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HELMINTHS AND ECTOPARASITES OF THE COMMON SNIPE *(Capella gallinago L.)* FROM SOUTHWEST TEXAS AND MONTE VISTA NATIONAL WILDLIFE REFUGE, COLORADO.

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Abstract: Sixty common snipe, *(Capella gallinago),* collected from Hudspeth County, Texas and 13 collected from Monte Vista National Wildlife Refuge, Colorado were examined for metazoan parasites. The parasites recovered were Cestoda: *Amoebotaenia fuhrmanni, Haploparaxis brachyphallos, Haploparaxis crassirostris, Haploparaxis echinovatum, Haploparaxis* sp., *Hymenolepis calumnacantha, Hymenolepis* sp. I, *Hymenolepis* sp. II; Trematoda: *Cyclocoelum mutabile, Echinostoma revolutum, Tanaisia fedtschenkoi;* Nematoda: *Capillaria contorta, Cosmocephalus capellae, Tetrameres coloradensis;* Acanthocephala: *Arhythmorhynchus capellae;* Mallophaga: *Austromenopon durisetosum* and *Rhynonirmus scolopacis.*

More species of parasites were recovered from fall migrants; (12), than from spring migrants, (10).

The cestode *Haploparaxis echinovatum* was recorded from North America for the first time.

The parasite fauna recorded in this study did show some concentration for dominance by Simpson's index (0.33). This parasite fauna was most similar to that reported by Schmidt from snipe collected in Northern Colorado (67%).

INTRODUCTION

Investigations on the parasites of the common snipe, *(Capella gallinago),* in North America are limited. Deblock and Rausch[4] described several species of *Haploparaxis* from snipe in Alaska, and Schmidt[8,9,10,11] described species of *Hymenolepis, Tetrameres,* and *Arhythmorhynchus,* from snipe collected in Northern Colorado. Threlfall[15] examined common snipe from Newfoundland, Ontario, and Louisiana for parasites and noted differences in geographical distribution of the parasites and reported on their prevalence. Tuck[17] lists species of parasites, geographic location (Palearctic and Nearctic), and abbreviated citations in his monograph *The Snipes.*

The common snipe is a migratory shore bird who occupies wetland habitats and is considered an excellent game and table bird. According to Fogarty and Deith[5] the bird, "is distributed throughout almost the whole North American continent, from Point Hope, Alaska, on the Arctic Ocean, south to Brownsville, Texas, on the Gulf Coast, and through most of central and eastern Mexico, all of Central America and the Northern part of South America in Columbia and Venezuela." *Capella gallinago* is a common migrant in the Southwest and utilizes the Rio Grande Valley on its annual migrations. The migration from the breeding grounds begins in September and early October. The migration from the wintering grounds begins in April and extends to about the middle of May.[7]

The Monte Vista National Wildlife Refuge, Colorado, located in the San Juan Basin near the upper reaches of the

Rio Grande, hosts both migratory and nesting common snipe.

The purpose of this paper is to report on the species and prevalence of parasites harbored by the common snipe collected in the Rio Grande Valley in Hudspeth County, Texas in the fall and spring and at Monte Vista National Wildlife Refuge, Colorado in August. The geographic distribution of parasites reported in this study and by others is summarized.

METHODS AND MATERIALS

Seventy-three common snipe were examined for metazoan parasites. Sixty were collected from the Rio Grande Valley, Hudspeth County, Texas in the fall of 1976 and 1977 and the spring of 1976, 1977, and 1978. Thirteen were collected from Monte Vista National Wildlife Refuge, Rio Grande County, Colorado in August, 1978. Birds were shot and placed in individual plastic bags. Those not examined within six h were frozen and examined at a later date. All birds were classified as adults because juveniles and adults could not be distinguished. Sex was determined by examination of the gonads. The birds were not examined for blood parasites.

Trematodes and cestodes were fixed in alcohol-formalin-acetic acid (AFA), stained in Ehrlich's hematoxylin and mounted in Canada balsam. Nematodes were fixed in 70% ethanol and cleared and examined in temporary lactophenol mounts. Acanthocephalids were fixed in AFA, stained in Van Cleave's hematoxylin and mounted in Permount. Ectoparasites were fixed in 70% ethanol, cleared in 10% KOH and mounted in polyvinyl alcohol or in Lipshaw's mounting media.

