

## Two new Philippine *Aphelocheirus* WESTWOOD, 1833 (Insecta: Heteroptera: Aphelocheiridae) and a key to the Philippine species

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### Abstract

Two *Aphelocheirus* species from Luzon Island, Philippines, are described as new: *Aphelocheirus venus* sp.n. and *A. gapudi* sp.n. *Aphelocheirus luzonicus* POLHEMUS & POLHEMUS, 1988, is ranked as a subspecies of *A. zamboanga* POLHEMUS & POLHEMUS, 1988 (*Aphelocheirus zamboanga luzonicus*, stat.n.); the male is described for the first time. The female and the macropterous morph of *A. baguio* POLHEMUS & POLHEMUS, 1988, is described. *Aphelocheirus zamboanga zamboanga* is newly recorded from Samar, *A. zamboanga luzonicus* from Catanduanes. A key and a check-list for Philippine *Aphelocheirus* species are given.

**Key words:** Aphelocheiridae, *Aphelocheirus*, new species, new status, new record, Philippines, Luzon, Samar, Catanduanes, check-list, key.

### Zusammenfassung

Zwei *Aphelocheirus* Arten von Luzon, Philippinen, werden neu beschrieben: *Aphelocheirus venus* sp.n. und *A. gapudi* sp.n. *Aphelocheirus luzonicus* POLHEMUS & POLHEMUS, 1988, wird als Unterart zu *A. zamboanga* POLHEMUS & POLHEMUS, 1988 gestellt (*Aphelocheirus zamboanga luzonicus*, stat.n.); das Männchen wird erstmals beschrieben. Das Weibchen und die makroptere Form von *A. baguio* POLHEMUS & POLHEMUS, 1988, werden beschrieben. *Aphelocheirus zamboanga zamboanga* wird erstmals für Samar gemeldet, *A. zamboanga luzonicus* für Catanduanes. Ein Bestimmungsschlüssel und eine Liste der philippinischen *Aphelocheirus* Arten ist beigefügt.

### Introduction

Species of the genus *Aphelocheirus* WESTWOOD, 1833, are remarkable water bugs, morphologically and ecologically. They are highly adapted to a benthic life in clean streams and rivers by specialized nutrition, locomotion, and respiration. Because of the destruction of the tropical rain forests by man, many species became rare, in the Philippines as elsewhere. Therefore, until now, knowledge of the distribution of the Philippine *Aphelocheirus* species has been poor; and findings of *Aphelocheirus* are always "special events" for water bug researchers.

Two collecting trips to Southern and Northern Luzon, Samar, and Catanduanes in 1998 and 1999 yielded some interesting *Aphelocheirus*, which are described and discussed in this paper. While studying the newly collected material, some taxonomic questions arose, which made a more detailed study necessary.

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As the author found it difficult to identify Philippine species with the key of POLHEMUS & POLHEMUS (1988), a key restricted to the Philippine species was worked out, which is practical, because all Oriental *Aphelocheirus* species are regional endemics.

#### Repositories:

CAS	California Academy of Sciences, San Francisco, U.S.A.
CNT	Coll. Nico Nieser, Tiel, The Netherlands
CSW	Coll. Franz Seyfert, Vienna, Austria
CZW	Coll. Herbert Zettel, Vienna, Austria
JTPC	Colorado Entomological Museum, Coll. John T. Polhemus, Englewood, Colorado, U.S.A.
NHMW	Naturhistorisches Museum in Wien, Vienna, Austria
UPLB	Museum of Natural History, University of the Philippines, Los Baños, Laguna, Philippines

### Descriptions of new species

#### *Aphelocheirus venus* sp.n. (Figs. 1 - 3, 15 - 18, 31, 35, 44)

**Holotype** (brachypterous ♂) "Philippinen: Camarines Sur\ 20km E Naga, 3km E Carolina\ Mainit Spring ("Hydro")\ 20.2.1998, leg. Zettel (142)" (UPLB); **paratypes**: 19 ♂♂, 34 ♀♀ (brachypterous), same label data as holotype (NHMW, UPLB, CNT, JTPC); 1 ♂ (brachypterous), 1 ♂ (macropterous, dealate) "Philippinen: Camarines Sur\ Lake Buhi area, Twin Falls\ nr. Itbog, 22.3.1998\ leg. H. Zettel (164)" (CZW); 4 ♂♂, 2 ♀♀ (brachypterous) "Philippinen: Camarines Sur\ 20km E Naga, 3km E Carolina\ Mainit Spring ("Hydro")\ 4.3.1999, leg. Zettel (193)" (NHMW, UPLB); 2 ♂♂, 1 ♀ (brachypterous) "Philippinen: Camarines Sur\ 20km E Naga, 5km E Carolina\ Mt. Isarog, nr. Malabsay Falls\ 4.3.1999, leg. Zettel (192)" (NHMW, UPLB); **further material**: 8 larvae from locality # 142 (UPLB, NHMW); 1 larva from locality # 164 (UPLB); 2 larvae from locality # 193 (UPLB).

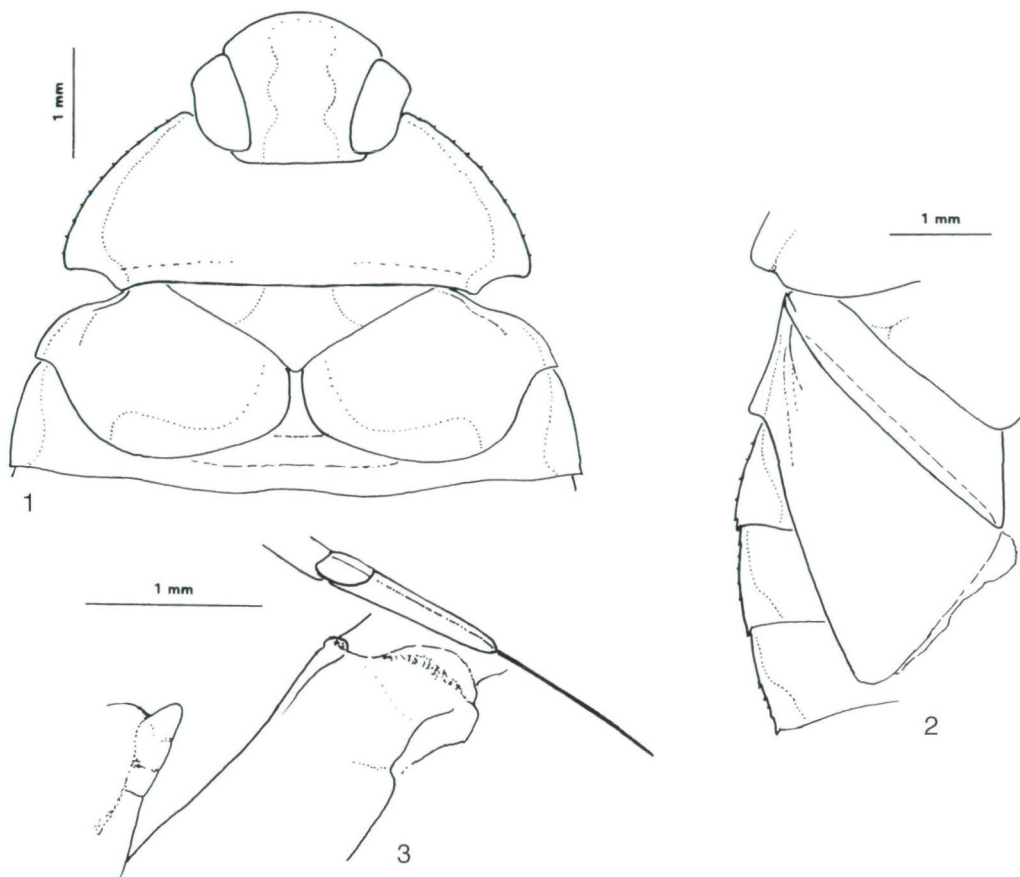
#### Description:

