

## A new species of *Pseudovelia* HOBERTLANDT, 1950 (Insecta: Heteroptera: Veliidae) from the central Philippines

C. Hecher\* & J. P. Bongo\*\*

### Abstract

One new species, *Pseudovelia schoenigi* sp.n., is described from the central Philippines. It is recorded from the islands Ticao, Masbate, Panay, Negros, Siquijor, Cebu, Poro, Bohol, Leyte, Biliran, and Samar. Small variations among populations on the different islands are discussed.

**Key words:** Heteroptera, new species, Philippines, *Pseudovelia*, Veliidae.

### Zusammenfassung

Eine neue Art, *Pseudovelia schoenigi* sp.n., wird von den zentralen Philippinen beschrieben. Sie kommt auf den Inseln Ticao, Masbate, Panay, Negros, Siquijor, Cebu, Poro, Bohol, Leyte, Biliran und Samar vor. Geringfügige Variationen zwischen den Populationen der einzelnen Inseln werden diskutiert.

### Introduction

*Pseudovelia* HOBERTLANDT, 1950 is widely distributed throughout the Oriental Realm (ANDERSEN 1983) and elsewhere in the Old World. Most species of this genus from Southeast Asia have very limited ranges (ANDERSEN 1983, NIESER 1995, HECHER 1997, SEHNAL 1999, HECHER 2005). Four of the five described species occurring in the Philippines are endemic on single islands: *Pseudovelia reiseni* POLHEMUS, 1976 on Luzon; *P. kalami* NIESER, 1995 on Mindanao; *P. tenuis* SEHNAL, 1999 on Busuanga; and *P. lata* SEHNAL, 1999 on Palawan. Only *P. argyropardala* NIESER, 1995, is described from Mindanao and Karakelong in Indonesia.

The islands of the central Philippines have mainly developed since the Pliocene epoch and belong to three different faunal subregions (HEANEY 1986, ONG & al. 2002). Ticao, Masbate, Panay, Negros, and Cebu belong to "Greater Negros-Panay" because they were connected late in the Pleistocene epoch. Siquijor was an isolated island and therefore represents a separate biogeographic region, as do the Camotes Islands (with Poro Island). Bohol, Leyte, Biliran, and Samar are part of "Greater Mindanao" because of the Pleistocene land bridges.

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## Material and methods

The examined material is deposited in the following collections:

CNT	Nico Nieser Collection, Tiel, The Netherlands
CZW	Herbert and Sally V. Zettel Collection, Vienna, Austria
NHMW	Natural History Museum, Vienna, Austria
JTPC	John T. Polhemus Collection, Englewood, Colorado, USA
UPLB	Museum of Natural History, University of the Philippines, Los Baños, Philippines
USC	University of San Carlos (Biological Collection), Cebu City, Philippines

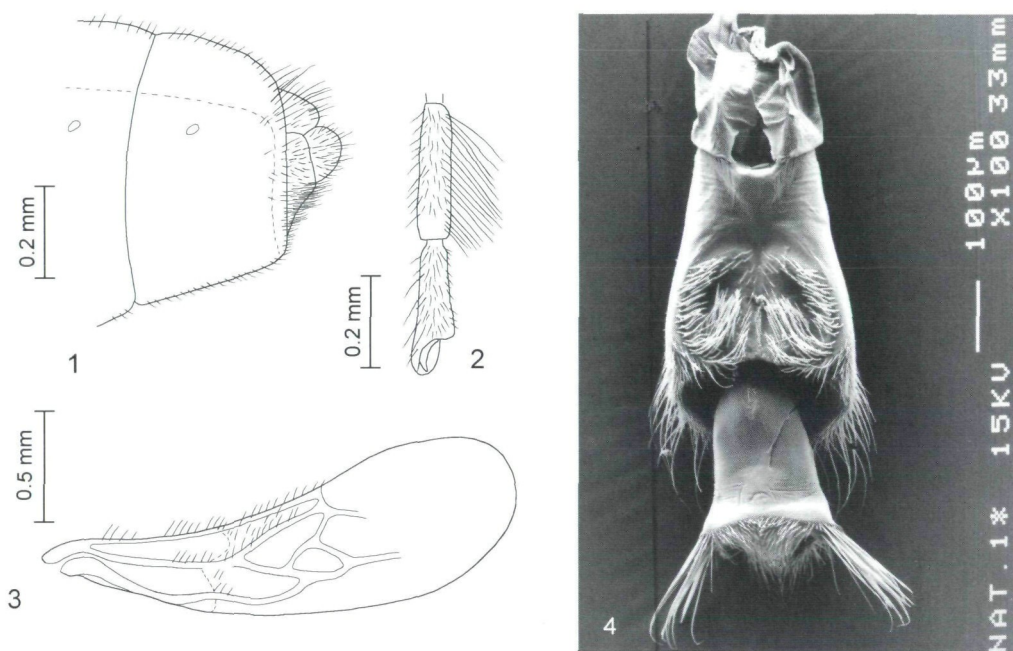
Abbreviations: apt. = apterous, deal. = dealate, macr. = macropterous

