A REVIEW OF THE GENUS PSITTACONIRBUS
(MALLOPHAGA: PHILOPTERIDAE) FROM SOUTH
PACIFIC PARROTS (PSITTACIFORMES)

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Abstract. Eleven species of Psittaconirbus are recognized, 5 having been previously described and 6 representing the following new species: phasianire (type-host Trichoglossus phasianus), heliodobu (type-host Psittacula eluardi), tika (type-host Nyctipilius nemarum), choromyns (type-host Choroa nova), rica (type-host Lorus chlorocercus), and cardinato (type-host Chakopista cardinalis). P. neumanus conci is placed as a junior synonym of P. lauvela. A key is provided for the identification of these species.

The mallophagan genus Psittaconirbus Harrison presently contains 6 specific and subspecific taxa (Guimarães 1974). All authenticated records of these taxa have type-hosts among the parrot family Lories (Morony et al. 1975). Unfortunately, Guimarães had only 37 loose specimens representing these 6 taxa and 14 additional Psittaconirbus lice from 7 other hosts that he chose not to include in his study. While his treatment of Psittaconirbus is an excellent one, it suffers from the lack of specimens and limited number of host taxa sampled. We have been able to study 433 specimens of Psittaconirbus collected from 15 species of Lories and 1 of Psittacidae. Based on these specimens, we redescribe 5 of the currently-recognized taxa, establish a synonymy for the 5th, and describe 6 new species. Our work is summarized in a key for the identification of these 11 species.

All species included in Psittaconirbus may be characterized as follows:

Elongate, relatively slender lice (Fig. 1-2). Dorsolateral head margin with oval indentation; dorsoanterior plate present, but usually not clearly demarcated; temple margin rounded, temple slightly wider than preantennal region, and with long seta; antenna sexually dimorphic, 9 with 5 similar segments, 6 with enlarged segment 1 and process on segment III. Pronotum with pair of short posterior setae; each side of metasternum with 5-7 medium to long posterior setae, often clustered into 2 groups and 2 lateroanterior setae; small mesoventral and large metasternal plate, each with pair of setae. Male abdomen with tergite II (1st apparent segment) divided at midline, tergites III-IX entire; tergite IX with lobed posterior margin (Fig. 3); tergites II-VIII with lateroanterior setae on each side and 4 medioposterior setae; tergites VI-VII with additional long seta on each side; sternites II-VI with 4-6 medium length setae. Female abdomen with tergites II-VIII divided at midline, tergite IX entire, and pair of small lateral sublateral plates on III-VII; tergites II-VIII with 1-2 lateroanterior setae and 1 minute seta

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and 1 long mediodentral seta, tergites VI–VII with additional long seta, and each side of IX with 1 short and 1 long seta; sternum II–VI with 4–6 setae; sternum VII with large median plate with lobes and associated setae (Fig. 5). Male genitalia with variable structures medially, and with prominent parameres each bearing minute apical setae. We agree with Guimarães (1974) that these taxa form "... a very homogeneous ensemble of species ..."

All measurements are in millimetres. Host identifications and data have been confirmed where possible by Bishop Museum personnel; however, we have used "probably" in conjunction with host names when hosts were discarded in the field before having their identifications verified. In these cases, each host identification represents a careful taxonomic judgment by a vertebrate zoologist based on the collection data. Furthermore, louse identifications from hosts designated "probably" match louse identifications from corresponding verified hosts. Thus, the designation "probably" infers a high degree of likelihood.

In the specimen examined sections, BBM-NG and BBM-BSIF refer to Bernice P. Bishop Museum collections from New Guinea and the British Solomon Island Protectorate, respectively. PNG refers to Papua New Guinea. BPFM indicates Bishop Museum as the depository institute. Numbers following abbreviations are host catalog numbers. As numbers of specimens allow, paratypes will be distributed to the Bishop Museum, U.S. National Museum of Natural History, Oklahoma State University, University of Minnesota, and British Museum (Natural History).

Psittaconirmus australis Harrison

Psittaconirmus australis Harrison. 1915, Parasitology 7: 403. Type-host: Gonocephala porphyrophthalma (Dietrich).[...]

- **d.** No specimen examined; only known from lectotype in the British Museum (Natural History). Head, genalia, and pleural thickening of abdominal segments I–VI illustrated by Guimarães (1974).
- **i.** With well-developed pleural thickenings of abdominal segments I–VI as for **d.**

**Dimensions.** Temple width (TW), d 0.28, v 0.31; prothorax width (PW), d 0.22, v 0.19; metathorax width (MW), d 0.35, v 0.35; abdomen width (AW), d 0.36, v 0.40; head length (HL), d 0.39, v 0.43; total length (TL), d 1.35, v 1.66. Dimensions for **d** from Guimarães (1974).

