

Chewing lice (Insecta, Phthiraptera) of the Burrowing Parrot *Cyanoliseus p. patagonus* (VIEILLOT) from Argentina

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With 14 figures and 3 tables

Summary

In the course of ongoing studies of Burrowing Parrots *Cyanoliseus p. patagonus* in a breeding colony at El Cóndor, Río Negro, Argentina, we collected data on the prevalence of ectoparasitic chewing lice. Using a »Fair Isle« apparatus, we found only two species on chicks of Burrowing Parrots, namely *Heteromenopon macrurum* (EICHLER) (Amblycera, Menoponidae *sensu lato*) and *Paragoniocotes meridionalis* GUIMARÃES (Ischnocera, Philopteridae *sensu lato*). For both species, we provide additional descriptions. *Heteromenopon pilosum* CICCINO & CASTRO, 1976 is shown to be a more recent synonym of *H. macrurum*. All seven revised chicks of Burrowing Parrots (age 21–39 days) were infested with *Heteromenopon macrurum* (3–14 specimens per host), while only five of seven chicks had *Paragoniocotes meridionalis* (2–5 specimens per host).

Zusammenfassung

Federlinge (Insecta, Phthiraptera) vom Felsensittich *Cyanoliseus p. patagonus* (VIEILLOT) aus Argentinien
Aus einer fortdauernden Untersuchung am Felsensittich *Cyanoliseus p. patagonus* in einer Brutkolonie bei El Cóndor in der Provinz Río Negro/Argentinien werden neben Daten zur Biologie des Wirtes Befunde über dessen Befall mit Federlingen vorgestellt. Mittels eines »Fair Isle«-Apparates sind auf nestjungen Felsensittichen lediglich *Heteromenopon macrurum* (EICHLER) (Amblycera, Menoponidae *sensu lato*) und *Paragoniocotes meridionalis* GUIMARÃES (Ischnocera, Philopteridae *sensu lato*) festgestellt worden. Beide Arten werden ergänzend beschrieben. *Heteromenopon pilosum* CICCINO & CASTRO, 1976 erweist sich als jüngeres Synonym von *H. macrurum*. Alle sieben untersuchten Felsensittich-Nestlinge im Alter von 21–39 Tagen besaßen Federlinge der Art *Heteromenopon macrurum* (3–14 Ex. pro Wirtsindividuum), aber nur 5 von 7 Nestlingen waren mit *Paragoniocotes meridionalis* (2–5 Ex. pro Wirtsindividuum) befallen.

Keywords: chewing lice, taxonomy, *Heteromenopon macrurum*, *Paragoniocotes meridionalis*, infestation and life history of *Cyanoliseus patagonus*, Argentina.

Since 1998 J. F. MASELLO and P. QUILLFELDT have been conducting extensive studies on the life history of the nominate form of the Burrowing Parrot *Cyanoliseus patagonus* (VIEILLOT) in Argentina. In a breeding colony near El Cóndor in Río Negro province, nestlings in particular (Fig. 1) have been regularly examined for ectoparasitic infestation, and any parasites found collected. So far only two chewing lice species, *Heteromenopon macrurum* (Amblycera, Menoponidae *sensu lato*) and *Paragoniocotes meridionalis* (Ischnocera, Philopteridae *sensu lato*), have been confirmed. Following a brief

introduction on the life history of the Burrowing Parrot, these findings are presented here with accompanying remarks on points of taxonomy and nomenclature of both chewing lice. These ectoparasitic studies by J. F. MASELLO and P. QUILLFELDT on the Burrowing Parrot are continuing.

Material and Methods

Field studies of the breeding biology of Burrowing Parrots were carried out from October 1998 to February

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Fig. 1.
Burrowing Parrot *Cyanoliseus p. patagonus* 5 weeks old. El Cóndor, Río Negro, Argentina. – Photo: Juan F. MASELLO.

1999 and November 1999 to January 2000 at the largest colony of the species. The colony is located on a sandstone cliff at the Atlantic coast in El Cóndor, province of Río Negro, Patagonia, Argentina (for a detail description see ANGULO & CASAMIQUELA 1982). The colony covers 5 to 10 kilometres (YORIO & HARRIS 1997). The first kilometre of the colony (41° 3' S, 62° 48' W) is the most densely populated with 6750 active nests (J. F. MASELLO unpubl. data). This study was carried out in order to obtain detailed field data on the breeding biology of Burrowing Parrots and to describe variation in breeding success and chick growth within a wild population.

In the densest sector of the colony, 68 nests were selected and inspected every five days by climbing onto the cliff face. Chicks and adults were captured at the nests, weighed and measured. In order to obtain information about the chewing lice found on Burrowing Parrots, and to plan a quantitative sampling for the next field season, a subset of three nests was selected during the field season 1999-2000, and ectoparasites were removed from the nestlings. Nestlings ages ranged from 21-39 days. A »Fair Isle« apparatus (MARSHALL 1981) was used to remove the chewing lice and other ectoparasites without harming the nestling. Chloroform was used as fumigant since it has proved to be the most effective fumigant for lice, detaching about 75% of the lice in the Feral Pigeon *Columba livia* (VISNAK & DUMBACHER 1999). The chewing lice obtained in this way were kept in 70% alcohol to be later preserved as permanent specimens in Canada balsam. Measurements of the mounted insects were carried out using the standard method (see E. MEY, *Ornithol. Anz.* 36, 1997: 1-18).

On the life history of *Cyanoliseus patagonus*

The Burrowing Parrot *Cyanoliseus patagonus* is one of the most southern neotropical parrots (Aves, Psittaciformes, Psittacidae). Three races are found in Argentina *C. p. andinus* DABBENE & LILLO, 1913, *C. p. conlara* NORES & YZURIETA, 1983 and *C. p. patagonus* (VIEILLLOT, 1818) and one in central Chile *C. p. bloxami* OLSON, 1995, (previously *C. p. byroni* GRAY, 1831). In Argentina, it occurs from the Andean slopes in the Northwest to the arid Patagonian steppes in the South (DARRIEU 1980, NORES & YZURIETA 1983, BUCHER & RINALDI 1986). This species generally inhabits open grassland. The Patagonian race (*C. p. patagonus*) occurs in Central to Southeast Argentina. Southern populations migrate in winter to the north, sometimes reaching as far as Uruguay (BUCHER & RODRÍGUEZ 1986).

