

***Menacanthus bonariensis* new species (Phthiraptera: Menoponidae), parasitic on the White-bellied Sparrow, *Zonotrichia capensis hypoleuca* (Todd, 1915) (Aves: Passeriformes: Fringillidae) in Buenos Aires Province, Argentina**

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ABSTRACT

The new species *Menacanthus bonariensis* is described and illustrated from specimens collected off *Zonotrichia capensis hypoleuca* (Todd, 1915) from coastal areas in the NE of Buenos Aires Province, Argentina. Morphologically the new species is close to *M. robustus* (Kellogg, 1896), but with larger females, longer ocular seta 19 and ventral spinous processes, greater number of setae on certain tergites and sternites, and fewer setae in the subgenital plate. Descriptions of the male, the three nymphal instars and the egg are also included, with comments on prevalence and spatial relationship with other species of lice of the genera *Philopterus* Nitzsch, 1818, *Ricinus* De Geer, 1778 and *Machaerilaemus* Harrison, 1916, which are found on this host in different populations of the geographical area mentioned above.

Key words: *Menacanthus*, *M. bonariensis*, new species, egg morphology, oviposition sites, *Zonotrichia capensis*, Buenos Aires, Argentina

INTRODUCTION

Menacanthus eurysternus is hitherto the only species of *Menacanthus* Neumann, 1912 known to parasitize two out of five finch species currently included in the passerine genus *Zonotrichia*: *Z. leucophrys* (Forster) and *Z. querula* (Nuttall), both in the United States of America (see Price, 1975). It has also been collected from species of the related genera *Passerella* (*P. iliaca* (Merrem)) and *Junco* (*J. hyemalis* (Linnaeus)) in the same country.

A second species, *Menacanthus chrysophaeus* (Nitzsch in Giebel, 1866), parasitizes two out of three of the allied genus *Melospiza* (*M. melodia* (Wilson) and *M. georgiana* (Latham)), and occurs also on *Passerella iliaca* (see Price, 1977).

No species of *Menacanthus* has been recorded from the only South American representative of *Zonotrichia*: *Z. capensis* (P. L. S. Mueller), a polytypic species with 22 to 25 described subspecies, depending on the author (see Chapman, 1940; Handford, 1984; Paynter, 1970), and ranging from Chiapas (Mexico) to Cape Horn (Argentina). The purpose of this paper is to describe the new louse species *M. bonariensis* taken from a coastal population of the oriental race of the host species: *Z. capensis hypoleuca* (Todd, 1915), in Buenos Aires Province, Argentina.

MATERIALS AND METHODS

A total of 163 specimens of *Z. c. hypoleuca* have been searched for lice between 1984 and 1989 from three major sampling sites located at or near the NE coast of Buenos Aires Province: Punta Indio (Partido de Punta Indio), La Balandra (Partido de Berisso) and La Bellaca Lagoon (Partido de San Vicente) (see fig. 33).

Birds were captured with mist-nets. Each netted bird was immediately wrapped with an absorbent paper, put in individual plastic bags containing *ca.* 2 cm³ ethyl acetate in order to kill lice *in situ*, and then frozen as soon as possible. In the laboratory each bird was carefully searched for lice by a feather-by-feather procedure. Location of individual lice in particular pteryla or apteria was mapped in pre-printed cards, paying special attention to the sites of oviposition.

Lice were slide-mounted following conventional procedures. Eggs were cleared with Amman lactophenol, mounted and observed in this medium. Drawings were made using a *camera lucida* attached to a Wild m-20 microscope. All measurements were taken from mounted specimens by means of a calibrated eyepiece, all expressed in millimeters and identified by the following abbreviations: HL head length, POW preantennal width, OW maximum width of the head, PL prothorax length, PW prothorax width, PTW pterothorax width, AL abdominal length, AW maximum width of the abdomen, TL total body length, GL male genitalia length, GW maximum width of the male genitalia. Measurements include ranges, and means plus sample standard deviations within parentheses.

Repository of specimens: holotype and paratypes in the collection of Museo de La Plata, La Plata, Buenos Aires Province, Argentina.

