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**ABSTRACT**

Five species of the avian family Rallidae namely *Amaurornis phoenicurus javanicus* (white-breasted waterhen), *Gallicrex cinerea* (watercock), *Gallinula chloropus lozanoi* (common moorhen), *Gallirallus philippensis philippensis* (buff-banded rail) and *Gallirallus torquatus torquatus* were examined live for lice at different periods. Lice were collected and fixed and stored in 70% ethyl alcohol until further study. Lice were processed for examination by cleaning in 5% potassium hydroxide solution, washing in distilled water, dehydrating in increasing grades of ethyl alcohol, clearing in terpineol and mounting in Canada balsam. Representative specimens of the lice were stained with Ziehl-Neelsen (carbol-fuchsin) in absolute ethyl alcohol before clearing in terpineol and mounting in Canada balsam. Three species of chewing lice of the genus *Pseudomenopon* Mjöberg, 1910 including one new to science were identified from the collection as follows: *Pseudomenopon scopulacorne*, *P. pilosum* and *P. micosai* new species. These are all illustrated based on the present specimens. *Pseudomenopon pilosum* occurred on all birds examined; *P. scopulacorne* on *Amaurornis phoenicurus javanicus* and *P. micosai*, which is described and illustrated as a new species, on *Gallirallus philippensis philippensis* and *Gallirallus torquatus torquatus*. The new species is characterized by a unique male genitalia especially the roughly rectangular principal genital sclerite, a short head seta 7, absence of a pair of pointed post palpal processes, a very long lateral anal setae in the female, and a different chaetotaxy in terms of distribution, number and size of setae in both the male and female. It is differentiated from species of the genus *Pseudomenopon* especially those occurring on the Rallidae. A summary of *Pseudomenopon* species together with their specific avian hosts, so far recorded from Rallidae in the Philippines is provided.

**Key words:** Chewing lice, ectoparasites, Mallophaga, *Pseudomenopon pilosum*, *P. micosai*, *P. scopulacorne*, Philippines, Rallidae

**INTRODUCTION**

The avian fauna of the Philippines is known for its high degree of endemicity. However continued habitat destruction, increasing population density and rampant nest poaching, hunting and illegal trade have resulted to many species being threatened to extinction, placing the country as one of the “hot spots” in the world (Collar *et al.*, 1999, Kennedy *et al.*, 2000). The avian family Rallidae is no exception to this threat. This family which includes the coots, crakes, rails and waterhens, is represented in the Philippines by 16 species distributed in 9 genera. Majority of the species are residents with two endemic species (Kennedy *et al.*, 2000). A species of Rallidae, *Lewinia mirificus* (brown-banded rail), although data are deficient, has been listed as one of the threatened birds of the Philippines (Collar *et al.*, 1999). Many members of this bird family reside and breed in grasslands and marshy areas. Such habitats are being reduced to much smaller areas or totally...
destroyed in favor of realty developments for residential and commercial purposes. Future conservation efforts may require captive breeding of these birds as one of the strategies. But for this program to succeed basic information on the health aspects including parasitism must also be known.

Worldwide, the genus *Pseudomenopon* Mjöberg, 1910 currently contains about 34 nominal species distributed to three avian orders and six families (Tendeiro, 1965; Price, 1974; Price et al., 2003). However, only 21 species are considered valid and the rest as junior synonyms (Price et al., 2003).

There is paucity of works on the ectoparasites including lice of the avian family Rallidae in the Philippines. To date, only six species of *Pseudomenopon* including one unidentified to species level have been recorded (Eduardo, 2007) and five of which were from Rallidae. Examination of *Pseudomenopon* specimens collected at different periods from five species of Rallidae revealed the presence of two previously known and one new species. This paper presents my observation on these lice species.

**MATERIALS & METHODS**

Five species of the avian family Rallidae namely, *Amaurornis phoenicurus javanicus* (white-breasted waterhen) (n=3), *Gallicrex cinerea* (watercock) (n=4), *Gallinula chloropus lozanoi* (common moorhen) (n=7), *Gallirallus philippensis philippensis* (buff-banded rail) (n=5) and *Gallirallus torquatus torquatus* (n=4) were examined live for lice at different periods. Some of these were kept at the Parks and Wildlife Bureau (PAWB) of the DENR and at the Laguna Wildlife Park and Rescue Center (LWPRC). Other birds kept by private owners were also examined. Additional unidentified lice specimens from these bird hosts kept at the Parasite Collection Center of the College of Veterinary Medicine, UPLB were examined and identified. The birds examined conform to the description and illustration by Kennedy et al. (2000) for the respective species.

