BioOne COMPLETE

Helminth Parasites of Unisexual and Bisexual Whiptail Lizards (Teiidae) in North America. V. Mesocestoides sp. Tetrathyridia (Cestoidea: Cyclophyllidea) from Four Species of Cnemidophorus

Authors: McAllister, Chris T., Cordes, James E., Conn, David Bruce, Singleton, Jeurel, and Walker, James M.

Source: Journal of Wildlife Diseases, 27(3) : 494-497

Published By: Wildlife Disease Association

URL: https://doi.org/10.7589/0090-3558-27.3.494

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

Downloaded From: https://bioone.org/journals/Journal-of-Wildlife-Diseases on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

Journal of Wildlife Diseases, 27(3), 1991, pp. 494–497
© Wildlife Disease Association 1991

Helminth Parasites of Unisexual and Bisexual Whiptail Lizards (Teiidae) in North America. V. *Mesocestoides* sp. Tetrathyridia (Cestoidea: Cyclophyllidea) from Four Species of *Cnemidophorus*

Chris T. McAllister,[1] James E. Cordes,[2,4] David Bruce Conn,[3] Jeurel Singleton,[2] and James M. Walker,[2] [1] Renal-Metabolic Lab (151-G), Veterans Administration Medical Center, 4500 S. Lancaster Road, Dallas, Texas 75216, USA; [2] Department of Zoology, University of Arkansas, Fayetteville, Arkansas 72701, USA; [3] Department of Biology, St. Lawrence University, Canton, New York 13617, USA. [4] Present address: Department of Biology, Arkansas College, Batesville, Arkansas 72501, USA

ABSTRACT: Two hundred and one whiptail lizards, *Cnemidophorus* spp., from Texas and Colorado (USA), were examined for *Mesocestoides* sp. tetrathyridia. Eleven (5%) were infected, including three of 58 (5%) *C. dixoni*, six of 70 (9%) *C. gularis septemvittatus*, one of 35 (3%) *C. marmoratus*, and one of 34 (3%) *C. tesselatus*; four *C. inornatus heptagrammus* were not infected. In addition, 41 non-cnemidophorine lizards from the same study area were not infected. Free tetrathyridia were found in the body cavity of lizards and encapsulated tetrathyridia were observed in the heart, liver, stomach, mesenteries, ovaries, intestines, and lungs. None of the *Mesocestoides* sp. exhibited any evidence of asexual proliferation such as multiple scoleces or buds. This note, the fifth in a series of reports on helminths of *Cnemidophorus* spp., represents the first time *Mesocestoides* sp. has been reported from these four taxa, and Colorado is a new geographic locality record for this parasite.

Key words: Cestoidea, tetrathyridia, *Mesocestoides* sp., whiptail lizards, survey, Cyclophyllidea, *Cnemidophorus* spp., prevalence, intensity, Teiidae.

Tetrathyridia of the cyclophyllidean cestode, *Mesocestoides* sp., have been reported previously from various North American lizards (McAllister, 1988; Goldberg and Bursey, 1990) as well as anuran amphibians (McAllister and Conn, 1990) and snakes (McAllister et al., 1991). Of the lizards that are hosts of *Mesocestoides* sp., the most commonly reported taxa belong to the family Iguanidae, while other families are thought to harbor the parasite less often. For example, only three species of North American teiid lizards (*Cnemidophorus* spp.) are reported as hosts of *Mesocestoides* sp. tetrathyridia (Babero and Matthias, 1967; Dyer, 1971; Mankau and Widmer, 1977; Benes, 1985; Goldberg, 1987).

Between June 1989 and May 1990, we examined five species of *Cnemidophorus* for tetrathyridia of *Mesocestoides* sp. During that period, we found the metacestode (as well as other helminths to be reported elsewhere) in four of five taxa which represents new host and geographic distribution records for the parasite. This paper is the fifth in a series of reports on helminths of North American whiptail lizards (see McAllister 1990a, b, c, d).

