

## **Review of the genus *Pseudovelia* HOBERLANDT, 1950 (Heteroptera, Veliidae) on the Philippines: Part III: Greater Mindoro, Sibuyan, Romblon-Tablas, Greater Negros-Panay**

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### **Abstract**

The third part of the revision of the Philippine species of *Pseudovelia* HOBERLANDT, 1950 treats the biogeographic region Greater Negros-Panay, and some smaller regions, i.e., Greater Mindoro, Sibuyan, and Romblon-Tablas. Four new species are described: *P. kerzhneri* sp.n. (Negros, Siquijor), *P. mindoroensis* sp.n. (Mindoro), *P. sibuyana* sp.n. (Sibuyan), and *P. zetteli* sp.n. (Tablas). The widespread species *P. schoenigi* HECHER & BONGO, 2006 also occurs on Greater Negros-Panay. A key to the males occurring in these regions is provided. The actual number of *Pseudovelia* taxa in the Oriental and eastern Palaearctic Region is cited with 61 species and two subspecies.

**Key words:** Veliidae, Microveliinae, *Pseudovelia*, new species, key, Philippines, Greater Mindoro, Greater Negros-Panay, Tablas, Sibuyan.

### **Zusammenfassung**

Der dritte Teil der Revision philippinischer Arten der Gattung *Pseudovelia* HOBERLANDT, 1950 behandelt die biogeografische Region „Greater Negros-Panay“ sowie einige kleinere Inselregionen, nämlich „Greater Mindoro“, Sibuyan und „Romblon-Tablas“. Vier neue Arten werden beschrieben: *P. kerzhneri* sp.n. (Negros, Siquijor), *P. mindoroensis* sp.n. (Mindoro), *P. sibuyana* sp.n. (Sibuyan) und *P. zetteli* sp.n. (Tablas). Die weitverbreitete Art *P. schoenigi* HECHER & BONGO, 2006 ist ebenfalls aus der Region „Greater Negros-Panay“ nachgewiesen. Ein Bestimmungsschlüssel zu den Männchen in diesen Regionen wird vorgestellt. Die aktuelle Anzahl der *Pseudovelia*-Taxa in der orientalischen und ostpalaarktischen Region beträgt nun 61 Spezies und zwei Subspezies.

### **Introduction**

This study represents part III of the review of the Philippine species of *Pseudovelia* HOBERLANDT, 1950. Part I was published in 1999 and dealt with the biogeographic region “Greater Palawan” and two new species, *P. tenuis* and *P. lata* (SEHNAL 1999). Part II from 2006 provides the descriptions of nine new species from “Greater Luzon”: *P. polhemi*, *P. cristata*, *P. curvata*, *P. gapudi*, *P. simplex*, *P. quezonica*, *P. heissi*, *P. quadrifolia*, and *P. marinduquensis*, and a redescription of *P. reiseni* POLHEMUS, 1976 (HECHER 2006). Part IV will treat the region of “Greater Mindanao” and some smaller islands in the southern Philippines, e.g., the Camotes group and Camiguin.

Greater Mindoro was never connected to other islands, not even during the Pleistocene regression of the sea level, and therefore is considered as one of the hot spots of endemism on the Philippines (VALLEJO 2011). Romblon, Tablas, and Sibuyan form the Romblon Island Group (RIP), located in the centre of the Philippine archipelago. These islands also stayed separated from each other during the Pleistocene (HEANEY 1985). Greater Negros-Panay includes the islands of Panay, Negros, Cebu, Masbate, and Ticao, which formed a large island when the sea-level was low in the Pleistocene (HEANEY 1985). Now, a great break, the Tañon Strait, separates the islands Negros and Panay from Cebu and Bohol (HEADS 2014). But according to HEADS (2014), who based his studies on molecular evidence, the distribution patterns on the Philippine islands are not only related with the geological situation during the Pleistocene, but also with earlier tectonic and climatic events which have taken place since the late Mesozoic time. This may explain the occurrence of the widespread species *P. schoenigi* HECHER & BONGO, 2006, on all islands of Greater Negros-Panay, as well as on Siquijor, Poro, Bohol, Leyte, Biliran, and Samar (HECHER & BONGO 2006).

Since the clarification of the taxonomic status of *Pseudovelia* as a valid genus and its detailed redescription by ANDERSEN (1983), many new species have been added from Southeast Asia: from the mainland (Vietnam, HECHER 1997; Thailand, HECHER 2005; China, YE et al. 2013), from the Malay Peninsula (HECHER & ZETTEL 2006), and from several islands (Mindanao and Sulawesi, NIESER 1995; other Philippine islands, SEHNAL 1999, HECHER 2005, HECHER & BONGO 2006; Taiwan, YE et al. 2013). The current number of valid taxa of *Pseudovelia* in the Oriental and eastern Palaearctic region thereby increased to 61 species and two subspecies, and further undescribed species remain unpublished, e.g., from Mindanao and Borneo.

## Material and methods

The examined material is deposited in the following collections: NHMW = Natural History Museum, Vienna, Austria; PNM = Philippine National Museum, Manila, Philippines; UPLB = Museum of Natural History, University of the Philippines, Los Baños, Laguna, Philippines; ZCW = Herbert Zettel private collection, Vienna, Austria.

Further abbreviations: apt. = apterous; macr. = macropterous.

Label data are cited in brackets [].

Measurements were taken from at least three males and three females of each morph and each locality, or of all specimens, if fewer than three were available. The relative lengths of antennomeres 1, 3, and 4 are given in relation to the length of antennomere 2. The term “genitalia” is used functionally and thus includes segment 8 of males.

## Taxonomy

### Key for males

- 1 Metatarsomere 2 with long hairs (Fig. 10). ..... *P. mindoroensis* sp.n.
- Metatarsomere 2 without long hairs (Figs. 9, 11, 12). ..... 2
- 2 Metatarsomere 1 with dense row of short bristles (Fig. 9). Body stout; mediotergite 2 about as wide as head (Fig. 1). ..... *P. kerzhneri* sp.n.