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 table of ranges of diagnostic measurements (Tab. 1) includes only apterous specimens because the number of macropterous individuals is very low. The data of the apterous specimens were not evaluated statistically.

### *Pseudovelgia schoenigi* sp.n. (Figs. 1 - 9)

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

**Type material:** **Holotype:** ♂ (apt.) [PHILIPPINEN: Cebu, S Badian\ Matutinao, Kawasan Falls\ 2-50m, 23.-24.2.1997\ leg. H. Zettel (116)] (UPLB). **Paratypes:** Masbate: 21 ♂♂, 9 ♀♀ (apt.) [Philippinen: Masbate Isl.\ 3.5 km SE Masbate, Tugbo\ Tugbo River, 2.3.1998\ leg. H. Zettel (152)] (NHMW, UPLB); 1 ♂, 3 ♀♀ (apt.), 1 ♂ (deal.) [Philippinen: Masbate Isl. \ 8 km SE Masbate S Mobo\ Ubo Falls, 3.3.1998\ leg. H. Zettel (153)] (NHMW); 5 ♂♂, 5 ♀♀ (apt.), 1 ♂ (deal.) [Philippinen: Masbate Isl. \ 2 km S Baleno\ stream, 4.3.1998\ leg. H. Zettel (154)] (NHMW, UPLB). Ticao: 3 ♂♂, 5 ♀♀ (apt.), 1 ♂ (macr.) [Philippinen: Ticao Isl.\ W. San Fernando, Mag-Kaipit\ Spring, 27.2.1998\ leg. H. Zettel (148)] (NHMW). Samar: 6 ♂♂, 5 ♀♀ (apt.) [Philippinen: N. Samar\ Veriato, El Amigo\ Veriato Falls 16.3\ 1998, leg. Zettel (162)] (CZW, UPLB); 43 ♂♂, 78 ♀♀ (apt.) [Philippinen: N. Samar\ Veriato, El Amigo\ Veriato Falls, 3.3.2003\ leg. H. Zettel (344)] (CZW, UPLB, NHMW, CNT); 8 ♂♂, 4 ♀♀ (apt.) [Philippinen: N Samar\ San Joaquin, Lologayan\ Falls, 4.-6.3.2003\ leg. H. Zettel (345)] (CZW, UPLB). Panay: 1 ♂ (macr.) [PHILIPPINEN: N Panay \ Antique, Libertad\ 21.-22.1.1994\ leg. Seyfert & Graindl] (NHMW); 1 ♂, 1 ♀ (apt.) [PHILIPPINEN: Panay, Antique\ 50 km NE San Jose d.B.\ San Remigio Napula Falls\ Leg. Zettel 20.3.1994 (43)] (NHMW). Biliran: 7 ♂♂, 19 ♀♀ (apt.) [Philippinen: Biliran\ SE Almeria Balagonbong\ Falls, 14.3.1998\ leg. H. Zettel (161)] (CZW, UPLB). Leyte: 57 ♂♂, 58 ♀♀ (apt.) [Philippinen: Leyte\ E Ormoc, Lake Danao\ 11.3.1998\ leg. H. Zettel (158)] (CZW, UPLB, USC); 6 ♂♂, 6 ♀♀ (apt.) [Philippinen: Leyte\ E Ormoc, Lake Danao\ 13.2.200\ leg. H. Zettel (237)] (NHMW, UPLB); 6 ♂♂, 4 ♀♀ (apt.), 1 ♂, 5 ♀♀ (macr.) [Philippinen: S. Leyte, N\ Maasin, small stream E\ Lonoy, 20.11.2003, leg.\ Zettel & Pangantihon (362)] (CZW); 4 ♂♂, 4 ♀♀ (apt.), 4 ♂♂ (3 macr., 1 deal.), 3 ♀♀ (macr.) [Philippinen: Leyte\ Makinhas, 11.3.2001\ Pacdanganan River\ leg. H. Zettel (299)] (NHMW, UPLB); 3 ♂♂, 4 ♀♀ (apt.), 2 ♂♂, 1 ♀ (macr.) [Philippines, Leyte\ Leyte Province\ Makhinas River at Makhinas\ 12 km. SE Baybay VII-16-85\ CL 1984 J.T. & D.A. Polhemus] (JTPC). Cebu: 9 ♂♂, 7 ♀♀ (apt.), 1 ♂ (deal.) [PHILIPPINEN: Cebu, S. Badian\ Matutinao, Kawasan Falls\ 2-50m, 29.-30.11.1996\ leg. H. Zettel (112)] (NHMW); 6 ♂♂, 9 ♀♀ (apt.) [PHILIPPINEN: Cebu, S Badian\ Matutinao, Kawasan Falls\ 2-50m, 23.-24.2.1997\ leg. H. Zettel (116)] (CZW, UPLB, USC); 6 ♂♂, 3 ♀♀ (apt.), 1 ♂ (macr.) [Philippinen: Cebu, S Badian\ Matutinao, Kawasan Falls\ 1-30m, 11.11.2003\ leg. H. Zettel (352a)] (NHMW, USC); 2 ♀♀ (apt.) [Philippinen: Cebu, S Badian\ Matutinao, Kawasan Falls\ 20-50m, 12.11.2003\ leg. H. Zettel (352d)] (NHMW); 7 ♂♂, 6 ♀♀ (apt.), 1 ♀ (deal.) [Philippinen: Cebu, NNW\ Cebu City, Lusan, Lu-\ saran River, 9.11.2003\ leg. H. Zettel (350)] (NHMW, UPLB). Poro: 1 ♂ (apt.) [Philippinen: Camotes Isl.,\ Poro Isl.,