**Brachypterous male**: length 9.9 - 10.7 mm; maximum width (at abdominal segment 3) 6.2 - 6.8 mm; pronotal width 5.1 - 5.5 mm.

Colour: dark brown; head yellowish with broad dark medial stripe usually reaching anterior margin; pronotum with broad yellowish lateral margins; mesoscutellum medially yellowish; hemelytron with posterior quarter to half yellow, becoming gradually darker anteriorly (Fig. 1); abdominal segments dorso-laterally with triangular yellowish marks reaching anterior margin of segment; venter yellowish brown; rostrum and legs yellow.

Head dorsally with a very few large and numerous small punctures, weakly shining; pronotum, hemelytra and abdomen coriaceous, matt; disk of pronotum and middle of mesoscutellum rugulose-punctate, weakly shining; head 0.75 times as long as broad, in front of anterior eye margin 0.45 times as long as eye length (Fig. 1); pronotum 3.75 times as broad as median length, without demarcated lateral areas, with short curved emarginations in the posterior corners (Fig. 1); mesoscutellum 2.9 times as broad as long; hemelytron with sharp angle at embolar margin, medially slightly or not separated, caudally not reaching hind margin of tergite 2 (Fig. 1); connexiva of abdominal segment 2 nearly rectangular, of segments 3 - 6 becoming more acute and produced into short, caudad directed tips; lateral part of segment 7 elongate and slender, distally weakly tapered (Fig. 31).

Rostrum of medium length, 1.3 times as long as profemur, surpassing posterior margin of mesosternum (Fig. 3); legs relatively short and stout, profemora slightly, meso- and metafemora weakly surpassing the body sides; propleuron internally with a relatively



Figs. 1 - 3: *Aphelocheirus venus* sp.n.: (1) anterior part of body of brachypterous male, dorsal view; (2) hemelytron (membrane broken off) and lateral margin of anterior abdominal segments of macropterous male, dorsal view; (3) propleural process, mesosternum, and tip of rostrum, ventrolateral view.

small, acuminate process (Fig. 3); mesosternum (Fig. 3) in posterior two-thirds very highly elevated, keeled, rugulose, not shining; abdomen weakly asymmetrical; sternites medially without posteriad directed processes, sternite 4 with (2 -) 4, sternites 5 with (5 -) 6 (- 7) peglike setae, sternite 6 without distinct peglike setae, but often with some less stout, short setae in the same location.

Genitalia: genital capsule as in Fig. 44; left parandrium distinctly longer and much broader than right parandrium; aedeagus broad, with narrow sclerotized part; left paramere broad, in distal part nearly evenly tapered, with rounded apex, without basal lobe (Figs. 15, 16); right paramere distally rather slender and twisted, with apex weakly curved (Figs. 17, 18).

**Brachypterous female:** length 9.6 - 10.6 mm; maximum width (at abdominal segment 3) 6.4 - 6.8 mm; pronotal width 4.9 - 5.5 mm; most characters as in brachypterous male except the following:

Abdomen nearly symmetrical; sternite 6 with 0 - 4 relatively small peglike setae; sternite 7 (Fig. 35) subtriangular with straight sides and rounded apex, with 4 hair tufts located nearly in a transverse row; interior corners of abdominal segment 7 acute (Fig. 35).

**Macropterous male** (dealate specimen): length 10.4 mm; maximum width (at abdominal segment 3) 6.3 mm; pronotal width 5.5 mm; most characters as in brachypterous male except the following:

Posterior corners of pronotum, large mesoscutellum, and hemelytron as in Figure 2; structure of mesosternum as typical for the macropterous form; posterior corners of abdominal segments less acute.

**Macropterous female** unknown.

**Comparative notes:** *Aphelocheirus venus* sp.n. is closely related to *A. uichancoi*, sharing with this species nearly the same structure of male genitalia, except the lack of a distinct basal lobe on the left paramere (comp. Figs. 15, 16 and 19, 20) and a slightly more slender and twisted distal part of the right paramere (comp. Figs. 17, 18 and 21, 22). However, several external characters clearly separate these two species. The colour is lighter in *A. venus* sp.n., especially the lateral margin of the pronotum is largely yellowish (with a narrow yellow margin in *A. uichancoi*) and the posterior quarter to half of the hemelytron is yellowish, too (Fig. 1). The anterior half of the lateral margin of the pronotum is less curved in *A. venus* sp.n. (Fig. 1) than in *A. uichancoi*. The anterior portion of the head is longer in *A. venus* sp.n. than in *A. uichancoi*. The female sternite 7 is subtriangular, with concave sides in *A. uichancoi* (Fig. 36), but with more broadly rounded apex and straightly convergent sides in *A. venus* (Fig. 35). The interior corners of the female abdominal segment 7 are often rectangular in *A. uichancoi* (Fig. 36), but acute in *A. venus* sp.n. (Fig. 35).