- Metatarsomere 1 with long hairs (Figs. 11, 12). Body slender; mediotergite 2 distinctly narrower than head (Figs. 3, 5). ..... 3
- 3 Small species (Fig. 3); maximum body width  $\leq 0.70$  mm (apt.) or  $\leq 0.95$  mm (macr.). Segment 8 with ventral depression and transverse ridges as shown in Figure 19. .... *P. sibuyana* sp.n.
- Larger species; maximum width  $> 0.70$  mm (apt.) or  $\geq 0.95$  mm (macr.). Segment 8 of different structure. .... 4
- 4 Body shape ovate (Fig. 5); combined length of mediotergites 1–7 in relation to width of mediotergite 4 as  $1 : \geq 0.27$ . Ventral depression of segment 8 with sparse pilosity, its margin with ear-like elevation beset with short bristles (Figs. 22, 23). ..... *P. zetteli* sp.n.
- Body shape parallel-sided (Fig. 4); combined length of mediotergites 1–7 in relation to width of mediotergite 4 as  $1 : \leq 0.27$ . Ventral depression of segment 8 with dense pilosity, margin of depression with long hairs (Figs. 25, 26). ..... *P. schoenigi*

***Pseudovelia kerzhneri* sp.n.** (Figs. 1, 9, 13–15, 28)

Type locality: Philippines, Negros Island, Negros Oriental Province, Casaroro Falls, N9°17', E123°12'.

Type material: holotype (apt. ♂; PNM) labelled [PHILIPPINES, Negros or.\ W Dumaguete, Valencia\ Casaroro Falls, 26.2.\ 1997, leg. H. Zettel (118)]. Paratypes (NHMW, UPLB, ZCW): 2 ♂♂ (apt.), 2 ♀♀ (apt.) same data as holotype; 5 ♂♂ (apt.), 7 ♀♀ (apt.) labelled [Philippines: Siquijor\ Bandila-an NP, Lodge-\ Little Waterfall, 23.10.\ 2004, leg. Zettel (395)]; 9 ♂♂ (apt.), 10 ♀♀ (apt.) labelled [Philippines: Siquijor\ Bandila-an NP, Lodge-\ Little Waterfall, 23.10.2004\ leg. Pangantihon (P395)].

Further material (NHMW): 1 larva from locality #P395.

Size: Body length: 2.17–2.43 mm (apt. ♂♂), 2.52–2.75 mm (apt. ♀♀); length of mediotergites 1–7 (♂♂) or 1–8 (♀♀) to width of mediotergite 4 as  $1 : 0.33$ – $0.37$  (apt. ♂♂),  $1 : 0.23$ – $0.29$  (apt. ♀♀); maximum width across suture between metanotum and laterotergite 1: 0.95–1.00 mm (apt. ♂♂), 1.00–1.10 mm (apt. ♀♀); width of pronotum 0.85–0.90 mm (apt. ♂♂), 0.82–0.90 mm (apt. ♀♀); width of head 0.60–0.64 mm (♂♂, ♀♀).

Apterous male (Fig. 1): Colour: Head brown to dark brown, in most specimens with posterior margin of vertex lighter brown or yellow; antenna brown, with base of antennomere 1 light brown to yellow. Pronotum light to dark brown, with transverse stripe near anterior margin yellow to light brown; black, irregularly distributed punctures or pores on pronotum, but missing on stripe. Metanotum dark brown to black. Legs brown, with basal part of femora yellow and tarsi dark brown. Mediotergites dark brown to black, mediotergite 7 caudally (dark) brown to reddish-brown. Laterotergite 1 entirely and laterotergites 2–7 medially dark brown to black, laterally (dark) brown to reddish-brown, in most specimens entire sutures between laterotergites dark brown to black. Ventral surface of thorax and abdomen black, stripe on lateral margins of sterna light to dark brown or reddish-brown.

Pilosity: Entire body surface covered with short, recumbent, silvery hairs and long, erect hairs, obviously long and dense on metatibia, but stripes on lateral margins of sterna 2–5 only with very short, recumbent bristles. Stout, silvery hairs forming stripes on vertex along margin of eyes, covering lateral area of mediotergite 1, forming small and in some specimens very indistinct patches on mediotergite 3, in some specimens also on mediotergite 2, and scattered on caudal margin of mediotergite 6, on mediotergite 7,



Figs. 1–2: Habitus of apterous male, dorsal: (1) *P. kerzhneri* sp.n.; (2) *P. mindoroensis* sp.n.



Figs. 3–4: Habitus of apterous male, dorsal: (3) *P. sibuyana* sp.n.; (4) *P. schoenigi*.



Figs. 5–6: Habitus of *P. zetteli* sp.n., dorsal: (5) apterous male; (6) macropterous male (dealate).



Figs. 7–8: Habitus of *P. zetteli* sp.n., dorsal: (7) apterous female; (8) macropterous female.



and caudal margin of laterotergites 3–5. Metatarsus with dense row of short bristles over entire length of metatarsomere 1, metatarsomere 2 without special pilosity (Fig. 9). Eyes without hairs except for two ocular setae.

Structural characters: Ventral lobe of head not produced caudad. Antenna 0.61–0.68 times as long as body, relative length of antennomeres 1–4 as 1.2–1.3 : 1 : 1.1–1.2 : 1.3–1.4;  $4 \geq 1 > 3 > 2$ . Pronotum 0.51–0.59 times as long as wide. Grasping comb on protibia 0.77–0.82 times as long as tibia. Metatarsus 0.57–0.65 times as long as metatibia, first metatarsomere 0.70–0.85 times as long as second. Second mediotergite 1.00–1.09 times as wide as head. Laterotergites 2–7 slightly raised.

Genitalia: Segment 8 with scattered, long hairs on caudo-dorsal margin; ventral surface with two large, oval, sloping depressions, beset with long, recumbent hairs (Figs. 13, 14). Pygophore with row of dense, long bristles on caudo-lateral margin (Fig. 15).

Apterous female: Colour as in apterous male, but in some specimens transverse stripe near anterior margin of pronotum very slender and in some specimens not extending over lateral portion; mediotergite 7 and sternum 7 unicoloured, caudal margin of sternum 8 light to dark brown or reddish-brown.

