination on right posterolateral angle, asymmetrical (Fig. 13). Hypandrium asymmetrical (Fig. 17), similar to that of *P. surinamensis*, but projection on left posterolateral angle indistinct; right style large (Fig. 18), left style absent. Male genitalia similar to those of *P. gorochovi*, but sclerite L1 clearly elongated with enlarged toothed parts (Fig. 23). Sclerite L2d with small tooth on inner side before apex (Fig. 35).

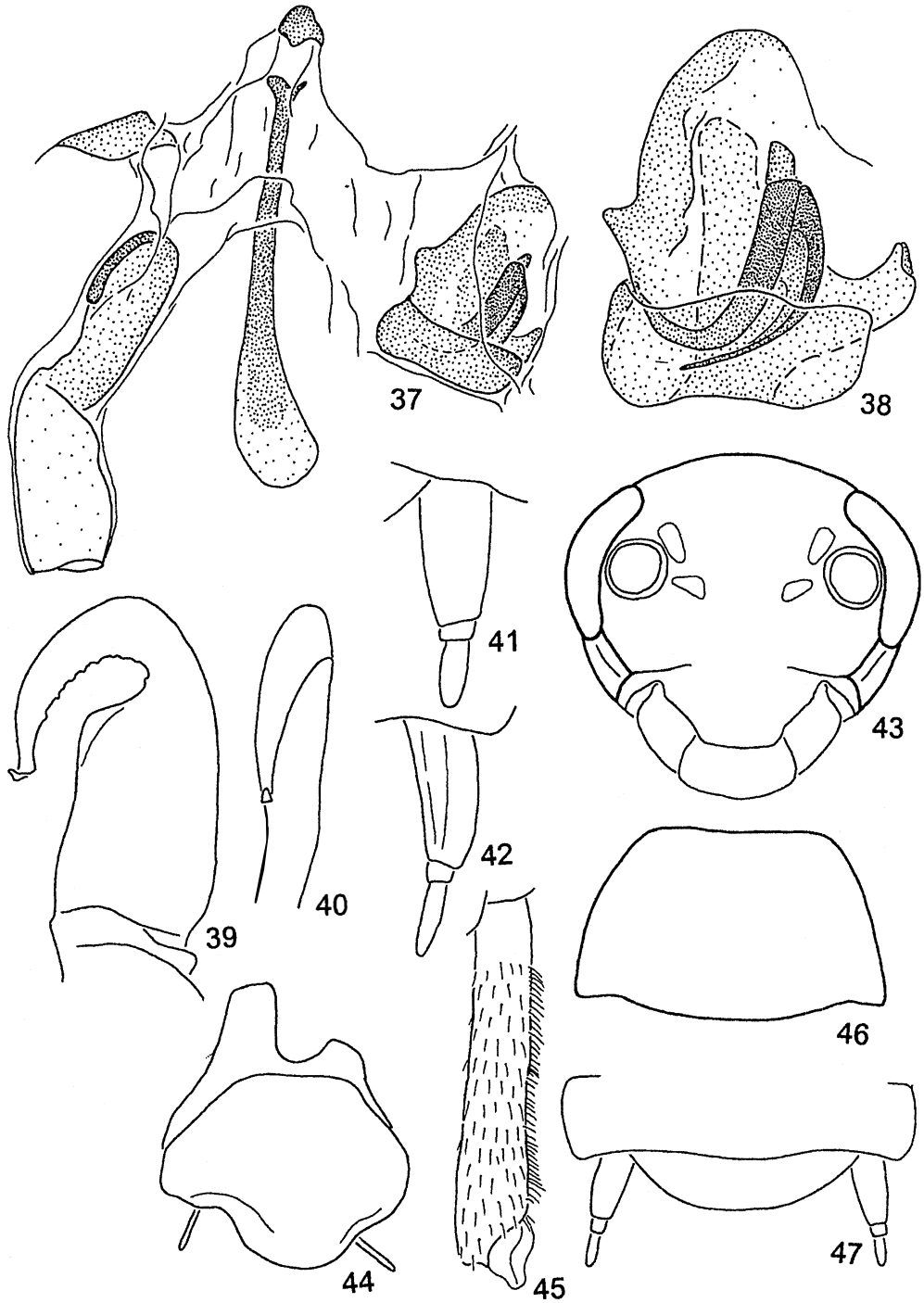
Female unknown.



Figs 20-28. Genus *Pycnoscelus*, male genitalia. **20**, **25**, *P. surinamensis* (L.); **21**, **22**, **27**, **28**, *P. gorochovi* sp. n.; **23**, *P. vietnamensis* sp. n.; **24**, **26**, *P. rothi* sp. n. Complex of sclerites R (R3d, R2, R3v) and N (20, 21, 23, 24); sclerite R3v (22); apex of sclerite L1 from above (25, 26) and from side (28); sclerite L1 from above (27). Dotted area shows sclerotized parts.



