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George M. Talley
Brigham Young University - Provo

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THE INCIDENCE OF NASAL MITES IN OVER-WINTERING RED-WING
BLACKBIRDS IN THE VICINITY OF UTAH LAKE, UTAH

A Thesis
Submitted to the
Department of Zoology and Entomology
of the
Brigham Young University
Provo, Utah

In Partial Fulfillment
of the Requirements for the Degree
Master of Science

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by
George M. Talley

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This thesis by George M. Talley is accepted in its present form by the Department of Zoology and Entomology, Brigham Young University, as satisfying the thesis requirement for the degree of Master of Science.

Date _____

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INTRODUCTION

All known species of mites belonging to the family Rhinonyssidae are parasitic in the nasal cavities of birds, whereas those of the family Speleognathidae are predaceous on other mites. Apparently because of their small size and cryptic habitat, they have been overlooked by most acarologists. Berlese and Trouessart (1889) were the first to describe nasal mites. Trouessart (1894, 1895) published on nasal mites and proposed a new subfamily, Rhinonyssinae, which has since been revised and given family status by de Castro (1948). Other European acarologists, such as Hirst (1921), Vitzthum (1935) and Cooreman (1946), contributed to our early knowledge of these mites.

In North America, Strandtmann (1948) was the first to publish on nasal mites. In succeeding papers (Strandtmann 1951, 1952, 1956^a and 1956^b), he reported nasal mites from gulls, owls, the horned lark, and a variety of shore and marsh birds including ducks and geese collected in New York, Texas, California and Utah. Crossley (1950, 1952) described two new species of nasal mites from the mourning dove and domestic pigeon from Texas. Porter and Strandtmann (1952) conducted a survey of the nasal mites of the English sparrow in Texas. Strandtmann and Furman (1956) listed a new species of nasal mite from the meadowlark, bronzed grackle, western tanager, cowbird, tricolored red-wing blackbird, common red-wing blackbird, and the Brewer's blackbird from Texas and California. Furman (1957) published a revision of the mite genus Sternostoma in which he listed records

from a variety of birds, including the common red-wing. As far as can be determined, these reports of Strandtmann and Furman include the only published records of nasal mites from blackbirds.

The purpose of the study reported in this paper was to obtain additional data on the incidence and inter-relationships of nasal mites in the over-wintering male, common red-wing blackbird (Agelaius phoeniceus ssp.) in the vicinity of Provo, Utah County, Utah. Limited comparative data on the immature male and female red-wing and the male and female Brewer's blackbirds (Euphagus cyanocephalus cyanocephalus Wagler) are also included.

METHODS AND TECHNIQUES

Birds were collected at two-week intervals from October 26, 1956, to March 31, 1957 from the farmlands and lakeshore north of Provo Bay on the eastern side of Utah Lake, Utah County, Utah. Although no specific time of day was chosen, the roosting and feeding habits of the birds made collecting easier in early morning or late afternoon. Birds were collected with either a twelve or .410 guage shotgun. Each bird was placed in a separate paper sack immediately after retrieving it, and the top of each sack was sealed to minimize the chances of cross-contamination between birds.

In the laboratory each bird was examined in the following manner. The nasal sinus was exposed by skinning the feathers of the forehead back to the inside corners of the eyes. The upper bill was then pushed to one side and twisted downward, breaking open the nasal sinus. This method usually exposed the nasal cavities intact. A dissecting microscope was used to examine the open nasal sinus for mites. After the initial examination, the cavity was further dissected by cutting the upper bill free from the bird. The contents of the nasal sinus of the skull and the upper bill were placed in a syracuse watch glass filled with 70 % ethyl alcohol and further examined under the dissecting microscope. All mites were stored in 70 % ethyl alcohol until they were mounted on glass slides in polyvinyl alcohol or Hoyer's solution.

RESULTS

Thirty adult male, 9 yearling male, and 7 adult female red-wing blackbirds were collected. Of these numbers, 12 adult males (40 %), 5 yearling males (55 %), and 1 adult female (14 %) were found infested with nasal mites. Twenty-one adult male and 7 adult female Brewer's blackbirds were also collected. Of these, 13 males (61.9 %) and 4 females (57 %) were found infested. Table I shows the species, numbers and associations of mites in the infested birds.

Mites in Adult Male Red-wing Blackbirds

In adult male red-wing blackbirds, the following species of mites were found: Paraneonyssus icteridius: 14 males, 60 females, and 1 larva; Sternostoma n. sp. "A": 17 males, 88 females (3 gravid, each with 1 larva), 4 nymphs, and 1 larva; Ptilonyssus n. sp. "A": 1 female; Speleognathus sp.¹: 3 adults (sex unknown). The largest number of mites found in any one of the adult male birds was 92, the least 1, and the average 13.

