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Source: Journal of Wildlife Diseases, 13(4) : 435-439

Published By: Wildlife Disease Association

URL: <https://doi.org/10.7589/0090-3558-13.4.435>

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## PARASITES OF WATERFOWL FROM SOUTHWEST TEXAS:

### II. THE SHOVELER, *Anas clypeata*

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**Abstract:** Thirty-eight shoveler ducks, *Anas clypeata*, were collected in the Rio Grande Valley, Hudspeth County, Texas. Nineteen species of helminths, six species of lice and a sarcosporidian, *Sarcocystis rileyi*, were recorded. Seventeen of the nineteen species of helminths were observed in fall migrants and twelve species were recorded from spring migrants. The nematode *Alifilaria pochardi* Ali, 1969, is a new host and American record.

#### INTRODUCTION

Little is known about the parasites harbored by waterfowl from the southwestern part of the United States. A study was undertaken to determine the helminth and ectoparasite fauna of selected waterfowl as they migrate southward to their wintering grounds in the fall and northward to their breeding grounds in the spring.

This paper presents information about the parasites recovered from the shoveler *Anas clypeata* and compares our observations on geographic distribution of parasites in fall and spring migrants to those made by Buscher<sup>1</sup> and others.<sup>2,3,4,6</sup>

#### MATERIALS AND METHODS

Thirty-eight shoveler ducks, *A. clypeata*, were collected in the Rio Grande Valley, Hudspeth County, Texas. Twenty were fall migrants collected in December, 1974 and January, 1975 and eighteen were spring migrants collected in April, May and June, 1975. Ducks were shot then were placed in plastic bags and on ice. Those that could not be examined within six h. were frozen and examined later. Examination for blood parasites was not done.

Trematodes, cestodes, and acanthocephalans were fixed in Alcohol-Formalin-Acetic Acid, stained in Harris' hematoxylin, and mounted in Canada balsam.

Nematodes and ectoparasites were preserved in 70% ethanol and mounted in lactophenol and Hoyer's, respectively.

Differences between numbers of a species of parasite harbored by fall and spring migrants were analyzed by applying the chi square test without an a priori hypothesis. Significance was assumed for  $P < (0.05)$ . In some cases statistical analysis was not done because the numbers of parasites or their distribution was not appropriate.

#### RESULTS AND DISCUSSION

Nineteen species of helminth parasites, six species of lice, and one species of sarcosporidian, *Sarcocystis rileyi*, were recorded. Seventeen of the nineteen species of helminths were observed in fall migrants and twelve species were recorded for spring migrants.

Buscher,<sup>1</sup> in a study of the dynamics of the helminth parasites of three species of ducks utilizing the eastern portion of the Central Flyway, collected ducks in Manitoba, Kansas, and Galveston County, Texas. He recorded 17 helminth species from the shoveler, only seven of which were identical to the species recorded in this study. Buscher also attempted to determine geographic ranges for helminth parasites by noting their presence or absence in migrating ducks obtained at different times and locations.

TABLE 1. Helminths and ectoparasites of the shoveler, *Anas clypeata*, from southwest Texas.

	FALL (20)		SPRING (18)		TOTAL (38)		Range of Infections
	Number and % Infected	Number and % Infected	Number and % Infected	Number and % Infected			
<b>TREMATODA (7)</b>							
** <i>Notocotylus attenuatus</i>	11	55	3	17	14	37	1-275
<i>Trichobilharzia</i> sp.	3	15	2	11	4	13	1-3
<i>Echinoparyphium recurvatum</i>	3	15	—	—	3	8	7
<i>Echinostoma revolutum</i>	3	15	—	—	3	8	1-6
<i>Dendrobilharzia pulverulenta</i>	1	5	—	—	1	3	1
<i>Typhlocoelum cucumerinum</i>	—	—	1	6	1	3	3
<i>Zygocotyle lunata</i>	—	—	1	6	1	3	3
<b>CESTODA (8)</b>							
<i>Diorchis nyrocae</i>	20	100	18	100	38	100	15-100+
<i>Cloacotaenia megalops</i>	6	30	11	61	17	45	1-9
** <i>Gastrotaenia cygni</i>	2	10	12	67	14	37	3-21
<i>Diorchis americana</i>	3	15	5	27	8	21	20-100
<i>Diorchis spinata</i>	2	10	—	—	2	5	6-35
<i>Echinocotyle rosseteri</i>	1	5	1	6	2	5	2-5
<i>Microsomacanthus hopkinsi</i>	1	5	1	6	2	5	2-10
<i>Sobolevicanthus filumiferens</i>	1	5	—	—	1	3	4
<b>ACANTHOCEPHALA (1)</b>							
<i>Polymorphous</i> sp.	1	5	—	—	1	3	1

TABLE 1 (continued)