Burrowing Parrots breed colonially excavating their own nest burrows by tunnelling into the faces of sandstone, limestone or earth cliffs. The nests are depressed cylinders in the sandstone's softest layers of the cliff. The nests are normally between 80 cm and 2.5 m deep but

sometimes they reach more than 3m depth. The nests terminate in a nest chamber where the nestling are raised (LEONARDI & OPORTO 1983). The nests are often very close together and interconnected as burrows sometimes run in zigzag. The nesting pairs use burrows which they have dug in previous seasons but they enlarge the burrows every year (MASELLO *et al.* 2001). Each burrow is occupied by a single pair. Burrowing Parrots do not use nesting material but, rather, deposit their eggs on the sandy bottom of the nest chamber. The sand covering the bottom of the nests results from digging of the nests by the parrots.

Burrowing Parrots have a socially and genetically monogamous breeding system with intensive biparental care (MASELLO *et al.* 2002). The clutch of two to five eggs (J. F. MASELLO & P. QUILLFELDT unpubl. data) is incubated by the female alone while the male provides food (DE GRAHL 1985). Chick feeding is shared between the sexes. The chicks remain in the nest for about 60 days (J. F. MASELLO & P. QUILLFELDT unpubl. data). The breeding birds occupy the colonies between one or two months before egg laying (October to November) and leave the breeding site gradually as the young fledge (end of December to end of January). After fledging the young are fed by the adults for approximately four months (WESTEN 1995).

Formerly, Burrowing Parrots were very common in Argentina, but now they are only regionally abundant. The species' decline in parts of Argentina is due to increasing persecution as crop pest, conversion of grasslands to croplands, and trapping for the increasing live bird trade (BUCHER & RINALDI 1986, NORES & YZURIETA 1994, COLLAR 1997, JUNIPER & PARR 1998). As many other parrot species which are considered pests, the Burrowing Parrot is also valued in the pet trade: it is one of the most frequently sold Psittacidae birds in Europe (GUIX *et al.* 1997).

The Burrowing Parrot has serious difficulties to re-colonise a region once disappeared, making the species extremely fragile in a global sense. This a very important key factor for management of this species. Another feature of this parrot's life-cycle which potentially make this species fragile are its very specific

breeding habitat requirements. They breed only in specific limestone and sandstone vertical cliffs that satisfy specific height requirements. An example of this species fragility is the current status of the Chilean subspecies *Cyanoliseus patagonus bloxami*. This subspecies is considered under risk of extinction because of its drastic decline: only 3.000 individuals were estimated in the late 1980s.

RESULTS

Taxonomy

Heteromenopon CARRIKER, 1954

The genus *Heteromenopon* CARRIKER currently contains 13 species which are found exclusively on the Neotropical Psittacidae, the Australian Platycercini, and the Nestorini of New Zealand (PRICE & BEER 1966, PRICE 1968). The chewing lice infesting the latter two tribes, two and one species respectively, were placed in the subgenus *Keamenopon* PRICE & BEER, 1966 by the same authors, but in our opinion (E. MEY) they should have full genus status.

Heteromenopon (Heteromenopon) macrurum (EICHLER, 1952)

Figs. 2–4, Tab. 1

Kurodaia macrura EICHLER, 1952 (Zool. Anz. **149**, 257, Abb. 11) ex »*Falco (cinnamomeus) = sparverius cinnamominus* SWAINS.« sic! (prep. WEC 1252) and »*Sterna paradisea* BRÜNN.« (prep. WEC 1182, two specimens, only these mentioned as paratypoides), type serie with altogether 12 specimens, leg. R. PAEBLER 7.3.1904 Corral/Chile.

Kurodaia macrura EICHLER fide WEIDNER 1966 (Mitt. Hamburg Zool. Mus. Inst. **63**, 257), listed only 2 females (WEC 1252 b–c) ex »*Falco cinnamomeus = Sparverius cinnamominus* Swais.« and 2 females (WEC 1182) ex »*Sterna paradisea* PONTOPPIDAN«, all syntypes not paratypes as registrated by WEIDNER.

Heteromenopon (Heteromenopon) macrurum (EICHLER) fide PRICE & BEER 1966 (Ann. Entomol. Soc. Am. **60**, 333, fig. 24). 4 type specimens (females), listed by WEIDNER (1966: 257).

? *Heteromenopon (Heteromenopon) macrurum* (EICHLER) fide PALMA 1975 (Physis, Sec. C, **34**, 113–115) ex *Myiopsitta m. monacha*. Argentina.