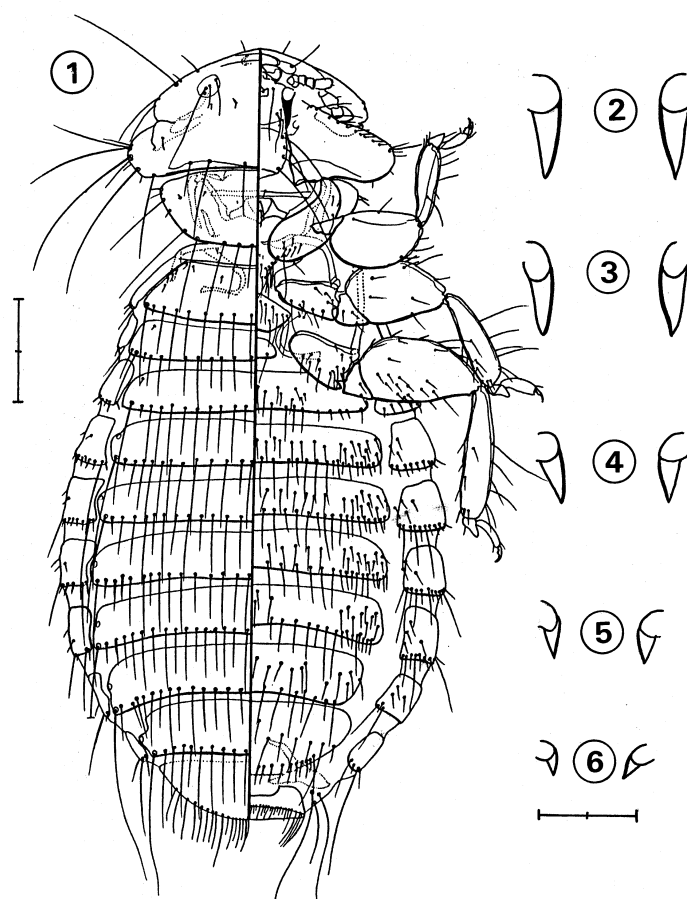
RESULTS

Menacanthus bonariensis, new species

(Figs. 1–27)

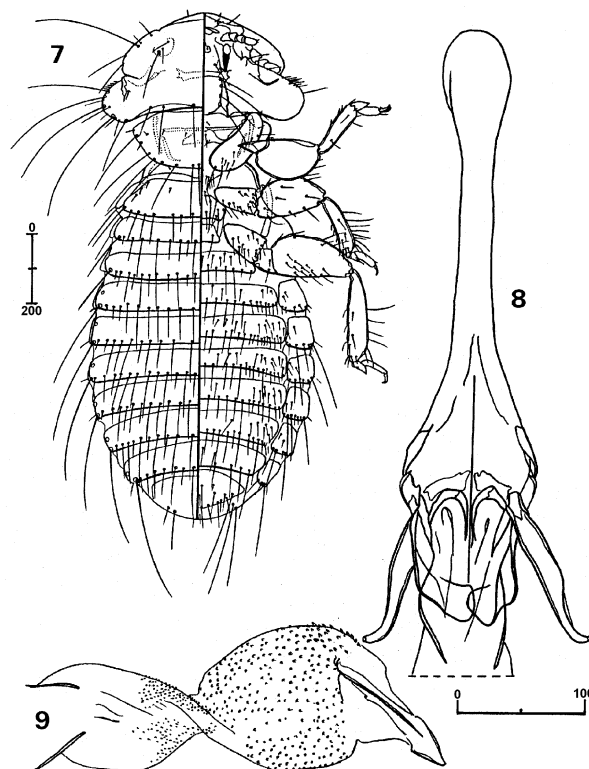
Female: habitus as in figure 1. Length of ventral spinous processes 0.104–0.108 (0.107 ± 0.002) (fig. 2). Ocular seta 19 slender, 0.032–0.043 long. Gular plate lightly pigmented, in