Figs. 1 - 4: *Pseudovelgia schoenigi* sp.n.: (1) end of abdomen of female, lateral view; (2) metatarsus of male, lateral view; (3) forewing, lateral view; (4) abdominal segments 8 - 9 of male from Cebu, ventral view.

Poror, Libertad, \ Panganuron Falls, 26.2.2001 \ leg. H. Zettel (277)] (NHMW). Siquijor: 3 ♂♂, 3 ♀♀ (apt.) [Philippines: Siquijor \ Lazi, Poo River \ 1.3.1997 \ leg. H. Zettel (121)] (CZW). Bohol: 4 ♂♂, 6 ♀♀ (apt.) [PHILIPPINEN: Bohol \ Antequera, Mag-aso \ Falls, 22.11.1996 \ leg. H. Zettel (104)] (NHMW). Negros: 6 ♂♂, 10 ♀♀ (apt.) [Philippines: Negros or. \ W. Dumaguete, Valencia \ Banica Valley Resort \ 25.2.1997, leg. Zettel (117)] (CZW, UPLB); 1 ♂ (macr.) [Philippines: Negros Or. \ Amlan, Mag-abo, stream \ reaching sea, 31.10 \ 2004, leg. Zettel (405)] (NHMW).

**Further material:** 106 nymphs from Masbate, Ticao, Samar, Biliran, Leyte, and Negros are deposited in NHMW, UPLB, and CZW.

### Description:

**Size.** Body length 2.05 - 2.43 mm (apt. ♂♂), 2.12 - 2.48 mm (macr. ♂♂), 2.35 - 2.93 mm (apt. ♀♀), 2.62 - 2.73 mm (macr. ♀♀); length of tergites 1 - 7/8 to width of tergite 4 as 1 : 0.19 - 0.27 (apt. ♂♂), 1 : 0.11 - 0.23 (apt. ♀♀); maximum width across suture between metanotum and laterotergite 1: 0.75 - 0.88 mm (apt. ♂♂), 0.82 - 1.04 mm (apt. ♀♀); width of pronotum 0.67 - 0.80 mm (apt. ♂♂), 0.94 - 1.08 mm (macr. ♂♂), 0.72 - 0.83 mm (apt. ♀♀), 1.05 - 1.13 (macr. ♀♀); width of head 0.51 - 0.58 mm (♂♂), 0.52 - 0.63 mm (♀♀).