Figs 29-36. Genus *Pycnoscelus*, male genitalia. **29-31**, *P. gorochovi* sp. n.; **32-34**, *P. surinamensis* (L.); **35**, *P. rothi* sp. n.; **36**, *P. vietnamensis* sp. n. Sclerite L2d and accessorial sclerites, from above (29, 33, 35), from side (30), and from below (31, 34); apex of sclerite L2d (32); sclerite L2d and accessorial sclerites and L1, from above (36). Dotted area shows membranous parts.



Figs 37-47. *Diploptera punctata* (Eschscholtz), male. Genitalia, general view from above (37); complex of sclerites R (R3d, R2, R3v) and N (38); sclerite L2d from above (39) and from side (40); cercus in different aspects (41, 42); head (43); hypandrium from below (44); 1st segment of tarsus from side (45); outline of pronotum (46) and abdominal apex (47). Dotted area shows sclerotized parts.

Length (mm): head 2.4; pronotum 3.6; elytra 13.5. Width (mm): head 2.4; pronotum 5.1.

Comparison. The coloration of pronotum and head of *P. rothi* is similar to that of *P. conferta* (Walker), but the blackish area on pronotum reaches its caudal margin. The new species differs from the other representatives of *Pycnoscelus*, except for *P. gorochovi* and *P. vietnamensis*, in having an asymmetrical anal plate with distinct emargination. *P. rothi* differs from *P. gorochovi* and *P. vietnamensis* in the coloration of head and pronotum, and in weaker emargination on the anal plate.

Subfamily **DIPLOPTERINAE** Walker, 1868

The author follows Roth (1973) in understanding of this subfamily. According to him, Diplopterinae is a monogeneric subfamily.

Two morphological features of Diplopterinae may be assumed as autapomorphies:

1. Tegmina are completely sclerotized and form elytra resembling those of beetles. Wings are completely developed and have large apical field with distinct veins.
2. At least *Diploptera punctata*, the only species with well-known bionomics in the subfamily, is viviparous (Roth, 1970).

The both features are not unique for the suborder Blattina. More or less beetle-like tegmina are known in representatives of Corydiidae, Blattidae and Anaplectidae. The viviparity developed independently in the tribe Geoscapheini (Panesthiinae) (Rugg & Rose, 1984).

Genus **Diploptera** Saussure, 1864

From seven species of this genus, only *D. punctata* (Eschscholtz) is reported from the continental part of South-East Asia (Princis, 1965).

Diploptera punctata (Eschscholtz, 1822) (Figs 37-47)

Material. **China**: 1 ♀, *prov. Yunnan*, Ganlanba (30 km SO of Cheli, on Mekong), 560 m, 19.IV.1957 (Hun Kuanchi). **Vietnam**: 1 ♂, *prov. Vinh Phu*, env. of Buon Luoi, 1.IV.1995 (A. Gorochov); 1 ♀, NO of Thai Nguyen, 31.VII.1963 (O. Kabakov). **Thailand**: 1 ♀, *prov. Phetchaburi*, env. of National Park Kaeng Krachan, 30-31.VII.1996 (A. Gorochov); 1 ♀, *prov. Nakhon Ratchasima*, env. of National Park Khao Yai, 500-1000 m, 26.X.-4.XI.2000 (A. Gorochov, L. Anisyutkin); 2 ♂, 1 ♀, *prov. Trat*, Chang Is. (Siam Bay), low mountains near sea, 5-20.XI.2000 (A. Gorochov, L. Anisyutkin). **Hawaii**: 2 ♀, "*Eleutheroda dytiscoides* Brunn. Hawaii, Ma Ku Kona". **New Britain Is.**: 1 ♀, 1 larva, "*E. dytiscoides* Serv. New Britania. Brunner v. W. det". **Fiji**: 3 ♀, "Viti Ins.".

Notes. The male genitalia and structures of abdominal apex are of usual blaberid-type (Figs 37-40). The structure of cerci is unusual (Figs 41, 42), they are three-segmented with 1st segment the largest.

Diploptera punctata is a common species in SE Asia and Pacific. It is found both in undisturbed and anthropogenic landscapes.

Length (mm): head ♀ 3.4-4.1, ♂ 3.7; pronotum ♀ 3.9-4.6, ♂ 4; elytra ♀ 12.5-15.5, ♂ 12.3. Width (mm): head ♀ 3.6-4.1, ♂ 3.8; pronotum ♀ 6.6-7.8, ♂ 6.9.

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