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RESEARCH NOTES

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Some Platyhelminths Inhabiting White-throated Sparrows, *Zonotrichia albicollis* (Aves: Emberizidae: Emberizinae), from Algonquin Park, Ontario, Canada

Daniel R. Brooks, Eric P. Hoberg*, and Anne Houtman, Department of Zoology, University of Toronto, Toronto, Ontario, Canada M5S 1A1; and *Biosystematic Parasitology Laboratory, USDA, ARS, Beltsville, Maryland 20705

ABSTRACT: Twenty-two of 26 white-throated sparrows, *Zonotrichia albicollis*, from Algonquin Park, Ontario, Canada, hosted 1 or 2 species of platyhelminths. One species of cestode and 3 of digeneans were collected. *Anonchotaenia quiscali* inhabited 50% of the sparrows. This is the third report of *A. quiscali*; *Z. albicollis* is a new host. *Brachylecithum nanum* inhabited 43%, *Zonorchis alveyi* 15%, and *Prosthogonimus macrorchis* 8% of the sparrows examined. Ontario is a new geographic distribution record for all 4 parasite species. The proportion of hosts infected with 2 species was not significantly different from expected based on single species prevalences, indicating that there is no competitive interaction among these species of parasites for access to the avian hosts.

The white-throated sparrow, *Zonotrichia albicollis* (Gmelin), has become an important model system for ecological and behavioral studies, as a result of studies documenting information about their mating system and breeding behavior (Knapton and Falls, 1983; Knapton et al., 1984; Kopachena, 1992), habitat preferences (Knapton and Falls, 1982), population structure (Thornycroft, 1976; Knapton and Falls, 1983), singing behavior (Falls, 1969), and aggressive behavior (Lowther and Falls, 1968; Hailman, 1975; Ficken et al., 1978; Watt et al., 1984; Schwabl et al., 1988). As part of a long-term study of the behavioral ecology of *Z. albicollis* in Algonquin Park, Ontario, Canada, we collected parasites from 26 (16 males and 10 females) white-throated sparrows during 27–30 May 1991.

Birds were caught on territories at the beginning of the breeding season using mistnets. Captured birds were killed promptly with an overdose of anesthetic and dissected immediately. Helminths were collected alive, rinsed in saline, fixed with alcohol–formalin–acetic acid (digeneans were flattened with slight coverslip pressure if large and heat killed to relax them if small; cestodes were relaxed until moribund in cold saline), stored in 70% ethanol, stained with Mayer's hematoxylin and mounted in Canada balsam. Representative specimens of digeneans were

deposited in the Harold W. Manter Laboratory, Division of Parasitology, University of Nebraska State Museum (HWML); specimens of cestodes were deposited in the U.S. National Museum Helminthological Collection, Beltsville, Maryland (USNM Helm. Coll.). We collected specimens of 1 species of cestode and 3 species of digeneans (Table I).

Anonchotaenia quiscali was originally described in common grackles, *Quiscalus quiscalis* (Linnaeus) (reported as *Quiscalus versicolor* Vieillot) (Emberizidae: Icterinae) from Ohio (Rausch and Morgan, 1947). There appears to be only 1 subsequent record of this cestode, from red-winged blackbirds, *Agelaius phoeniceus* (Linnaeus), another member of Icterinae, also from Ohio (Stanley and Rabalais, 1971). This is the first recognized occurrence of *A. quiscalis* in *Z. albicollis*, thus constituting a new host record and extending the range of known definitive hosts to 2 subfamilies of emberizids. This report also extends the known geographic distribution of the species, now known from Ohio and Ontario. Another species of *Anonchotaenia*, *A. globata* (von Linstow, 1879), a ubiquitous cestode inhabiting a wide variety of passerine birds (Schmidt, 1986), has been reported from *Z. albicollis*. *Anonchotaenia globata* can be distinguished from *A. quiscalis* on the basis of 3 traits: *A. globata* has an average of 4 testes per proglottid, cirrus sacs averaging 79 μm in length, and scolices averaging 760 μm in diameter, whereas *A. quiscalis* has an average of 8.5 testes per proglottid, cirrus sacs averaging 118 μm in length, and scolices averaging 550 μm in diameter. Specimens of *A. quiscalis* all were gravid and had completely formed paruterine organs. Although Rausch and Morgan (1947) described 9 testes per proglottid, the specimens collected in this study exhibited variation in testes numbers. In counts from 8 strobila, the number of testes ranged from 5 to 10 per proglottid ($\bar{x} = 8 \pm 1.05$, $n = 222$ segments). Such variation is not inconsistent with that reported

TABLE I. Information about site of infection, prevalence, and range of intensity for 4 species of helminths collected in *Zonotrichia albicollis* from Algonquin Park, Ontario, Canada.