**Apterous male.** Colour. Head light to dark brown and black; antenna light to dark brown. Pronotum light to dark brown, in some specimens with transverse stripe near anterior margin lighter brown; black, irregularly distributed punctures or pores on pronotum, but absent on stripe. Metanotum brown, with sutures between pronotum and metanotum, and between metanotum and laterotergite 1 black. Legs light to dark brown, with basal part of femora yellow and tarsi dark brown. Tergites dark brown to blackish

or dark reddish-brown, caudal part of tergite 7 in some specimens slightly lighter. Laterotergite 1 and medial parts of laterotergites 2 - 7 dark brown, lateral parts slightly or distinctly lighter. Ventral surface of thorax and abdomen black, stripe on lateral margins of sternites brown to reddish-brown.

**Pilosity.** Entire body surface covered with short, decumbent, silvery hairs and erect hairs of different lengths, obviously dense on caudal margin of sternite 7. Stout, silvery hairs forming stripes on vertex along margin of eyes, covering lateral part of tergite 1, scattered on tergites 2, 3, 6 and 7 (in some specimens also on tergite 4), and forming patches or scattered on medial parts of laterotergites 3 - 5, in some specimens also of laterotergite 6. Metatarsal segment 1 with row of very long, bristle-like hairs over entire length (Fig. 2). Eyes without pilosity except for two ocular setae.

**Structural characters.** Ventral lobe of head not produced caudad. Antenna 0.54 - 0.63 times as long as body, relative length of segments 1 - 4 as 1.2 - 1.5 : 1 : 1.1 - 1.3 : 1.3 - 1.7, segment 4 > segment 1, segment 3 < segment 1. Pronotum 0.57 - 0.69 times as long as wide. Grasping comb on protibia 0.68 - 0.82 times as long as tibia. Metatarsus 0.63 - 0.74 times as long as metatibia, first segment 0.89 - 1.10 times as long as second. Second tergite 0.71 - 0.96 times as wide as head. Laterotergites 2 - 7 moderately raised.

**Genital segments.** Ventral depression of segment 8 large and heart-shaped, with dense long hairs (Figs. 5 - 8); dorso-caudal margin of segment 8 with very long hairs. Pygophore with two low, elongate tubercles, each bearing a tuft of very long, bristle-like hairs (Fig. 4).

**Macropterous male.** Colour as in apterous male, but tergites and laterotergites light brown, with sutures between segments black; forewing dark brown, with basal area white.

**Pilosity** as in apterous male (except where covered by wings); long, erect hairs on veins of basal part of forewing (Fig. 3).

**Structural characters and genital segments** as in apterous male, but pronotum 0.80 - 0.90 times as long as wide; wings ending at apex of abdomen, or dealate.

**Apterous female.** Colour as in apterous male, but tergite 7 unicoloured.

**Pilosity** as in apterous male, but long, erect hairs obviously dense on caudal margin of tergite 8 and on laterotergites 7 and 8; tergites 4 - 6 almost without pilosity; metatarsal segment 1 without row of long, bristle-like hairs.