one specimen showing insinuation of two “holes” located near the center, and bearing 4+4 setae. Pronotum with 16–17 posterior setae. Metanotum with 4–5 lateroanterior setae each side, and 17–18 posterior setae. Prosternum with 1–2 setae, mesosternum with 14–16 and metasternum with 12–14. Tergal setae: I 25–26, II 25–27, III 28–31, IV 28–33, V 31–53, VI 31–34, VII 29–30, VIII 21–23. Anterior setae of the pleurites: I–II 0, III 1–3, IV–V 3–5, VI 4, VII 2–4, VIII 0. Sternal setae: I 2–3, II 36–37, III 67–71, IV 69–72, V 68–72, VI 60–65, VII 46–59. Subgenital plate with 46–59 setae, and with medioposterior strong serrations. Each anal fringe with 53–54 setae. Body measurements: HL 0.287–0.300 (0.296 ± 0.008), POW 0.505–0.517 (0.511 ± 0.006), OW 0.625–0.642 (0.632 ± 0.009), PL 0.175–0.217 (0.195 ± 0.021), PW 0.462–0.475 (0.468 ± 0.007), PTW 0.600–0.625 (0.617 ± 0.014), AL 1.200–1.275 (1.233 ± 0.038), AW 0.912–0.937 (0.925 ± 0.013), TL 1.875–1.987 (1.921 ± 0.059).



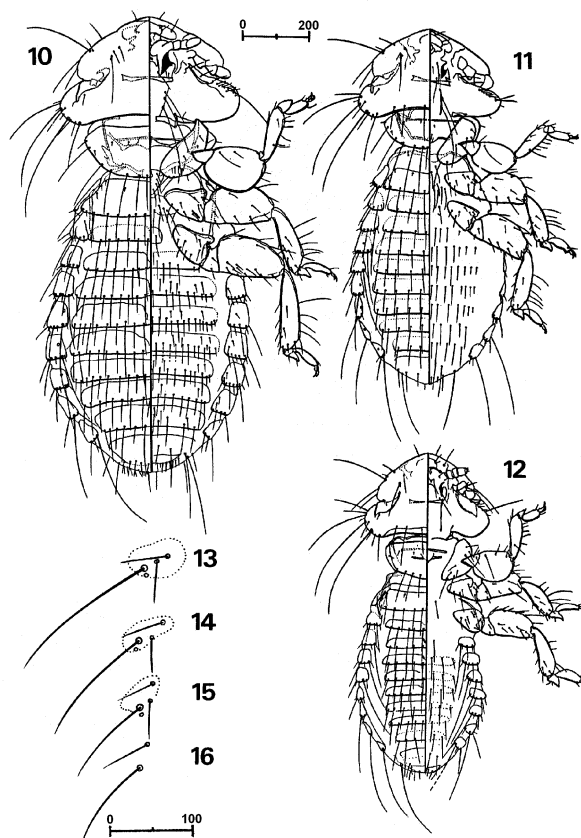
FIGURES 1–6. *Menacanthus bonariensis* n. sp.: 1, female (dorsal and ventral); 2–6, ventral spinous processes of the head, drawn at same scale: 2, female; 3, male; 4, nymph III; 5, nymph II; 6, nymph I. Scale in micrometers (μm).

Male: habitus as in figure 7. Length of ventral spinous processes 0.084–0.096 (0.089 ± 0.005), with 3-4+3-4 setae (figs 3, 17). Ocular seta 19: 0.025–0.028 (0.027 ± 0.002) long. Pronotum with 16–17 posterior setae. Metanotum with 4 lateroanterior setae each side, and 16–17 posterior ones. Prosternum with 1–2 setae, mesosternum with 13–15 and metasternum with 11–13 (fig. 17). Tergal setae: I 16–19, II 19–22, III 23–24, IV 26, V 26–31, VI 25–27, VII 23–27, VIII 16–17. Anterior setae on pleurites: I–II 0, III 1–3, IV 3, V 2–4, VI–VII 1–2, VIII 0. Sternal setae: I 2–3, II 29–35, III 47–54, IV 53–61, V 48–50, VI 45–49, VII 30–38, VIII 13–16. Subgenital plate with 19–21 setae. Genitalia (fig. 8) with apical portion of parameres abruptly curved outwardly and endomeral plate with a noticeable subapical constriction. Genital sac and “penis” as shown in figure 9. Body measurements: HL 0.267–0.287 (0.276 ± 0.010), POW 0.437–0.462 (0.451 ± 0.013), OW 0.562–0.580 (0.569 ± 0.009), PL 0.180–0.187 (0.185 ± 0.004), PW 0.387–0.405 (0.393 ± 0.010), PTW 0.487–0.500 (0.493 ± 0.006), AL 0.812–0.925 (0.862 ± 0.058), AW 0.630–0.662 (0.645 ± 0.016), GL 0.468–0.475 (0.472 ± 0.005), GW 0.100, TL 1.400–1.500 (1.458 ± 0.052).