Two hundred and one lizards, including 58 gray-checkered whiptails (*C. dixoni*), 70 plateau spotted whiptails (*C. gularis septemvittatus*), 35 marbled whiptails (*C. marmoratus*), and four Trans-Pecos striped whiptails (*C. inornatus heptagrammus*) from "Campo Nuevo" in San Antonio Canyon, 45 km N Presidio (Presidio County, Texas, USA; 29°53′N, 104°29′W, elevation 900 to 1,500 m) and 34 Colorado checkered whiptails (*C. tesselatus* [28 diploid, 6 triploid]; see Walker et al., 1990) from 11.5 km SSW Higbee in Ninemile Valley of the Purgatoire River (Otero County, Colorado, USA; 37°43′N, 103° 31′W, elevation 1,286 m) were examined for *Mesocestoides* sp. For comparative purposes, 41 non-cnemidophorine lizards (40 iguanids, one scincid) collected from the former site were also examined for tetrathyridia, including (number examined in parentheses): *Uta stansburiana stejnegeri* (1), *Cophosaurus texanus scitulus* (27),

Downloaded From: https://bioone.org/journals/Journal-of-Wildlife-Diseases on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

TABLE 1. *Cnemidophorus* spp. (Teiidae) examined for tetrathyridia of *Mesocestoides* sp. from Colorado and Texas.

Species	County and state	Prevalence*
Cnemidophorus dixoni	Presidio Co., Texas	3/58 (5%)
C. gularis septemvittatus	Presidio Co., Texas	6/70 (9%)
C. marmoratus	Presidio Co., Texas	1/35 (3%)
C. tesselatus	Otero Co., Colorado	1/34 (3%)
C. inornatus heptagrammus	Presidio Co., Texas	0/4 (0%)

* Number infected/number examined (Margolis et al., 1982).

Urosaurus ornatus schmidti (3), *Sceloporus magister bimaculosus* (4), *S. poinsetti poinsetti* (1), *Crotaphytus collaris collaris* (3), *Phrynosoma modestum* (1), and *Eumeces obsoletus* (1). Specimens were collected with rubber bands or shot with 0.22 caliber rat shot, preserved in the field with 10% formalin, and stored in 70% ethanol. The body cavity of individual lizards was exposed by midventral incision and free tetrathyridia were counted. Worms were stained in acetocarmine, dehydrated in a graded series of alcohols, cleared in xylene, and mounted whole in damar. Tissues thought to contain encapsulated tetrathyridia were embedded in paraffin, sectioned at 7 μm, stained with Mayer's hematoxylin and eosin counterstain, and further prepared as above. Representative specimens of *Mesocestoides* sp. are deposited in the USNM Helminthological Collection (United States Department of Agriculture, Beltsville, Maryland 20705, USA; accession numbers 81452–81456). Voucher hosts are deposited in the University of Arkansas Department of Zoology (UADZ, Fayetteville, Arkansas 72701, USA).

Eleven of 201 (5%) whiptail lizards [mean (SD) of snout-vent length (SVL) = 95.4 (10.1), range 78 to 107 mm] were infected with *Mesocestoides* sp. tetrathyridia (Table 1). All 41 non-cnemidophorine lizards were negative for *Mesocestoides* sp. None of these tetrathyridia exhibited any evidence of asexual proliferation (e.g., multiple scoleces or buds) and infected tissues revealed minimal compression of liver parenchyma (Fig. 1).

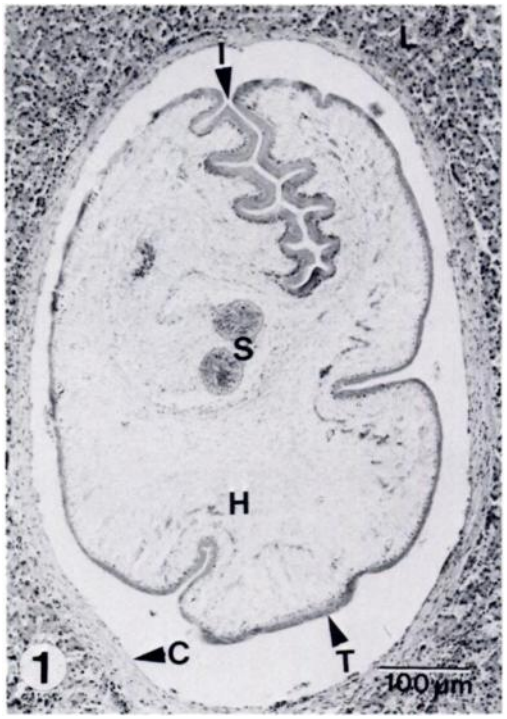


FIGURE 1. Encapsulated *Mesocestoides* sp. tetrathyridium in the liver of *Cnemidophorus tesselatus*. Note the characteristic thin host-derived capsule (C), solid hindbody of the cellular parenchyma (H), deep invagination canal (I), apparently healthy host liver tissue (L), scolex with prominent suckers (S), and tegument (T). Also note the absence of an apical organ and unarmed rostellum. H&E.