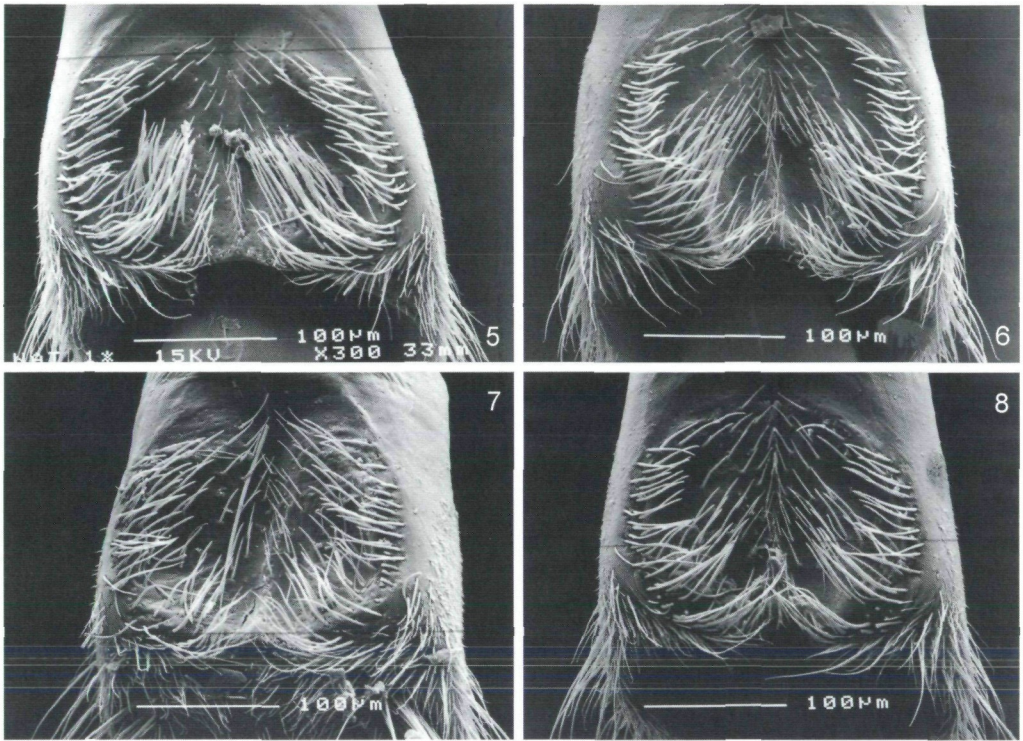
**Structural characters** as in apterous male, but antenna 0.48 - 0.58 times as long as body; pronotum 0.55 - 0.71 times as long as wide; metatarsus 0.49 - 0.59 times as long as metatibia, first segment 0.58 - 0.70 times as long as second; caudal margin of tergite 8 slightly deflexed ventrad; laterotergites 2 - 7 more strongly raised, in some specimens upturned vertically.

**Genital segments.** Proctiger with short, dense, erect hairs; gonocoxa 1 with tuft of bristle-like hairs; genital structure as shown in Figure 1.

**Macropterous female.** Colour and pilosity as in apterous female or macropterous male.

**Structural characters and genital segments** as in apterous female, but pronotum 0.84 - 0.90 times as long as wide; wings ending at caudal margin of tergite 8, or dealate.





Figs. 5 - 8: *Pseudovelgia schoenigi* sp.n.: ventral depression of segments 8 of males from (5) Cebu, (6) Negros, (7) Leyte, (8) Panay.

**Comparative notes.** *Pseudovelgia schoenigi* sp.n. is an obviously large and slender species. The male specimens can easily be distinguished from all other species of this genus by the structure and pilosity of segments 8 and 9, length of the grasping comb on the protibia, lengths of metatibia and metatarsal segments, and row of hairs on the first metatarsal segment. *Pseudovelgia reiseni* POLHEMUS, 1976, *P. argyropardala* NIESER, 1995, *P. tenuis* SEHNAL, 1999, *P. lata* SEHNAL, 1999, and some undescribed species from the Philippines (Hecher in prep.) share single features with *P. schoenigi* sp.n., but the combination of characteristics is unique.

**Variability.** The authors regard the examined material as belonging to one species. However, due to geographical isolation, the specimens among some islands or island groups vary slightly in colouration, structure of the male segment 8, and morphometric characteristics.

**Colouration:** Specimens from Cebu and Poro are generally lighter in colour, especially the legs, the pronotum, and the laterotergites. This phenomenon was also observed in Cebu populations of several other species of semiaquatic and aquatic Heteroptera (ZETTEL & CHEN 2000; ZETTEL 2003, 2004), i.e. in *Rhagovelgia cotabatoensis* HUNGERFORD & MATSUDA, 1960 (Veliidae); *Rheumatogonus luzonicus* KIRKALDY, 1909, *Limnometra nigripennis cebuana* ZETTEL, 2004 (both Gerridae); and *Hydrotrepes visayasensis* ZETTEL, 2003 (Helotrephidae).

