

## Lice on helmeted guineafowls at five localities in South Africa

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### ABSTRACT

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A total of 234 helmeted guineafowls, *Numida meleagris coronata*, were examined for lice at five localities in South Africa. These were the Mountain Zebra National Park in the eastern Karoo, Cape Province; the Andries Vosloo Kudu Reserve and the farm Bucklands, in Valley Bushveld, eastern Cape Province; the Bontebok National Park, south-western Cape Province; and the southern part of the Kruger National Park, eastern Transvaal Lowveld.

A total of eight louse species, comprising *Amyrsidea desousai*, *Clayia theresae*, *Goniodes gigas*, *Goniodes numidae*, *Lipeurus numidae*, *Numidicola antennatus*, *Numidilipeurus lawrensis* and *Somaphantus lusius* were recovered from the guineafowls. With the exception of *A. desousai*, which was not recovered from the guineafowls in the Bontebok National Park, all eight species were present on the birds at each locality.

The prevalence of infestations on the birds at the various localities ranged from 99.2–100 %, and the numbers of lice present on individual birds, from 0–3619. *Goniodes* spp. and *N. antennatus* were the most abundant and *A. desousai* the least.

### INTRODUCTION

Helmeted guineafowls, *Numida meleagris*, are widely distributed in southern Africa, with various subspecies occurring in different regions (Crowe 1978; McLachlan & Liversidge 1975). The louse species infesting these birds in Africa south of the Sahara have been listed by Ledger (1980). He recorded 14 species from this host. Two of these species, *Goniocotes maculatus* and *Goniodes gigas*, have domestic chickens as type host, but Ledger (1980) states that

they are both primary parasites of *N. meleagris*. Another two, *Lipeurus caponis* and *Numidilipeurus tropicalis*, also have domestic chickens as type host, but have been recovered from *N. meleagris*. Ledger (1980) lists *N. meleagris* as the only host of the remaining ten species, but mentions that *Lipeurus numidae* was first recovered from domesticated guineafowls belonging to this species. Descriptions of several of the louse species can be found in Kellogg & Paine (1911), Bedford (1929), Clay (1938; 1940), Kéler (1952) and Emerson (1954).

Helmeted guineafowls, *N. meleagris coronata*, have been examined for ixodid ticks at five localities in South Africa (Horak & Williams 1986; Horak, Spickett, Braack & Williams 1991). In addition, blood smears and morphometric measurements were taken from some of the birds (Earlé, Horak, Huchzermeyer, Bennett, Braack & Penzhorn 1991; Penzhorn, Horak,

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Spickett & Braack 1991). Lice were collected from all the guineafowls and the present paper describes the prevalence and abundance of the lice recovered from the birds at the five localities.

## MATERIALS AND METHODS

### Localities

1. *Mountain Zebra National Park* (32°15'S; 25°27'E) in the eastern Karoo region of the eastern Cape Province. The vegetation in this park is described as Karroid *Merxmuellera* Mountain Veld replaced by Karoo (Acocks 1988).
2. *Andries Vosloo Kudu Reserve* (33°07'S; 26°40'E) in the eastern Cape Province. The vegetation in this region is described as Valley Bushveld (Acocks 1988).
3. *Bucklands*, a stock farm, adjacent to the Andries Vosloo Kudu Reserve.
4. *Bontebok National Park* (34°02'S; 20°26'E) in the southern Cape Province. Acocks (1988) classifies the vegetation of this region as Coastal Renosterbosveld.
5. *Kruger National Park* (south of 24°50'S, within the boundaries of the park) in the eastern Transvaal Lowveld. The vegetation in this section of the park is classified as Lowveld Sour Bushveld and Arid Lowveld (Acocks 1988).

With the exception of the Bontebok National Park, which lies within the winter rainfall region, the survey sites all lie within the summer rainfall regions of South Africa.

### Survey birds

Guineafowls were collected from the various localities as follows:

1. *Mountain Zebra National Park*. Two birds were shot every 3 months from February 1984 to December 1985. A total of 16 birds were collected.
2. *Andries Vosloo Kudu Reserve*. With the following exceptions, two birds were shot each month from May 1984 to January 1987:
  - February, July and December 1985—no birds
  - September 1984, March and April 1985, and February and June 1986—one bird per month
  - March, May and December 1986—three birds per month

A total of 58 birds were collected.

