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ECTOPARASITES COLLECTED FROM BOBWHITE QUAIL IN THE SOUTHEASTERN UNITED STATES[1]

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Abstract: Twenty-one species of ectoparasites representing 19 genera were collected from 481 bobwhite quail *(Colinus virginianus)* from nine areas in four southeastern states. Sixteen species, *Amblyomma americanum, Amblyomma maculatum, Haemaphysalis chordeilis, Haemaphysalis leporispalustris, Eutrombicula alfreddugesi alfreddugesi, Neoschoengastia americana, Boydaia colini, Pterolichus* sp., *Colinophilus wilsoni, Megninia* sp., *Apionacarus wilsoni, Colinoptes cubanensis, Menacanthus pricei, Colinicola numidiana, Gonoides ortygis* and *Oxylipeurus clavatus* were previously known from bobwhites, whereas five species, *Ixodes minor, Neotrombicula whartoni, Dermoglyphus* sp., *Microlichus* sp. and *Rivoltasia* sp. (near *coturnicola)* represented new host-parasite associations. Data are presented giving prevalence, geographic location, host age and numbers of quail infested with each species. Significant lesions were not associated with any species.

INTRODUCTION

Previous surveys on ectoparasites of bobwhite quail *(Colinus virginianus)* provide limited information, particularly in the major portion of the bobwhite's range. Some studies involved cursory examinations for larger arthropods,[10] were examinations to recover only certain ectoparasites,[4,9,10] or were conducted outside the primary range of the bobwhite.[1,4,7] The present investigation provides information on the ectoparasite fauna of bobwhites in areas of the Southeast where the bobwhite occurs more abundantly.

MATERIALS AND METHODS

Ectoparasites were collected from bobwhites in conjunction with long-term management and disease studies. Bobwhites collected early in the study (approximately 30-40 birds) were subjected to only a hasty examination, which resulted in finding a few ticks and the larger lice and mites. Later in the study, more emphasis was placed on the collection of ectoparasites, and techniques for their recovery were improved. With experience and refined recovery techniques, a thorough examination took 15-20 min per bird.

Detailed examinations involved collection of the head, all the primary, secondary, and greater covert feathers from one wing, most of the tail feathers, and a sample of at least 15-20 feathers each from the breast, sides, and back. All were examined with the aid of a dissecting microscope (7×-42×). The carcass was examined grossly for mites and ticks. The head was examined by using direct light projected from the top of the dissecting microscope, whereas individual

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feathers were examined by reflecting light from beneath the stage plate. The head was checked for ticks, lice, and mites. The ears were examined for mites and the nares were excised with scissors to facilitate examination for nasal mites.

Each feather collected was examined individually by scanning under the dissecting microscope. The after-shaft on body feathers was pulled away with forceps to disclose lice and mites. The proximal tips of the larger feathers were examined for shaft mites.

Parasites were preserved and stored in 70% ethanol and subsequently were cleared, mounted and identified using standard parasitologic techniques. Specimens from this study have been deposited in: Bernice P. Bishop Museum, Honolulu, Hawaii; British Museum (Natural History), London, England; Department of Biology, University of Northern Iowa, Cedar Falls, Iowa; Department of Entomology, University of Georgia, Athens, Georgia; Field Museum of Natural History, Chicago, Illinois; Florida State Collection of Arthropods, Florida Department of Agriculture and Consumer Services, Gainesville, Florida; and United States National Museum of Natural History, Washington, D.C.

RESULTS AND DISCUSSION

Ectoparasites were collected from 481 birds from nine areas in four southeastern states. Areas, dates, and ages of quail are given in Table 1. The ectoparasites found are listed in Table 2. Included in this table are data relative to prevalence, geographic distribution, host age and numbers of bobwhites infested with each species. In some cases these data represent minimum values for the above criteria due to rather hasty examinations conducted early in the study and due to small numbers of bobwhites examined from some areas. Thorough examination of individual feathers and body parts with the use of a dissecting microscope resulted in finding numerous ectoparasites which otherwise would have been overlooked.