**Specimens examined.** 17 (paratype of **P. australis**), ex *G. porphyrophthalma*. WESTERN AUSTRALIA: Bow Rev. 30.X 1912, L. Harrison.

**Remarks.** *P. australis* is the type species of *Psittaconirmus*. The quality of the lectotype male and paratype female is not optimal; yet it is sufficient to confirm that this species is distinct, based on the overall small dimensions, well-developed abdominal pleural thickenings, and genitalic details noted by Guimarães (1974).

Psittaconirmus lanceoloti Eichler

**New synonymy.**

- As in Fig. 2. Tergite VI usually with pair of fine short median setae (11 of 10 specimens examined with 1 long heavy and 1 short fine seta); tergite IX (Fig. 3) with 5–8 subequal long setae along each posterior lobe. Genitalia as in Fig. 4, with circular hole in elongate median sclerite, small triangular bridge connecting lobe to posterior projection of semicircular sclerite, and roughly diagonal line of junction between arm of paramere and its tip.

**Dimensions.**

- TW, 0.33–0.38, 0.34–0.40; LW, 0.24–0.29, 0.24–0.27; MW, 0.38–0.44, 0.39–0.45; AW, 0.38–0.35, 0.41–0.46; HL, 0.41–0.46, 0.43–0.48; TL, 1.51–1.72, 1.76–2.05; genitalia width (GW), 0.13–0.16.

**Suggested emended.**


**Remarks.**

Harrison (1915) noted differences between T. harmautus mokouannus (= T. novus-hollandiae) and a female P. australis from G. phrynoscoetes. Eichler (1943) provided the new name P. launelottii for the first 2 specimens. After examination of males from T. harmautus (Linnaeus), we agree that P. launelottii is separable from P. australis, since both sexes of the former are larger than the latter and have less well-developed abdominal pleural thickenings. Furthermore, the P. australis male genitalia illustrated by Guimaraes (1974) are different from P. launelottii male genitalia (Fig. 4). Confirmation of this difference, however, awaits the collection and subsequent examination of more male P. australis specimens. We cannot con-
ment on potential differences of female ventral terminalia because we are unable to
discern details of the female *P. ustralis* specimen.

We find no differences between the paratype male of *P. n. conei* and male *P.
laureloeti*, and there are no features in the description by Guiné-Neto (1974) that show
differences for either sex. While we are unable to account for the appearance of the
same host taxon on hosts that are so widely geographically separated, we are con-
fident that this synonymy is justified.

**Psittaconirmus harrisi** Uchida

naparte).

Unfortunately, we could not locate any of the 5 specimens from *T. neglecta* that
Guiné-Neto (1974) used to redescribe *P. harrisi*, nor could we obtain any other
material from the type-host. However, Guiné-Neto chose this species for full illustra-
tion, giving entire male and female drawings plus the male genitalia and female
ventral terminalia; dimensions are given for both sexes, these being near to those of
*P. ustralis* Guiné-Neto. These show an evident similarity to *P. laureloeti* in all respects
except the male of *P. harrisi* illustrated by Guiné-Neto (1974) shows a much longer
heavier median seta on tergite VI. Guiné-Neto did not have a male of *P. laureloeti*,
but he suspected the similarity of *P. laureloeti* and *P. harrisi*. While our male *P.
laureloeti* specimens usually have both setae of this median pair short and fine, occa-
sionally 1 is long and heavy, thereby causing a problem in our evaluation of this
character. Furthermore, we can only assume from Guiné-Neto’s divided illustration
that both setae of the median pair are long and heavy. On the basis of the assumed
different chaetotaxy of male tergite VI, the different hosts involved, the geographic
separation of these hosts, and the absence of any *T. neglecta* specimens for study,
we believe it best to continue recognizing *P. harrisi* as separate.

**Psittaconirmus acuminatus** Guiné-Neto

B. Meyer)—possible error, perhaps *Loxosceles enemita* (Lemmcke).

δ. As for *P. laureloeti*, except for larger dimensions and genitalia as in Fig. 6, with broad
semicircular hole surrounding faint circular hole in elongate median sclerite, large triangular
bridge connecting this sclerite to anterior semicircular sclerite lacking button at juncture point,
and horizontal line of junction between arm of paramere and its tip.