3. *Bucklands*. With the following exceptions, two birds were shot each month from May 1985 to January 1987:
  - November and December 1985—no birds

- November 1986—one bird

A total of 37 birds were shot.

4. *Bontebok National Park*. One bird was shot in February 1987, another in February 1988 and two in February 1992.
5. *Kruger National Park*. With the exception of two birds shot in each of January and February 1990, five birds were shot monthly from August 1988 to August 1990, giving a total of 119 birds.

### Necropsy and counting procedures

After the guineafowls had been shot, each whole carcass was immediately placed in a plastic bag and transported to the laboratory where the birds were decapitated just caudad to the junction of the bare neck and the feathered neck, and the tail cut off at the pygostyle. The feathered portion of the carcass was skinned; the wing-tips and legs severed at the joints and left attached to the skin; the skin divided in half, lengthwise, and one half retained for processing. The head and tail were placed in a 1-l plastic bottle, and the half portion of skin, with the leg and wing-tip attached, was placed in a plastic bag. A 1:500 dilution of Amitraz [Triatix, Coopers (SA) Pty Ltd], a tick-detaching agent, was added to the bottle and the bag to cover the material. The following morning sufficient formalin was added to the contents of the bottle and the bag to render a formalin concentration of approximately 4% in these containers. The contents of the bottle (including the head and tail) and of the bag (including the skin) were separately and thoroughly washed with a strong jet of water over a coarse sieve held over a sieve with 150- $\mu$ m apertures. The material retained on the fine sieve was collected and examined under a stereoscopic microscope, and the lice counted and removed for identification. The head, tail and the half portion of skin retained on the coarse sieve were also examined under a stereoscopic microscope, and the remaining lice were counted and removed for identification. The numbers of lice recovered from the half portion of skin and its sievings were doubled and added to the numbers recovered from the head and tail in order to obtain a total count.

### Identification of the lice

At the commencement of the project all the lice were mounted in lactophenol and identified under a standard microscope. For this purpose the descriptions of Clay (1938; 1940), Emerson (1954), Kéler (1952) and Ledger (1980) were used. Later, when the species characteristics were known, identifications were done under a stereoscopic microscope and only problematic specimens were mounted in lactophenol and examined under a standard microscope.

**RESULTS**

The eight species of lice found on the guineafowls were *Amyrsidea desousai* (Kéler, 1952); *Clayia theresae* Hopkins, 1941; *Goniodes gigas* (Taschenberg, 1879); *Goniodes numidae* Mjöberg, 1910; *Lipeurus numidae* (Denny, 1842); *Numidicola antennatus* (Kellogg & Paine, 1911); *Numidilipeurus lawrensis* (Bedford, 1929); and *Somaphantus lusius* Paine, 1914.

The species and numbers of lice recovered, and the prevalence of infestations on the guineafowls at each locality are summarized in Table 1.

Except for a single bird shot in the Kruger National Park during May 1990, all guineafowls were infested. The total numbers of lice recovered from individual birds varied from 0–3 619 and 25 of the 234 birds examined each harboured more than 1 000 lice.

Excluding the louse *A. desousai*, which was absent on the birds in the Bontebok National Park, all eight species of lice were harboured by the guineafowls at each of the localities. *A. desousai* and *S. lusius* were the least abundant and the two *Goniodes* species and *N. antennatus* the most.

Approximately 60 % of the total burdens of *C. theresae*, *L. numidae* and *N. lawrensis* consisted of nymphs, while the total burdens of the two *Goniodes* species combined, comprised 85 % and that of *N. antennatus* 40 % nymphs. No nymphs of the feather shaft louse, *S. lusius*, were recovered, while the total numbers of *A. desousai* were too low to draw any conclusions. Excluding the lice found in the Bontebok National Park, where only four birds were examined, the mean total louse burdens varied from 484 in the Kruger National Park to 651 in the Andries Vosloo Kudu Reserve.

The monthly mean total louse burdens of the guineafowls from the Andries Vosloo Kudu Reserve, Bucklands and the Kruger National Park are graphically represented in Fig. 1–3.

No pattern of seasonal abundance is evident at any of the localities.