FIGURES 7–9. *Menacanthus bonariensis* n. sp., male: 7, habitus (dorsal and ventral); 8, genitalia (dorsal and ventral); 9, genital sac and “penis”, extruded. Scale in micrometers (μm).

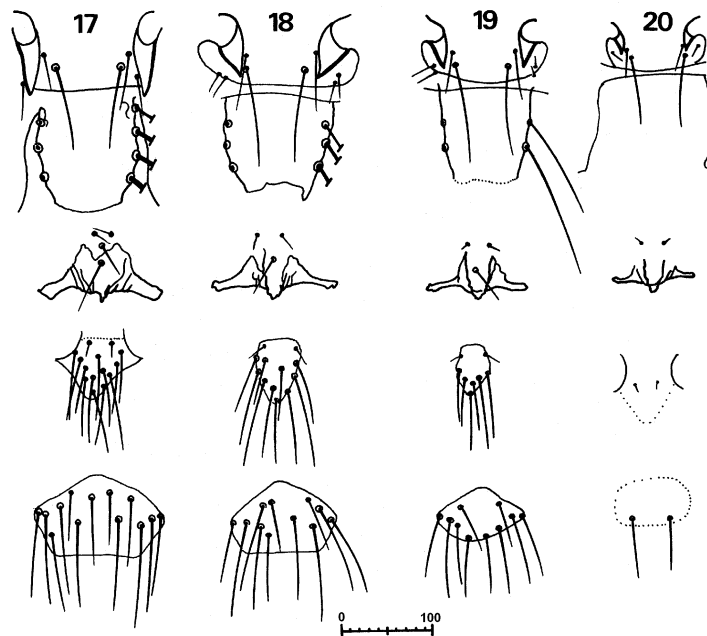
Third nymphal instar: habitus as in figure 10. Cephalic setae 14, 15 and 16 and sensillum *c* as in figure 14. Length of ventral spinous processes 0.070–0.072 (0.071 ± 0.001) (figs 4, 18). Gular plate with 3+3 setae (fig. 18). Prosternum with one seta, mesosternum with 11–12 and metasternum with 11 setae (fig. 18). Pronotum with 16 posterior setae. Metanotum with 3–4 anterolateral setae each side, and 15–17 posterior setae. Tergal setae: I 14, II–III 16–19, IV 17–18, V 18–19, VI 20, VII 15–18, VIII 12. Pleurites with 1–2 anterior setae. Sternal setae: I 1–2, II 21, III 29–33, IV–V 36–37, VI 32–33, VII 37–28, VIII 14. Subgenital plate with 4 setae. Measurements: HL 0.267–0.275 (0.272 ± 0.005), POW 0.437–0.442 (0.439 ± 0.003), OW 0.537–0.550 (0.541 ± 0.008), PL 0.175, PW 0.375–0.392 (0.382 ± 0.009), PTW 0.475–0.492 (0.481 ± 0.010), AL 0.800–0.837 (0.814 ± 0.020), AW 0.600–0.637 (0.622 ± 0.020), TL 1.362–1.425 (1.391 ± 0.0032).



FIGURES 10–16. *Menacanthus bonariensis* n. sp.: 10, 11, and 12 Nymphs III, II and I, respectively (dorsal and ventral, all at same scale); 13–16 cephalic setal complex and sensillum *c*: 13, male; 14, nymph III; 15, nymph II; 16, nymph I (all at same scale). Scale in micrometers (μm).