Lice collected from them were fixed and stored in 70% ethyl alcohol until further study. These were then processed for examination first by placing them in 5% potassium hydroxide solution until the soft tissues, mainly the digestive tract and its contents can be expelled easily from the body by teasing and pressing carefully with a fine needle under a stereomicroscope. These were then washed in distilled water, dehydrated in increasing grades of ethyl alcohol, cleared in terpineol and mounted in Canada balsam. Representative specimens were stained in Ziehl-Neelsen (carbol fuchsin) in absolute alcohol, also cleared in terpineol and mounted in Canada balsam.

Measurements were made with the aid of a calibrated eyepiece micrometer. Photomicrographs were taken using an Olympus BX51 research microscope with digital camera attachment. Drawings were made with the aid of an Olympus drawing apparatus attached to an Olympus CX31 research microscope.

Voucher and type specimens were deposited in the Parasite Collection and Reference Center of the College of Veterinary Medicine, UPLB.

**RESULTS**

Three species of chewing lice of the genus *Pseudomenopon* Mjöberg, 1910 including one new to science were identified. These were *Pseudomenopon pilosum* (Scopoli, 1763) (n=30), *Pseudomenopon scopulacorne* (Denny, 1842) (consisted only of female specimens, n=10) and *Pseudomenopon micosai* n.sp. (n=18). These are described and illustrated below based on the present materials.

*Pseudomenopon pilosum* (Scopoli, 1763) (Figs. 1, 2, 4, 6, 8)

Male: As in Fig. 1. Median portion of gula (Fig. 6) broadly rounded. Head seta 7 is less than halfway the base of seta 9. Marginal seta 3 is nearly as long or twice as long as seta 1. Number of marginal tergal setae: I=11-13, II=12-15, III-IV=11-13, VII=8-10. Postspiracular seta on V much shorter that those on IV and VI. Number of sternal setae: II=23-27, V=22-36, VI=16-24, VII=9-18, VIII-8-14. Subgenital plate has 6-12 setae. Genitalia (Fig. 8) measures 0.41-0.50
Figs. 1-5. Pseudomenopon spp. from Philippine Rallidae. 1. Pseudomenopon pilosum, male, ventral view. 2. Pseudomenopon pilosum, female, ventral view. 3. Pseudomenopon scopulacorne, female, ventral view. 4. Ventral genitalia of female Pseudomenopon pilosum. 5. Ventral genitalia of female Pseudomenopon scopulacorne. (Carbol fuchsin stain)

mm long, 0.07-0.010 mm wide with principal sclerite measuring 0.12-0.17 mm long. Dimensions (in mm): Preocular width 0.33-0.35, temple width 0.42-0.50, prothorax width 0.32-0.38, metathorax width 0.35-0.41. Total body length 1.31-1.57.

Female: As in Fig. 2. Gula, head seta 7, pronotum and postspiracular setae are similar to that of the male. Number of marginal tergal setae: I=12-16, II-V=13-24, VI-VII=12-17, 8=10-15. Last tergite has 16-24 inner posterior setae. Number of sternal setae: II=23-29, III=29-41, IV-V=36-48, VI=26-38, VII=16-20. Subgenital plate has 12-25 marginal setae. Anus has 50-62 ventral fringe setae and 50-70 dorsal setae (Fig. 4). Dimensions (in mm): Preocular width
0.36-0.41, temple width 0.48-0.57, prothorax width 0.40-0.46, metathorax width 0.45-0.52. Total body length 1.65-1.94.

Hosts: *Gallicrex cinerea*, *Gallinula chloropus lozanoi* and *Gallirallus philippensis philippensis*.

Locality: Laguna and Quezon, Luzon, Philippines.

Voucher specimens: Nos. 118-01, 118-02, 118-03 and 118-04

*Pseudomenopon scopulacorne* (Denny, 1842)  
(Figs. 3, 5, 7)
Only female (Fig. 3) specimens were obtained in the present study. Median gular plate (Fig. 7) is not as broad as in *P. pilosum*. Head seta 7 is reaching half the distance or slightly more to the base of seta 9. Marginal pronotal seta is 3 longer than seta 1. Number of marginal tergal setae: I=11-12, II=14-18, III-VI=13-22, VII=14-19, VIII=11-15. Last tergite has 20-22 inner posterior setae. Postspiracular seta on V is variable in length. Number of sternal setae: II=25-34, III=35-45, IV-V=40-59, VI=32-48, VII=16-33. Subgenital plate has 18-31 marginal setae. Anus has 56-80 ventral fringe setae and 52-75 setae (Fig. 5). Dimensions (in mm): Preocular width 0.35-0.41, temple width 0.48-0.59, prothorax width 0.35-0.43, metathorax width 0.35-0.43, metathorax width 0.45-0.56. Total body length 1.68-2.20.