ρ. As for *P. laureloeti*, except tendency for larger dimensions.

Dimensions. TW, δ 0.37–0.41, ρ 0.37–0.45; PW, δ 0.26–0.31, ρ 0.27–0.31; MW, δ 0.12–0.30, ρ 0.14–0.36; AW, δ 0.19–0.59, ρ 0.31–0.59, H1, δ 0.43–0.48, ρ 0.27–0.46; H2, δ 1.18–1.50, ρ 1.54–2.42; δ GW, 0.16–0.19.

Specimens examined. 96, δ, ex C. urticata. PNG, Western Prov: Oroiro Riv (BBM-NG 291615, 29475, 50808); Weam (BBM-NG 50817); 25, probably ex C. urticata. PNG, Western Prov: Oroiro Riv (BBM-
NG 29174, 3009); 25, ρ, ex *Pandemus fasciatus*. PNG, Morobe Prov: Bulolo (BBM-NG 50259), Nakara

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**Fig. 6**

Ridge, Wau (BBM-NG 27669); Northern Prov: Cape Killerton (BBM-NG 29257, 29282, 29283), Soputa Re (BBM-NG 29753).

Remarks. P. neumanni is very similar to P. launceloth; however, both sexes of the former tend to be larger than the latter in most dimensions and the male genitalia are different. With the exception of the type-series, none of the many specimens of lice from Lrurus lory are P. neumanni. Therefore, we suspect that the type-host is in error and suggest that it be replaced with Chalcospila antillata, since all specimens collected from the latter are P. neumanni.

Psittacanirmus johnstoniae Price & Clayton, new species

Type-host: Trichoglossus johnstoni (Hartert).

Much as for P. launceloth, except dorsal abdomen (Fig. 8) having vertice II with only 1 long seta on each side and vertigii VIII without any long setae; somewhat smaller dimensions; and genitalia (Fig. 7) smaller, with less tapered paramere tip.

Unknown.

Dimensions. TW 0.33; PW 0.22; MW 0.35; AW 0.40; HL 0.41; TL 1.49; GW 0.12.


Remarks. P. johnstoniae is distinguished by its small dimensions, genitalia, and the chaetotaxy of vertigii VII–VIII.

Psittacanirmus hellenthalii Price & Clayton, new species

Type-host: Psittacanirmus edwardii (Oustalet).

Much as for P. launceloth, except as follows. Dorsal abdomen and metanotal margin as in Fig. 12, without evident clustering of metanotal setae; with long heavy median pair of setae on vertigii II–VI, short and fine on VII, and medium on VIII, vertige IX (Fig. 11) with pigmented lobe on each side bearing 3–5 short setae, and single very long 2–3 short setae medioradial to lobe. Genitalia (Fig. 9) markedly different, with elongate median sclerite having suggestion of hole posteriorly and lacking other median structures shown in Fig. 4.

Unknown.

Much as for P. launceloth, except ventral terminalia as in Fig. 10, plate on segment VII shorter, with posterior margin as illustrated; posterior pair of lobes not evenly rounded; and anterior margin of median plate very well defined.

Dimensions. TW 0.56–0.40, 1.38–0.43; PW 0.24–0.28, 1.29–0.32; MW 0.39–0.42, 1.44–0.49; GW 0.49–0.62; HL 0.42–0.45, 0.46–0.50; TL 1.22–1.50, 1.69; GW 0.11–0.13.


Remarks. The male of P. hellenthalii is separable from those of other known species by its long median setae on vertigii II–VI and its unique genitalia; the female is recognizable by the shape of plates associated with the ventral terminalia.

This species is named for Dr Ronald A. Hellenthal, University of Notre Dame, in recognition of his extensive collaboration with RDP on Mallophaga research.

Psittacanirmus zinki Price & Clayton, new species

Type-host: Neoptoparrus muschlenbrocki (Schlegel).

Much like P. launceloth, except as follows. Dorsal terminalia as in Fig. 15, with posterior lobes of vertige IX less pronounced and each bearing a single long seta among shorter ones. Genitalia (Fig. 14) similar to those of P. hellenthalii, but more slender, with narrow space between parameters, this containing attenuate sclerite.

Unknown.

Dimensions. TW 0.34–0.35, 0.36–0.39; PW 0.24–0.26, 0.25–0.28; MW 0.36–0.43, 0.39–0.45; GW 0.37–0.49, 0.35–0.62; HL 0.41–0.44, 0.45–0.47; TL 1.49–1.61, 1.89–2.03; GW 0.09–0.10.