Second nymphal instar: habitus as in figure 11. Length of ventral spinous processes 0.048–0.054 (0.051 ± 0.002) (figs 5, 19). Gular plate with 2+2 setae, exceptionally 2+1

setae (fig. 19). Ocular seta 19: 0.020–0.024 (0.023 ± 0.002) long. Cephalic setae 14, 15 and 16 and sensillum *c* much as for nymph III (fig. 15). Prosternum with one seta, mesosternum with 3–8 and metasternum with 9–11. Pronotum with 16–17 posterior setae. Metanotum with 2–3 anterolateral setae each side, and 10 posterior setae. Tergal setae: I 8–9, II–IV 9–10, V–VII 10, VIII 5–7. No anterior setae on pleurites III–VII. Sternal setae: I 2, II 13–14, III 12–15, IV 12–16, V 14–15, VI 12–14, VII 10–11, VIII 5–7. Subgenital plate with 4 setae. Measurements: HL 0.225–0.250 (0.240 ± 0.011), POW 0.367–0.375 (0.373 ± 0.004), OW 0.425–0.450 (0.437 ± 0.010), PL 0.137–0.162 (0.151 ± 0.011), PW 0.287–0.325 (0.307 ± 0.016), PTW 0.362–0.405 (0.372 ± 0.027), AL 0.587–0.630 (0.605 ± 0.020), AW 0.442–0.512 (0.470 ± 0.031), TL 1.075–1.167 (1.112 ± 0.038).

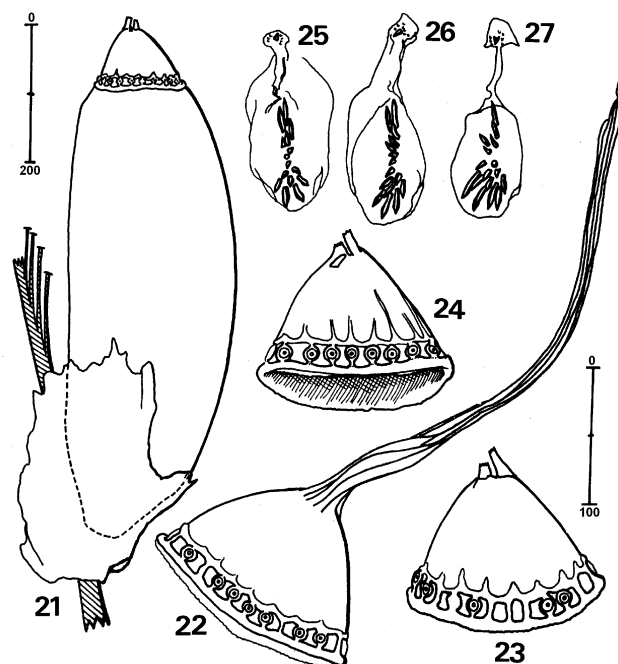


FIGURES 17–20. *Menacanthus bonariensis* n. sp., ventral spinous processes of the head, gular plate, pro, meso and metasternum: 17, male; 18, nymph III; 19, nymph II; 20, nymph I (at same scale). Scale in micrometers (μm).

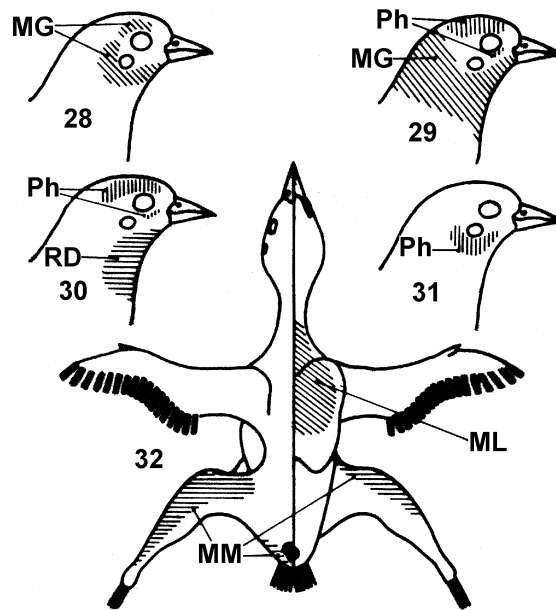
First nymphal instar: habitus as in figure 12. Length of ventral spinous processes 0.036–0.040 (0.038 ± 0.002) (figs 6, 20). Gular plate lacking setae (fig. 20). Ocular seta 19: 0.020–0.024 (0.023 ± 0.002) long. Seta 16 lacking and sensillum *c* not seen in the available specimens (fig. 16). Prosternum without setae, mesosternum and metasternum with 2. Pronotum with 10 posterior setae. Metanotum with 2–3 lateroanterior setae each side, and 9–10 posterior setae. Tergal setae: I–II 8, III 7, IV 8, V 7–8, VI–VII 8, VIII 6. No anterior setae on pleurites III–VII. Sternal setae: I 3–4, II 6–7, III–V 6, VI–VIII 4. Measurements: HL 0.212–0.225 (0.216 ± 0.008), POW 0.292–0.305 (0.301 ± 0.008), OW