*Pseudomenopon micosai* n. sp. (Figs. 9-15)

Male: As in shown in Fig. 9. Gula sharply pointed at its median portion as shown in Fig. 13. Head and thorax chaetotaxy: Seta 7 is less than half way to the base of seta 9 (Fig. 12). Marginal pronotal seta 2 is the longest and is more than twice as long as the shortest, setae 1 and 3. Metanotum margin has 15-18 setae. Abdominal tergites IV to V have no distinct gap between two lateral setae and central marginal setae on each side. Abdominal chaetotaxy: Number of marginal tergal setae, I=12-15, II=14-18, III-VII=16-18, VIII=9-10; postspiracular setae, VI-VII usually much longer than those on other segments; number of sternal setae, II=25-27, III=21-30, IV=25-44, V=22-35, VI=18-25, VII=11-18, VIII=8-13; Subgenital plate with 11-15 setae. Genitalia as in Fig. 14 and measures 0.440-0.500 mm long, with principal sclerite roughly rectangular in shape (Fig. 15) with deeply sclerotized anterior and posterior margins, anterior part of which is folded ventrally to about one third of the length of the sclerite. Dimensions (in mm): Preocular width 0.290-0.325, temple width 0.360-0.450, prothorax width 0.325-0.340, metathorax width 0.365-0.410. Total body length 1.30-1.50.

Female: As in Fig. 10. Gula is similar to that of the male. Head seta 7, pronotum and postspiracular setae are also similar to that of the male. Metanotum marginal setae and abdominal tergite IV-V are similar to that of the male. Abdominal chaetotaxy: number of marginal tergal setae, I=13-18, II-VII=18-25, VIII=15-20, last tergite with 12-25 inner posterior setae; number of sternal setae, II=20-25, III=29-32, IV-V=33-40, VI=28-35, VII=15-20. Subgenital plate has 18-21 marginal setae. Anus has 49-60 ventral and 55-63 dorsal fringe setae, these being comparatively longer laterally; and very long lateral anal setae (Fig.11). Dimensions (in mm): Preocular width 0.325-0.360, temple width 0.475-0.500, prothorax width 0.330-0.370, metathorax width 0.405-0.460. Total body length 1.450-1.700.

Type host: *Gallirallus philippensis philippensis*. Other host: *Gallirallus torquatus torquatus*. Type locality: Pampanga, Luzon, Philippines. Other locality: Laguna, Luzon, Philippines. Type specimens: Holotype (male) (No.117-01, slide 1), Allotype (female) (No.117-01, slide 2), paratypes (No.117-01, slides 3-4; No. 117-02, slides 1-3).

Etymology: Species is named for Mr. Fernando P. Micosa, artist and illustrator of the College of Veterinary Medicine, UPLB in appreciation for a decade of fruitful collaboration of assisting the author in many ways especially in the photography of specimens that formed part of many of the latter’s publications.

**DISCUSSION**

The species of the genus *Pseudomenopon* has been studied by Tendeiro (1965) and revised by Price (1974). To date, twenty one species of the genus are considered valid occurring on various avian orders and families and 15 of these occur on the Rallidae (Price *et al.*, 2003). Five species of *Pseudomenopon* including one that has not been identified to species level have previously
been recorded from Philippine Rallidae. These include *Pseudomenopon pilosum* from *Gallinula chloropus lozanoi* (Eduardo, 2007), *P. scopulacorne* from *Gallirallus philippensis philippensis* and *Gallirallus torquatus torquatus*, *P. mcclurei* from *Porzana cinerea*, *P. phoenicuri* from *Gallicrex cinerea* (Price, 1974) and *Pseudomenopon* sp. from *Amaurornis phoenicurus javanica* (Emerson and Ward, 1958).