P. icteridius was the only species found in eight of twelve infested birds and comprised 41.8 % of the total mite population. In one bird, P. icteridius was associated with Sternostoma n. sp. "A" and with Ptilonyssus n. sp. "A" in one other bird. Sternostoma n. sp. "A" comprised 55.8 % of the total mite population, although it was found in only

¹In a letter to the writer dated February 25, 1957, R. W. Strandtmann tentatively identified this mite only to genus because of the unsettled taxonomic status of this group.

TABLE 1

NUMBERS OF BLACKBIRDS INFESTED BY SOLITARY OR ASSOCIATED SPECIES OF NASAL MITES

Mite Species and Associations ^a	Common Red-wing Blackbird			Brewer's Blackbird	
	Adult Male	Immature Male	Adult Female	Adult Male	Adult Female
<u>P. icteridius</u>	8(41.8%) ^b	4(85.7%)	1(100%)	4(41%)	1(24%)
<u>Ptilonyssus</u> n. sp. "A"				2(30%)	2(75%)
<u>Sternostoma</u> n. sp. "A"	1(55.8%)				
<u>Speleognathus</u> sp.	1(1.7%)			1	
<u>P. icteridius</u> <u>Ptilonyssus</u> n. sp. "A"	1	1		1	
<u>P. icteridius</u> <u>Sternostoma</u> n. sp. "A"	1				
<u>P. icteridius</u> <u>Speleognathus</u> sp.				1	
<u>Ptilonyssus</u> n. sp. "A" <u>Speleognathus</u> sp.				3	1
<u>P. icteridius</u> <u>Ptilonyssus</u> n. sp. "A" <u>Speleognathus</u> sp.				1	

^aThe species of mites that were found together in individual birds.

^bPercentage indicates the relative proportion of each species of mite to the total mite population found in each group of birds.

two birds, in one of which it was the only species present. Speleognathus sp., representing 1.7 % of the total mite population, was found in only one bird, and Ptilonyssus n. sp. "A", representing 0.6 % of the total mite population, was found in one bird.

Mites in Red-wing Yearling Male Blackbirds

In red-wing yearling male blackbirds, the following species of mites were found: Paraneonyssus icteridius: 4 males, 30 females, and 2 nymphs; Ptilonyssus n. sp. "A": 5 females and 1 male. The largest number of mites found in any one of the yearling birds was 23, the least 1, and the average 8.

P. icteridius was the only species found in four of five infested birds and comprised 85.7 % of the population of mites. In one bird, P. icteridius and Ptilonyssus n. sp. "A" were found together. Ptilonyssus n. sp. "A" comprised 14.3 % of the mite population.

Mites in Red-wing Adult Female Blackbirds

One adult female (14 %) was infested with two female specimens of P. icteridius.

Mites in Adult Male Brewer's Blackbirds

In adult male Brewer's blackbirds, the following species of mites were found: Paraneonyssus icteridius: 20 males, 92 females (4 gravid, each with 1 larva), 5 nymphs, and 1 larva; Ptilonyssus n. sp. "A": 6 males, 87 females, and 2 nymphs; Speleognathus sp.: 63 adults (sex unknown), 1 nymph, and 6 larvae. The largest number of mites found in any male bird was 43, the least 2, and the average 22.

P. icteridius was the only species found in four of thirteen in-

festated birds and comprised 41 % of the population of mites. Ptilonyssus n. sp. "A" was the only species found in two birds and comprised 30 % of the population of mites. P. icteridius and Ptilonyssus n. sp. "A" were associated in one bird. Speleognathus sp., representing 25 % of the total mite population, was the only species found in one bird. Speleognathus sp. was associated with Ptilonyssus n. sp. "A" in three birds, with P. icteridius and Ptilonyssus n. sp. "A" in one bird, and with P. icteridius in one bird.

Mites in Adult Female Brewer's Blackbirds

In adult female Brewer's blackbirds, the following species of mites were found: Paraneonyssus icteridius: 19 females and 1 nymph; Ptilonyssus n. sp. "A": 10 males, 52 females, and 1 nymph; Speleognathus sp.: 1 adult (sex unknown). The largest number of mites found in any one female bird was 63, the least 2, and the average 21.

P. icteridius, which was the only species of mite infesting one of four infested female birds, comprised 24 % of the population of all mites. Ptilonyssus n. sp. "A" was the only species found in two birds, and comprised 75 % of the total mite population. Speleognathus sp., representing 1 % of the total mite population, was found in association with Ptilonyssus n. sp. "A" in one bird.