0.362–0.367 (0.365 ± 0.003), PL 0.112–0.137 (0.122 ± 0.013), PW 0.242–0.262 (0.249 ± 0.012), PTW 0.280–0.325 (0.314 ± 0.030), AL 0.462–0.517 (0.497 ± 0.030), AW 0.305–0.425 (0.372 ± 0.061), TL 0.875–0.962 (0.921 ± 0.044).

Egg: elongated (fig. 21). Amphoral surface smooth. Operculum lacking sculpturing, with a row of 13 irregularly spaced air chambers (figs. 22–24), and with an apical long phanerum composed of *ca.* 9 strands, much as those described by Hohorst (1939) for *M. stramineus* (Nitzsch, 1818). Measurements: total length, phanerum excluded, 0.765–0.808 (0.805 ± 0.052), maximum width of the amphora 0.232–0.268 (0.247 ± 0.015), maximum length of the apical phanerum 0.293–0.390 (0.358 ± 0.056). *Hatching organ of the embryo* composed by an apical set of 7–9 lancets of different lengths, an irregular medial row of 7–8 lancets progressively longer, and a caudal set with a strong central tooth surrounded by *ca.* 7–8 small tubercles (figs. 25–27). *Sites of oviposition*: eggs are glued to the basal half of the lower barbs of the feather vanes by means of a moderate amount of spumaline (fig. 21), 1–10 per feather. In moderate infestations and in the absence of *Philoferus* n. sp. (see below) which appears to lay eggs in similar sites, *Menacanthus* eggs are laid on feathers of pteryla of the throat, mandible, periauriculars, eyebrow and lateral margins of the crown (fig. 28). In heavier infestation, and even in the presence of *Philoferus*, *Menacanthus* eggs are laid on pteryla of the chin, throat, upper neck, periauricular and nuchal areas (fig. 29).



FIGURES 21–27. *Menacanthus bonariensis* n. sp.: 21, whole egg glued to a lower barb of a gular feather (opercular phanerum broken off); 22, operculum; 23–24, views of operculi showing irregularly spaced air chambers; 25–27, hatching organ of the embryonary cuticle of three nearly mature embryos. Scale in micrometers (μm).



FIGURES 28–32. Oviposition sites of the five louse species recorded from *Zonotrichia capensis hypoleuca* (Todd, 1915) within the study area, corresponding to five individual hosts from the following localities: 28 and 31, Punta Piedras 6-X-1984; 29, La Balandra 12-XII-1986; 30, General Mansilla (13 km W from La Balandra) 18-XII-1984; 32 ditto 4-XII-1985. Abbreviations: **MG** *Menaecanthus bonariensis* n. sp., **ML** *Machaerilaemus* cfr. *laticorpus* (Carriker, 1903), **MM** *Machaerilaemus maestus* (Kellogg, 1899), **Ph** *Philoaterus* n. sp., **RD** *Ricinus diffusus* (Kellogg, 1896). For further explanation see text.

Remarks: *M. bonariensis* n. sp. is morphologically similar to *M. robustus* (Kellogg, 1896) (only females are known for this species), but can be readily separated by the following combination of characters: most body measurements larger (over all POW, TW and TL), ocular seta 19 and ventral spinous processes longer, tendency to a greater number of setae on tergites IV–VIII and sternites III–VI, and subgenital plate with fewer setae. *Menaecanthus bonariensis* forms a compact group with other 12 species: *M. eurysternus* (Burmeister, 1838), *M. merisui* Eichler, 1953, *M. agilis* (Nitzsch in Giebel, 1866), *M. geothlypis* Price 1977, *M. dendroicae* Price 1977, *M. curuccae* (Schrank, 1776), *M. takayamai* Uchida, 1926, *M. aurocapillus* Carriker, 1958, *M. orioli* Blagoveshtchensky, 1951, *M. robustus* (Kellogg, 1896), *M. tenuifrons* Blagoveshtchensky, 1940 and *M. sinuatus* (Burmeister, 1838). This group has been defined by Price (1977: 215) by having: 1. at least three lateroanterior setae each side of the metanotum; 2. pleurites either without anterior setae or with 1–3 anterior setae only along their medioventral margins; 3. female subgenital plate usually with strong serrations, less often with only a light spiculation, along its medioposterior margin; 4. male genitalia with apical portion of parameres abruptly curved

outwardly and endomerale plate with subapical constriction. It is unfortunate that no eggs or nymphs were described for the species cited above, so that no comparison with those of *M. bonariensis* n. sp. can be made.