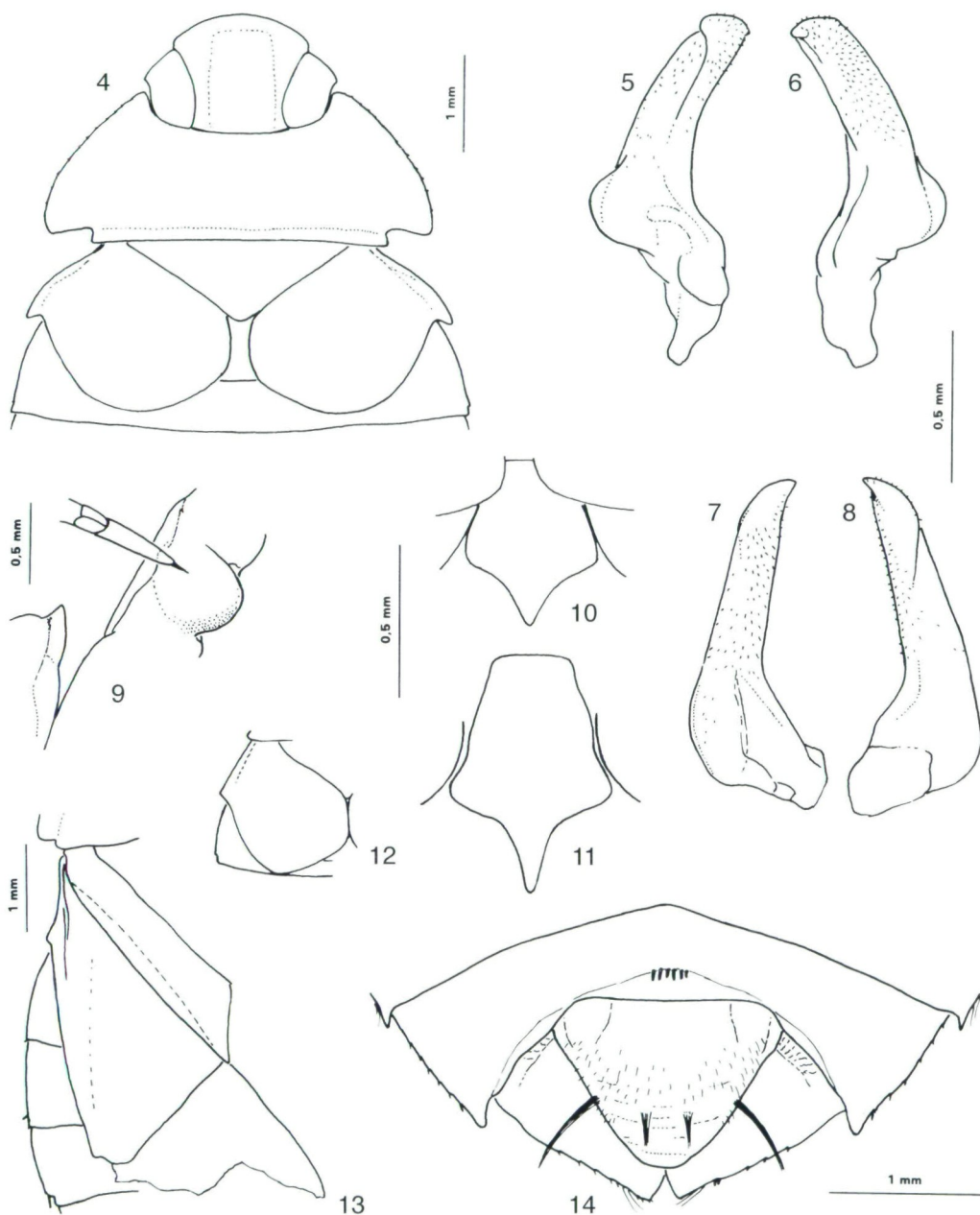
**Distribution:** Luzon: Camarines Sur.

**Habitats:** The type locality (# 142) is a small stream (while collecting, in dry season, an average two metres wide and in most sections less than half a metre deep) running through secondary vegetation at the slopes of the Mount Isarog, about one kilometre from the Mount Isarog National Park. Sections with sandy sediments alternate with gravel sediments, where in the current *Aphelocheirus venus* sp.n. was found in surprisingly high numbers together with the holotype of *A. gapudi* sp.n. and a good series of *Asthenocoris luzonensis* USINGER, 1938 (Naucoridae). The second locality (# 164; "Twin Falls") is a much larger stream with high water velocity just beyond the water falls. The two specimens were found in a deeper section (about half a metre deep) with steady, but not very high water velocity behind some rocks.

**Etymology:** *Venus*, Roman goddess of beauty (used as a noun in apposition); named after the appearance of Venus (nomen est omen) to the author in the barangay Carolina near the type locality.

### *Aphelocheirus gapudi* sp.n. (Figs. 4 - 10, 45)

**Holotype** (brachypterous ♂) "Philippinen: Camarines Sur\ 20km E Naga, 3km E Carolina\ Mainit Spring ("Hydro")\ 20.2.1998, leg. Zettel (142)" (UPLB); **paratype:** 1 ♂ (brachypterous) "Philippinen: LZ, Albay\ Malinao, Palali Falls\ 200 m, 14.3.1999\ leg. H. Zettel (201)" (NHMW).



Figs. 4 - 10: *Aphelocheirus gapudi* sp.n., brachypterous male: (4) head, pronotum, and hemelytra; (5, 6) left paramere, external and internal views (7, 8) right paramere, internal and external view; (9) propleural process, mesosternum, and tip of rostrum, ventrolateral view; (10) metasternum, ventral view.

Figs. 11 - 14: *Aphelocheirus baguio*: (11) metasternum; (12) hemelytron of brachypterous male (redrawn from POLHEMUS & POLHEMUS 1988); (13) hemelytron and anterior connexiva of macropterous female, dorsal view; (14) female abdominal segments 6 - 7, ventral view.

**Description:**

**Brachypterous male:** length 7.9 - 8.1 mm; maximum width (at abdominal segment 3) 4.8 - 4.9 mm; pronotal width 4.0 - 4.2 mm.

Colour: dark brown; head yellowish with broad dark mark medially except in the most anterior part (Fig. 4); middle of pronotum and hemelytra of paratype light brown, darker in holotype; rostrum and legs yellow.

Head dorsally with a few large and numerous small punctures, distinctly shining; pronotum, hemelytra and abdomen finely coriaceous, matt; disk of pronotum and middle of mesoscutellum punctate, shining; head 0.7 times as long as broad, in front of anterior eye margin 0.45 times as long as eye length (Fig. 4); pronotum 3.6 times as broad as median length, without demarcated lateral areas, with short rectangular emarginations in the posterior corners (Fig. 4); mesoscutellum 2.6 times as broad as long; hemelytron with small sharp angle at embolar margin, medially slightly separated, caudally not reaching the hind margin of tergite 2 (Fig. 4); connexiva of abdominal segment 2 nearly rectangular, of segments 3 - 6 becoming more acute and produced into short, caudad directed tips; lateral part of segment 7 elongate.

Rostrum relatively short, 1.2 times as long as profemur, reaching posteriad to middle of mesosternum (Fig. 9); legs relatively short and stout, profemora slightly, meso- and metafemora weakly surpassing the body sides; propleuron internally with a distinct acuminate process (Fig. 9); mesosternum medially unkeeled, in posterior two-thirds with a large, smooth, very sparsely punctate, shining tumescence, which rounded posteriorly (Fig. 9); abdomen weakly asymmetrical, sternites medianly without posteriad directed processes, sternite 4 with 5 peglike setae, sternites 5 and 6 with 6 each.

Genitalia: genital capsule as in Fig. 45; left parandrium distinctly longer than right parandrium, both broad; aedeagus broad, with narrow sclerotized part; left paramere subparallel in distal part, subbasally with a distinct, roundish lamella (Figs. 5, 6), apex in paratype more distinctly truncate; right paramere distally rather slender, apically acuminate, without rows of hairs (Figs. 7, 8).