Differences between numbers of a species of a parasite harbored by fall and spring migrants were analyzed by applying the Chi-square test without an *a priori* hypothesis and utilizing the Yates correction factor. Significance was assumed for $P < .05$. Mean intensity ratios (MIR) were calculated by using the smaller mean intensity from fall or spring as the denominator. In some cases statistical analysis was not done because the number of parasites or their distribution was not appropriate.

Simpson's index was calculated to measure the concentration for dominance of parasite species in snipe collected in Hudspeth County, Texas and Sorenson's index of similarity was used to compare parasite faunas from Southwest Texas to other areas in North America, as used by Stone and Pence.[13]

Two terms proposed by Canaris *et al.*[2] are used in this manuscript. They are: Parasite Geographic Range (PGR) = the total region that a parasite is transported by the migratory bird host. Parasite Infective Geographic Range (PIGR) = total region where infection of the migratory bird host is known to take place. The Parasite Geographic Range is equal to or greater than the Parasite Infective Geographic Range (PGR $\geq$ PIGR).

Representative slides of parasites have been sent to Dr. Malcom E. McDonald, National Fish and Wildlife Health Laboratory. Fish and Wildlife Service, 1655 Linden Drive, Madison, Wisconsin 53706. Others have been retained in the Zoonoses Laboratory, Dept. Bio. Sci. University of Texas at El Paso, El Paso, Texas 79968.

RESULTS AND DISCUSSION

Eighty three percent of the snipe from Hudspeth County were infected with at least one species of parasite. Fourteen species of helminths and two species of mallophagan lice were recovered (Table 1). Six species of helminths were recorded from fall migrants, four from spring, and four species were ubiquitous.

Twenty-three percent of the birds were infested with lice. *Austromenopon durisetosum* and *Rhynonirmus scolopacis* were present on spring and fall migrants from Hudspeth County,

TABLE 1. Parasites on the common snipe *(Capella gallinago)* from Hudspeth County, Texas.

	FALL (27)		SPRING (33)		TOTAL (60)			
	Number and % Infected		Number and % Infected		Number and % Infected		Mean Intensity & Range	
CESTODA (7)								
Amoebotaenia fuhrmanni	2	7.4	4	12	6	10.0	7.3	1-33
Haploparaxis brachyphallos	3	11.1	0	0	3	5.0	34.3	1-33
Haploparaxis crassirostris	1	3.7	0	0	1	1.6	20.0	20
Haploparaxis echinovatum	0	0	3	9	3	5.0	2.7	1-5
Haploparaxis sp.	3	11.1	8	24	11	18.3	3.6	1-7
Hymenolepis calumnacantha	3	11.1	0	0	3	5.0	6.7	6-7
Hymenolepis sp. I	0	0	4	12	4	6.6	10.5	1-15
TREMATODA (3)								
Cyclocoelum mutabile	1	3.7	0	0	1	1.6	1.0	1
Echinostoma revolutum	0	0	1	3	1	1.6	2.0	2
Tanaisia fedtschenkoi	7	25.9	9	27	16	26.6	7.1	1-56
NEMATODA (3)								
Capillaria contorta	1	3.7	0	0	1	1.6	2.0	2
Cosmocephalus capellae	1	3.7	0	0	1	1.6	12.0	12
Tetrameres coloradensis	9	33.3	6	18	15	25.0	21.5	1-185
ACANTHOCEPHALA (1)								
Arhythmorhynchus capellae	0	0	2	6	2	3.3	1.0	1
MALLOPHAGA (2)								
Austromenopon durisetosum	5	18.5	4	12	9	15.0	2.2	1-9
Rhynonirmus scolopacis	5	18.5	3	9	8	13.3	3.0	1-10

TABLE 2. Parasites of the common snipe *(Capella gallinago)* from Monte Vista National Wildlife Refuge, Rio Grande County, Colorado.

	August 1978 (13)			
	Number and % Infected		Mean Intensity and Range	
CESTODA				
Hymenolepis sp. II	4	30.8	3.25	1-10
TREMATODA				
Tanaisia fedtschenkoi	1	7.7	16.0	16
MALLOPHAGA				
Austromenopon durisetosum	2	15.4	3.0	5
Rhynonirmus scolopacis	2	15.4	4.0	4

Texas and on birds collected in August from Monte Vista National Wildlife Refuge in southern Colorado. There was no significant difference in infestation between spring and fall birds.

