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Author: McAllister, Chris T.

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Mesocestoides sp. Tetrathyridia (Cestoidea: Cyclophyllidea) in the Iguanid Lizards, *Cophosaurus texanus texanus* and *Sceloporus olivaceous*, from Texas

Chris T. McAllister, Renal-Metabolic Lab, Veterans Administration Medical Center, 4500 S. Lancaster Road, Dallas, Texas 75216, USA and Department of Biological Sciences, North Texas State University, Denton, Texas 76203, USA

ABSTRACT: New host records are reported for *Mesocestoides* sp. tetrathyridia in two species of iguanid lizards (*Cophosaurus texanus* and *Sceloporus olivaceous*) from Texas. Tetrathyridia were found free within the body cavity or encapsulated in the liver of the hosts. Prevalence of infection was generally low, with intensities ranging from 90 to over 200 tetrathyridia per host. In addition, a summary of North American lizard species reported as hosts of *Mesocestoides* sp. tetrathyridia is presented.

Key words: Cestoidea, *Cophosaurus texanus*, Cyclophyllidea, encapsulated, lizards, *Mesocestoides* sp., parenchyma, *Sceloporus olivaceous*, tetrathyridia.

The metacestode stage (tetrathyridium) of the cyclophyllidean cestode, *Mesocestoides* sp., is often found in the coelomic cavity, liver, cardiac musculature, and mesenteries of vertebrate intermediate hosts (usually anuran amphibians and squamate reptiles) and reaches sexual maturity if ingested by definitive hosts such as carnivorous birds or mammals (Williams and Conn, 1985). Presumably, the first intermediate host in the life cycle is an arthropod (probably an insect); however, this is not proven (Webster, 1949; James, 1969). Vertebrate hosts which harbor tetrathyridia cannot be infected directly with oncospheres of *Mesocestoides* sp. Specht and Voge (1965) and Hanson and Widmer (1985) demonstrated asexual multiplication of tetrathyridia in laboratory mice and prairie rattlesnakes (*Crotalus viridis*), respectively.

Mankau and Widmer (1977) suggested that data on the range, distribution, food habits and natural history of the second intermediate host may provide important information which could lead to better understanding the life cycle of this enigmatic tapeworm. The purposes of this note are to report, for the first time, the occurrence of *Mesocestoides* sp. tetrathyridia in the Texas earless lizard (*Cophosaurus texanus*

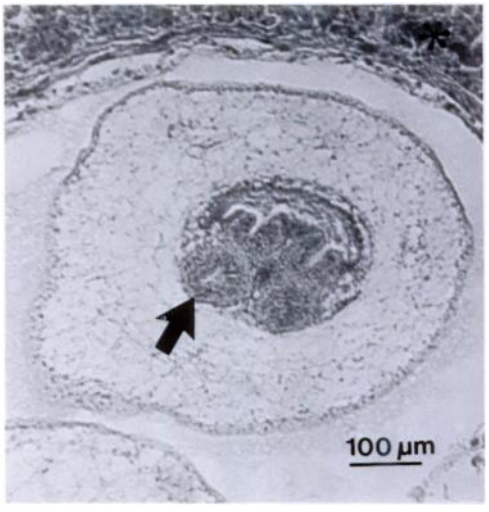


FIGURE 1. Encapsulated *Mesocestoides* sp. tetrathyridia in the liver of *Cophosaurus t. texanus*. Note sucker (arrow) and normal liver parenchyma (*). H&E.

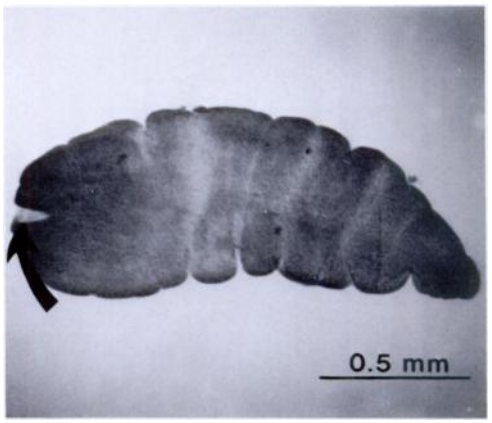


FIGURE 2. *Mesocestoides* sp. tetrathyridia removed from the body cavity of *Sceloporus olivaceous*. Note appearance of the invaginated holdfast (arrow).

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TABLE 1. Lacertilid reptiles reported as hosts of *Mesocestoides* sp. tetrathyridia.