Pilosity as in apterous male, but long, erect hairs additionally on lateral margins of sterna 2–5 (instead of short bristles as apparent in male), more dense on latero-caudal margin of sternum 7, and missing on mediotergites 5–7; metatarsus without special pilosity.

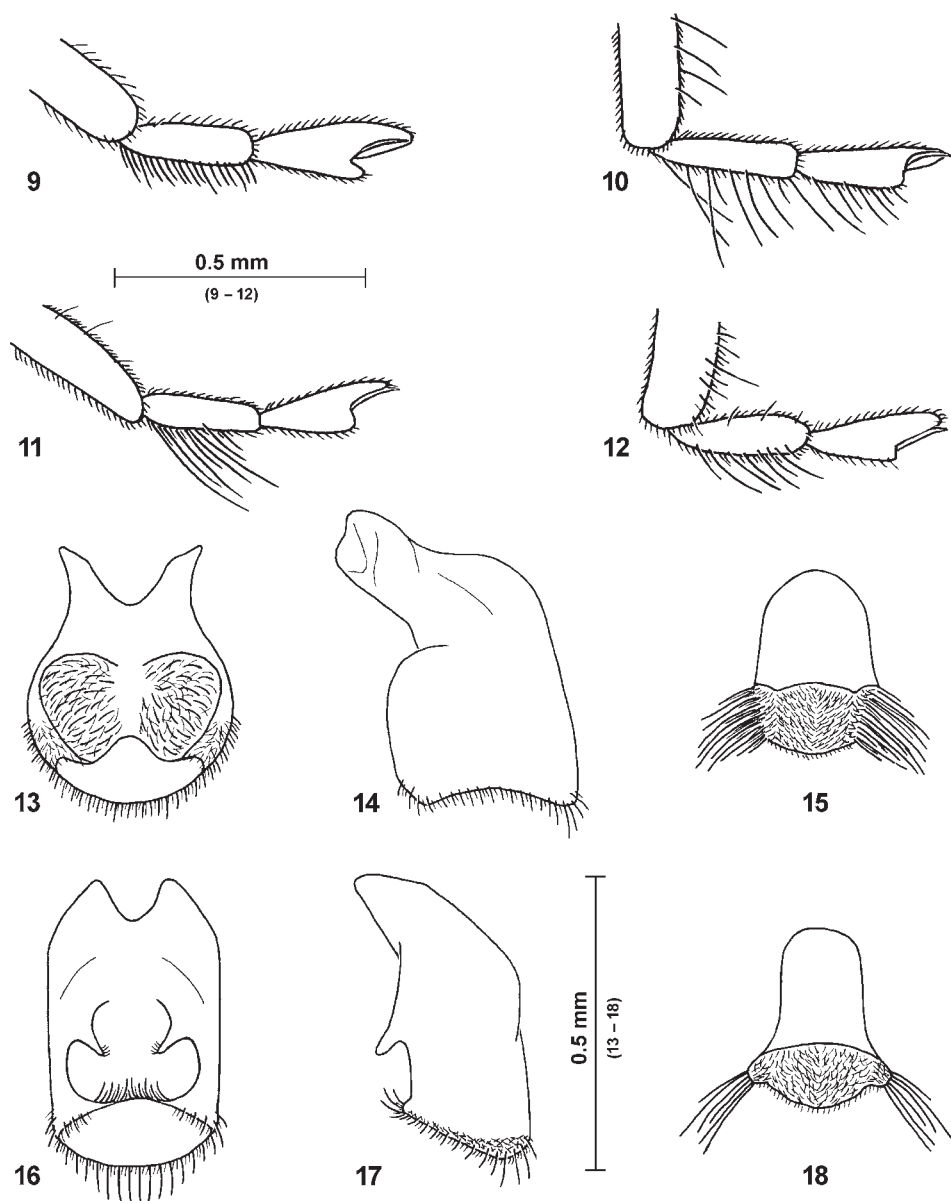
Structural characters as in apterous male, but antenna 0.51–0.53 times as long as body, relative length of antennomeres 1–4 as 1.2–1.4 : 1 : 1.0–1.1 : 1.3–1.4; pronotum 0.49–0.57 times as long as wide; protibia without grasping comb; metatarsus 0.53–0.56 times as long as metatibia, first metatarsomere 0.53–0.61 times as long as second; second mediotergite 1.05–1.17 times as wide as head; laterotergites 2–7 wider and more strongly raised than in male. Proctiger and gonocoxa 1 with short, dense, erect hairs, gonocoxa 1 with some long, bristle-like hairs; structure as shown in Figure 28.

**Diagnosis:** Length of mediotergites 1–7 (8) to width of mediotergite 4 as 1 : 0.33–0.37 (apt. ♂♂), 1 : 0.23–0.29 (apt. ♀♀); maximum width in apterous specimens across suture between metanotum and laterotergite 1. Relative length of antennomeres:  $4 \geq 1 > 3 > 2$ . Male: Grasping comb on protibia 0.77–0.82 times as long as tibia. First metatarsomere 0.70–0.85 times as long as second, with ventral row of short, dense bristles over entire length; metatarsus 0.57–0.65 times as long as metatibia. Pygophore with row of dense, long bristles on caudo-lateral margin. Structure of male and female genitalia as shown in Figures 13–15, 28.

**Etymology:** *Pseudovelvia kerzhneri* sp.n. is named in honour of the late Dr. Izyaslav M. Kerzhner, whom I (the first author) got to know personally during his study visit in the Natural History Museum of Vienna in 1998. I was fascinated by his extraordinary knowledge of Heteroptera and heteropterological literature, and I appreciated his pleasant and friendly character a lot.

**Comparative notes:** *Pseudovelvia kerzhneri* sp.n. seems to be closely related to *P. argyropardala* NIESER, 1995 from Sulawesi and Mindanao, because of similarities in the structure of the male segment 8, but can easily be distinguished by the structure and pilosity of the metatarsus. In *P. argyropardala* the first metatarsomere is about 0.59 times as long as the second and beset with about 20 long cilia (NIESER 1995), whereas in *P. kerzhneri* sp.n. it is 0.70–0.85 times as long as the second and beset with short, dense bristles.