Only two species of helminths, *Tanaisia fedtschenkoi* and *Hymenolepis* sp. II, and two species of lice were recovered from birds collected in Colorado. The percent of infected birds (62%) was not as great as those from Hudspeth County, 83% (Table 2).

The cestode, *Haploparaxis echinovatum,* is recorded for the first time from North America.

The mean intensities for the five major groups of parasites and their MIR's are given in Table 3. The mean intensities for the cestodes, nematodes and mallophaga was greater in fall birds. The mean intensities for the trematodes was strongly influenced by the number of kidney trematodes, *T. fedtschenkoi.* This parasite's PIGR may be more southerly and as a consequence would infect more of the spring migrants.

A checklist of helminth parasites reported for *C. gallinago* is given in Table 4. Of the 44 species of helminths recorded for the common snipe in North America, 15 species were recorded from snipe in this study.

The parasite fauna recorded here for the common snipe did show some concentration for dominance by Simpson's index (0.33). Most of the dominance was contributed by the nematode *Tetrameres coloradensis.* This fauna was most similar to that reported by Schmidt[11] from snipe collected in northern Colorado. The rank order for similarity among five regions in North America is given in Table 5. The greatest similarity for all regions is to Louisiana and the least is to Northern Colorado.

Cestoda. As a group, the prevalence and, in most instances, the mean intensities were highest for the cestodes. Three

TABLE 3. Mean intensity for parasite groups, fall and spring, common snipe, Hudspeth County, Texas.

	FALL (27)	SPRING (33)	M.I.R.
CESTODA	7.3	1.8	4.1
TREMATODA	3.6	5.4	1.5
NEMATODA	11.7	0.6	19.5
ACANTHOCEPHALA	0.0	0.06	0.0
MALLOPHAGA	1.0	0.6	1.6

TABLE 4. Checklist of helminth parasites of *Capella gallinago* from North America.

	Threlfall[15] Newfoundland Ontario Louisiana	Threlfall[16] USA Canada	Schmidt[11] Colorado	Byrd & Denton[1] Texas Georgia	Deblock & Rausch[4] Alaska	This Study S.W. Texas Colorado
CESTODA (24)	1.2.3.	4.5.	6.	7.8.	9.	10.11.
Amoebotaenia fuhrmanni	1. 3.		6.			10.
Amoebotaenia sp.	1. 3.					
Anomotaenia citrus	1.2.3.					
Anomataenia variabilis		4.				
Anomataenia sp.	1. 3.					
Choanotaenia cingulifera	3.					
Choanotaenia manipurensis		4.				
Diorchis sp.	1. 3.					
Haploparaxis brachyphallos					9.	10.
Haploparaxis clerci			6.			
Haploparaxis crassirostris	1.2.3.					10.
Haploparaxis echinotatum						10.
Haploparaxis filum	1.2.3.					
Haploparaxis parafilum					9.	
Haploparaxis penetrans	2.					
Haploparaxis sp.	1.2.3.					10.
Hymenolepis calumnacantha			6.			10.
Hymenolepis capellae	1. 3.					
Hymenolepis sp.	1.		6.			10.11.
Paricterotaenia decacantha			6.			
Paricterotaenia paradoxa		4.5.				
Paricterotaenia stellifera		4.				
Paricterotaenia sp.	1.2.3.					
Profimbriaria multicanalis		4.				
TREMATODA (16)	1.2.3.	4.5.	6.	7.8.	9.	10.11.
Cotylurus brevis		4.				
Cotylurus cornutus	1.	4.				
Cotylurus leidyi	1.					
Cyclocoelum mutabile	1. 3.		6.			10.
Cyclocoelum obscurum		4.				
Cyclocoelum sp.		5.				
Echinostoma operosum		4.				
Echinostoma revolutum	1. 3.	5.	6.			10.
Hypoderaeum sp.		4.				
Pulvinifer macrostomum	1. 3.	5.				
Pulvinifer singularis			6.			
Tanaisia fedtschenkoi			6.	7.8.		10.11.
Tanaisia sp.		4.				
Wardianum wilsoni		4.				
Zygocotyle lunata		4.				