The most commmon groups of ectoparasites encountered were chewing lice and feather mites. One or more species of each was found on bobwhites from seven of the nine areas surveyed and multiple infestations were common. Among the lice, *Oxylipeurus clavatus* infested the greatest number of birds (63%), followed by *Gonoides ortygis* (47%), *Colinicola numidiana* (25%), and *Menacanthus pricei* (13%). The same four species *(Menacanthus* sp. = *M. pricei)* were reported in the same order of frequency in southern Illinois,[1] whereas in east-central Texas *G. ortygis* infested more birds, followed closely by *C. numidiana* and *O. clavatus.*[7] Of the feather mites, *Megninia* sp. (73%) was found more often than *Pterolichus* sp. (67%). This was the same as reported by Bergstrand and Klimstra[1] in southern Illinois *(M. cubitalis* = *Megninia* sp.).

Nasal mites were the next most frequently encountered group of ectoparasites and were identified from five of nine areas. *Colinoptes cubanensis* (43%) was most frequently encountered followed by *Boydaia colini* (26%). In southern Illinois, Bergstrand and Klimstra[1] collected only the latter species at the same rate of infestation.

Shaft mites were found on birds from six areas but were found on slightly fewer birds than nasal mites. Both nasal mites and shaft mites were found with regularity after techniques were devised to detect them readily. One new family (Apionacaridae) and two new genera and species *(Apionacarus wilsoni* and *Colinophilus wilsoni)* of shaft mites were described from specimens found in this study.[2,3,5]

Ticks were not common but were found on birds from five areas. *Haemaphysalis leporispalustris* (7%) was most frequently collected overall. It was also the most common tick observed on quail in southern Illinois,[1] Texas,[4,7] and the

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TABLE 1. Origins and ages of bobwhite quail examined for ectoparasites.

Area Number		Date of Collection	Age Juveniles	Subadults	Adults	Undetermined	Total
	ARKANSAS						
1	Camp Robinson, Pulaski County	July, 1974	-	7	3	-	10
2	Lonoke County	July, 1974	-	6	-	-	6
3	Wattensaw W.M.A., Prairie County	July, 1974	-	2	2	-	4
	FLORIDA						
4	Cecil Webb W.M.A., Charlott County	January, 1974	-	9	1	-	10
5	Corbett W.M.A., Palm Beach County	March, 1969	-	2	3	-	5
6	Tall Timbers Research Station, Leon County	Multiple dates*	45	201	188	7	441
	GEORGIA						
7	Clarke County	September, 1968	-	-	1	-	1
8	Dougherty County	September, 1967	-	-	-	1	1
	SOUTH CAROLINA						
9	Barnwell County	Winter 1963-64	-	-	-	3	3
	TOTALS		45	227	198	11	481

*Each month from March, 1968 to February, 1969; June, 1969; and each February from 1971 to 1975.