Figs. 9–18: Metatarsus (and apex of metatibia) of male: (9) *P. kerzhneri* sp.n., (10) *P. mindoroensis* sp.n., (11) *P. sibuyana* sp.n., (12) *P. zetteli* sp.n. Male genitalia: (13–15) *P. kerzhneri* sp.n., (16–18) *P. mindoroensis* sp.n. (13, 16) segment 8, ventral, (14, 17) segment 8, lateral, (15, 18) segment 9, ventral.

In Negros and Siquijor also *Pseudovelia schoenigi* occurs, but it differs in the body shape, the structure of the male genitalia, and the pilosity of the metatarsus.

Distribution: Negros, Siquijor.

*Pseudovelia mindoroensis* sp.n. (Figs. 2, 10, 16–18, 29)

Type locality: Philippines, Mindoro Island, Oriental Mindoro Province, ca. 10 km west of Puerto Galera, Mindoro Beach, ca. N13°29', E120°51'.

Type material: holotype (apt ♂; PNM), labelled [PHILIPPINEN: Mindoro or. Mindoro Beach, 10km W Puerto Galera, leg. H.Zettel (17)] [kleiner Fluß u.Ufer, 24.11.1992]. Paratypes (NHMW, CZW): 3 ♀♀ (apt.), 2 ♀♀ (macr.): same data as holotype; 1 ♂ (apt.), 1 ♂ (macr.), 1 ♀ (apt.) [Philippinen: Mindoro Or. W Puerto Galera, Aninuan Waterfalls, 27.1.1999 leg. H. Zettel (168)].

Further material (NHMW, CZW): 6 larvae from locality #17; 1 larva from locality #168.

Size: Body length: 2.12–2.20 mm (apt. ♂♂), 2.38 mm (macr. ♂), 2.42–2.63 mm (apt. ♀♀), 2.62–2.65 mm (macr. ♀♀); length of mediotergites 1–7 (8) to width of mediotergite 4 as 1 : 0.31 (apt. ♂♂), 1 : 0.20–0.24 (apt. ♀♀); maximum width across suture between metanotum and laterotergite 1: 0.82–0.85 mm (apt. ♂♂), 0.95–1.05 mm (apt. ♀♀); width of pronotum 0.77–0.79 mm (apt. ♂♂), 1.08 mm (macr. ♂), 0.75–0.84 mm (apt. ♀♀), 1.10–1.13 mm (macr. ♀♀); width of head 0.56–0.58 mm (♂♂), 0.57–0.61 mm (♀♀).

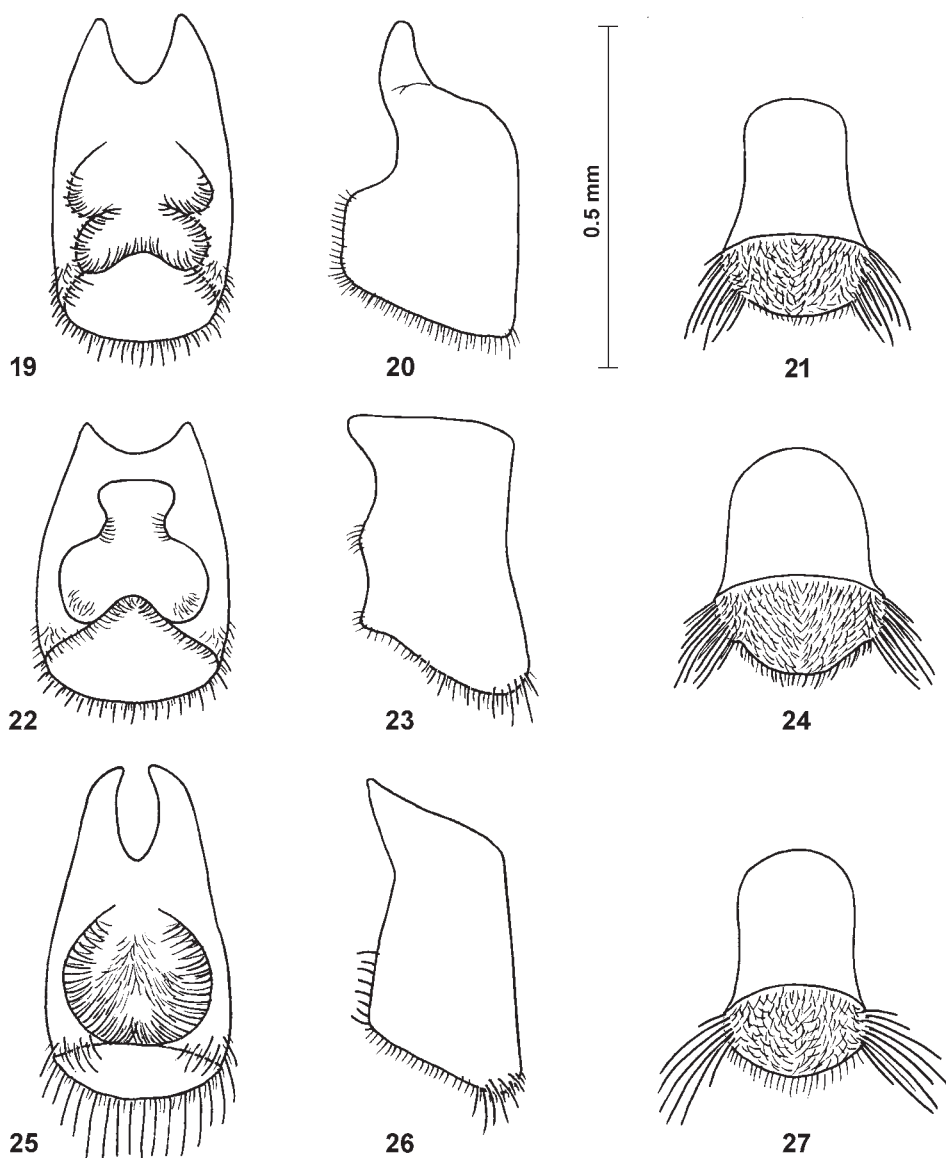
Apterous male (Fig. 2): Colour: Head light brown; antenna dark brown. Pronotum light brown, with transverse stripe near anterior margin slightly lighter; black, irregularly distributed, fine pores on pronotum, but missing on stripe. Metanotum (dark) reddish-brown, sutures between pronotum and metanotum, and between metanotum and laterotergite 1 black. Legs brown, with basal part of femora yellow, apex of femora, base and apex of tibiae, and entire tarsi dark brown. Mediotergites dark brown to dark reddish-brown, mediotergite 7 caudally light brown. Laterotergites reddish-brown, laterotergites 2–7 medially only slightly darker than laterally. Ventral surface of thorax and abdomen blackish, stripe on lateral margins of sterna and caudal margin of sternum 7 light brown.