Tab. 1: Ranges of diagnostic measurements from specimens on the single islands. Characters: 1 – bodylength, 2 – maximum width, 3 – width of head, 4 – width of pronotum, 5 – relative width of T4 (to length of T 1-7/8), 6 – relative length of metatarsus (to metatibia), 7 – relative length of metatarsal segment 1 (to segment 2), 8 – relative length of grasping comb (to protibia). Minimum and maximum value of the species in bold.

### 1.1. Apterous males.

	1	2	3	4	5	6	7	8
Ticao (n = 2)	2.10-2.23	0.76-0.79	<b>0.51</b> -0.53	0.72-0.73	0.22-0.26	0.65	0.93-1.07	0.75-0.78
Masbate (n = 3)	<b>2.05</b> -2.10	<b>0.75</b> -0.80	<b>0.51</b> -0.53	<b>0.67</b> -0.73	0.22-0.26	<b>0.63</b> -0.68	<b>0.89</b> -1.04	0.75-0.76
Panay (n = 1)	2.11	<b>0.75</b>	0.53	0.73	0.26	0.66	0.90	0.74
Negros (n = 3)	2.17-2.20	0.80-0.83	0.52-0.55	0.75	0.22-0.24	0.69-0.71	1.00-1.03	0.77-0.79
Cebu (n = 12)	2.08-2.35	0.75-0.85	0.52- <b>0.58</b>	0.70-0.78	0.21- <b>0.27</b>	<b>0.70</b> - <b>0.74</b>	0.94-1.06	0.69-0.81
Poro (n = 1)	2.23	0.80	0.54	0.74	0.22	0.69	0.94	0.77
Siquijor (n = 2)	2.27-2.28	0.82-0.83	0.55	0.75-0.78	0.21-0.24	0.65-0.68	1.03	<b>0.82</b>
Bohol (n = 3)	2.27-2.35	0.80-0.85	0.55- <b>0.58</b>	0.75-0.76	0.23-0.26	0.66-0.69	0.94-0.97	<b>0.68</b> -0.70
Leyte (n = 14)	2.22- <b>2.43</b>	0.80-0.85	0.55- <b>0.58</b>	0.75-0.78	<b>0.19</b> -0.23	<b>0.63</b> -0.71	0.97- <b>1.10</b>	0.72- <b>0.82</b>
Biliran (n = 3)	2.29- <b>2.43</b>	0.79- <b>0.88</b>	0.52-0.55	0.75- <b>0.80</b>	0.20-0.23	0.67-0.71	1.00	0.77-0.78
Samar (n = 9)	2.27- <b>2.43</b>	0.82-0.85	0.52- <b>0.58</b>	0.75- <b>0.80</b>	0.21-0.24	0.66-0.71	1.00- <b>1.10</b>	0.75-0.80