TABLE 2. Ectoparasites from 481 Bobwhite Quail *(Colinus virginianus).*

ACARI (ticks & mites)
- Ixodidae (hard ticks)
  - *Amblyomma americanum* (Linnaeus)
    6J(4/45)*, 6S(1/201), 6A(6/188)
  - *Amblyomma maculatum* (Koch)
    4S(1/9), 6S(9/201), 6A(4/188)
  - *Haemaphysalis chordeilis* (Packard)
    4S(4/9)
  - *Haemaphysalis leporispalustris* (Packard)
    2S(1/6), 6J(3/45), 6S(16/201), 6A(10/188), 8U(1/1), 9U(3/3)
  - *Ixodes minor* (Neumann)**
    6S(2/201)
- Trombiculidae (chiggers)
  - *Eutrombicula alfreddugesi alfreddugesi* (Oudemans)
    2S(1/6), 3S(2/2), 3A(2/2)
  - *Neoschoengastia americana* (Hirst)
    2S(4/6), 3S(2/2), 3A(2/2), 6A(1/188), 7A(1/1)
  - *Neotrombicula whartoni* (Ewing)**
    6S(1/201)
- Ereynetidae (nasal mites)
  - *Boydaia colini* (Clark)
    1S(2/7), 3S(1/2), 4S(1/9), 4A(1/1), 5A(2/3), 6J(14/45), 6S(54/201), 6A(48/188), 6U(1/7)
- Pterolichidae (feather mites)
  - *Pterolichus* sp.
    1S(2/7), 2S(3/6), 4S(9/9), 4A(1/1), 5S(2/2), 5A(2/3), 6J(3/45), 6S(172/201), 6A(74/188), 6U(1/7)
- Syringophilidae (shaft mites)
  - *Colinophilus wilsoni* (Kethley)***
    1S(6/7), 1A(3/3), 2S(4/6), 3S(2/2), 3A(2/2), 4S(6/9), 5S(2/2), 5A(1/3), 6S(147/201), 6A(61/188), 6U(61/188)
- Analgidae (feather mites)
  - *Megninia* sp.
    1S(2/7), 2S(3/6), 3S(1/2), 4S(5/9), 4A(1/1), 5S(2/2), 5A(2/3), 6J(33/45), 6S(150/201), 6A(99/188), 6U(2/7), 7A(1/1)
- Dermoglyphidae (shaft mites)
  - *Dermoglyphus* sp.**
    6J(1/45)
- Apionacaridae (shaft mites)
  - *Apionacarus wilsoni* (Gaud & Atyeo)***
    1S(3/7), 1A(1/3), 2S(3/6), 4S(6/9), 6S(19/201), 6A(8/188)
- Epidermoptidae (skin mites)
  - *Microlichus* sp.**
    6J(1/45)
  - *Rivoltasia* sp. (near *coturnicola* Fain)**
    6J(2/45)
- Turbinoptidae (nasal mites)
  - *Colinoptes cubanensis* (Fain)
    4S(1/9), 5A(1/3), 6J(5/45), 6S(118/201), 6A(76/188), 6U(4/7)

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TABLE 2. (continued)

MALLOPHAGA (chewing lice)
Menoponidae
Menacanthus pricei (Wiseman)
6J(11/45), 6S(23/201), 6A(27/188)
Philopteridae
Colinicola numidiana (Denny)
1S(2/7), 1A(1/3), 3A(1/2), 4S(1/9), 6J(21/45), 6S(48/201), 6A(43/188), 6U(2/7)
Gonoides ortygis (Denny)
1S(2/7), 1A(2/3), 2S(4/6), 4S(3/9), 5S(2/2), 5A(1/3), 6J(22/45), 6S(93/201), 6A(92/188), 6U(4/7), 9U(1/3)
Oxylipeurus clavatus (McGregor)
1A(2/3), 2S(4/6), 3A(1/2), 4S(6/9), 4A(1/1), 5S(2/2), 5A(1/3), 6J(29/45), 6S(152/201), 6A(101/188), 6U(4/7), 9U(1/3)

*First number designates area as delineated in Table 1; letters signify age of quail: J = juvenile; S = sub-adult; A = adult; and U = age undetermined. Numbers in parentheses denote number of birds infested/number examined.
**First report of this parasite on bobwhite.
***New genus and species described from specimens from this study.

south Georgia/north Florida region.[10] Chiggers were detected on birds from four areas only during summer months. Chiggers have been reported from bobwhites on several previous occasions.[6,8,10,11]

Skin mites were the rarest group of ectoparasites found. Only three juvenile quail from one area were parasitized. Except for this, there appeared to be no difference in prevalence of infestation by any species of ectoparasite as far as host sex or age was concerned.

The only problems associated with any ectoparasites were superficial lesions at the point of attachment of ticks and small crater-like lesions containing chiggers. Very heavy infestations of shaft mites damaged the internal pulp caps which resulted in the calamus being filled with fine yellowish debris. Although clinical signs associated with the internal structure of feathers often were visible without the aid of magnification, it did not appear to adversely affect the health of bobwhites.

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