Pilosity: Entire body surface covered with short, recumbent, silvery hairs and long, erect hairs, obviously long and dense on metatibia. Stout, silvery hairs forming very indistinct stripes on vertex along margin of eyes, covering lateral area of mediotergite 1, forming patches medially on mediotergites 6 and 7, and medially on laterotergites 3–5. Metatibia with scattered long hairs. Metatarsus with ventral row of long, bristle-like hairs over entire length of metatarsomere 1, metatarsomere 2 also with long hairs, but shorter (Fig. 10). Eyes without hairs except for two ocular setae.

Structural characters: Ventral lobe of head not produced caudad. Antenna 0.57–0.63 times as long as body, relative length of antennomeres 1–4 as 1.3–1.4 : 1 : 1.1–1.2 : 1.5–1.6; 4 > 1 > 3 > 2. Pronotum 0.58 times as long as wide. Grasping comb on protibia 0.77–0.79 times as long as tibia. Metatarsus 0.69–0.71 times as long as metatibia, first metatarsomere 0.97–1.03 times as long as second. Second mediotergite 0.98 times as wide as head. Laterotergites 2–7 slightly raised.

Genitalia: Segment 8 with scattered, very long hairs on caudo-dorsal margin, ventral surface caudally with small depression, latero-basal margin of depression with spine-like elevation, beset with hairs (Figs. 16, 17). Pygophore caudo-laterally with tubercle, carrying tuft of long bristle-like hairs (Fig. 18).

Macropterous male: Colour as in apterous male, but head darker brown; pronotum dark brown, with transverse stripe near anterior margin slightly lighter, black, irregularly distributed pores or punctures on pronotum, but missing on stripe; forewing brown, with elongate white stripe at base and light brown to white patch in discal cell.



Figs. 19–27: Male genitalia: (19–21) *P. sibuyana* sp.n., (22–24) *P. zetteli* sp.n., (25–27) *P. schoenigi*. (19, 22, 25) segment 8, ventral, (20, 23, 26) segment 8, lateral, (21, 24, 27) segment 9, ventral.

Pilosity as in apterous male (except for body parts covered by wings), but stout, silvery hairs also caudally on mediotergite 7; long, erect hairs on base of forewing.

Structural characters and genitalia as in apterous male, but pronotum 0.89 times as long as wide; grasping comb on protibia 0.75 times as long as tibia; metatarsus 0.66 times as long as metatibia; specimen dealate.

**Apterous female:** Colour as in apterous male, but head and pronotum in some specimens darker brown; mediotergites dark (reddish-) brown to black, laterotergites 2–7 medially in some specimens distinctly darker; stripe on lateral margins of sterna and caudal margin of sternum 7 light to dark reddish-brown.

Pilosity as in apterous male, but long, bristle-like hairs on caudal margin of laterotergite 8 and on caudo-lateral margin of sternum 7; stripe of stout silvery hairs along eyes distinct; additionally stout silvery hairs forming patches on mediotergites 2 and 3, scattered on mediotergite 8 and covering caudal margin of laterotergite 1; metatarsus without special pilosity.

Structural characters as in apterous male, but antenna 0.50–0.52 times as long as body; pronotum 0.56–0.60 times as long as wide; protibia without grasping comb; metatarsus 0.51–0.54 times as long as metatibia, first metatarsomere 0.58–0.69 times as long as second; second mediotergite 1.00–1.06 times as wide as head, mediotergite 8 slightly bent ventrad; laterotergites 2–7 wider and more strongly raised than in male, laterotergites 5–7 slightly converging, but leaving mediotergites visible.

Genitalia: Proctiger and gonocoxa 1 with short, dense, erect hairs, gonocoxa 1 with some long, erect hairs; structure as shown in Figure 29.

**Macropterous female:** Colour and pilosity as in macropterous male, but pilosity of metatarsus, mediotergite 8, laterotergite 8, and sternum 7 as in apterous female. Structural characters and genitalia as in apterous female, but pronotum 0.86–0.89 times as long as wide; wings ending at apex of genitalia.

**Diagnosis:** Length of mediotergites 1–7 (8) to width of mediotergite 4 as 1 : 0.31 (apt. ♂♂), 1 : 0.20–0.24 (apt. ♀♀); maximum width in apterous specimens across suture between metanotum and laterotergite 1. Relative length of antennomeres: 4 > 1 > 3 > 2. Male: Grasping comb on protibia 0.75–0.79 times as long as tibia. First metatarsomere 0.97–1.03 times as long as second, ventral row of long, bristle-like hairs over entire length of metatarsomeres 1 and 2; metatarsus 0.66–0.71 times as long as metatibia. Pygophore caudo-laterally with tubercle, carrying tuft of long, bristle-like hairs. Structure of male and female genitalia as shown in Figures 16–18, 29.