**DISCUSSION**

Kéler (1952) described several species of lice from *Numida meleagris mitrata* from Mozambique and from Potchefstroom in South Africa. His records of *N. meleagris mitrata* from Potchefstroom in the western Transvaal do not agree with the Operational Taxonomic Unit (OTU) boundaries drawn for the distribution of the different sub-species of *N. meleagris* (Crowe 1978). According to these OTU boundaries, *N. meleagris mitrata* does not occur further west than the north-eastern border region of the Kruger National Park. All 234 guineafowls examined in the present study resembled *N. meleagris coronata* as illustrated

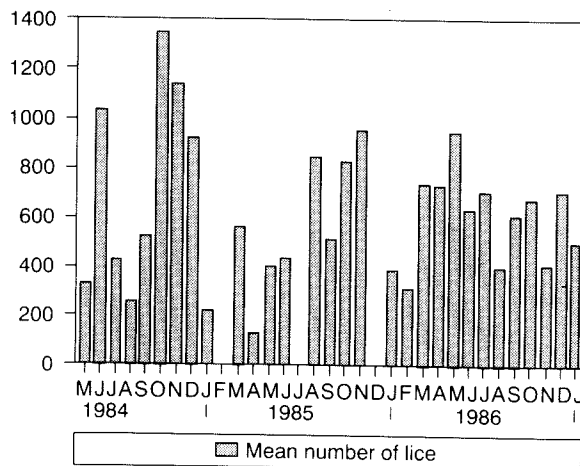


FIG. 1 The mean numbers of lice recovered from two guineafowls shot at monthly intervals in the Andries Vosloo Kudu Reserve. No birds were examined during February, July and December 1985

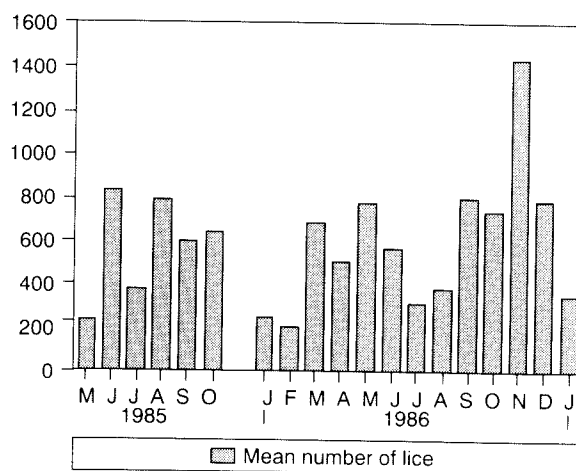


FIG. 2 The mean numbers of lice recovered from two guineafowls shot at monthly intervals on the farm Bucklands. No birds were examined during November and December 1985

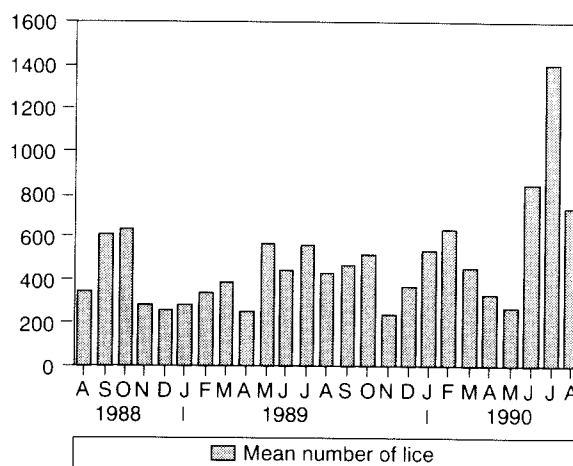


FIG. 3 The mean numbers of lice recovered from five guineafowls shot at monthly intervals in the Kruger National Park. Only two birds were examined during January and during February 1990

TABLE 1 The total numbers of lice recovered and the prevalence (%) of these infestations on helmeted guineafowls at five localities in South Africa