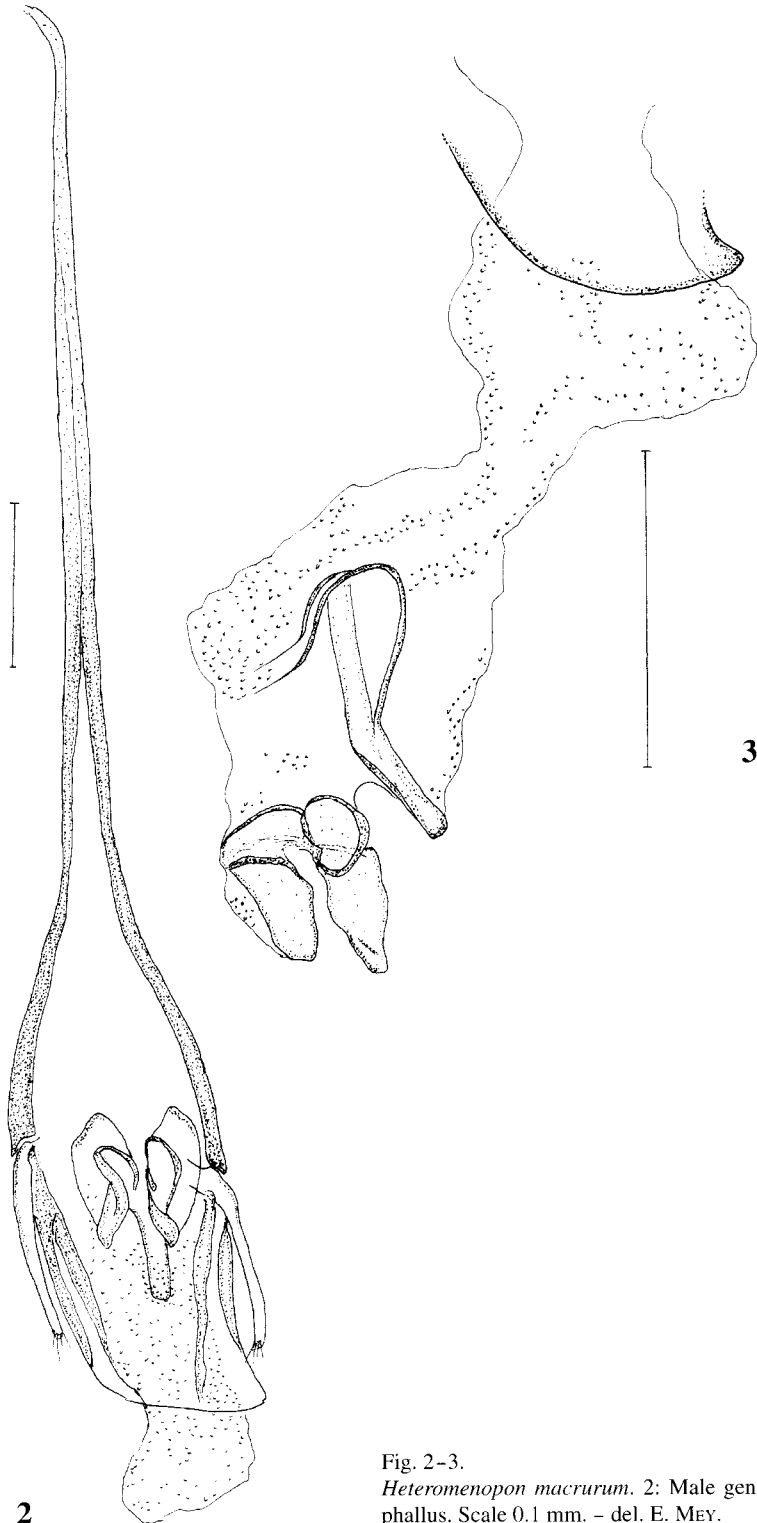


Fig. 2-3.
Heteromenopon macrurum. 2: Male genitalia; 3: erect
phallus. Scale 0.1 mm. - del. E. MEY.

Heteromenopon (Heteromenopon) subpilosus CICCINO & CASTRO, 1977 (Neotropica **23**, 85, figs. 1–5) ex *Cyanoliseus p. patagonus*. **Absolute synonym.** 4 males, 1 female. General Acha, Prov. de la Pampa, Argentina.

Type host (designated): *Cyanoliseus patagonus bloxami* OLSON, 1995

Specimens examined: 3 specimens (deposited at the Museum für Naturkunde, Berlin) of the type series ›*Kurodaia macrura* EICHLER, 1952‹: 1 male (prep. WEC 1252a, subsequently labelled by EICHLER as ›holotype‹, now = lectotype), 2 females (prep. WEC 1252e and h, unlabelled as types, now = syntypes), all ex *Falco sparverius cinnamominus*. – 23 males, 23 females and 21 larvae (prep. MEY 4414. a-c, 4437. c-e, 4444. a-d, 4445. b-e, 4446. a, 4447. a-c, 4452. a-b, 4453. a-c, 4454. c-h, 4455. a-h, 4457., 4458. a-c, 4460., 4461. and 4537.a-c) from 14 host individuals of *Cyanoliseus p. patagonus* (VIEILLOT, 1817) 14.12.1999 to 3.1.2000 from El Cóndor, province of Río Negro, Patagonia, Argentina, leg. J. F. MASELLO & P. QUILLFELDT.

The description of this species, like so many chewing lice species named by Wolfdietrich EICHLER, has had an unlucky history, leading to a deal of confusion. EICHLER (1952) received them from the Zoologisches Museum Hamburg, for which Captain Carl Friedrich Richard PAEBLER, on the same day in Chile, had collected 10 individuals from an American Kestrel *Falco sparverius cinnamominus* and 2 individuals from an Arctic Tern *Sterna paradisaea*. While EICHLER *l.c.* regarded the two individuals from the Arctic Tern as resulting from secondary infestation he thought that the others were host-authentic and placed them accordingly in the genus *Kurodaia*, typical for the Falconidae, although he felt that the allocation was unsafe. HOPKINS & CLAY (1955) inserted ›*Kurodaia macrura* EICHLER‹ in the supplement to their Mallophaga checklist. WEIDNER (1966: 257) remarks: ›... according to CLAY (*in litt.*) do not belong in the genus (*Kurodaia*).‹

The credit for bringing the true nature of ›*K. macrura*‹ to light goes to PRICE & BEER (1967), since they 1) recognized that the species belonged to the parrot chewing-lice genus *Heteromenopon*, and 2) deduced from this that the American Kestrel is most unlikely to be the type host of *macrurum*. PRICE & BEER *l.c.* base this revision on four syntypes of ›*K.*

macrura‹. The character-host affiliation remained uncertain.

PALMA (1975) thought that the type host of *Heteromenopon macrurum* (EICHLER) was most probably Monk Parakeet *Myiopsitta m. monachus* after he had collected many chewing lice specimens from that species in NE Argentina and had identified them as *Heteromenopon macrurum* solely on the basis of the revised description by PRICE & BEER (1967). PALMA *l.c.* made detailed illustrations of male and female and of male genitalia but neglected to make body measurements. However, a comparison of details from his drawings (chaetotaxy, thorax structure) with the types of ›*Kurodaia macrura*‹ available to us, and with the two conspecific *Heteromenopon* chewing lice from *Cyanoliseus p. patagonus*, causes us to doubt PALMA's identification. Either PALMA's drawings are insufficiently accurate in their representation of these details for *Heteromenopon macrurum* (in head and thorax bristle pattern, shape of the male pronotum, mesothorax not separated from metathorax), or PALMA was using another, (as yet) unknown *Heteromenopon* species as his model. The host origin would be an argument in favour of the latter. We are unable to see why *Myiopsitta monachus*, which does not even occur in Chile, should be the type host of ›*Kurodaia macrura* EICHLER‹. PAEBLER had collected a variety of bird species near Corral (southern half of Chile, the present province of Valdivia in the 10th Region Los Lagos) in March 1904, but it is extremely unlikely that Monk Parakeet could have been among them. Instead, the only naturally occurring parrot species in the area are *Enicognathus ferrugineus*, *E. leporhynchus*, and/or *Cyanoliseus patagonus*.¹ Therefore we think that it is much more reasonable

¹ Despite considerable efforts we have so far been unable to reconstruct the details of the origin and ectoparasite yield of the PAEBLER collection. It is hardly to be expected that PAEBLER strictly avoided chewing lice host-switching during his bird collecting. The bird collection containing the relevant Chilean skins in the Zoologisches Museum Hamburg was almost completely destroyed in an air raid in 1943. The collection no longer contains any Chilean parrot skins originating with PAEBLER (C. BRACKER *in litt.*).

to assume that only one of these parrot species can be the true type host of *>Kurodaia macrura<* than to construct a scenario of natural secondary infestation.