**Female and macropterous male unknown.**

**Comparative notes and discussion:** The glabrous, relatively flat and completely unkeeled posterior part of the mesosternum (Fig. 9) is unknown in any Oriental *Aphelocheirus* species except *A. baguio* POLHEMUS & POLHEMUS, 1988 from North Luzon. From this species *A. gapudi* sp.n. may be distinguished easily by the smaller size, the broader body shape, the shape of the hemelytron (comp. Figs. 4 and 12), and a shorter median process of the metasternum (comp. Figs. 10 and 11). Male genitalia are similar, except that the distal part of the right paramere of *A. gapudi* sp.n. (Figs. 7 - 8) is more slender than in *A. baguio*. *Aphelocheirus gapudi* sp.n. is smaller than other *Aphelocheirus* from Luzon, except *luzonicus*, from which it is at once separable by the presence of peglike setae on the abdominal sternites.

**Distribution:** Luzon: Camarines Sur, Albay.

**Habitats:** The type locality (# 142) is described under *A. venus* sp.n. Although the holotype specimen was recognized in the field as a species different from the common *A. venus* sp.n., intensive search did not yield any further specimens. The single paratype

was collected in the outflow of a large pool below the Palali Falls at the South slopes of Mount Malinao (# 201).

**Etymology:** This species is dedicated to my dear colleague Prof. Dr. Victor P. Gapud (University of the Philippines, Los Baños) in honour of his numerous contributions to our knowledge on Philippine Heteroptera.

### Taxonomic, morphological, and faunistic notes on some other species

#### *Aphelocheirus baguio* POLHEMUS & POLHEMUS, 1988 (Figs. 11 - 14)

**Material examined:** 1 ♀ (macropterous) "PHILIPPINES\ Ifugao Prov., Liwo\ 8km E Mayoyao, 1000-1300m, 30.-31.V.1967", "L.M. Torrevillas\ Collector\ BISHOP MUSEUM", "J.T.Polhemus\ Collection" (JTPC); 1 ♂, 2 ♀♀ (brachypterous), and 1 ♂, 1 ♀ (macropterous) "Philippinen: LZ, Mount.Pr.\ NE Sagada, Banga'an\ Bomod-ok Wf., 22.2.1999\ 1500 m, leg.H.Zettel (185)" (UPLB, CZW, NHMW); 1 ♂, 1 ♀ (macropterous), same label data, except "leg.F.Seyfert (9)" (CSW, UPLB); 1 ♀ (brachypterous) "Philippinen: LZ, Mount.Pr.\ 5km S Bontoc, Balitian Riv.\ 900 m, 27.2.1999\ leg. H. Zettel (190)" (NHMW); 1 ♀ (brachypterous) "Philippinen: LZ, Benguet\ Asin Hot Springs\ W Baguio, 17.2.1999\ leg. H. Zettel (180)" (CZW); 2 ♀♀ (macropterous), same label data, except "leg. F. Seyfert (4)" (CSW, UPLB).

**Description of macropterous female:** length 9.8 - 10.0 mm; maximum width (at abdominal segment 4) 5.2 mm; pronotal width 4.6 mm.

Head in front of eye 0.45 times eye length, with colour pattern similar as in *A. gapudi* sp.n. (see Fig. 4), but more diffuse; pronotum 3.5 times wider than long, with weakly incised posterior corners (Fig. 13); hemelytron broken behind corium, with embolar margin forming a distinct small tooth (Fig. 13); medial part of mesonotum weakly convex, nearly flat, smooth and shining, with very sparse, fine punctation; metasternum with posteromedian process spinelike (Fig. 11); sternite 4 with 4, sternite 5 with 5 - 6, and sternite 6 with 6 peglike setae.

Subgenital plate relatively broad, subtriangular, with broadly rounded, slightly asymmetrical hind margin, with four tufts of bristles nearly arranged in a transverse line, two long laterally, and two shorter medially (Fig. 14); interior corners of the female abdominal segment 7 rectangular (Fig. 14).

**Brachypterous female:** length 9.4 - 10.0 mm; maximum width (at abdominal segment 4) 5.2 - 5.5 mm; pronotal width 4.4 - 4.8 mm; body shape similar as in brachypterous male (POLHEMUS & POLHEMUS 1988: fig. 61); subgenital plate as in macropterous female.

**Notes:** *Aphelocheirus baguio* has a very characteristic elongate body shape. It was described from a single brachypterous male from Benguet Province. The macropterous female from Ifugao was formerly identified as *A. philippinensis* by POLHEMUS & POLHEMUS (1988). Although macropterous specimens are difficult to recognize, the short rostrum, and the typical structures of the meso- and metasternum are very typical for *A. baguio*, of which the female has been undescribed so far. The female was taken from a light trap (POLHEMUS & POLHEMUS 1988).

Very recently, small series of specimens were collected by Franz Seyfert and the author in Benguet and in the Mountain Province. *Aphelocheirus baguio* inhabits currents of middle sized and large streams. In one locality (# 185) it was found intermixed with *A. sculpturatus*, whereas *A. philippinensis* preferred the most rapid places.

**Distribution:** Luzon: Mountain Province, Benguet, Ifugao.

***Aphelocheirus philippinensis* USINGER, 1938** (Figs. 27 - 30, 34, 38)

**Material examined:** **holotype** (brachypterous ♂): "Los Banos\ P.I. VII-19-36", "Mt. Maquiling", "Molawin\ Creek", "R.L. Usinger\ Collector", "Aphelocheirus\ philippinensis\ Usinger", "[ALLO-\TYPE]" [obviously wrong label], "Holotype\ Aphelocheirus\ philippinensis\ (labeled: Zettel 1998)", "California Academy\ of Sciences\ Type\ No. 4239" (CAS); **allotype** (brachypterous ♀) "Los Banos\ P.I. VII-18-36", "Mt. Maquiling", "R.L. Usinger\ Collector", "Molawin\ Creek", "ALLOTYPE\ Aphelocheirus\ philippinensis\ Usinger", "Aphelocheirus\ philippinensis\ Usinger", "Collection of the\ CALIFORNIA ACADEMY\ OF SCIENCE, San\ Francisco, California" (CAS); **further material:** 1 ♂, 1 ♀ (brachypterous) "PHILIPPINES\ Ifugao Province\ Jacmal Bunnian\ 24km E Mayoyao, 800-\ 1000m, 1-3.V.1967", "H.M. Torrevillas\ Collector\ BISHOP MUSEUM", "J.T. Polhemus\ Collection" (JTPC); 1 ♂ (brachypterous), same locality data, except "9-12.IV.1967" (JTPC); 3 ♂♂, 4 ♀♀ (brachypterous) "Philippines: LZ, Mount.Pr.\ Chico River, Gonogon\ 1100 m, 21.2.1999\ leg. H. Zettel (184)" (UPLB, CZW, NHMW); 1 ♀ (brachypterous) "Philippines: LZ, Mount.Pr.\ Chico River trib., Gonogon\ 1100 m, 21.2.1999\ leg. F. Seyfert (8b)" (CSW); 1 ♂ (macropterous), 1 ♀ (brachypterous) "Philippines: LZ, Mount.Pr.\ NE Sagada, Banga'an\ Bomod-ok Wf., 22.2.1999\ 1500 m, leg.H.Zettel (185)" (CZW, UPLB).