Locality	n	Stage	<i>Amyrsidea desousai</i>	<i>Clavia theresae</i>	<i>Goniodes</i> spp.	<i>Goniodes gigas</i>	<i>Goniodes numidae</i>	<i>Lipeurus numidae</i>	<i>Numidicola antennatus</i>	<i>Numidilipeurus lawrensis</i>	<i>Somaphan-tus lusus</i>	Mean total burdens
Mountain Zebra National Park	16	Nymph Adult	2 (6.0) 12 (12.5)	254 (87.5) 332 (100)	3139 (100)	94 (87.5)	489 (93.8)	457 (100) 451 (100)	1004 (100) 1948 (100)	94 (87.5) 129 (93.8)	18 (25)	527 (100)
Andries Vosloo Kudu Reserve	58	Nymph Adult	1 (1.7) 8 (5.2)	1800 (94.8) 1246 (89.7)	13467 (100)	1053 (91.4)	1975 (96.6)	2357 (94.8) 2341 (96.6)	3827 (96.6) 8047 (98.3)	925 (86.2) 467 (75.9)	270 (44.8)	652 (100)
Bucklands	37	Nymph Adult	2 (2.7) 24 (13.5)	793 (94.6) 437 (83.8)	5967 (100)	388 (86.5)	879 (91.9)	1293 (100) 990 (97.3)	2528 (100) 5221 (100)	1016 (97.3) 525 (89.2)	76 (29.7)	544 (100)
Bontebok National Park	4	Nymph Adult	0 (0.0) 0 (0.0)	6 (75) 18 (100)	147 (100)	1 (25)	12 (50)	51 (100) 12 (75)	238 (100) 407 (100)	3 (50) 0 (0)	34 (50)	232 (100)
Kruger National Park	119	Nymph Adult	58 (12.6) 227 (18.5)	3014 (87.4) 2370 (82.4)	19462 (97.5)	947 (64.7)	1502 (83.2)	6269 (95.8) 3395 (95.8)	9058 (96.6) 9316 (98.3)	752 (62.2) 560 (58.8)	709 (42)	484 (99.2)

n = Total number of guineafowls examined

in McLachlan & Liversidge (1975). Moreover, all the localities at which guineafowls were shot in the current survey were situated within the OTU boundaries for *N. meleagris coronata* (Crowe 1978).

Although there are some species of lice that are common to the various sub-species of guineafowls in the Ethiopian region, the converse is usually the case (Kéler 1952; Fabiyi 1980; Okaeme 1988). In Nigeria, Fabiyi (1980) and Okaeme (1988) found nine and seven species, respectively, on helmeted guineafowls. In the present study eight species were recovered. With the exception of the birds in the Bontebok National Park, on which *A. desousai* was not found, the birds at each locality were infested with the same eight species. This observation supports the observation of Kéler (1952) that the distribution of Mallophaga is more closely associated with host species than with geographical boundaries.

Avian lice are predominantly feather feeders, although the Amblycera may also feed off host blood, serum and skin debris (Ledger 1980). Consequently, it is conceivable that the characteristics of the plumage may have an influence on the louse populations of different species of birds (Ledger 1980). A primitive bird like the ostrich, which has a uniform and homogenous feather covering, is host to only one louse species, while a bird like the guineafowl, in which the feathering is not homogenous, is host to 14 species (Ledger 1980).

Lice usually occupy different niches on the body, but the validity of classifying them according to their preferred niches as body-, head- or wing-lice has been disputed by Nelson & Murray (1971), after they had made a thorough study of the Mallophaga on domestic pigeons. The various body parts of the guineafowls in the present study were, to a certain extent, examined separately, but the collected material was pooled and, consequently, the preferred sites of the various lice species could not be determined.

Guineafowls are gregarious birds and large flocks are common (McLachlan & Liversidge 1975). It is therefore likely that all birds within a flock will be infested with ectoparasites, such as lice that spread mainly by host contact. The high overall prevalence of infestation in the present study confirms this observation.

The abundance of *A. desousai* was low, but this species is known to occur in small numbers (Ledger 1980). *S. lusius* inhabits the feather shafts and, consequently, the small numbers recovered and the absence of nymphs are probably due to inadequate recovery techniques.

The mean total burdens of lice on the birds in the present study are considerably higher than those reported by Okaeme (1988) as causing clinical disease and even mortality amongst intensively kept guineafowls in Nigeria. None of the birds in the present study

showed any overt signs of distress, confirming the observation made by Okaeme (1988) for free-ranging guineafowls.