Our studies point strongly to *Cyanoliseus patagonus bloxami* as being the type host of *>Kurodaia macrura<*, which switched to the American Kestrel and Arctic Tern in PAEBLER's game-bag or when he was skinning the Burrowing Parrot along with the other birds. However, neither *Enicognathus ferrugineus* nor *E. leptorhynchus* can, strictly speaking, be completely excluded as the type host since we have to accept that *Heteromenopon macrurum* could occur on these parrots, although there is as yet absolutely no evidence that this is the case.

Following the designation of *Myiopsitta m. monachus* as the type host of *H. macrurum* and its description by PALMA (1975), CICCHINO & CASTRO (1976) assumed that they were dealing with an undescribed *Heteromenopon* species, a few individuals of which had been collected from *Cyanoliseus p. patagonus*. However *Heteromenopon subpilosum* CICCHINO & CASTRO is beyond any doubt conspecific with *H. macrurum* (EICHLER) and therefore must be regarded as a synonym.

To better characterize our findings we give body measurements (Tab. 1) of *H. macrurum* as well as illustrations of the male genitalia (Figs. 2-3) and female terminalia (Fig. 4).

***Paragoniocotes* CUMMINGS, 1916**

This genus, to which HOPKINS & CLAY (1952)² allocated 48 species is, according to GUIMARÃES (1975: 256) *>a highly heterogeneous group of species, which may be distributed through three or four subgroups<*. This assertion is based on his study (GUIMARÃES 1947) in which he describes how four species groups can be separated by the form of the clavus and antenna in both sexes. CARRIKER (1947, 1950)

² Only species are catalogued in this checklist. The forms described as subspecies (this applies here to several members of *Paragoniocotes* described by CARRIKER) were automatically *>elevated<* to species by HOPKINS & CLAY (1952).

Table 1. Body measurements (mm) and head index (head width divided by head length) both of *Heteromenopon (Heteromenopon) macrurum* (n = 21) and of lectotype and syntypes of "*Kurodaia macrura* EICHLER, 1952". These types are in poor condition. * n = 20; ** n = 19; *** n = 18.

	M a l e s (n = 21, excl. type)			F e m a l e s (n = 21, excl. types)		
	Lectotype			Syntypes, WEC 1252	e	h
Total length	1.65	1.90-2.06	(\bar{x} = 1.986)	2.38	2.11	2.11-2.37 (\bar{x} = 2.271)
Head length	0.29	0.33-0.35	(\bar{x} = 0.336)	0.33	0.33	0.35-0.36 (\bar{x} = 0.359)
Head width	0.54	0.51-0.57	(\bar{x} = 0.543)	0.60	0.59	0.49-0.60 (\bar{x} = 0.579)
Head index	1.86	1.54-1.73	(\bar{x} = 1.623)	1.82	1.79	1.36-1.69 (\bar{x} = 1.616)
Prothorax width	0.41	0.39-0.44	(\bar{x} = 0.418)*	0.48	0.47	0.44-0.48 (\bar{x} = 0.458)
Metathoracic width	0.51	0.48-0.53	(\bar{x} = 0.501)**	0.62	0.60	0.54-0.60 (\bar{x} = 0.572)
Abdominal width	0.68	0.66-0.72	(\bar{x} = 0.691)***	0.93	0.84	0.75-0.87 (\bar{x} = 0.823)
Genitale length	-	0.74-0.86	(\bar{x} = 0.809)*			
Genitale width	-	0.12-0.14	(\bar{x} = 0.132)***			

attempted to resolve this *Paragoniocotes* >heterogeneity< by using additional characters, some of them wrongly interpreted, to place some species groups in their own genera, thereby creating *Epipsittacus* CARRIKER, 1947 (nomen novum for *Dimorphia* CARRIKER, 1940 nec MALLOCH) (see CLAY 1946, who correctly doubts the status of the genus *Epipsittacus*). EICHLER (1952a) follows these conclusions of CARRIKER, but did what he so often does (much to the irritation of all conscientious taxonomists) and erected new genera, here *Avipedi-*

culus in this case and *Mausolus*, simply by using the literature and without examining any actual specimens. This situation demands a revision of *Paragoniocotes* sensu lato, for which GUIMARÃES (1975) most recently created an important prerequisite (e.g. showed that *Avipediculus* has no justification) and described the following species.

According to the latest research, 45 species and subspecies of *Paragoniocotes* parasitize only Neotropical parrots.