**Notes:** The middle of the hind margin of male tergite 5 is slightly concave. Details of the characteristic parameres are shown in the Figures 27 - 30. Females are easily recognizable by the stout setae and five tufts of bristles on the subgenital plate (Fig. 38). The single macropterous female from Ifugao, Liwo, cited in POLHEMUS & POLHEMUS (1988) under *A. philippinensis*, does not agree with the other specimens examined in these structures but belongs to *A. baguio* (see above).

*Aphelocheirus philippinensis* inhabits the currents of small and middle sized, fast flowing streams (POLHEMUS & POLHEMUS 1988; and personal observations).

**Distribution:** Luzon: Mountain Province, Ifugao, Benguet, Laguna.

***Aphelocheirus sculpturatus* POLHEMUS & POLHEMUS, 1988** (Figs. 23 - 26, 33, 37)

**Material examined:** **paratypes:** 1 ♂, 1 ♀ (brachypterous) "PHILIPPINES, Luzon\ Benguet Province\ stream below Camp John\ Hay hydro, nr. Tuba mines\ VII-8-85 CL 1968 900m.\ J.T. & D.A.Polhemus", "PARATYPE\ Aphelocheirus\ sculpturatus\ D.A. & J.T.Polhemus" (NHMW); 3 ♂♂, 4 ♀♀ (brachypterous), and 2 ♂♂, 5 ♀♀ (macropterous) "Philippines: LZ, Mount.Pr.\ NE Sagada, Banga'an\ Bomod-ok Wf., 22.2.1999\ 1500 m, leg.H.Zettel (185)" (CZW, UPLB, NHMW); 1 ♂, 3 ♀♀ (brachypterous), 3 ♂♂, 2 ♀♀ (macropterous), same label data, except "leg.F.Seyfert (9)" (CSW, UPLB).

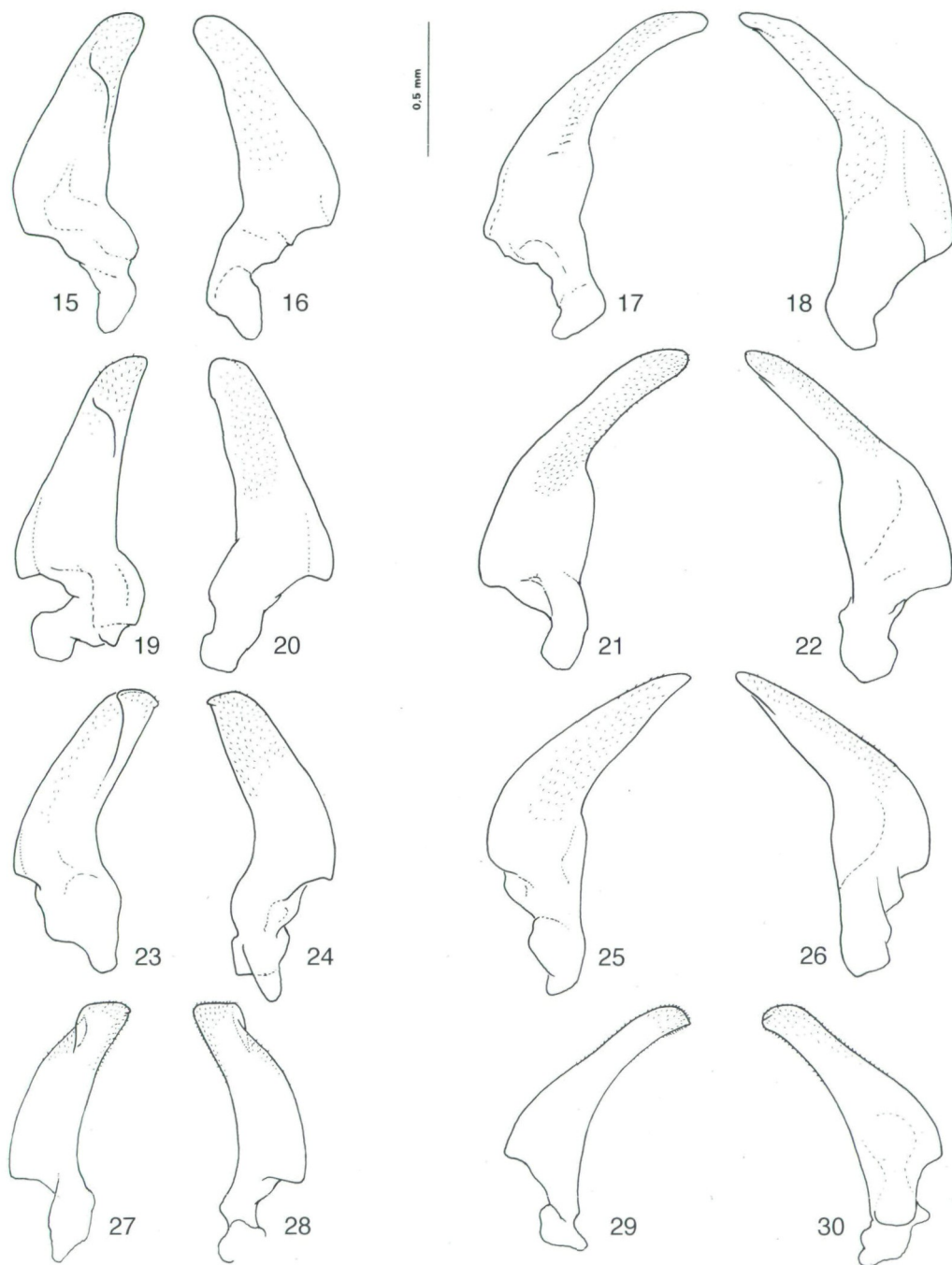
**Notes:** see the details of male parameres (Figs. 23 - 26), the very stout male segment 7 (Fig. 33), and the female subgenital plate (Fig. 37).

**Distribution:** Luzon: Mountain Province, Ifugao, Benguet, Laguna.

***Aphelocheirus uichancoi* USINGER, 1938** (Figs. 19 - 22, 32, 36)

**Material examined:** 25 ♂♂, 21 ♀♀ (brachypterous), 2 ♂♂, 4 ♀♀ (macropterous) "Philippines: LZ, Benguet\ Asin Hot Springs\ W Baguio, 17.2.1999\ leg. H. Zettel (180)" (UPLB, CZW, NHMW); 5 ♂♂, 4 ♀♀ (brachypterous), 2 ♀♀ (macropterous), same label data, except "leg. F. Seyfert (4)" (CSW, UPLB); 7 ♂♂, 4 ♀♀ (brachypterous) "ZAMBALES: SBFR\ Binictican River\ VPG/MGS/4/27/98" (UPLB); 12 ♂♂, 14 ♀♀ (brachypterous), 3 ♂♂, 2 ♀♀ (macropterous) "ZAMBALES: SBFR\ Mabayan River\ VPG/MGS/4/25/98" (UPLB); 2 ♂♂, 1 ♀ (brachypterous), 1 ♀ (macropterous) "PHILIPPINES: Luzon\ Cavite Province\ Tapat River, 2 km. S of\ Alfonso VII-24-85\ CL 2003 J.T. & D.A.Polhemus" (NHMW, CZW).