TABLE 4. (continued)

	Threlfall[15] Newfoundland Ontario Louisiana	Threlfall[16] USA Canada	Schmidt[11] Colorado	Byrd & Denton[1] Texas Georgia	Deblock & Rausch[4] Alaska	This Study S.W. Texas Colorado
Dicrocoeliids unidentified	1.					
NEMATODA (3)						
Capillaria contorta	3.		6.			10.
Cosmocephalus capellae	2.3.		6.			10.
Tetrameres coloradensis			6.			10.
ACANTHOCEPHALA (1)						
Arhythmorhynchus capellae			6.			10.

species were present in fall migrants, two in spring migrants and one was ubiquitous (Table 1). There was no significant difference for species of cestodes between fall and spring birds.

Ten percent of the snipe were infected with *Amoebotaenia fuhrmanni*. Schmidt[11] reported *A. fuhrmanni* from birds collected in northern Colorado. Threlfall[15] reported it in 8.2% of 24 snipe from Newfoundland and 16% of 268 snipe from Louisiana, but he did not observe this tapeworm in snipe from Ontario. The PGR and PIGR appears to be extensive.

Haploparaxis echinovatum was present in 3% of the snipe. Deblock and Rausch[4] recovered and described this species from snipe, *(C. gallinago)*, collected in Iran. *H. echinovatum* is recorded for the first time from North America. The PIGR may be more southerly since it was absent in birds collected in August from Monte Vista National Wildlife Refuge, Colorado and from all fall migrants.

Five percent of the snipe were infected with *Haploparaxis brachyphallos*. This parasite was reported by Deblock and Rausch[4] from the common snipe, *(C. gallinago)*, collected near Anchorage, Alaska and by Webster[18] from the red-backed sandpiper, *(Erolia alpina pacifica)*, from southeastern Alaska. This parasite was not recorded from spring migrants or from birds collected in August in southern Colorado. Schmidt[11] did not report this parasite

TABLE 5. Rank order of similarity-helminths, common snipe, North America.

Louisiana	Newfoundland	S.W. Texas	Ontario	Northern Colorado
NF 83	LA 83	NCO 67	LA 60	SWT 67
ONT 60	ONT 56	LA 48	NF 56	LA 40
SWT 48	SWT 35	NF 35	SWT 21	NF 26
NCO 40	NCO 26	ONT 21	NCO 11	ONT 11
Σ = 231	200	171	148	144
$\bar{x}$ = 58	50	43	37	36

from the common snipe, *(C. gallinago),* collected in northern Colorado. It is not clear how much of his material came from fall migrants. The PIGR based on the above, may be more northerly.

Only one snipe was infected with *Haploparaxis crassirostris* = *(Aploparaksis rauschi* Webster). It was a fall migrant and a total of 20 specimens were recovered from the small intestine. Threlfall[15] reported a prevalence of 1.8% in Louisiana, 10.5% in Ontario, and 12.3% in Newfoundland for this parasite. Webster[18] recovered this species of tapeworm from the redbacked sandpiper, *E. a. pacifica,* in the Stikine River flats near Wrangel, southeastern Alaska. The absence of this parasite from spring migrants in this study and the low prevalence in Louisiana as reported by Threlfall[15] indicate that the PIGR is perhaps more northerly.

Schmidt[10] described *Hymenolepis calumnacantha* from 27 specimens recovered from the small intestine and caeca of snipe collected in northern Colorado. In this study *H. calumnacantha* infected 5% of the snipe. The PIGR may be more northerly since it was not present in spring migrants or in birds collected at Monte Vista National Wildlife Refuge in southern Colorado.

Hymenolepis sp. I was recovered only from spring migrants. Species identification was not possible because specimens were in poor condition. *Hymenolepis* sp. I resembled *Hymenolepis deblocki* described by Schmidt and Neiland[12] from the short-billed dowitcher, *Limnodromus griseus,* collected near Bristol Bay, Alaska. The main difference between *Hymenolepis* sp. I and *H. deblocki* was the hooks. *Hymenolepis* sp. I had 10 hooks, each 80 μm long arranged in a circle. A guard, a long blade and long handle with a small knob on the end were present. *H. deblocki* had 10 hooks averaging 100-102 μm, arranged in a circle, with the guard almost absent, and a long blade and long handle with a knob on the end present. The PGR is at least from Alaska to southwest Texas.

Hymenolepis sp. II was recovered from snipe collected in southern Colorado (Table 2). Four birds were infected with the cestode. Not enough material was obtained for an identification of the species.