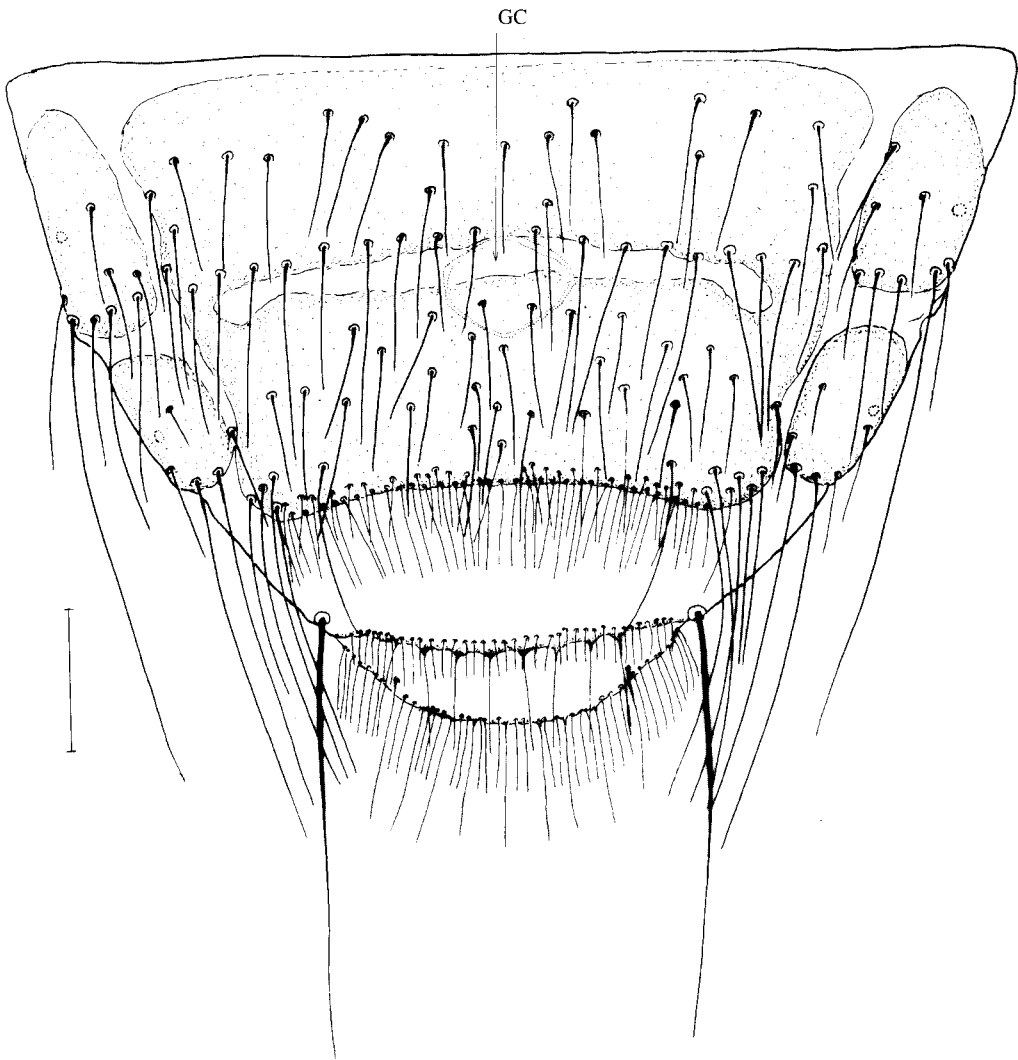


Fig. 4. *Heteromenopon macrurum*. Female terminalia (ventral) with internal structure of genital chamber (GC). Scale 0.1 mm.

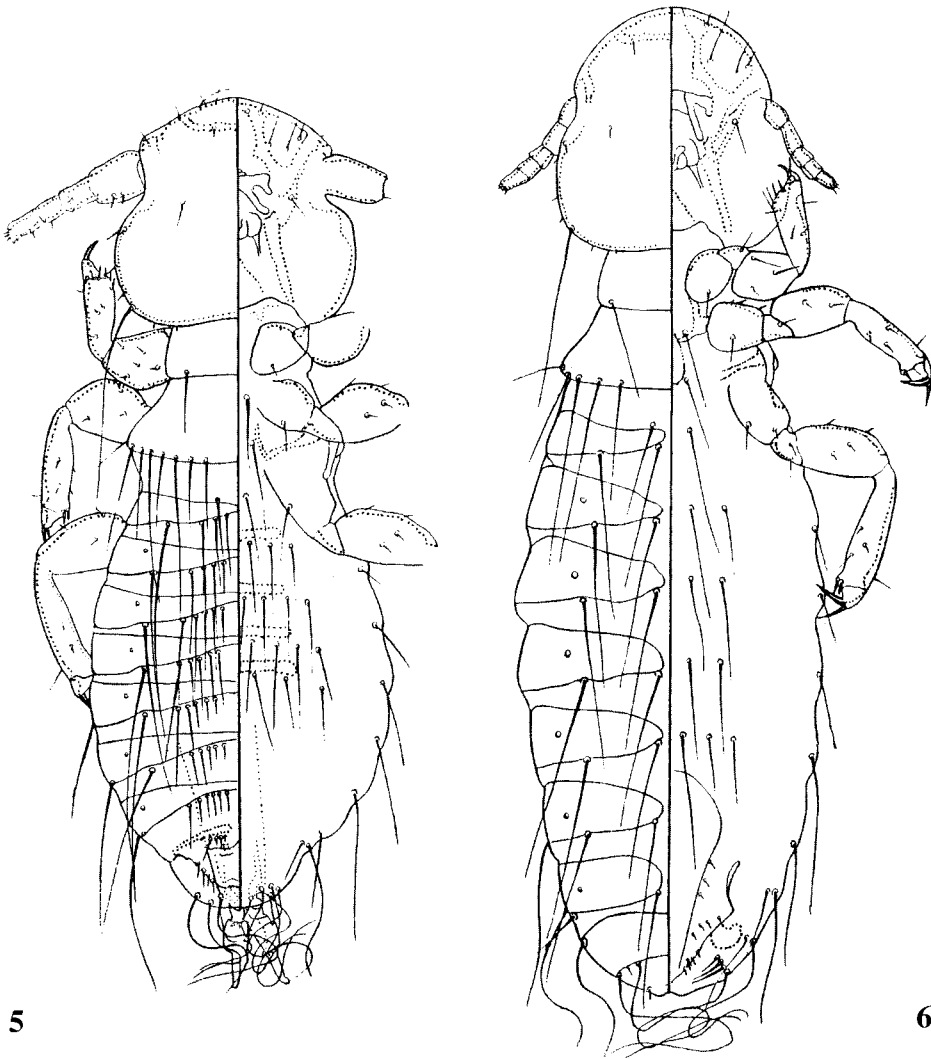


Fig. 5-6.
Paragoniocotes meridionalis. 5: Male; 6: Female. From GUIMARÃES (1975: 263).

Paragoniocotes meridionalis

GUIMARÃES, 1975

Figs. 5-13, Tab. 2

Paragoniocotes meridionalis GUIMARÃES 1975 (Pap. Avul. Zool. 28, 262, figs. 8-14) ex *Cyanoliseus patagonus* (»probably come from Argentina«). 1 males, 2 females from skin (?) in Institut Royal des Sciences Naturelles de Belgique.

Type host: *Cyanoliseus p. patagonus* (VIEILLOT, 1817)

Specimens examined: 5 males, 10 females, and 1 Larva (prep. MEY 4437.a-b; 4444.e-f; 4445.a; 4453.d; 4454.a-b; 4455.i-k; 4459.) from 7 host individuals of *Cyanoliseus p. patagonus* (VIEILLOT, 1817) 14.12.1999 to 3.1.2000 from El Cóndor, province of Río Negro, Patagonia, Argentina, leg. J. F. MASELLO & P. QUILLFELDT.