Other species. Id. ex. N. pinnulata (Hartert). PNG: Western Highlands Prov: Kepulam (BBM-NG 29299), Tambul (BBM-NG 29055). 25.VI, probably ex Neoptoparrus sp. muschelenbrocki or pinnulata. PNG: Morobe Prov: Buldog Road (BBM-NG 29094, 29095), BRIAN JAYAN: Farm: Fimbulado (BBM-NG 21062, 21064).

Remarks. The male of P. zinki is recognized by the combination of dorsal abdominal chaetotaxy like that of P. launceloth and genitalia resembling those of P. hellenthalii. The female is recognizable by the shape of plates associated with the ventral terminalia. This species is named for Dr Robert M. Zink, University of California, Berkeley, in recognition of his interest in the use of Mallophaga for avian systematics.

Psittacanirmus charmosynae Price & Clayton, new species

Type-host: Charmosyna papoi (Scopoli).

Much as for P. launceloth, except with median pair of setae on vertige VII shorter, not extending beyond segment VII; posterior lobes of vertige IX rounded (Fig. 16); and genitalia (Fig. 13) with wide space between parameters, this containing V-shaped sclerite and small pieces on each side.
Much as for *P. lauviroth*, except median piece of setae on tergite VIII not extending to end of abdomen, only reaching \( \frac{1}{2} \) to \( \frac{3}{4} \) of distance to end of body, ventral terminalia as in Fig. 18, showing plate on segment VII with concave posterior margin well separated from median plate and several setae exposed between posterior ends of paired lobes.

**Dimensions.** TW, \( \delta \) 0.37, \( \gamma \) 0.37-0.43; PW, \( \delta \) 0.27, \( \gamma \) 0.37-0.29; MW, \( \delta \) 0.40, \( \gamma \) 0.45-0.50; AW, \( \delta \) 0.44, \( \gamma \) 0.60-0.74; HL, \( \delta \) 0.44, \( \gamma \) 0.48-0.51; TL, \( \delta \) 1.56, \( \gamma \) 1.95-2.05; GW, \( \delta \) 0.12.


**Remarks.** *P. characomyrma* is separated from other members of the genus by general structure of the male genitalia, including shapes of the median pieces, and by details of the female ventral terminalia.

**Pithaconimirus chlorocerci** Price & Clayton, new species

**Type-host:** *Loris chlorocercus* Gould.

\( \delta \). Much as for *P. lauviroth*, but structure of tergite IX like that of *P. zink* and genitalia as in Fig. 20, with elongate median sclerite plus broadened-shaped sclerite surrounding hole, the latter unusually situated anteriorly or posteriorly of position illustrated.

\( \gamma \). Much as for *P. lauviroth*, but ventral terminalia as in Fig. 19, with median plate fused to anterior plate located on segment VII, thereby interrupting posterior margin of anterior plate.

**Dimensions.** TW, \( \delta \) 0.37-0.38, \( \gamma \) 0.38-0.42; PW, \( \delta \) 0.25-0.27, \( \gamma \) 0.28-0.30; MW, \( \delta \) 0.40-0.42, \( \gamma \) 0.34-0.47; AW, \( \delta \) 0.41-0.47, \( \gamma \) 0.46-0.66; HL, \( \delta \) 0.45-0.46, \( \gamma \) 0.47-0.50; TL, \( \delta \) 1.38-1.43, \( \gamma \) 1.80-2.06; GW, \( \delta \) 0.10.


**Remarks.** The structure of the male genitalia and the fusion of the anterior and median plates of the female ventral terminalia readily distinguish *P. chlorocerci* from other known species of the genus.

**Pithaconimirus comis** Guimarães


\( \delta \). Much as for *P. lauviroth*, except pair of median setae on abdominal tergites II-VIII long and genitalia as in Fig. 22, with somewhat rectangular complex of median sclerites.

\( \gamma \). Much as for *P. lauviroth*, but ventral terminalia as in Fig. 21, with large clearly defined hole at juncture of anterior and median plates and with evenly rounded posterior lobes.