### 1.1. Apterous females.

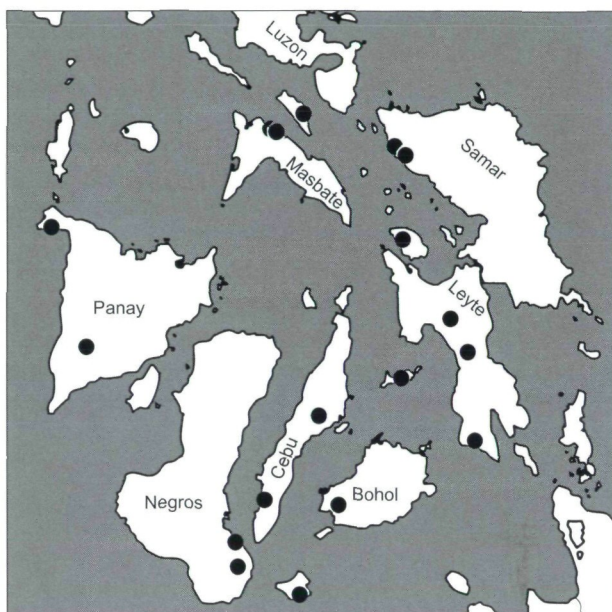
	1	2	3	4	5	6	7
Ticao (n = 4)	<b>2.35</b> -2.48	<b>0.82</b> -0.90	<b>0.52</b> -0.58	<b>0.72</b> -0.75	0.18- <b>0.23</b>	0.51-0.53	0.67- <b>0.70</b>
Masbate (n = 4)	2.37-2.50	0.87-0.93	0.54-0.56	0.75-0.78	0.19-0.22	<b>0.49</b> -0.55	0.59-0.68
Panay (n = 1)	2.43	0.93	0.55	0.75	0.19	0.53	0.63
Negros (n = 3)	2.57-2.83	0.95-1.03	0.57-0.60	0.77- <b>0.83</b>	0.14-0.19	0.53-0.56	0.62-0.64
Cebu (n = 14)	2.42-2.73	0.85-1.00	0.55-0.60	<b>0.72</b> -0.80	0.19-0.23	0.51- <b>0.59</b>	<b>0.58</b> -0.70
Siquijor (n = 3)	2.52-2.65	0.90-0.95	0.57-0.58	0.75	0.17-0.18	0.52-0.56	0.64-0.65
Bohol (n = 3)	2.60- <b>2.93</b>	0.87-0.98	0.57-0.60	0.75- <b>0.83</b>	0.15-0.18	0.53-0.56	0.59-0.64
Leyte (n = 14)	2.57-2.75	0.92-1.00	0.57- <b>0.63</b>	0.75-0.80	<b>0.11</b> -0.17	0.50-0.55	0.59- <b>0.70</b>
Biliran (n = 3)	2.72-2.78	0.97-1.03	0.60- <b>0.63</b>	0.80- <b>0.83</b>	0.14-0.17	0.50-0.55	0.64-0.68
Samar (n = 10)	2.65-2.88	0.92- <b>1.04</b>	0.58-0.60	0.76- <b>0.83</b>	0.13-0.15	0.50-0.55	0.59-0.68

Structure of the male segment 8: The ventral groove of segment 8 of males exhibits variation in the density of hairs, the size of areas without hairs, and the depth of the depression (Figs. 5 - 8), not only among specimens of the different islands, but also within the populations of Cebu, Leyte, and Samar, from where the most specimens are available.

Morphometric characteristics: According to the morphometric characteristics (Tab. 1) three more or less distinct types can be distinguished: (1) On the islands Negros, Siquijor, Poro, and Bohol the specimens show more or less similar values as in the typical populations from Cebu. (2) Males and females from Ticao and Masbate tend to be smaller and more slender than typical specimens from Cebu. From northern Panay only one apterous male and one apterous female are available, which seem to be of similar size as the specimens from Ticao and Masbate. (3) Individuals from Leyte, Biliran, and Samar are generally larger and especially the females are slightly broader than speci-



Fig. 9: Distribution of *Pseudovelia schoenigi* sp.n.



mens from Cebu, but the relative width of tergite 4 is more narrow. Data on the relative lengths of metatarsi, metatarsal segments 1, and grasping combs express no substantial differences among populations.

These trends of variations correspond only partly with the faunal subregional division (see Introduction) of the central Philippines. We offer two different explanations for the great similarities between populations from southern Negros, Siquijor, Cebu, Poro, and western Bohol: (1) The set of characteristics is plesiomorphic. This hypothesis needs to be verified in a character analysis including related species. (2) Uniformity of characteristics is due to a post-pleistocene gene exchange by individuals crossing the sea.

**Distribution** (Fig. 9). Ticao, Masbate, Panay, Negros, Siquijor, Cebu, Poro, Bohol, Leyte, Biliran, Samar.

**Etymology.** *Pseudovelia schoenigi* sp.n. is dedicated to Dr. Heinrich Schoenig (1912 - 1989), a German priest of the Societas Verbi Divini. He is considered the founder of the Biology Department, University of San Carlos (USC), Cebu City, Philippines. He was a dedicated priest, knowledgeable lover of the biological sciences as well as an outstanding scientist and educator. One of his highly-acclaimed achievements and contributions to USC was the establishment and development of the Biological Museum. He headed several biological expeditions to various parts of the archipelago and to other parts of Asia for the purpose of enriching the botanical and zoological collections. These specimens are identified, catalogued, and exhibited in the Herbarium, the Marine Collection, and in the Entomological Collection of USC, the most extensive collections of biological specimens in the Visayas Region.

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