In this study lice were present throughout the year, and no pattern of seasonal abundance was evident. In Northern Nigeria Fabiyi (1980) found that major outbreaks of all ectoparasites on guineafowls occurred during the hot and dry period from February to May. Although lice were always present on guineafowls kept under intensive conditions in southern Guinea savanna in Nigeria, the highest prevalence of infestations were recorded from June to August (Okaeme 1988).

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## REFERENCES

- ACOCKS, J.P.H. 1988. *Veld types of South Africa, with accompanying veld type map* (Memoirs of the Botanical Survey of South Africa, no. 57).
- BEDFORD, G.A.H. 1929. Anoplura (Siphunculata and Mallophaga) from South African hosts. *15<sup>th</sup> Report of the Director of Veterinary Research, Union of South Africa*: 501-549.
- CLAY, T. 1938. A revision of the genera and species of Mallophaga occurring on Gallinaceous hosts. Part I. *Lipeurus* and related genera. *Proceedings of the Zoological Society of London* (B-series), 108:109-204.
- CLAY, T. 1940. Genera and species of Mallophaga occurring on Gallinaceous hosts. Part II. *Goniodes*. *Proceedings of the Zoological Society of London* (B-series), 110:1-120.
- CROWE, T.M. 1978. The evolution of guineafowls (Galliformes, Phasianidae, Numidinae) taxonomy, phylogeny, speciation and biography. *Annals of the South African Museum*, 76:43-146.
- EARLÉ, R.A., HORAK, I.G., HUCHZERMEYER, F.W., BENNETT, G.F., BRAACK, L.E.O. & PENZHORN, B.L. 1991. The prevalence of blood parasites in helmeted guineafowls, *Numida meleagris*, in the Kruger National Park. *Onderstepoort Journal of Veterinary Research*, 58:145-147.
- EMERSON, K.C. 1954. Three new African species of *Clayia*. *Proceedings of the Entomological Society of Washington*, 56:203-207.

- FABIYI, J.P. 1980. Arthropod parasites of domestic fowl and guineafowls on the Jos plateau, Northern Nigeria. *Tropical Animal Health and Production*, 12:193–194.
- HORAK, I.G. & WILLIAMS, E.J. 1986. Parasites of domestic and wild animals in South Africa. XVIII. The crowned guinea fowl (*Numida meleagris*), an important host of immature ixodid ticks. *Onderstepoort Journal of Veterinary Research*, 53:119–122.
- HORAK, I.G., SPICKETT, A.M., BRAACK, L.E.O. & WILLIAMS, E.J. 1991. Parasites of domestic and wild animals in South Africa. XXVII. Ticks on helmeted guineafowls in the eastern Cape Province and eastern Transvaal Lowveld. *Onderstepoort Journal of Veterinary Research*, 58:137–143.
- KÉLER, S. VON 1952. Notes on some mallophages from mammals and gallinaceous birds in Mocambique and South Africa. *Mocambique Documentario Trimestral*, 72:17–62.
- KELLOGG, V.H. & PAINE, J.H. 1911. Anoplura and Mallophaga from African hosts. *Bulletin of Entomological Research*, 2: 145–152.
- LEDGER, J.A. 1980. *The arthropod parasites of vertebrates in Africa south of the Sahara. Volume IV. Phthiraptera (Insecta)*. Johannesburg: South African Institute for Medical Research.
- MCLACHLAN, G.R. & LIVERSIDGE, R. 1975. *Roberts Birds of South Africa*. 3rd ed. Cape Town: Cape & Transvaal Printers Ltd.
- NELSON, B.C. & MURRAY, M.D. 1971. The distribution of Mallophaga on the domestic pigeon (*Columba livia*). *International Journal for Parasitology*, 1:21–29.
- OKAEME, A. N. 1988. Ectoparasites of guinea fowl (*Numida meleagris galeata* Pallas) and local domestic chicken (*Gallus gallus*) in southern Guinea savanna, Nigeria. *Veterinary Research Communications*, 12:277–280.
- PENZHORN, B.L., HORAK, I.G., SPICKETT, A.M. & BRAACK, L.E.O. 1991. Morphometrics of helmeted guineafowls from the Kruger National Park. *South African Journal of Wildlife Research*, 21:62–66.