The present specimens of *Pseudomenopon pilosum* and *P. scopulacorne* conform to the redescriptions and illustrations of Price (1974) for both species. The occurrence of *P. pilosum* on *Gallicrex cinerea* and *Gallirallus philippensis philippensis* and *P. scopulacorne* on *Amaurornis phoenicurus javanica* all constitute additional host records for these lice species in the Philippines. *Pseudomenopon mcclurei* which was previously recorded in the Philippines from
Porzana cinerea by Price (1974) was not found in the present study as no available material of the avian host was examined. It appears from literature that P. pilosum has a wide range of hosts and according to Price (1974); it is the only species of Pseudomenopon thus far found to occur on two avian host orders, Gruiformes and Charadriiformes. It is not possible to assess the specific identity of the Pseudomenopon sp. recorded by Emerson & Ward (1958) from Amaurornis phoenicurus javanica from San Pedro, Culion, Calamian Group of Islands, Philippines, as no description and illustrations were provided and the original specimens were not available for re-examination. Although I have examined the avian host, Amaurornis phoenicurus javanica in the present study, I have found only one species of Pseudomenopon, i.e. P. scopulacorne. Price (1974) however reported another species, P. phoenicuri from the same host in India, Malaysia and Thailand and from Gallicrex cinerea in the Philippines.

**Pseudomenopon micosai** conforms to the generic features of *Pseudomenopon* as defined by Price (1974) and which are shared by known members of the genus. *P. micosai* is separable from all species of the genus through features of the male genitalia especially the principal genital sclerite (see Figs. 14 and 15) and chaetotaxy in terms of the distribution, number and size of the setae in both the male and female. It also differs from all species except for *P. pilosum* and *P. dolium* in the short head seta 7. In possessing a slender and pointed median gular plate (Fig. 13), *P. micosai* differs further from *P. pilosum*, *P. carrikeri*, *P. mcclurei*, *P. scopulacorne*, *P. raliculata* and *P. bracofortei*, which have a broadly rounded median gular plate (Figs. 6 & 7). In the absence of a pair of pointed post palpal processes, it is separable from *P. stresemanni*.

The species of *Pseudomenopon* so far recorded from Philippine birds are summarized in the table given below.

Table. *Pseudomenopon* species and their specific avian hosts so far recorded from Rallidae in the Philippines.

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<thead>
<tr>
<th>Species</th>
<th>Avian host</th>
<th>Author</th>
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<tr>
<td><em>Pseudomenopon pilosum</em></td>
<td><em>Gallicrex cinerea</em>¹, <em>Gallinago megalae</em>², <em>Gallinula chloropus lozanoi</em>³,</td>
<td>Price (1974), Eduardo (2007),</td>
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<tr>
<td>(Scopoli, 1763)</td>
<td><em>Gallirallus torquatus torquatus</em>³</td>
<td>Present work</td>
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<tr>
<td><em>Pseudomenopon scopulacorne</em></td>
<td><em>Amaurornis phoenicurus javanicus</em>¹, <em>Gallirallus philippensis philippensis</em>³,</td>
<td>Price, 1974, Present work</td>
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<tr>
<td>(Denny, 1842)</td>
<td><em>Gallirallus torquatus torquatus</em>¹, <em>Porzana pusilla pusilla</em>¹,</td>
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<td></td>
<td><em>Rallina eurizonoides eurizonoides</em>¹</td>
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<tr>
<td><em>Pseudomenopon phoenicuri</em></td>
<td><em>Gallicrex cinerea</em>¹</td>
<td>Price, 1974</td>
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<td>Price, 1974</td>
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<tr>
<td><em>Pseudomenopon mcclurei</em></td>
<td><em>Porzana cinerea</em>¹</td>
<td>Price, 1974</td>
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<td>Price, 1974</td>
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<tr>
<td><em>Pseudomenopon rostratulae</em></td>
<td><em>Rostratula benghalensis benghalensis</em>³</td>
<td>Price, 1974</td>
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<td>Bedford, 1919</td>
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<tr>
<td><em>Pseudomenopon micosai</em></td>
<td><em>Gallirallus philippensis philippensis</em>¹, <em>Gallirallus torquatus torquatus</em>³</td>
<td>Present work</td>
</tr>
<tr>
<td>Eduardo, n.sp.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Pseudomenopon sp</em></td>
<td><em>Amaurornis phoenicurus javanicus</em>¹</td>
<td>Emerson &amp; Ward (1958)</td>
</tr>
</tbody>
</table>

¹Order Gruiformes, family Rallidae
²Order Charadriiformes, family Scolopacidae
³Order Charadriiformes, family Rostratulidae

**ACKNOWLEDGMENTS**

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**REFERENCES**


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