P. meridionalis is not only behaviourally clearly sexually dimorphic (Figs. 5-6). In the obviously smaller male the head is always broader than long, in the female usually as broad

Table 2.

Body measurements (mm) and head index (head width divided by head length) of *Paragoniocotes meridionalis* GUIMARÃES, 1975.

	M a l e s					F e m a l e s							
Total length	1.14	1.16	1.11	-	1.11	1.39	1.46	1.44	1.43	1.47	1.26	1.41	1.23
Head length	0.30	0.32	0.30	0.30	0.30	0.35	0.36	0.35	0.36	0.33	0.33	0.33	0.32
Head width	0.36	0.35	0.35	0.35	0.35	0.38	0.36	0.36	0.36	0.36	0.35	0.33	0.35
Head index	1.20	1.09	1.17	1.17	1.17	1.09	1.00	1.03	1.00	1.09	1.06	1.00	1.09
Prothorax width	0.21	0.21	0.20	-	0.20	0.21	0.21	0.21	0.21	0.21	-	-	-
Mesometathoracic width	0.31	0.30	0.30	-	0.26	0.33	0.35	0.33	0.33	0.36	-	-	0.30
Abdominal width	0.46	0.45	0.39	0.30	0.35	-	0.54	0.51	0.50	0.47	-	-	-

as or slightly broader than long (Tab. 2). The clavi are very inconspicuous and most clearly developed in the female (Figs. 8–9). The male antenna, with a large scapus, has a small, heavily chitinized growth on both the 3rd and 5th segments (Figs. 7–8), which also, and only, occurs in other *Paragoniocotes* species, e.g. *P. mirabilis* (CARRIKER) and *P. pyrrhurae* GUIMARÃES, and in this genus seems to be a better intra-generic distinguishing character than the form of the clavi (CLAY 1946). To clarify GUIMARÃES's description the male genital apparatus (Fig. 10) and the female genital region (Fig. 11) are also illustrated here.

One plesiomorphic character of the (avian) Ischnocera, which as far as we know is not present in any other species, appears to have been retained in *Paragoniocotes meridionalis*: in both sexes, on each side of the second abdominal segment (the first visible) there is a well-developed macrochaeta-type postspiracular seta that is accompanied on the left side by a sensillus close to the seta's point of emergence (Figs. 12–13). However, the lack of a postspiracular seta along with sensillus and stigmata (though the latter are detectable as an apparent stigma scar in many Ischnocera species) on the second abdominal segment is the usual apomorphic character state. A postspiracular seta plus sensillus is also present on abdominal segments iii to v in *P. meridionalis*, but this macrochaeta occurs alone on tergo-pleurits vi and vii.

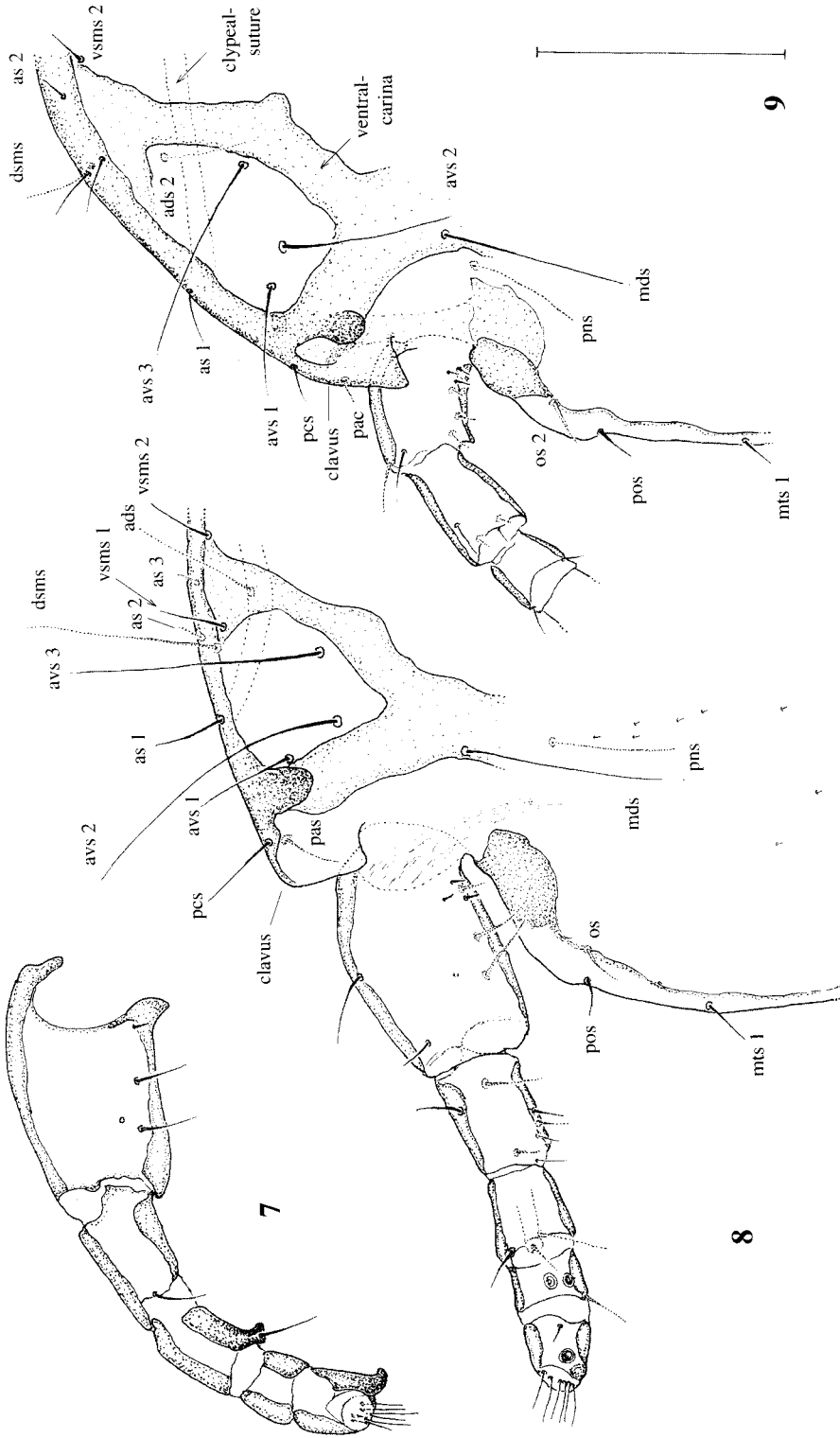
Although the spiracle (stigma) of abdominal segment ii is clearly smaller than those of seg-

ments iii to viii it is still more than a barely visible rudiment, and therefore probably still serves for breathing, as has been demonstrated for *Strigiphilus splendens* (see MEY 1995).