Figs. 15 - 30: Parameres of (15 - 18) *A. venus* sp.n., (19 - 22) *A. uichancoi*, (23 - 26) *A. sculpturatus*, and (27 - 30) *A. philippinensis*; (15, 19, 23, 27) left paramere, external view, (16, 20, 24, 28) left paramere, internal view, (17, 21, 25, 29) right paramere, internal view, (18, 22, 26, 30) right paramere, external view.

**Notes:** see details of the male parameres (Figs. 19 - 22) and the male segment 7 (Fig. 32). *Aphelocheirus uichancoi* shows some regional variability in the female subgenital plate. Figure 36 depicts the subgenital plate of a female from Cavite; this is slightly different from a specimen drawn by POLHEMUS & POLHEMUS (1988: fig. 59), which lacks clear lateral tufts, but has broader rows of hairs in the same position; in Benguet (locality # 180) both forms were collected together.

**Distribution:** Luzon: Ifugao, Benguet, Zambales, Cavite.

***Aphelocheirus zamboanga* ssp. *zamboanga* POLHEMUS & POLHEMUS, 1988**

**Material examined:** 1 ♀ (brachypterous) "Philippinen: N. Samar\ Veriato, El Amigo\ Veriato Falls, 16.3.1998, leg. Zettel (162)" (CZW).

**Remarks:** The single female represents the first record from Samar. No significant differences to specimens from Mindanao could be detected.

**Distribution:** Mindanao (data summarized by ZETTEL 1998); Samar: Northern Samar.

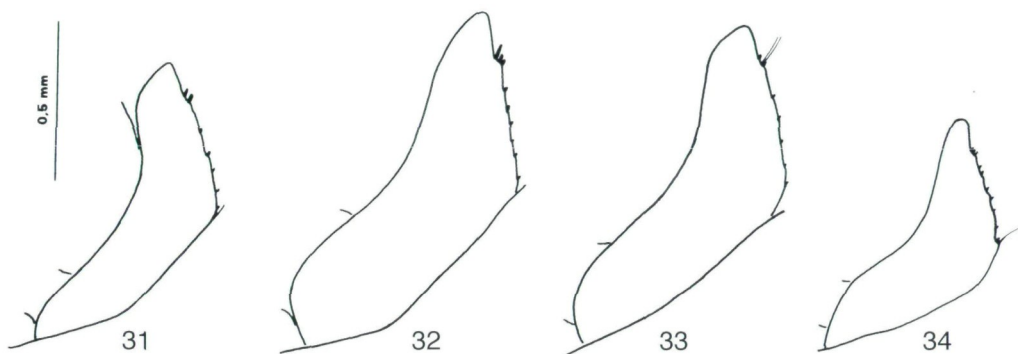
***Aphelocheirus zamboanga* ssp. *luzonicus* POLHEMUS & POLHEMUS, 1988, stat.n.**  
(Figs. 40 - 43)

**Material examined:** paratype (brachypterous ♀): "ALFONSO, CAVITE\ TALONG, MALAPAD\ 17 MAY 1977\ V.P. GAPUD" (JTPC); **further material:** 1 ♂ (brachypterous) "Philippinen: LZ, Camarines\ Sur, Lupi, Alanao\ Bahi River, 3.3.1999\ leg. F. Seyfert (18)" (CSW); 7 ♂♂, 7 ♀♀ (brachypterous) "Philippinen: Luzon, Albay\ 15 km SW Manito, S Cawayan\ river, 24.2.1998\ leg. H. Zettel (144)" (UPLB, NHMW); 1 ♂, 1 ♀ (brachypterous) "Philippinen: Luzon, Albay\ 40 km N Legaspi, 1 km W\ Malilipot, Busai Falls\ 23.2.1998, leg. Zettel (143)" (NHMW); 3 ♂♂, 4 ♀♀ (brachypterous) "Philippinen: Catanduanes\ W Virac, Sto. Domingo\ Pajo River area, 10.3.1999, leg. Zettel (199)" (NHMW, UPLB); 2 ♂♂, 2 ♀♀, same label data except "leg. Seyfert (24)" (CSW, UPLB).

**Description of brachypterous male:** length 7.8 - 8.5 mm; maximum width (at abdominal segment 3) 4.8 - 5.2 mm; pronotal width 3.8 - 4.1 mm. Colour as in brachypterous female (see POLHEMUS & POLHEMUS 1998).

Head with some large and numerous small punctures, slightly shining; pronotum, hemelytra and abdomen coriaceous, matt; disk of pronotum and middle of mesoscutellum punctate, shining; head 0.7 times as long as broad, in front of anterior eye margin 0.45 times as long as eye length (Fig. 40); pronotum 3.5 times as broad as median length, without demarcated lateral areas, with very short emarginations in the posterior corners (Fig. 40); mesoscutellum 2.9 times as broad as long; hemelytron with small angle at embolar margin, medially not separated, caudally not or just reaching the hind margin of tergite 2 (Fig. 40); connexiva of abdominal segment 2 nearly rectangular, of segments 3 - 6 produced into very short tips.

Rostrum relatively short, 1.2 times as long as profemur, reaching posteriad to posterior third of mesosternum; legs relatively short and stout, profemora slightly, meso- and meta-femora weakly surpassing the body sides; propleuron internally with a short, relatively blunt process (Fig. 41); mesosternum in posterior two-thirds highly elevated, with a blunt keel, not distinctly shining; abdomen weakly asymmetrical, sternites medially without posteriad directed processes and without peglike setae.



Figs. 31 - 34: Lateral area of abdominal segment 7, ventral view, of (31) *A. venus* sp.n., (32) *A. uichancoi*, (33) *A. sculpturatus*, and (34) *A. philippinensis* (holotype).

Genitalia: left parandrium distinctly longer than right parandrium, both broad; left paramere subparallel in distal part, with straight left margin (Fig. 42); right paramere distally rather slender, apex distinctly curved (Fig. 43).

**Discussion:** *Aphelocheirus zamboanga* POLHEMUS & POLHEMUS, 1988, is known from Mindanao and Samar (nominate subspecies), Negros and Panay (ssp. *visayasensis* ZETTEL, 1998) (POLHEMUS & POLHEMUS 1988, ZETTEL 1998, and this paper). *Aphelocheirus luzonicus* was described from three brachypterous females from Central Luzon. The fact that POLHEMUS & POLHEMUS (1988) did not compare them with the similar *A. zamboanga* from Mindanao was probably caused by a mistake in the production of the key, where *luzonicus* is wrongly placed under species with "Stout erect peg-like setae present ... on abdominal ventrite V ..." (POLHEMUS & POLHEMUS 1988: p. 188, key couplet 5), although those setae are lacking as stated in the diagnosis of *luzonicus* (POLHEMUS & POLHEMUS 1988: p. 213). However, females of *A. zamboanga* and *luzonicus* show only minute differences. Newly collected material from Albay, Camarines Sur, and Catanduanes agrees well with a studied paratype of *luzonicus*; males confirm the general similarity of *zamboanga* and *luzonicus*, and show that *luzonicus* as a species taxon proves untenable. However, the small differences mentioned below may justify a subspecific separation. No morphological differences between the populations from Luzon and Catanduanes were found. A single male of *A. zamboanga* was collected in Benguet, Northern Luzon (locality # 180, cited in material of *A. uichancoi*); it differs from *luzonicus* in several characters, but more material is necessary to confirm its subspecific status.