**Dimensions.** TW, \( \delta \) 0.32, \( \gamma \) 0.31-0.36; PW, \( \delta \) 0.23, \( \gamma \) 0.21-0.24; MW, \( \delta \) 0.36, \( \gamma \) 0.37-0.44; AW, \( \delta \) 0.42, \( \gamma \) 0.43-0.49; HL, \( \delta \) 0.41, \( \gamma \) 0.41-0.46; TL, \( \delta \) undetermined, \( \gamma \) 1.75-1.95; GW, \( \delta \) 0.10.
Remarks. The abdominal chaetotaxy of male *P. comis* is much like that of *P. hellenthali*, and the structure of *P. comis* male genitalia is close to those of *P. hellenthali*, *P. zikii*, and *P. chloroecris*. However, the complex of median sclerites of the male genitalia is sufficiently distinct to allow easy separation of *P. comis*. Likewise, the central hole in the ventral terminalia of female *P. comis* is unique among known species of the genus.

**Psitaconuris cardinalis** Price & Clayton, new species

**Type-host:** *Chlaopis cardinalis* Gray.

δ. Grows as for *P. lauenecii*, but 10 very long setae on metanotum marginal (Fig. 26); abdominal tergites II–VI with minute pair of median setae on each side (Fig. 26); tergite IX with very broad posterior lobes, each bearing 8–10 subequal long setae (Fig. 24); and genitalia much as in Fig. 23, very large and with complex median structures.

γ. Much as for *P. lauenecii*, but ventral terminalia as in Fig. 23, with large rounded anterior plate on segment VII, this fused to median plate.

**Dimensions.** TW, δ 0.41–0.45, γ 0.43–0.46; PW, δ 0.30–0.35, γ 0.31–0.33; MW, δ 0.50–0.55, γ 0.50–0.55; AW, δ 0.51–0.64, γ 0.63–0.75; HL, δ 0.49–0.52, γ 0.52–0.53; TI, δ 1.95–2.10, γ 2.30–2.45; CW, δ 0.20–0.22.


**Remarks.** The large size and complexity of the male genitalia of *P. cardinalis*, along with the 4 minute median setae on abdominal tergites II–VI, readily separate this species from all others. The female of *P. cardinalis* is recognized by the shape of the ventral terminalia plates.

**Psitaconuris forculoides** (Neumann)


We agree with Guimarães (1974) that this name cannot be satisfactorily placed. *P. forculoides* is the only *Psitaconuris* other than *P. hellenthali* reported from a host not in the family Loriidae (see below for further comment on *P. hellenthali* distribution). We suspect that *Pephostis v. varius* is not the correct host; unfortunately, Neumann's original material is probably lost. Until further material is collected from *P. varius*, we feel *P. forculoides* must be considered a nomen dubium.
The louse parasitizing *Trichoglossus versicolor* is morphologically unlike congeners parasitizing the other 3 *Trichoglossus* species sampled. This is interesting, since Peters (1957) lists *T. versicolor* in a different genus, *Psittacella*.

The 4 species of *Charmosyna* sampled are host to 4 species of *Eunymphus* that form a morphologically distinct species group designated the *dissoz* group by Price (1966). Furthermore, *Eunymphus*, the only genus found on 3 of the *Charmosyna* species; the 4th species, *Charmosyna pappana*, is host to all 3 host genera.

The parrots *Larus hypomelas* and *L. lory* represent a host pair sharing the same species of lice in the 3 genera parasitizing *Lorideae*. This is not surprising, since these 2 species are sympatric with overlapping habitats in southeastern New Guinea. Furthermore, Forshaw (1973) comments “… *L. hypomelas* in habits resembles the more familiar Black-capped Lory (*L. lory*)." On the other hand, *L. chlorocephalus*, which does not overlap *L. hypomelas* or *L. lory* in range, shares only 1 species of louse with them. Another parrot, *Trichoglossus haematodus*, also shares a species of louse with the *Lorus* host pair. This relationship seems surprising at first, since it is 1 of only 2 cases given in Table 1 where members of different host genera are parasitized by the same louse species. More specifically, *T. haematodus* is the only parrot of the 4 *Trichoglossus* species sampled that is parasitized by a louse found on the *Lorus* host pair. However, *Trichoglossus haematodus* is also the only parrot of these 4 that is sympatric with the *Lorus* pair. According to the range maps in Forshaw (1973), *T. haematodus* has the widest geographic distribution of any parrot in the family *Lorideae* in New Guinea, it lives in the same habitat as the *Lorus* pair and is, according to Forshaw, “...very common and widespread...” The other case in Table 1 of members of different host genera parasitized by the same species of louse involves the parrots *Chalcoptera unicolor* and *Pseudeuctes fuscata*. As in the previous case, both species are found on New Guinea in the same habitat; however, a 3rd species, *Chalcoptera cardinalis*, is not found on New Guinea and is host to a different species of louse.