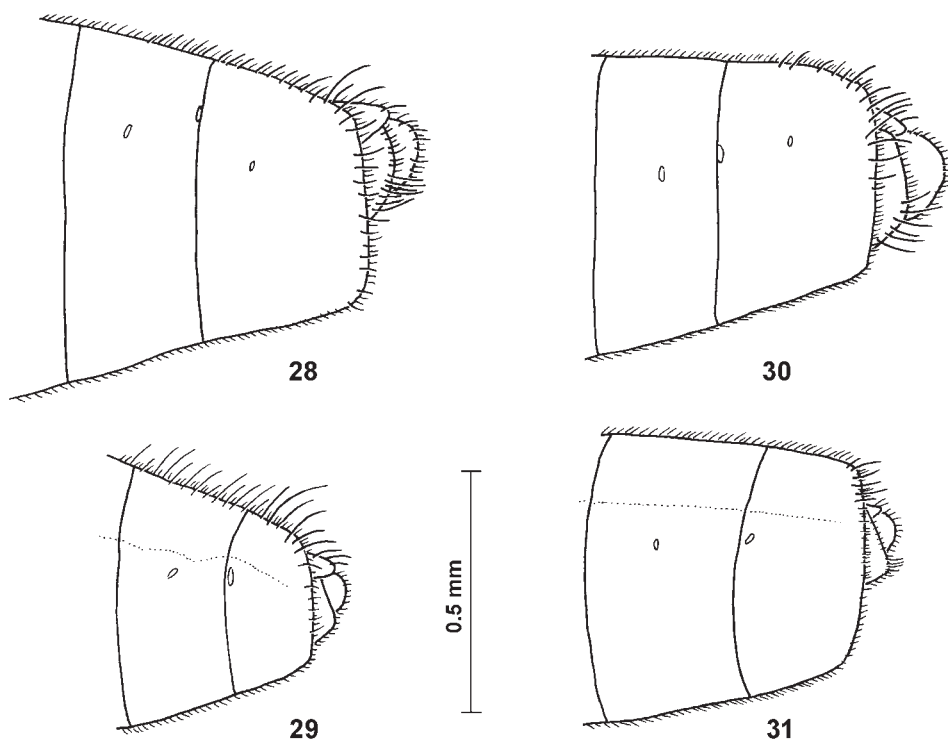
**Etymology:** The specific epithet “*mindoroensis*” refers to the type locality on Mindoro.

**Comparative notes:** *Pseudovelia mindoroensis* sp.n. seems to be closely related to *P. quezonica* HECHER, 2006 from Luzon, because of similarities in the structure of the male segment 8, but can be distinguished by the relative length of the first antennomeres, which is distinctly longer than the second in *P. mindoroensis*, but about as long as the second in *P. quezonica*, and by the greater width of the second mediotergite in relation to the head, which is 0.98 in *P. mindoroensis*, but 0.86–0.88 in *P. quezonica*. In addition, the metatarsus is 0.66–0.71 times as long as the metatibia in *P. mindoroensis*, but only 0.58–0.60 times in *P. quezonica*, and the first metatarsomere is about as long as the second in *P. mindoroensis*, but only 0.86–0.91 times in *P. quezonica*.

**Distribution:** Mindoro.

***Pseudovelia sibuyana* sp.n.** (Figs. 3, 11, 19–21, 30)

**Type locality:** Philippines, Sibuyan Island, Magdiwang, Silum, Lambingan Falls, N12°29.5', E 122°34.7'.



Figs. 28–31: End of abdomen, female, lateral: (28) *P. kerzhneri* sp.n., (29) *P. mindoroensis* sp.n., (30) *P. sibuyana* sp.n., (31) *P. zetteli* sp.n.

Type material: holotype (apt. ♂; PNM) labelled [PHILIPPINEN: Romblon Prov\ Sibuyan, E Magdiwang, W\ Silum, Lambigan [sic!] Falls, 21.11\ 1994, leg. H. Zettel (69)]. Paratypes (ZCW): 1 ♂ (macr.), 1 ♀ (apt.) [PHILIPPINEN: Romblon Prov\ Sibuyan, S Magdiwang\ Jao-asan, Fato-o river, 18.11\ 1994, leg. H. Zettel (67a)].

Size: Body length: 2.00 mm (apt. ♂), 2.10 mm (macr. ♂), 2.35 mm (apt. ♀); length of mediotergites 1–7 (8) to width of mediotergite 4 as 1 : 0.27 (apt. ♂), 1 : 0.21 (apt. ♀); maximum width across suture between metanotum and laterotergite 1: 0.70 mm (apt. ♂), 0.85 mm (apt. ♀); width of pronotum 0.64 mm (apt. ♂), 0.95 mm (macr. ♂), 0.70 mm (apt. ♀); width of head 0.50–0.51 mm (♂♂), 0.55 mm (♀).

Apterous male (Fig. 3): Colour: Head reddish-brown; antenna dark reddish brown, with base of antennomere 1 slightly lighter. Pronotum reddish-brown to dark brown, with transverse stripe near anterior margin slightly lighter; black, irregularly distributed punctures on pronotum, but missing on stripe. Metanotum black. Legs brown, with basal part or most of femora yellow. Mediotergites black, mediotergite 7 caudally dark reddish-brown. Laterotergite 1 dark reddish-brown to black, laterotergites 2–7 medially dark brown to black, laterally dark reddish-brown. Ventral surface of thorax and abdomen blackish, stripe on lateral margins of sterna reddish-brown.

Pilosity: Entire body surface covered with short, recumbent, silvery hairs and long, erect hairs, obviously long and dense on caudal margin of mediotergite 7, on laterotergite 7,

and on caudo-lateral margin of sternum 7. Stout, silvery hairs forming indistinct stripes on vertex along margin of eyes, covering lateral area of mediotergite 1, forming small and in some specimens very indistinct patches on mediotergites 3, 6, and 7, and on caudal margin of laterotergites 3–5. Metatarsus with tuft of very long hairs on basal half of metatarsomere 1, metatarsomere 2 without special pilosity (Fig. 11). Eyes without hairs except for two ocular setae.

Structural characters: Ventral lobe of head not produced caudad. Antenna 0.59 times as long as body, relative length of antennomeres 1–4 as 1.3 : 1 : 1.1 : 1.5;  $4 > 1 > 3 > 2$ . Pronotum 0.63 times as long as wide. Grasping comb on protibia 0.65 times as long as tibia. Metatarsus 0.68 times as long as metatibia, first metatarsomere 0.90 times as long as second. Second mediotergite 0.82 times as wide as head. Laterotergites 2–7 very slightly raised.