**Comparative notes:** *Aphelocheirus zamboanga luzonicus* differs from the nominate subspecies in a shorter process of the propleuron (which is, however, more acute than in the ssp. *visayasensis*) and in the smaller distance between the lateral and the medial hair tufts in the female subgenital plate. The shape of the left paramere (Fig. 42) is identical with that of the nominate subspecies and differs slightly from that of the ssp. *visayasensis* (see ZETTEL 1998). Further differences between the subspecies *luzonicus* and *visayasensis* are found in the length of the anterior portion of the head (extremely short in ssp. *visayasensis*) and in the female subgenital plate (usually with accessory hair tufts in ssp. *visayasensis*).

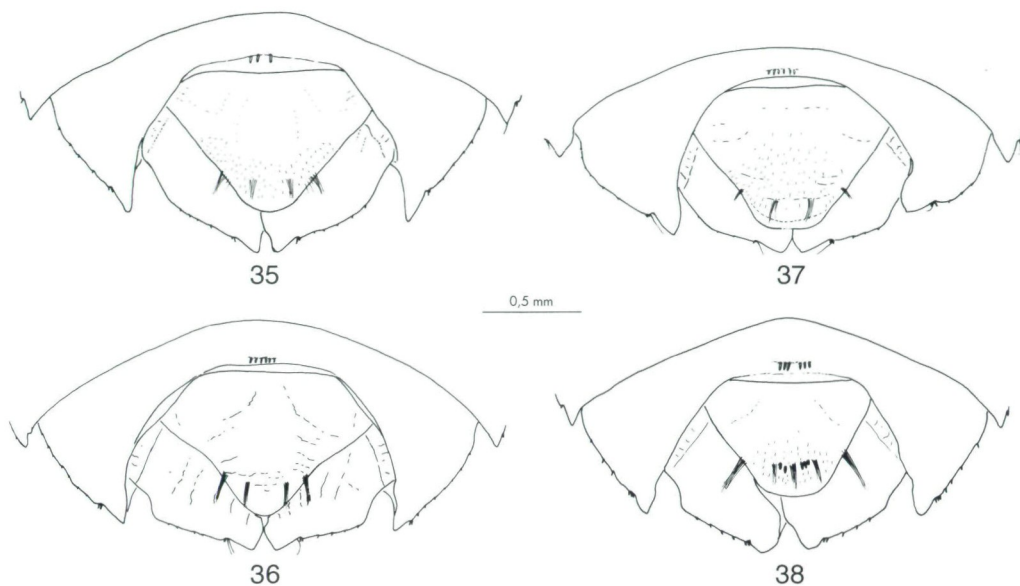
**Distribution:** Luzon: Pampanga, Cavite, Camarines Sur, Albay; Catanduanes.

### Key to Philippine *Aphelocheirus* species (brachypterous morphs)

**Notes:** Although this key is mainly for the identification of brachypterous specimens, most characters are also applicable to the rare (and in some species unknown) macropterous morphs. Exceptions are: dorsal colour pattern of thorax; body shape; structures of pronotum, mesosternum (but: glabrous / matt condition for couplet 2 constant), and hemelytra; shape of lateral parts of abdominal segments.

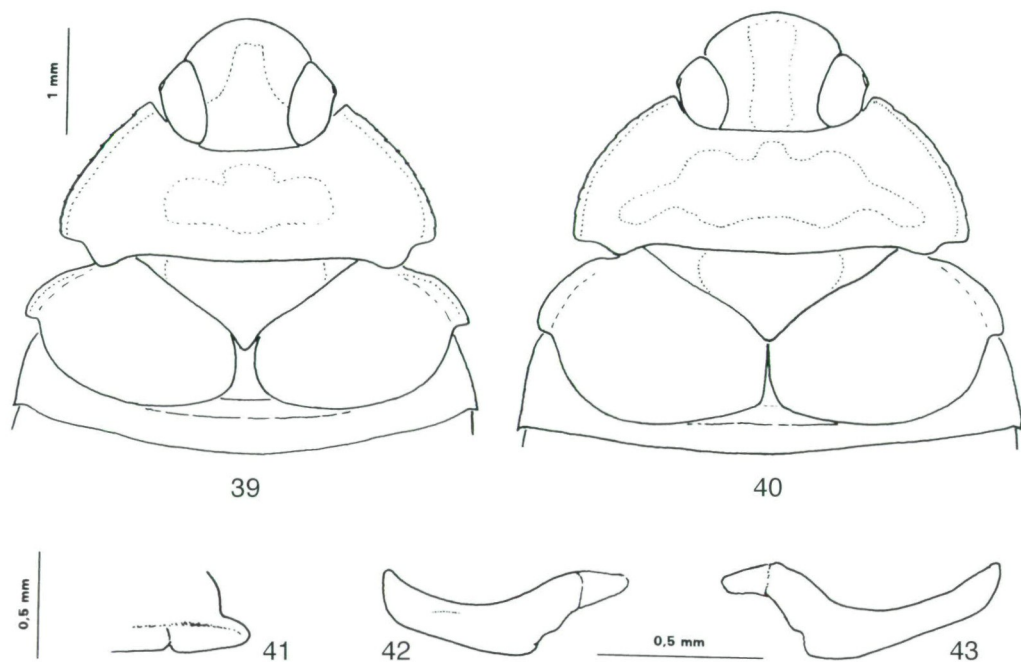
- 1 Sternites 4 - 5 (- 6, - 7) with a row of stout peglike setae close to middle of hind margin (for sternite 6 see Figs. 14, 35 - 38). ..... 2
- Sternites without stout peglike setae. .... 11
- 2 Mesosternum in posterior part glabrous, forming a evenly roundish tumescence; rostrum not reaching posterior margin of mesosternum (Fig. 9). ..... 3
- Mesosternum in posterior part matt, usually (except in *A. philippinensis*) with a median carina; rostrum surpassing posterior margin of mesosternum (Fig. 3). ..... 4
- 3 Body relatively slender, elongate ovate, length 9.2 - 10.0 mm; hemelytron about as long as wide, embolar margin forming a short angle (Fig. 12); metasternum postero-medially produced into a long spine (Fig. 11). (North Luzon) ..... *A. baguio*
- Body relatively stout, broadly ovate, length 7.9 - 8.1 mm; hemelytron distinctly shorter than wide, embolar margin forming a long angle (Fig. 4); metasternum postero-medially produced into an acute angle (Fig. 10); male parameres see Figures 5 - 8. (South Luzon) ..... *A. gapudi* sp.n.
- 4 Females. .... 5
- Males. .... 8
- 5 Subgenital plate with a subapical row of peglike setae and with 5 tufts of long hairs (Fig. 38); posterior part of mesosternum cushion-like, weakly elevated, not keeled. (North and Central Luzon) ..... *A. philippinensis*
- Subgenital plate without peglike setae and with 4 (2) tufts of long hairs (Figs. 35 - 37); posterior part of mesosternum strongly elevated and more or less keeled (Fig. 3). ..... 6
- 6 Posterolateral angles of tergite 6 strongly asymmetrical, the left one much larger and strongly downcurved (Fig. 37). (North and Central Luzon) ..... *A. sculpturatus*
- Posterolateral angles of tergite 6 subsymmetrical, slender, the left one not strongly downcurved (Figs. 35, 36). ..... 7
- 7 Lateral margin of pronotum largely yellowish; posterior quarter to half of hemelytra yellowish (Fig. 1); subgenital plate with broadly rounded apex and straightly convergent sides (Fig. 35); interior corners of abdominal segment 7 acute (Fig. 35). (South Luzon) ..... *A. venus* sp.n.
- Lateral margin of pronotum narrowly yellowish; posterior margin of hemelytra not or only narrowly yellowish; subgenital plate subtriangular, with concave sides (Fig. 36); interior corners of abdominal segment 7 rectangular (Fig. 36). (North and Central Luzon) ..... *A. uichancoi*
- 8 Posterior part of mesosternum cushion-like, weakly elevated, not keeled; hind margin of tergite 5 medially concave; posterolateral angle of segment 7 evenly tapered, apically narrowly rounded (Fig. 34); parameres see Figures 27 - 30. (North and Central Luzon) ..... *A. philippinensis*