Etymology: the Latin word “bonariensis” refers to the Argentine province where the specimens have been collected: Buenos Aires.

Specimens examined: male holotype, 2 males and 4 females paratypes, 4 nymphs III, 4 nymphs II, 3 nymphs I and numerous eggs from Punta Piedras, Partido de Punta Indio, Buenos Aires Province, 6-X-1984, A.C. Cicchino coll.; numerous eggs from La Balandra, Partido de Berisso, Buenos Aires Province, 12-XII-1986, A. C. Cicchino coll.

Type host: the three host populations examined are currently assigned to *Zonotrichia capensis hypoleuca* (Todd, 1915), widely distributed in Argentina from Jujuy and Salta Provinces in the north, to southern Buenos Aires (fig. 33). It must be noted that Todd (1920) described the race *Z. c. argentina* from specimens collected at Rio Santiago, Partido de Berisso, a coastal locality ca. 25 km north of La Balandra. Several years later Hellmayr (1938) listed this race as valid, but subsequently Chapman (1940) questioned its validity and included all populations from Buenos Aires Province in *Z. c. hypoleuca*. Bó (1972) discussed the status of *Z. c. argentina* and *Z. c. hypoleuca* maintaining the validity of the former and including under that race most of the populations from Buenos Aires Province (some of them only a few kilometers apart from the populations dealt with in this study). Subsequent bird lists (e.g. Olrog, 1979) returned to Chapman’s criterion, synonymizing *Z. c. argentina* under *Z. c. hypoleuca*. Since this synonymy is still accepted as valid, I designate *Z. c. hypoleuca* as the type host for the new species *M. bonariensis*.

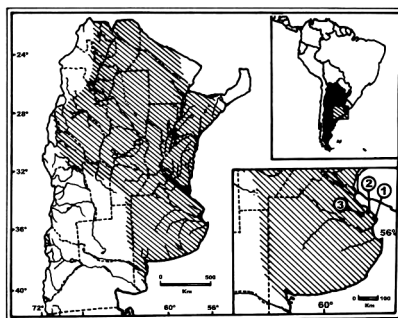


FIGURE 33. Geographic range of *Zonotrichia capensis hypoleuca* (Todd, 1915) in Argentina (left) and in Buenos Aires Province (right), indicating the three major sampling sites: 1, Punta Piedras, Partido de Punta Indio; 2, La Balandra, Partido de Berisso; 3, Laguna Bellaca, Partido de San Vicente.

Spatial relationships of *M. bonariensis* n. sp. with other louse species found on *Zonotrichia capensis hypoleuca*

Menacanthus bonariensis is one out of five louse species found in the three populations of the type host. The remainder are: *Philopterus* n. sp. (Philopteridae), *Ricinus diffusus* (Kellogg, 1896) (Ricinidae), *Machaerilaemus maestus* (Kellogg, 1899) and *Machaerilaemus* cfr. *laticorpus* (Carriker, 1903) (Menoponidae). No representatives of the genera *Brueelia* Kéler, 1936 (Philopteridae) or *Myrsidea* Waterston, 1915 (Menoponidae), both found on many passerine families, have been recorded from *Z. c. hypoleuca* yet.