Genitalia: Segment 8 with scattered, long hairs on caudo-dorsal margin; ventral surface with large depression and low, short transverse ridges marking off two small elliptical areas, caudo-lateral margin of depression furnished with hairs (Figs. 19, 20). Pygophore with long, erect hairs on caudo-lateral margin (Fig. 21).

**Macropterous male:** Colour as in apterous male, but legs darker brown, with base of femora light brown to yellow; forewing brown, with elongate white stripe at base, veins dark brown.

Pilosity as in apterous male (except for body parts covered by wings); long, erect hairs on base of forewing.

Structural characters and genitalia as in apterous male, but antenna 0.58 times as long as body, relative length of antennomeres 1–4 as 1.3 : 1 : 1.2 : 1.4; pronotum 0.82 times as long as wide; grasping comb on protibia 0.68 times as long as tibia; metatarsus 0.63 times as long as metatibia, first metatarsomere 0.82 times as long as second; specimen dealate.

**Apterous female:** Colour as in apterous male, but head dark brown; mediotergite 7 unicoloured; laterotergite 1 black, laterotergites 2–7 medially black, laterally dark reddish-brown.

Pilosity as in apterous male, but long, erect hairs obviously long and dense on laterotergite 8, but missing on mediotergites 4–7; stout, silvery hairs additionally on lateral area of mediotergite 1, forming patches on mediotergites 2, 3, 6, and 7, and medially on laterotergites 3–5; metatarsus without special pilosity.

Structural characters as in apterous male, but antenna 0.50 times as long as body; pronotum 0.54 times as long as wide; protibia without grasping comb; metatarsus 0.54 times as long as metatibia, first metatarsomere 0.55 times as long as second; second mediotergite 0.84 times as wide as head; laterotergites 2–7 wider and very strongly raised, almost upright.

Genitalia: Proctiger and gonocoxa 1 with dense, erect hairs, gonocoxa 1 with some long, bristle-like hairs; structure as shown in Figure 30.

**Diagnosis:** Length of mediotergites 1–7 (8) to width of mediotergite 4 as 1 : 0.27 (apt. ♂), 1 : 0.21 (apt. ♀); maximum width in apt. specimen across suture between metanotum and laterotergite 1. Relative length of antennomeres:  $4 > 1 > 3 > 2$ . Male: Grasping comb on protibia 0.62–0.68 times as long as tibia. First metatarsomere 0.82–0.90 times as long as second, with tuft of very long hairs on basal half; metatarsus 0.62–0.68 times as long as metatibia. Pygophore with long, erect hairs on caudo-lateral margin. Structure of male and female genitalia as shown in Figures 19–21, 30.

**Etymology:** The specific epithet “*sibuyana*” refers to the type locality on Sibuyan.

**Comparative notes:** *Pseudovelgia sibuyana* sp.n. is closely related to *P. schoenigi* because of similarities in some characters, such as the structure of the male segments 8 and 9, the antenna, and the pronotum. *Pseudovelgia sibuyana* sp.n. can be distinguished from *P. schoenigi* by the size, because *P. sibuyana* sp.n. is slightly smaller and more slender than *P. schoenigi*, by the metatarsomere 1, which is shorter in *P. sibuyana* sp.n., and by the hairs on the ventral depression of segment 8 of males, which are denser in *P. schoenigi*.

**Distribution:** Sibuyan.

***Pseudovelgia zetteli* sp.n.** (Figs. 5–8, 12, 22–24, 31)

**Type locality:** Philippines, Tablas Island, San Agustin, Dubduban, Busai Falls, N12°34', E122°07'.

**Type material:** holotype (apt. ♂; PNM) labelled [PHILIPPINES: Romblon Prov\ Tablas, S. Agustin, Dubduban\ Busai Falls, 23.-25.11.1994\ leg. H. Zettel (70)] (PNM). Paratypes (NHMW, UPLB, CZW): 17 ♂♂ (apt.), 2 ♂♂ (macr.), 24 ♀♀ (apt.), 1 ♀ (macr.), same data as holotype.

**Size:** Body length: 2.05–2.23 mm (apt. ♂♂), 2.10–2.23 mm (macr. ♂♂), 2.32–2.45 mm (apt. ♀♀), 2.43 mm (macr. ♀); length of mediotergites 1–7 (8) to width of mediotergite 4 as 1 : 0.27–0.31 (apt. ♂♂), 1 : 0.23–0.25 (apt. ♀♀); maximum width across suture between metanotum and laterotergite 1: 0.77–0.85 mm (apt. ♂♂), 0.85–0.90 mm (apt. ♀♀); width of pronotum 0.70–0.78 mm (apt. ♂♂), 0.95–0.98 mm (macr. ♂♂), 0.70–0.75 mm (apt. ♀♀), 0.89 mm (macr. ♀); width of head 0.52–0.58 mm (♂♂, ♀♀).

**Apterous male** (Fig. 5): Colour: Head light brown to dark or reddish-brown, in some specimens stripe on posterior margin of vertex lighter brown; antenna light to dark brown, with base of antennomere 1 light brown to yellow. Pronotum light brown to dark or reddish-brown, with transverse stripe near anterior margin light brown to yellow; black, irregularly distributed punctures or pores on pronotum, but missing on stripe. Metanotum light brown to dark or reddish-brown; sutures between pronotum and metanotum, and between metanotum and laterotergite 1 dark brown to black. Legs (light) brown, with basal part of femora yellow and tarsi darker brown. Mediotergites dark (reddish-)brown to black, mediotergite 7 caudally light brown to reddish-brown. In one specimen mediotergites 2–5 light brown with sutures dark brown. Laterotergite 1 light brown to dark or reddish-brown; laterotergites 2–7 entirely brown with sutures blackish, or medially dark brown and laterally light brown to reddish-brown. Ventral surface of thorax and abdomen blackish; stripe on lateral margins of sterna light brown to reddish-brown.