All three infected unisexual *C. dixoni* (UADZ 3665, 3759, 3870) were adult females (78 to 99 mm SVL) collected between July and September 1989. One of these lizards (UADZ 3759) had a massive infection of encapsulated metacestodes in liver, pericardial cavity, and ovaries and free tetrathyridia in the coelomic cavity. To our knowledge, this is the first time any parasite has been reported from *C. dixoni*.

McAllister (1990d) reported several helminths in a large sample of *C. gularis* from throughout its range; however, no *Mesocestoides* were found in any of 289 lizards surveyed. In the present study, all six in-

Downloaded From: https://bioone.org/journals/Journal-of-Wildlife-Diseases on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

fected *C. gularis septemvittatus* (UADZ 3564, 3619, 3620, 3634, 3646, 3658) were adults (four males, two females; 84 to 107 mm SVL) collected between June and July 1989. As with *C. dixoni*, they were collected from the same locale in San Antonio Canyon. Metacestodes were found free throughout the coelom and encapsulated in heart, liver, lungs, mesenteries, ovaries, stomach, and intestines.

The only infected *C. marmoratus* (UADZ 3687) was an adult female (94 mm SVL) collected during July 1989. Over 200 individual metacestodes were found in the coelomic cavity as well as encapsulated in the liver. *Mesocestoides* sp. has been reported previously from the closely related western whiptail (*C. tigris*) in Arizona (Benes, 1985), California (Mankau and Widmer, 1977), and Nevada (Babero and Matthias, 1967).

McAllister (1990a) provided information from a survey on parasites of parthenogenetic *C. tesselatus* from Texas, albeit no *Mesocestoides* sp. were found. Nearly half of those lizards came from Presidio County, but outside the San Antonio Canyon area. In the present study, a single *C. tesselatus* (100 mm SVL, diploid, UADZ 4113) collected during June 1990 from Higbee (Otero County, Colorado, USA) was infected.

These records bring to seven of 17 (41%) species of North American teiid lizards known to serve as hosts for *Mesocestoides* sp. This comparative data accords well with information from iguanid lizards, reported previously to harbor *Mesocestoides* sp. (19 of 45 species, 42%). However, members of the Iguanidae comprise almost one-half (47%) of the currently recognized 95 species of North American lizards whereas the Teiidae make up only 18% of these taxa (Collins, 1990). This may explain why some lizards within the larger families are more often reported to harbor tetrathyridia while others are not. Indeed, 62 species or about 65% of all North American lizards remain as potential second intermediate hosts of *Mesocestoides* sp.

In summary, four new host records and a new geographic locality record (Colorado, USA) are documented for tetrathyridia of *Mesocestoides* sp. Overall and individual prevalence of infection was relatively low in *Cnemidophorus* spp., but intensity of infection was high, which appears to be typical for this metacestode, regardless of host classification (see McAllister, 1988; McAllister and Conn, 1990). In agreement with these earlier studies, the absence of morphological features characteristic of asexual proliferation in the tetrathyridia reported herein further suggests that high intensities of infection by *Mesocestoides* sp. is not in most cases the result of asexually proliferative tetrathyridia (Conn, 1990), but rather some other unknown epizootiological factor.

We thank A. Real, general manager of the Mesquite Ranch, Presidio County, Texas, for lodging and field assistance. Lizard collections were made under the authority of Texas Parks and Wildlife Department permit no. 61 provided through the assistance of D. Riskind, Texas Parks Division, and G. C. Adams, Texas Resource Protection Branch, and Colorado Division of Wildlife permit no. 90-0256 provided through the assistance of C. Gardner.