Menacanthus bonariensis and both *Machaerilaemus* species are cursorial forms that wander actively over the host skin, climbing the shaft of lower barbs of feathers to lay eggs. *Philopterus* n. sp. is found on the cephalic and upper neck feathers where it lives, feeds and lays eggs (figs. 29–31). *Ricinus diffusus* is a large haematophagous species that slides easily among the feathers of the neck on which it lays eggs (fig. 30), but may also be found in other areas of the body, usually in small numbers. *Menacanthus bonariensis* and both *Machaerilaemus* species lay eggs in widely separated areas (cfr. figs. 28, 29 and 32), so no obvious competition for oviposition sites can be detected. *Menacanthus bonariensis* also appears to overlap the oviposition sites of *Philopterus* n. sp. but, when both species are present on one individual host, the latter tends to lay eggs on feathers of the upper head such as the supraocular and lateral pteryla of the crown (fig. 29). Theoretically, oviposition sites of *M. grandis* overlap those of *R. diffusus*, but to date I failed to find both species on the same individual host.

Prevalence of *M. bonariensis* is very low, 1.2 % (2 out of 163 individuals examined). In the other species is: 0.61 % in *M. maestus*, 3.68 % in *M. cfr. laticorpus*, 9.20 % in *Philopterus* n. sp. and 19.63 % in *R. diffusus*.

Relationship of *M. bonariensis* n. sp. with the other louse species during the breeding season of the host

Mason (1985) and Darrieu *et al.* (1988) give data on nesting chronology of *Z. c. hypoleuca* from three localities situated a few kilometers apart from the sampling sites of this study. These studies show that that finch nests from the beginning of September until the first week of February. Usually 2 to 4 eggs are laid per nest and, after an incubation period averaging 13 days, nestlings appear. An infestation of *M. bonariensis* has been observed in an adult male captured in October 6th (3 males, 4 females, 11 nymphs and numerous viable eggs) and in an adult female captured in December 12th carrying a large number of unhatched eggs, both individuals in the climax of the breeding period. A similar pattern has been found in *Machaerilaemus* cfr. *laticorpus*, with a significant record of a massive infestation of this species on a young individual with juvenile plumage captured in January 10th. These records, although fragmentary, show that colonization of young individuals by *M. bonariensis* or by *M. cfr. laticorpus* takes place primarily on the nestlings – as soon as

the postnatal molt has been completed – by direct parental contacts in the nest and, alternatively, by body-to-body contact among the nestlings. It was not possible to detect any effects exerted by postjuvenile molt on the success of louse colonization on adult hosts.

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LITERATURE CITED

- Bó, N.A. (1972) *Zonotrichia capensis hypoleuca* (Todd) Sistemática y distribución en Argentina. *Neotropica*, 18 (56), 95–102.
- Chapman, F.M. (1940) The postglacial history of *Zonotrichia capensis*. *Bulletin of the American Museum of Natural History*, 77(8), 381–438.
- Darrieu, C.A., Soave, G. & Soave, E. (1988) Nidificación de Passeriformes en la Reserva Integral de Punta Lara y sus alrededores, Buenos Aires, Argentina. *El Hornero*, 113, 53–58.
- Handford, F. (1984) Morphological relationships among subspecies of the Rufous-collared Sparrow, *Zonotrichia capensis*. *Canadian Journal of Zoology*, 63 (10), 2383–2387.
- Hellmayr, C. (1938) *Catalogue of Birds of the Americas*. Field Museum of Natural History Series 13 (Part XI), 662 pp.
- Hohorst, W. (1939) Die Mallophagen des Haushuhnes und ihre eigelege. *VeterinärMedizinische Nachrichten*, (5), 97–128.
- Mason, P. (1985) The nesting biology of some passerines of Buenos Aires, Argentina. *Ornithology Monographs*, n° 36, 954–972.
- Olrog, C.C. (1979) Nueva lista de la avifauna argentina. *Opera Lilloana* n° 27, 324 pp
- Paynter, R.A. (1970) (Editor) *Checklist of the birds of the world*. Museum of Comparative Zoology, vol 13, Harvard University Press, Cambridge, Mass., USA, 443 pp.
- Price, R. D. (1975) The *Menacanthus eurysternus* complex (Mallophaga: Menoponidae) of the Passeriformes and Piciformes (Aves). *Annals of the Entomological Society of America*, 68 (4), 617–622.
- Price, R. D. (1977) The *Menacanthus* (Mallophaga: Menoponidae) of the Passeriformes (Aves). *Journal of Medical Entomology*, 14 (2), 207–220.
- Todd, W. E. C. (1920) Descriptions of apparently new South American birds. *Proceedings of the Biological Society of Washington*, 33, 71–76.