**Pilosity:** Entire body surface covered with short, recumbent, silvery hairs and long, erect hairs, obviously long and dense on metatibia, caudal margin of mediotergite 7, and caudolateral margin of sternum 7. Stout, silvery hairs forming stripes on vertex along margin of eyes, covering caudal margin of metanotum and lateral area of mediotergite 1, forming patches caudally on mediotergite 6; in some specimens also medially on mediotergites 2 and 3, scattered on entire mediotergite 7, and in some other specimens forming patches medially on laterotergites 3–5. Apical part of mesotibia with a few very long hairs. Metatarsus with ventral row of long, bristle-like hairs over entire length of metatarsomere 1, hairs at base longest; metatarsomere 2 without special pilosity (Fig. 12). Eyes without hairs except for two ocular setae.



Structural characters: Ventral lobe of head not produced caudad. Antenna 0.57–0.62 times as long as body, relative length of antennomeres 1–4 as 1.2–1.3 : 1 : 1.1–1.2 : 1.4–1.6;  $4 > 1 \geq 3 > 1$ . Pronotum 0.55–0.64 times as long as wide. Grasping comb on protibia 0.69–0.75 times as long as tibia. Metatarsus 0.59–0.66 times as long as metatibia, first metatarsomere 0.82–0.92 times as long as second. Second mediotergite 0.86–0.95 times as wide as head. Laterotergites 2–7 strongly raised.

Genitalia: Segment 8 with scattered, long hairs on caudo-dorsal margin; ventral surface with very large, heart-shaped depression, margin of depression baso-laterally with ear-shaped, low elevation beset with short hairs (Figs. 22, 23). Pygophore with long bristle-like hairs on caudo-lateral margin (Fig. 24).

**Macropterous male** (Fig. 6): Colour as in apterous male, but head dark brown, with posterior margin of vertex reddish-brown; pronotum dark brown, with transverse stripe near anterior margin and median line light brown; median, shiny stripe distally on mediotergite 6 and proximally on mediotergite 7; forewing brown, with elongate white stripe at base.

Pilosity as in apterous male (except for body parts covered by wings); long, erect hairs on base of forewing.

Structural characters and genitalia as in apterous male, but pronotum 0.82–0.85 times as long as wide; both specimens dealate.

**Apterous female** (Fig. 7): Colour as in apterous male, but head in most specimens dark brown, with posterior margin of vertex light brown to reddish-brown; pronotum in most specimens dark brown, posterior margin in some specimens light brown to reddish-brown, transverse stripe near anterior margin in most specimens not extending over lateral portion; metanotum black, in some specimens light brown with suture between metanotum and laterotergite 1 blackish; mediotergite 7 unicoloured; laterotergite 1 in most specimens dark brown.

Pilosity as in apterous male, but long, erect hairs obviously long and dense on caudal margin of mediotergite 8 and on latero-caudal margin of sternum 7, but missing on mediotergites 5–7; metatarsus without special pilosity.

Structural characters as in apterous male, but antenna 0.51–0.54 times as long as body; pronotum 0.55–0.59 times as long as wide; protibia without grasping comb; metatarsus 0.51–0.56 times as long as metatibia, first metatarsomere 0.58–0.64 times as long as second; laterotergites 2–7 wider and in most specimens more strongly raised than in male.

Genitalia: Proctiger and gonocoxa 1 with short, dense, erect hairs, gonocoxa 1 with some long, erect, bristle-like hairs; structure as shown in Figure 31.

**Macropterous female** (Fig. 8): Colour and pilosity as in macropterous male, but pilosity of metatarsus and mediotergite 8 as in apterous female. Structural characters and genitalia as in apterous female, but pronotum 0.87 times as long as wide; wings ending at caudal margin of mediotergite 8.

**Diagnosis:** Length of mediotergites 1–7 (8) to width of mediotergite 4 as 1 : 0.27–0.31 (apt. ♂♂), 1 : 0.23–0.25 (apt. ♀♀); maximum width in apterous specimens across suture between metanotum and laterotergite 1. Relative length of antennomeres:  $4 > 1 \geq 3 > 2$ . Male: Grasping comb on protibia 0.69–0.75 times as long as tibia. First metatarsomere 0.82–0.92 times as long as second, with ventral row of long, bristle-like hairs over entire length, hairs at base longest; metatarsus 0.59–0.66 times as long as metatibia. Pygophore

with long, bristle-like hairs on caudo-lateral margin. Structure of male and female genitalia as shown in Figures 22–24, 31.

**Etymology:** *Pseudovelvia zetteli* sp.n. is dedicated to Dr. Herbert Zettel of the Natural History Museum Vienna, who has an enormous knowledge of the Philippine water bugs, collected most of the material studied herein, and whom the authors thank very much for his critical advice and help in all their studies.

**Comparative notes:** *Pseudovelvia zetteli* sp.n. is very unique. It shares some characters with *P. sibuyana* sp.n., but can easily be distinguished by the structure of segment 8.

**Distribution:** Tablas.

### ***Pseudovelvia schoenigi* HECHER & BONGO, 2006 (Figs. 4, 25–27)**

**Type locality:** Philippines, Cebu Island, Badian, Matutinao, Kawasan Water Falls.

**Distribution on Greater Negros-Panay** (summarized from HECHER & BONGO 2006): Cebu: S of Badian, Matutinao, Kawasan Falls; NNW of Cebu City, Lusaran, Lusaran River. Masbate: 3.5 km SE of Masbate, Tugbo, Tugbo River; 8 km SE of Masbate, S Mobo, Ubo Falls; stream 2 km S of Baleno. Ticao: W of San Fernando, Mag-Kaipit Spring. Panay: Antique, Libertad; Antique, 50 km NE of San Jose de Buenavista, San Remigio, Napula Falls. Negros: Negros Oriental, W of Dumaguete, Valencia, Banica Valley Resort; Negros Oriental, Amlan, Mag-abo.

**General distribution:** Ticao, Masbate, Panay, Negros, Siquijor, Cebu, Poro, Bohol, Leyte, Biliran, Samar (HECHER & BONGO 2006).

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