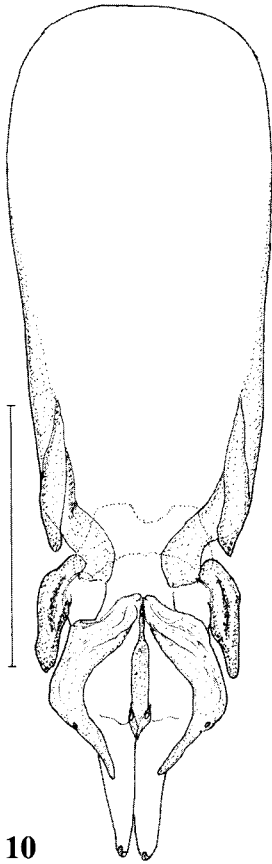
In the absence of a comparison of the males, the similarity of the females of *P. meridionalis* and *P. anomalus* GUIMARÃES (ex *Aratinga acuticaudata haemorrhous*), emphasized by GUIMARÃES *l.c.*, tells us little about the likelihood of a close relationship between them. To judge by the characteristic head shape (including antenna and clavus), male genitalia, abdominal bristle pattern, and formation of the plates, *P. meridionalis* is entitled to its own species group. The *Paragoniocotes* species *abnormis* (KELLOGG), *aratingae* GUIMARÃES, *fasciatus* (PIAGET), *guajirensis* CARRIKER, *militaris* CARRIKER, *mirabilis* (CARRIKER), *molinae* CARRIKER, *nevadensis* CARRIKER, *pyrrhurae* GUIMARÃES, and *venezolanus* STAFFORD (all of them from hosts in the genera *Brotogeris*, *Ara*, *Aratinga*, and *Pyrrhura*) are probably the closest relatives.

Data on infestation

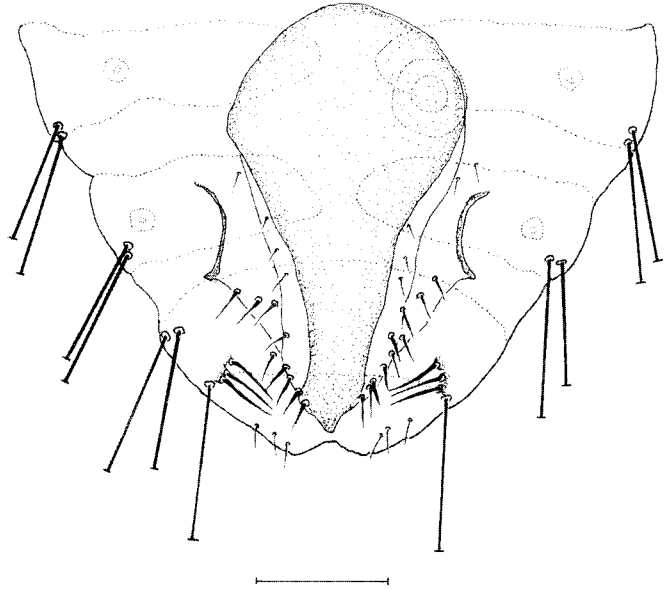
Preliminary data on infestation of Burrowing Parrots by chewing lice (Tab. 3) were calculated from the lice removed with the fair isle apparatus and chloroform as fumigant. The apparatus removed 0.7 ± 0.4 adult males (range 0–3, $n = 7$ nestlings), 1.4 ± 0.5 adult females (range 0–3, $n = 7$ nestlings) and 0.1 ± 0.1 larvae (range 0–1, $n = 7$ nestlings) of *Paragoniocotes*



Figs. 7-9. *Paragonticotes meridionalis*. 7: Male antenna (dorsal); 8: Male head with antenna and pre- and postantennal region, ventral aspect; 9: Dito female. Dorsal structures and setae hatched. - Abbreviations: **ads**, anterior dorsal seta (facial seta, Gesichtsbörste); **as 1-3**, marginal setae (1 - posterior, 2 - middle, 3 - anterior marginal seta); **avs 1-3**, anterior ventral setae (basal clypeal setae); **dsms**, dorsal submarginal seta; **mds**, dorsal submarginal seta; **mts 1**, first marginal seta; **os**, ocular seta; **pas**, preantennal seta (Tegsbörste); **pcs**, preconal seta (Zapfenbörste); **pns**, postocular seta; **pos**, postmarginal seta; **vsmms 1-2**, ventral submarginal setae (1 - Chomaborste, 2 - Ocularis). - Scale 0.1 mm.



10



11

Figs. 10–11.

Paragoniocotes meridionalis. 7: Male genitalia (paired tip of endomeron is dorsad curved); 8: Female terminalia (ventral). Scale 0.1mm.

meridionalis from individual chicks. We also found 2.9 ± 0.7 adult males (range 0–5, $n = 7$ nestlings), 1.9 ± 0.6 adult females (range 1–5, $n = 7$ nestlings) and 3.1 ± 0.9 larvae (range 0–7, $n = 7$ nestlings) of *Heteromenopon macrurum* on the same Burrowing Parrot chicks.

Assuming that the fair isle apparatus sampled 75% of the chewing lice (see Materials and Methods), Burrowing Parrot nestlings were infested by a mean of 2.9 individuals of *Paragoniocotes meridionalis* and 10.5 individuals of *Heteromenopon macrurum*. Table 3 shows the detailed data of infestation in three nests.

We interpreted the holes and bands (Fig. 14) found on the fresh flight feathers, even on pinfeathers, as the feeding traces left by, principally, *P. meridionalis*, although there have been no direct observations of this.

It is remarkable that our study has not yet resulted in evidence for the presence of the

Amblycera species *Psittacobrosus patagoni* PRICE & BEER, 1966 (Menoponidae *sensu lato*). However the species is so far only known on the Chilean host subspecies *C. p. bloxami* from Angol (PRICE & BEER 1966). In our opinion, the quill-inhabiting Menoponidae *Heterokodeia* CARRIKER can also be expected to occur on *Cyanoliseus patagonus*.