LITERATURE CITED

BABERO, B. B., AND D. MATTHIAS. 1967. *Thubunaea cnemidophorus* n. sp. and other helminths from lizards, *Cnemidophorus tigris*, in Nevada and Arizona. Transactions of the American Microscopical Society 86: 173–177.

BENES, E. S. 1985. Helminth parasitism in some central Arizona lizards. Southwestern Naturalist 30: 467–473.

COLLINS, J. T. 1990. Standard common and current scientific names for North American amphibians and reptiles, 3rd ed. Society for the Study of Amphibians and Reptiles Herpetological Circular 19: 1–41.

CONN, D. B. 1990. The rarity of asexual reproduction among *Mesocestoides* tetrathyridia (Cestoda). The Journal of Parasitology 76: 453–455.

DYER, W. G. 1971. Some helminths of the six-lined lizard, *Cnemidophorus sexlineatus*, in South Dakota. Proceedings of the Helminthological Society of Washington 38: 256.

Downloaded From: https://bioone.org/journals/Journal-of-Wildlife-Diseases on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

GOLDBERG, S. R. 1987. Larval cestodes (*Mesocestoides* sp.) in the giant spotted whiptail, *Cnemidophorus burti stictogrammus*. Journal of Herpetology 21: 337.

———, AND C. R. BURSEY. 1990. Prevalence of larval cestodes (*Mesocestoides* sp.) in the western fence lizard, *Sceloporus occidentalis biseriatus* (Iguanidae), from southern California. Bulletin of the Southern California Academy of Sciences 89: 42–48.

MANKAU, S. K., AND E. A. WIDMER. 1977. Prevalence of *Mesocestoides* (Eucestoda: Mesocestoididea) tetrathyridia in southern California reptiles with notes on the pathology in the Crotalidae. Japanese Journal of Parasitology 26: 256–259.

MARGOLIS, L., G. W. ESCH, J. C. HOLMES, A. M. KURIS, AND G. A. SCHAD. 1982. The use of ecological terms in parasitology (report of an ad hoc committee of the American Society of Parasitologists). The Journal of Parasitology 68: 131–133.

MCALLISTER, C. T. 1988. *Mesocestoides* sp. tetrathyridia (Cestoidea: Cyclophyllidea) in the iguanid lizards, *Cophosaurus texanus texanus* and *Sceloporus olivaceous*, from Texas. Journal of Wildlife Diseases 24: 160–163.

———. 1990a. Helminth parasites of unisexual and bisexual whiptail lizards (Teiidae) in North America. I. The Colorado checkered whiptail (*Cnemidophorus tesselatus*). Journal of Wildlife Diseases 26: 139–142.

———. 1990b. Helminth parasites of unisexual and bisexual whiptail lizards (Teiidae) in North America. II. The New Mexico whiptail (*Cnemidophorus neomexicanus*). Journal of Wildlife Diseases 26: 403–406.

———. 1990c. Helminth parasites of unisexual and bisexual whiptail lizards (Teiidae) in North America. III. The Chihuahuan spotted whiptail (*Cnemidophorus exsanguis*). Journal of Wildlife Diseases 26: 544–546.

———. 1990d. Helminth parasites of unisexual and bisexual whiptail lizards (Teiidae) in North America. IV. The Texas spotted whiptail (*Cnemidophorus gularis*). Texas Journal of Science 42: 381–388.

———, AND D. B. CONN. 1990. Occurrence of tetrathyridia of *Mesocestoides* sp. (Cestoidea: Cyclophyllidea) in North American anurans (Amphibia). Journal of Wildlife Diseases 26: 540–543.

———, ———, P. S. FREED, AND D. A. BURDICK. 1991. A new host and locality record for *Mesocestoides* sp. tetrathyridia (Cestoidea: Cyclophyllidea), with a summary of the genus from snakes of the world. The Journal of Parasitology 77: 329–331.

WALKER, J. M., E. D. PARKER, JR., H. L. TAYLOR, J. E. CORDES, AND R. M. ABUHTEBA. 1990. Hybridization between all-female *Cnemidophorus tesselatus* and gonochoristic *Cnemidophorus sexlineatus*. Journal of Herpetology 24: 388–396.

Received for publication 8 November 1990.

Downloaded From: https://bioone.org/journals/Journal-of-Wildlife-Diseases on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use