	Site of infection	Prevalence*	Range of intensity	Specimens deposited†
Eucestoda: Cyclophyllidea: Dilepididae				
<i>Anonchotaenia quisquali</i> Rausch and Morgan, 1947	Entire length of intestine	50%	1-13	USNM Helm. Coll. nos. 82201, 82208
Digenea: Plagiorchiiformes: Dicrocoeliidae				
<i>Brachylecithum nanum</i> Denton and Byrd, 1951	Liver	43%	5-20	HWML no. 34096
<i>Zonorchis alveyi</i> (Martin and Gee, 1949) Denton and Byrd, 1951	Gall bladder	15%	1-25	HWML no. 34097
Digenea: Plagiorchiiformes: Prosthogonimidae				
<i>Prosthogonimus macrorchis</i> Macy, 1934	Oviducts	8%	3-22	HWML no. 34098

* Determined from 26 birds.

† USNM Helm. Coll., U.S. National Museum Helminthological Collection, Beltsville, Maryland; HWML, Harold W. Manter Laboratory, Division of Parasitology, University of Nebraska State Museum, Lincoln, Nebraska.

for other species of *Anonchotaenia* by Mariaux (1991), for which distinction from otherwise similar taxa has been based largely on comparison of the mean number of testes per proglottid as determined from counts in a large number of segments. Aside from the numbers of testes, other mensural and structural characters in the cestodes collected in white-throated sparrows were consistent with the original description of *A. quisquali*; for example, in our specimens average cirrus sac length was 116 μm and average scolex diameter was 525 μm , whereas Rausch and Morgan (1947) reported average values of 120 μm and 580 μm , respectively.

Among the digeneans collected, *Brachylecithum nanum* was originally described in *Z. albicollis*, *Zonotrichia leucophrys* (Forster), and rufo-sided towhees, *Pipilio erythrophthalmus* (Linnaeus), from Georgia, North Carolina, Virginia, and Texas (Denton and Byrd, 1951), and it has been reported subsequently in the Florida scrub jay, *Aphelocoma coerulescens* (Bosc), from Florida (Kinsella, 1974) and *Passerella* sp. from Iowa (Ellis, 1963). This report extends the known geographic distribution of the species to Ontario. *Prosthogonimus macrorchis* occurs in a wide variety of wild and domestic avian hosts over a broad geographic range. Ellis (1963) reported *Prosthogonimus* sp. in *Z. albicollis* from Iowa, but this is apparently the first report specifically of *P. macrorchis* in *Z. albicollis*. *Prosthogonimus macrorchis* has been implicated in reduction of fecundity through interference with egg production (Schmidt and Roberts, 1989). In this study, 1 of the 2 sparrows infected with *P. macrorchis* had 3 worms and the other had 22 worms; in

neither case was there any evident pathological change, but histological examination of the oviducts was not performed. Finally, *Zonorchis alveyi* is a common species in passerines; it has been reported in *Z. albicollis* in Georgia and Texas (where it is also known to inhabit *Z. leucophrys* [see Denton and Byrd, 1951]), and Manitoba (Hodasi, 1963). Within Canada, it has been reported in *Zonotrichia iliaca* (Morrem) (as *Passerella iliaca*) from Newfoundland (Jewer and Threlfall, 1978). Ontario is thus a new geographic distribution record.

Twenty-two (84.6%) of the white-throated sparrows examined hosted at least 1 species of helminth. Eight (30.7%) hosted 2 species of helminths and none hosted 3 or 4 species. The proportion of hosts infected with 2 species was not significantly different from the expected values based on single species prevalences ($\chi^2 = 0.095$, $P = 0.9999$, $df = 5$). This indicates that there is no competitive interaction among these species of parasites for access to the avian hosts. This is not surprising, given that each species occupies a different site in the definitive host. It is also possible that these data reflect differences in intermediate hosts as well, but the intermediate hosts for these species in Algonquin Park are unknown. Given the prevalences of the helminth species, our sample size does not reveal whether the absence of 3- and 4-species mixed infections has any significance.

The 3 species of avian hosts currently known for *A. quisquali*, white-throated sparrows, common grackles, and red-winged blackbirds have broadly overlapping breeding distributions across boreal latitudes of southern Canada (Godfrey,

1976) and wintering ranges extending south across the continental U.S.A. to northern Mexico. Thus, it is possible that transmission of this parasite could occur in either or both the wintering and breeding ranges of these avian hosts, as determined by the availability of suitable (presumably) arthropod intermediate hosts. The presence of fully gravid specimens in birds that have recently arrived on the breeding grounds cannot be taken as definitive evidence that the parasites were acquired on the wintering grounds. If the rate of development in the definitive host is relatively slow, the infection could occur on the breeding grounds prior to departure for the wintering grounds, and full development of gravid cestodes might not occur until the following spring, when the birds return to their breeding grounds. The same can be said for the 3 species of digeneans, all of which could have been acquired by *Z. albicollis* either on the summer breeding grounds in Ontario where we collected them, or on the wintering grounds, where *B. nanum* and *Z. alveyi* have been reported previously in white-throated sparrows.

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