Another host pair, similar to the *Lorus* pair, is formed by *Neopittacus mueschenbroeki* and *N. pulicinuda*, which share the same species of lice in the 2 genera collected from these hosts. Forshaw (1973) again sets the stage for an explanation “… their ranges overlap considerably and both species may be found in the same area (habitat)." In conclusion, we wish to note that, although we have pointed out examples of sympatric hosts sharing the same species of Mallophaga, sympathy does not infer such sharing.

**Key to species of *Psittacorum***

1. Small specimen, $\delta$ TW under 0.29, $\Omega$ TW under 0.32 ... ex *Glossopitta papilliglotophaga*.
   Larger specimen, $\delta$ TW over 0.30, $\Omega$ TW over 0.32 ... *australis*.

2. $\delta$ with large complex genitalia (Fig. 25) and abdominal tergites II-VI with 4 minute median setae (Fig. 25); $\Omega$ ventral terminalia as in Fig. 23 ... *cardinalis*, $\Omega$ sp.
   $\delta$ with smaller complex genitalia and abdominal tergites II-VI with pair of median setae longer than outer pair (Fig. 2 or 12); $\Omega$ ventral terminalia otherwise...

3. $\delta$ with genitalia as in Fig. 4, 6, or 7, with median elongate sclerite having distinct anterior hole and connection anteriorly to crescentic sclerite; $\Omega$ with ventral terminalia much as in Fig. 5 ... 
   $\delta$ with genitalia otherwise (Fig. 9, 14, 17, 29, or 22); $\Omega$ with ventral terminalia not as above (Fig. 10, 13, 18, 19, or 21) ...

4. $\delta$ with median pair of setae on tergites II-VIII all comparable in size (Fig. 8) and genitalia as in Fig. 7; $\Omega$ unknown ... *Trichoglossus johnstoniae* $\Omega$, sp.
   $\delta$ with median pair of setae on tergites VI-VIII or VII-VIII much longer than corresponding setae on tergites II-V (Fig. 2) and genitalia as in Fig. 4 or 6; $\Omega$ ...

5. $\delta$ with long pair of head setae on setae on tergite VI, comparable in size to corresponding setae on tergites VII-VIII; $\Omega$ TW over 0.42 ... *Trichoglossus rubrigenos*
   $\delta$ usually with short (fine) median pair of setae on tergite VI (Fig. 2) (occasionally 1 of these larger, heavier): $\Omega$ TW usually less than 0.42 ...

6. $\delta$ with median sclerite of genitalia having small essentially circular anterior hole (Fig. 4) and with GW 0.16 or less; $\Omega$ TW 0.40 or less ... *laeviscula*.
   $\delta$ with median sclerite of genitalia having broad semicircular anterior hole (Fig. 6) and with GW 0.16 or more; $\Omega$ TW variable ...

7. $\delta$ with very long median pair of setae on tergites II-VI (Fig. 12), extending beyond following segment; $\Omega$ ventral terminalia with large anterior plate fused with median plate in hole (Fig. 21) or arched anterior plate clearly delineated from well-defined median plate (Fig. 10) ...
   $\delta$ with much shorter median pair of setae on tergites II-VI (Fig. 21) not extending beyond following segment; $\Omega$ ventral terminalia otherwise (Fig. 13, 18, or 19) ...

8. $\delta$ with essentially rectangular complex of median sclerites (Fig. 22); $\Omega$ ventral terminalia with distal circular hole formed by fusion of anterior and median plates (Fig. 21) ...
   $\delta$ with elongate narrow median sclerite (Fig. 9); $\Omega$ ventral terminalia with arched anterior plate clearly separated from median plate (Fig. 10) ...
   ... *hendenthalii*, $\Omega$ sp.

9. $\delta$ with median combination of elongate and horseshoe-shaped sclerites (Fig. 20); $\Omega$ ventral terminalia with anterior plate fused with median plate (Fig. 19) ...
   $\delta$ with small median sclerite (Fig. 17) ...
   ... *chlororhori*, $\Omega$ sp.

10. $\delta$ genitalia as in Fig. 14 or 17; $\Omega$ ventral terminalia with clearly delineated posterior margin of anterior plate, not fused with median plate (Fig. 15 or 18) ...
    $\delta$ genitalia (Fig. 14) with narrow space between parameters, this containing median sclerites as shown; $\Omega$ ventral terminalia with deeply concave posterior margin of anterior plate, median plate not well defined (Fig. 15) ...
    ... *zinkei*, $\Omega$ sp.

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