	FALL (20)		SPRING (18)		TOTAL (38)		Range of Infections
	Number and % Infected	Number and % Infected	Number and % Infected	Number and % Infected	Number and % Infected	Number and % Infected	
<b>NEMATODA (3)</b>							
<i>Amidostomum acutum</i>	5	25	9	45	14	37	1-20
<i>Tetrameres crami</i>	1	5	2	11	3	8	1-11
* <i>Altilaria pochardi</i>	1	5	—	—	1	3	2
<b>SARCOSPORIDIA (1)</b>							
<i>Sarcocystis rileyi</i>	2	10	—	—	2	5	Heavy inf. of breast muscles.
<b>MALLOPHAGA (6)</b>							
** <i>Trinoton querquedulae</i>	6	30	16	89	32	84	1-8
<i>Anaticola crassicornis</i>	5	25	10	56	15	39	2-13
** <i>Holomenopon setigerum</i>	2	10	9	50	11	29	2-4
<i>Anatoecus icterodes</i>	—	—	5	28	5	13	1-5
<i>Anatoecus dentatus</i>	—	—	3	17	3	8	1-6
<i>Holomenopon clypeilargum</i>	—	—	3	17	3	8	1-3

\* New host and American record.

\*\* Significance assumed for  $P < (0.05)$  between fall and spring species of parasites.

The following comments pertain to comparison of his results with ours.

Buscher noted *Echinostoma revolutum* and *Notocotylus attenuatus* were recorded from shovelers on the wintering area in Texas and in birds arriving on the breeding area in Manitoba. Our data supports his for the trematode *N. attenuatus* but we found only the fall migrants infected with *E. revolutum*.

*Amidostomum* sp., a gizzard roundworm, was not reported by Buscher from shovelers wintering in Galveston County, Texas nor in birds collected in April and May in Manitoba. He did observe this worm in 22 to 50% of the shovelers collected in Manitoba during June, July, and August and in 4% of those collected in Kansas. Our findings indicate this species was present in both fall and spring migrants in Southwest Texas. This parasite, therefore, may be remaining with the shoveler much longer than anticipated, or it has a wider infective geographic range.

Buscher categorized the cestode *Cloacotaenia megalops* as being present in ducks on the wintering grounds and in those arriving at the breeding area. He suggested it was one of the species possibly carried over from the wintering area to the breeding area. This implies that the infective geographic range was possibly more southerly. We found no significant difference in numbers between spring and fall migrants for this cestode. Juvenile northern cinnamon teal, *Anas cyanoptera*, collected during fall migration in Hudspeth County, Texas, also were infected with *C. megalops*.<sup>5</sup> It was not determined if this species of teal was becoming infected while on the more northerly breeding areas or as they moved southward in their fall migration. Therefore, it is not known at this time whether the infective geographic range of *C. megalops* is more extensive or more southerly.

*Diorchis nyrocae* was postulated by Buscher to be obtained in the breeding area and perhaps in the wintering area, but lost during the spring migration as they returned to their breeding area. We

found *D. nyrocae* in all spring and fall migrants. Either its infective geographic range is extensive or it is capable of remaining with its host for a protracted time.

Our findings for the cestodes *Sobolevicanthus filumferens* and *Echinocotyle rosseteri* are not sufficient to make comparisons with Buscher's data.

*Gastrotaenia cygni* is a small, externally unsegmented tapeworm, that occurs beneath the ventricular cuticle in waterfowl. Buscher did not report this tapeworm in his study. Willers and Olsen<sup>6</sup> reported a 48% infection for this cestode in shovelers collected in Larimer and Weld Counties, Colorado. Their sample of ducks apparently included spring and fall migrants but the data about this cestode was pooled. We found this parasite to be more common in spring migrants. The geographic range appears, therefore, to extend into the wintering area. This cestode's infective geographic range may also be more southerly.

The nematode *Alifilaria pochardi* Ali, 1969, is a new host and an American record. All other species of helminths observed in this study have been reported as parasites of the shoveler.<sup>3</sup>

*Sarcocystis rileyi*, whose life cycle is not completely understood, was recorded twice. There is some indication that this parasite is more common in the shoveler than in other ducks.<sup>2</sup>

Our findings indicate that the geographic range for the six species of mallophaga has been extended to the wintering area for the shoveler. Two species of lice, *Trinoton querquedulae* and *Holomenopon setigerum* appear more frequently on spring migrating shovelers.

Examination of juvenile ducks, as in the study by Turner and Threlfall,<sup>4</sup> is very important for establishing what parasites are capable of infecting ducks in the breeding areas. This type of data combined with parasite surveys along the migratory routes is needed to determine the geographic range, infective geographic range, and total dynamics of parasites of waterfowl in North America.

**Acknowledgments**

We wish to thank Dr. Malcolm E. McDonald for his assistance in identification of helminth parasites, Drs. K. C. Emerson and R. D. Price for their assistance with identification of the Mallophaga, and Mr. Richard Rosen, El Paso, Texas rancher for his interest in the project.

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*Received for publication 4 April 1977*

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