Lizard species	Locality	Reference
Gekkonidae		
Coleonyx variegatus	California	Mankau and Widmer, 1977
Xantusiidae		
Xantusia riversiana	California	Telford, 1970; Goldberg, 1985
Iguanidae		
Anolis carolinensis	Louisiana	Conn and Etges, 1984
Callisaurus draconoides	California	Mankau and Widmer, 1977
Cophosaurus texanus	Texas	McAllister, this report
Crotaphytus collaris[a]	Arkansas; New Mexico	McAllister, 1985; Pfaffenberger et al., 1986
Dipsosaurus dorsalis	California	Mankau and Widmer, 1977
Phrynosoma mcallii	California	Mankau and Widmer, 1977
P. platyrhinos[a]	California; Nevada	Mankau and Widmer, 1977; Babero and Kay, 1967
Sceloporus graciosus	California	Telford, 1970
S. magister[a]	Arizona	Benes, 1985
S. occidentalis	California	Voge, 1953; Specht and Voge, 1965
S. olivaceous	Texas	McAllister, this report
Uma notata	California	Telford, 1970
Urosaurus graciosus	California	Telford, 1970
U. ornatus[a]	Arizona	Benes, 1985
Uta stanburiana[a]	California; Arizona	Telford, 1970; Benes, 1985
Teiidae		
Cnemidophorus tigris	California	Mankau and Widmer, 1977
C. t. septentrionalis[a]	Arizona	Babero and Matthias, 1967; Benes, 1985
C. sexlineatus	South Dakota	Dyer, 1971
Scincidae		
Eumeces fasciatus[a]	Texas; California	Harwood, 1932; Voge, 1953
E. skiltonianus	California	Telford, 1970
Scincella lateralis[a]	Texas	Harwood, 1932
Anguidae		
Elgaria coerulea	California	Voge, 1953
E. multicarinata	California	Telford, 1970

[a] Possibly *Mesocestoides* sp.

texanus) and Texas spiny lizard (*Sceloporus olivaceous*), and to provide a summary of North American lizards known to be hosts of this cestode.

Lizards were captured alive by stunning with rubber bands and euthanized by overdose with sodium pentobarbital (Nembutal®, Abbott Laboratories, North Chicago, Illinois 60064, USA). Tetrathyridia were recovered from the body cavity of two hosts and placed in warm alcohol-formalin-acetic acid mixture, transferred to 70% ethanol, stained with Semichon's acetocarmine or Mayer's hematoxylin, dehydrated in a graded series of alcohols, cleared in xylene and mounted in Permount® mounting medium (Fisher Scientific, Pittsburgh, Pennsylvania 15219, USA). Tissues containing encapsulated tetrathyridia were fixed in 10% formalin, embedded in paraffin, sectioned at 8 μm and stained with Mayer's hematoxylin and eosin counterstain.

One of 21 (5%) *C. texanus texanus* (adult female, snout–vent length (SVL) = 60 mm) collected on 4 May 1986 in Johnson County, Texas (32°15′N, 97°35′W) was infected with a total of 90 *Mesocestoides* sp. tetra-

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thyridia in its body cavity. In addition, the liver contained numerous encapsulated tetrathyridia, which resulted in minimal compression of the parenchyma, with no fibrosis or necrosis (Fig. 1). Total length of the worms ranged from 1.5 to 2.1 mm ($\bar{x} \pm SE = 1.78 \pm 0.12$) and greatest width from 0.55 to 0.65 mm (0.62 ± 0.02).

The other case involved one of seven (14%) *S. olivaceous* (adult male, 81 mm SVL) collected on 22 June 1986, also in Johnson County. This lizard contained over 200 *Mesocestoides* sp. tetrathyridia free within the coelomic cavity (Fig. 2). The liver did not contain any encapsulated forms. Tetrathyridia from this host were slightly smaller, ranging from 1.0 to 1.8 mm (1.35 ± 0.08) by 0.45 to 0.55 mm (0.52 ± 0.01).

Twenty-four species of North American lizards of the families Gekkonidae, Xantusiidae, Iguanidae, Teiidae, Scincidae and Anguidae are reported as hosts of *Mesocestoides* sp. tetrathyridia (Table 1). Iguanids appear to be common second intermediate hosts, which suggests similarities in ecology and especially food habits. Except for the primarily herbivorous desert iguana (*Dipsosaurus dorsalis*), most of these lizards are opportunistic feeders which ingest various arthropods. In surveys which reported *Mesocestoides* sp. tetrathyridia from generous samples of lizards, prevalence usually ranged below 10%. Therefore, it appears that many factors are important in the transmission of *Mesocestoides* from the first to the second intermediate host. Further investigation will be necessary to provide specific answers to many of the unsolved problems concerned with the life cycle of *Mesocestoides*.

Lizard voucher specimens are deposited in the Arkansas State University Museum of Zoology (ASUMZ 5959, 6007). Representative specimens of tetrathyridia are deposited in the USNM Helminthological Collection (United States Department of Agriculture, Beltsville, Maryland 20705, USA; Accession Nos. 79662–79663).

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