DISCUSSION

In both the adult red-wing and Brewer's blackbird there was a higher percentage of males infested than females. Because the males in this area do not migrate southward in the winter, their continuous residence and their close association due to their flocking habits may provide a method by which the mites may be more easily spread from bird to bird. Because the females migrate southward for a period of approximately two months in the winter, there probably are less frequent associations and therefore fewer chances for spread of the mites. However, the small numbers of females examined may not represent an adequate sample of the population.

There were more immature than adult male red-wings infested. In a study of mites infesting canaries, Stephan et al. (1950) reported that mites of the species Sternostoma tracheacolum are transferred from one bird to another, and also suggested that the female birds infest their young while feeding them. Porter and Strandtmann (1952) maintained that "new hosts become infected by direct transfer from infected hosts, either by 'billing' or while feeding the young." This may also be true of the red-wing and Brewer's blackbirds.

Considering males and females together, a greater percentage of Brewer's than red-wings was infested. The adult male Brewer's blackbirds were also infested with a greater variety of mite species than were the male red-wings. This might be attributed to the difference in nesting and

feeding habits of the birds. Beecher (1951) stated that the Brewer's frequently prefers insects to seeds during the summer, whereas the opposite is true of the red-wing. To the writer's knowledge there are no published accounts dealing specifically with the feeding habits of the red-wing and Brewer's blackbirds in the winter. If an individual bird becomes infested from a source other than another bird, this infestation most likely would occur during the summer. Whether this initial infestation may be obtained from eating insects is not known since there is little data on the mite fauna of insects. Inasmuch as the Brewer's prefers nesting habitats such as the ground, trees, etc., and not marsh areas, this may be a factor contributing to their higher rate of infestation.

Sternostoma n. sp. "A" was found only in the red-wing adult males. According to Furman (1957), mites of this species inhabit the tracheae and lungs of birds as well as the nasal cavities. Lawrence (1948) stated that S. tracheacolum apparently invades the nasal cavities of canaries only when they become overcrowded in the trachea and lungs. Furman (1957) reported S. tracheacolum from the tricolored red-wing and the Bullock's oriole from California. Whether Sternostoma n. sp. "A" was present in the trachea and lungs of the birds collected in this study is not known, since only the nasal cavities were examined.

Ptilonyssus n. sp. "A" was found most frequently in the Brewer's blackbird with the highest incidence in the females. None was found in the red-wing female. This difference in infestation might be explained on the basis of the length of time that the paired birds associate together. The red-wing male and female are closely associated only during the breeding season, whereas the Brewer's male and female are associated continuously

except during the southern migration of the females.

According to Hollander (1956), the family Speleognathidae apparently consists of predaceous rather than parasitic mites. In this study Speleognathus sp. was found most frequently in the Brewer's males, with few if any in the other birds. Since there were high populations of a variety of species in the Brewer's blackbird and since this species may also be predaceous, it may be that Speleognathus sp. requires the presence of mites of other species (as found in the Brewer's blackbird) in order to survive. Speleognathus sp. was found unassociated in one red-wing blackbird, but may have been an accidental infestation. The complete absence of Speleognathus sp. from the immature and female red-wing blackbird probably is not unusual.

According to Porter and Strandtmann (1952), all the known nasal mites are ovoviviparous. The apparently fully developed larvae inside of several female P. icteridius, Sternostoma n. sp. "A", and Ptilonyssus n. sp. "A" observed during the study add support to their generalization.

CONCLUSIONS

Over-wintering Brewer's blackbirds were more frequently infested with nasal mites than were common red-wing blackbirds. In both species, male birds were more frequently infested than were females.

Paraneonyssus icteridius, the most common species of mite, was found in eight Brewer's and sixteen red-wing blackbirds examined. Sternostoma n. sp. "A" was found only in the red-wing male birds. Ptilonyssus n. sp. "A" was most common in the Brewer's blackbird. Speleognathus sp. was found most frequently in male Brewer's blackbirds.

In the total number of mites, the ratio of adult female, adult male, and immature mites was 8.3:1.0:0.5, respectively.

There were no significant seasonal fluctuations of the mite population during the period of this study.

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ABSTRACT

This paper reports the incidence and associations of four species of mites, Paraneonyssus icteridius, Ptilonyssus n. sp. "A", Sternostoma n. sp. "A", and Speleognathus sp., found in the nasal cavities of the common red-wing blackbird (Agelaius phoeniceus ssp.) and Brewer's blackbird (Euphagus cyanocephalus cyanocephalus Wagler) over-wintering in the vicinity of Provo, Utah County, Utah. Three species of mites are reported for the first time from these birds, and two of these three are undescribed species.