There is no information on the egg-laying sites of *Heteromenopon macrurum* and *Paragoniocotes meridionalis*. It can be expected that the former species (like other members of the genus) utilizes the interior of the flight-feather calamus, while the latter probably lays its eggs on the vanes, mainly of the wing-coverts (see PEREZ & ATYEO 1984).

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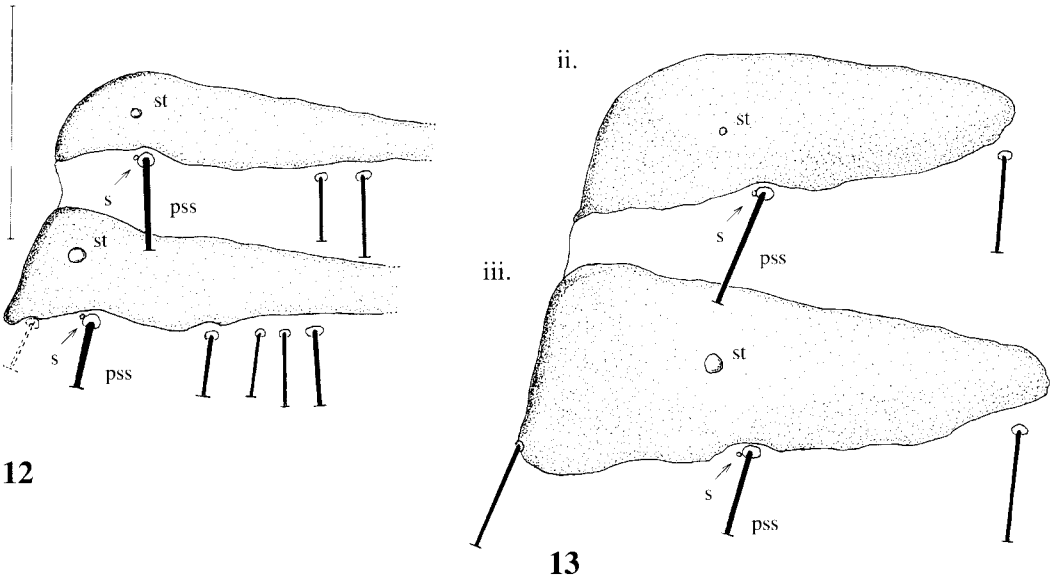


Fig. 12–13. *Paragoniocotes meridionalis*. 12: Male tergopleurite ii and iii. 13: dito female. – Abbreviations: pss, postspiracular seta; s, contiguous sensillus; st, stigma (abdominal spiracle). – Scale 0.1 mm.

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Fig. 14. Tail of a 7 weeks old Burrowing Parrot *Cyanoliseus p. patagonus* chick with bite marks of chewing lice. El Cóndor, Río Negro, Argentina. – Photo: Petra QUILLFELDT.

Table 3.

Preliminary data on infestation of Burrowing Parrots *Cyanoliseus p. patagonus* by chewing lice in El Cóndor, Río Negro, Patagonia, Argentina. The ectoparasites were collected the same day in chicks of three different nests using a fair isle apparatus and chloroform. The chick number indicates the hatching order of the chicks.

Date	Nest	Chick	Age (days)	<i>Paragoniocotes meridionalis</i>			<i>Heteromenopon macrurum</i>		
				male	female	larvae	male	female	larvae
14.12.99	46	1	23	0	3	0	3	1	3
14.12.99	46	2	22	0	3	0	5	1	2
14.12.99	46	3	21	0	0	0	4	1	1
14.12.99	47	1	39	1	0	1	0	5	5
14.12.99	47	2	36	3	2	0	5	2	7
14.12.99	47	3	33	1	2	0	1	2	4
14.12.99	69	1	21	0	0	0	2	1	0

Naturkunde, Berlin) kindly placed type material of this species at our disposal. We are very grateful to Brian HILLCOAT (Neuss) for translating parts of the manuscript.

Resumo

Malófagos (Insecta, Phthiraptera) do Conuro da Patagônia *Cyanoliseus p. patagonus* (VIEILLOT) da Argentina.

De uma série continuada de exames efetuados no Conuro da Patagônia *Cyanoliseus p. patagonus* em uma colônia de reprodução perto de El Cóndor, na província de Río Negro/Argentina, são apresentados, além de dados sobre a biologia do hospedeiro, informações sobre a sua infestação com malófagos. Com a ajuda de um aparelho »Fair Isle« foram encontrados em nidícolas do »loro barranquero« apenas *Heteromenopon macrurum* EICHLER (Amblycera, Menoponidae sensu lato) e *Paragoniocotes meridionalis* GUIMARÃES (Ischnocera, Philopteridae sensu lato). Ambas espécies são descritas complementarmente. *Heteromenopon pilosum* CICCHINO & CASTRO, revela ser um sinônimo recente de *H. macrurum*. Todos os sete nidícolas examinados do constatasinis (»loro barranquero«) com a idade de 21–39 dias possuíam malófagos da espécie *Heteromenopon macrurum* (3–14 exemplares por indivíduo hospedeiro), mas somente 5 dos 7 nidícolas estavam infestados com *Paragoniocotes meridionalis* (2–5 exemplares por indivíduo hospedeiro).

Resumen

Malófagos (Insecta, Phthiraptera) del loro barranquero *Cyanoliseus p. patagonus* (VIEILLOT) de Argentina.

En el transcurso de estudios sobre el loro barranquero *Cyanoliseus p. patagonus* llevados a cabo en una colonia

situada en El Cóndor, Río Negro, Argentina, hemos recogido datos sobre la prevalencia de malófagos. Usando un aparato »Fair Isle« hemos encontrado solo dos especies de piojos en pichones de loro barranquero, a saber *Heteromenopon macrurum* (Amblycera, Menoponidae sensu lato) y *Paragoniocotes meridionalis* GUIMARÃES (Ischnocera, Philopteridae sensu lato). A la vez brindamos para ambas especies descripciones taxonómicas adicionales. Se muestra también que *Heteromenopon pilosum* CICCHINO & CASTRO, 1976 es un sinónimo reciente de *H. macrurum* (EICHLER). Los siete pichones revisados de loro barranquero (edades entre 21 y 39 días) se encontraban parasitados por *Heteromenopon macrurum* (3–14 especímenes por hospedador), mientras que solo cinco de los siete pichones presentaban ejemplares de *Paragoniocotes meridionalis* (2–5 especímenes por hospedador).

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