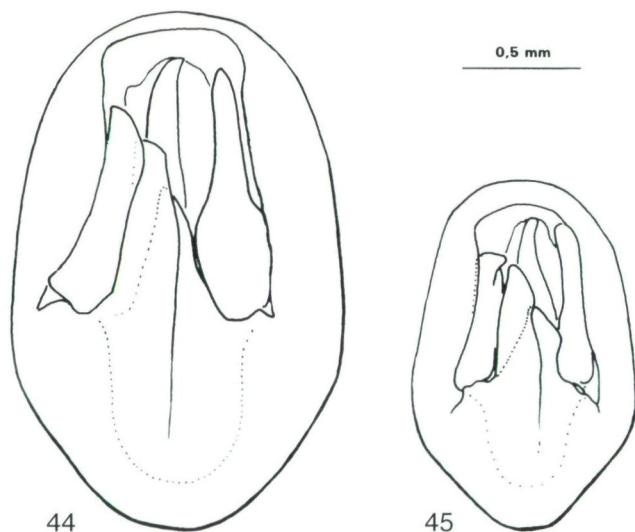


Figs. 35 - 38: Female abdominal segments 6 - 7, ventral view, of (35) *A. venus* sp.n., (36) *A. uichancoi*, (37) *A. sculpturatus*, and (38) *A. philippinensis* (allotype).

- Posterior part of mesosternum strongly elevated, with more or less developed, but always present median carina (Fig. 3); hind margin of tergite 5 medially convex or straight; posterolateral angle of segment 7 less tapered, broader, either broadly rounded or truncate (Figs. 31 - 33); parameres different (Figs. 15 - 30). ..... 9
- 9 Parameres very stout, left paramere distally very weakly tapered, right paramere with acute apex (Figs. 23 - 26); posterolateral angle of segment 7 very broad (Fig. 33); mesoscutellum mainly yellowish. (North and Central Luzon) ..... *A. sculpturatus*
- Parameres comparatively slender, left paramere distinctly tapered in distal half, right paramere with rounded apex (Figs. 15 - 22); posterolateral angle of segment 7 relatively slender (Figs. 31, 32); colour of mesoscutellum varying. .... 10
- 10 Left paramere with a basal lobe (Figs. 19, 20); lateral margin of pronotum narrowly yellowish; posterior margin of hemelytron not or only narrowly yellowish. (North and Central Luzon) ..... *A. uichancoi*
- Left paramere without a basal lobe (Figs. 15, 16); lateral margin of pronotum largely yellowish; posterior quarter to half of hemelytron yellowish (Fig. 1). (South Luzon) ..... *A. venus* sp.n.
- 11 Body length 6.4 - 7.3 mm; pronotum with posterior corners widely removed anteriorly from posterior margin, and with anterior lateral margins straight (Fig. 39); male: right paramere in distal half broad and straight. (Palawan, Busuanga) ..... *A. palawanensis*
- Body length 7.6 - 9.2 mm; pronotum with posterior corners close to posterior margin, and with anterior lateral margins curved (Fig. 40); male: right paramere in distal half slender, with curved apex (Fig. 43). ..... *A. zamboanga*



Figs. 39 - 43: (39) *Aphelocheirus palawanensis*, anterior part of body of brachypterous male (Palawan, Iwahig, in NHMW), dorsal view; (40 - 43) *A. zamboanga luzonicus*, brachypterous male: (40) anterior part of body, dorsal view, (41) propleural process, (42) left paramere, external view, (43) right paramere, external view.



Figs. 44 - 45: Male genital capsule of (44) *Aphelocheirus venus* sp.n. and (45) *A. gapudi* sp.n.

Three similar, allopatric subspecies (for distinction see ZETTEL 1998; and comparative notes on *A. z. luzonicus* in this paper):

- a) from Mindanao, Samar. .... *A. zamboanga zamboanga*
- b) from Luzon, Catanduanes. .... *A. zamboanga luzonicus*
- c) from Negros and Panay. .... *A. zamboanga visayasensis*

### Checklist of Philippine *Aphelocheirus* species and subspecies (in alphabetic order)

<i>Aphelocheirus baguio</i> POLHEMUS & POLHEMUS, 1988	North Luzon
<i>Aphelocheirus gapudi</i> <b>sp.n.</b>	South Luzon
<i>Aphelocheirus palawanensis</i> POLHEMUS & POLHEMUS, 1988	Palawan
<i>Aphelocheirus philippinensis</i> USINGER, 1938	North and Central Luzon
<i>Aphelocheirus sculpturatus</i> POLHEMUS & POLHEMUS, 1988	North and Central Luzon
<i>Aphelocheirus uichancoi</i> USINGER, 1938	North and Central Luzon
<i>Aphelocheirus venus</i> <b>sp.n.</b>	South Luzon
<i>Aphelocheirus zamboanga zamboanga</i> POLHEMUS & POLHEMUS, 1988	Mindanao, Samar
<i>Aphelocheirus zamboanga luzonicus</i> POLHEMUS & POLHEMUS, 1988	South and Central Luzon, Catanduanes
<i>Aphelocheirus zamboanga visayasensis</i> ZETTEL, 1998	Negros, Panay

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