Trematoda. Three species of trematodes were recorded and are listed in Table 1. *Tanaisia fedtschenkoi* is parasitic in the genito-urinary tract of aquatic and semiaquatic birds. This parasite was common in both fall and spring migrants including birds from Monte Vista National Wildlife Refuge, Colorado (Table 2). There was no significant difference in prevalence between fall and spring migrants but spring migrant's mean intensity was 20 and fall was 14 with an MIR of 1.4. Schmidt[11] reported this trematode from *C. gallinago* collected in northern Colorado and Byrd and Denton[1] recorded it for *Capella delicata* (= *C. gallinago)* from Texas and Georgia. Cheatum[3] described *Tanaisia pelidnae,* from a red-backed sandpiper, *E. a. sakhalina,* collected near Caseville, Michigan. This parasite was synonymized with *T. fedtschenkoi* by Byrd and Denton.[1] The PGR is extensive and it has been recorded from the orders Passeriformes, Gruiformes, and Charadriiformes from Russia, Turkestan, Siberia and Macedonia.

Cyclocoelum mutabile was found in the thoracic cavity of one fall migrant and only one parasite was recovered. Schmidt[11] reported it from *C. gallinago* collected in northern Colorado and Threlfall[15] recorded prevalences of 7.3% from Newfoundland and 19% from Louisiana. The PGR appears to be extensive.

Two specimens of *Echinostoma revolutum* were recorded from one spring migrant. This parasite was also recorded by Schmidt[11] from northern Colorado and by Threlfall[15] from Newfoundland and Louisiana with a 7.3% and 10.8% prevalence respectively. The PGR and

the number of different hosts for this parasite are known to be extensive. The reason for the very low prevalence recorded in this study is not known.

Nematoda. Three species of nematodes were recovered, all from the proventriculus (Table 1). *Cosmocephalus capellae* and *Capillaria contorta* were reported by Schmidt[11] from northern Colorado. Threlfall[15] noted a prevalence of 42.1% from Ontario and 0.3% from Louisiana for *C. capellae*. The prevalence for *C. contorta* was 1.4% and was reported only from Louisiana. In another study Threlfall[14] examined two snipe from Newfoundland and found a single infection of *C. contorta*. There was no significant difference between fall and spring migrants for these two species of nematodes. The low prevalence of these two species in Texas and Louisiana suggest that the PIGR may be more northerly.

Tetrameres coloradensis was a ubiquitous parasite and there was no significant difference in prevalence between fall and spring migrants, but fall migrant's mean intensity was 33 and spring migrant's was 3.5. This yielded an MIR of 9.4. Schmidt[8] described this species of parasite from *C. gallinago* collected in northern Colorado. Its PGR, as it is presently understood, appears to be from northern Colorado, southward. Its PIGR may be confined to northern Colorado or further north. Evidence that supports this is the apparent loss of nematodes in returning spring migrants, fall migrants with both female and male nematodes present but spring migrants with single sex infections, spring migrants with a lower mean intensity than fall migrants, and the fact that the parasite was not recorded from snipe collected from Monte Vista National Wildlife Refuge in southern Colorado.

Acanthocephala. During the spring of 1976 and 1978, single infections of *Arhythmorhynchus jeffreyi* (Schmidt 1963) Schmidt 1973, were recorded from two spring migrants. Schmidt[9] recovered and described this species from six snipe collected in northern Colorado. This parasite has not been reported from other geographic areas or from other hosts. Its PGR extends from northern Colorado to southwest Texas and since it was in returning spring migrants its PGR may extend further south. This parasite was not recovered from birds collected at Monte Vista National Wildlife Refuge in southern Colorado. Therefore, its PGR may be more northerly.

Mallophaga. Two species of Mallophaga, *Austromenopon durisetosum* and *Rhynonirmus scolopacis* infested the common snipe, Table 1. There was no significant difference in prevalence for either species between spring and fall migrants. The mean intensity for *A. durisetosum* was greater for spring migrants with an MIR of 2.4. The mean intensity for *R. scolopacis* was greater in the fall with an MIR of 3.1. Geist[6] reported a prevalence of 50% for Mallophaga from charadriiform birds collected in Ohio. He observed a decline in adult Mallophaga during late summer and early fall with few or no adults observed during the winter months, and an increase of adults during the late spring and early summer. The prevalence for Mallophaga in this study was lower, 23.2%, but the population trend was generally similar to that reported by Geist.

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