

Research Note

Helminths of the Sonoran Green Toad, *Bufo retiformis* (Bufonidae),
from Southern Arizona

STEPHEN R. GOLDBERG,¹ CHARLES R. BURSEY,² BRIAN K. SULLIVAN,³ AND
QUYNH A. TRUONG,¹

¹ Department of Biology, Whittier College, Whittier, California 90608,
e-mail: sgoldberg@whittier.edu,

² Department of Biology, Pennsylvania State University, Shenango Valley Campus, 147 Shenango Avenue,
Sharon, Pennsylvania 16146, e-mail: cxb13@psuvm.psu.edu, and

³ Department of Life Sciences, P.O. Box 37100, Arizona State University West,
Phoenix, Arizona 85069, e-mail: idbks@asuvm.inre.asu.edu

ABSTRACT: The gastrointestinal tracts, lungs, and urinary bladders from 49 *Bufo retiformis* were examined. Five species of nematodes, *Aplectana incerta*, *Aplectana itzocanensis*, *Oswaldocruzia pipiens*, *Physaloptera* sp. (larva), *Rhabdias americanus*, and one cestode, *Distoichometra bufonis*, were present. *Aplectana incerta* had the highest prevalence (61%) and greatest mean intensity (36.9). All represent new host records for *B. retiformis* but are previously known from other southwestern desert toads.

KEY WORDS: Cestoda, *Distoichometra bufonis*, Nematoda, *Aplectana incerta*, *Aplectana itzocanensis*, *Oswaldocruzia pipiens*, *Physaloptera* sp. (larva), *Rhabdias americanus*, Bufonidae, *Bufo retiformis*.

The Sonoran green toad, *Bufo retiformis* Sanders and Smith, 1951, occurs from south-central Arizona to west-central Sonora, Mexico, at elevations of 150 to 730 m (Stebbins, 1985). There are, apparently, no reports of helminths from *B. retiformis*. The purpose of this note is to report the prevalences and mean intensities of helminth parasites from a southern Arizona population of *B. retiformis* and to compare this helminth fauna with that of other North American southwestern desert toads.

Forty-nine *B. retiformis* (mean snout-vent length [SVL] = 49.4 mm ± 4.3 [SD]) (14 females, 35 males) were hand-collected in Pima County, Arizona at 516–969 m elevation during July–August. One toad was from 1992, 30 were from 1993, and 18 were from 1994. They came from several localities along Indian Routes 15 and 34 and Arizona Highways 85, 86, and 286, at approximately 32°14'–25'N, 112°1'–44'W. Toads were killed by immersion in 0.5% solution of 3-aminobenzoic acid ethyl ester (Sigma, St. Louis, Missouri) and were fixed in neutral-buffered 10% formalin.

The body cavity was opened by a longitudinal

incision from vent to throat and the gastrointestinal tract was removed by cutting across the anterior esophagus and rectum. The lungs, esophagus, stomach, small intestine, large intestine, and bladder of each toad were examined separately. Each helminth was identified utilizing the glycerol wet-mount procedure. Cestodes were stained with hematoxylin and mounted in balsam. Specimens were deposited in the U.S. National Parasite Collection, USDA, Beltsville, Maryland 20705: *Distoichometra bufonis* 84533, *Aplectana incerta* 84534, *Aplectana itzocanensis* 84535; *Oswaldocruzia pipiens* 84536, *Physaloptera* sp. (larva) 84537, and *Rhabdias americanus* 84538. All toads were deposited in the herpetology collection at Arizona State University, Tempe as ASU 30260–30266, 30268–30294, and 30296–30310.

Prevalence, location, and mean intensity for each parasite are given in Table 1. Terminology is in accordance with Margolis et al. (1982). There were no statistical differences in infection prevalences between female and male *B. retiformis*. *Distoichometra bufonis* was previously found in Arizona *Bufo cognatus*, *Scaphiopus couchii*, and *Bufo punctatus* (Goldberg and Bursey, 1991a, b) and New Mexico *B. cognatus*, *Bufo debilis*, and *Spea multiplicata* (Goldberg et al., 1995) and has also been reported in *Bufo terrestris*, *Bufo woodhousii*, and *Scaphiopus* sp. (Douglas, 1958; McAllister et al., 1989). *Distoichometra bufonis* was originally described from *Bufo terrestris* (= *lentiginosus*) by Dickey (1921).

Aplectana incerta and *A. itzocanensis* present an enumeration problem. While the adults are easily separated (*A. incerta* females have approximately 50 eggs, 99–123 × 54–62 μm; males have equal spicules, 135–143 μm. *Aplectana it-*

Table 1. Prevalence, mean intensity (range), and location of helminths from 49 *Bufo retiformis*.

Parasite	Prevalence (%)	Mean intensity (range)	Location*
Cestoda			
<i>Distoichometra bufonis</i>	27	1.7 (1-6)	b
Nematoda			
<i>Aplectana incerta</i>	61	36.9 (1-153)	b, c, e
<i>Aplectana itzocanensis</i>	57	23.1 (1-89)	b, c, e
<i>Oswaldocruzia pipiens</i>	2	18.0	a, b
<i>Physaloptera</i> sp. (larva)	2	1.0	a
<i>Rhabdias americanus</i>	35	3.3 (1-7)	d

* a = stomach, b = small intestine, c = large intestine, d = lungs, e = bladder.

itzocanensis females have several hundred eggs, 70–82 × 42–51 μm; males have equal spicules, 172–203 μm, immature forms are not easily distinguished and here they have arbitrarily been separated based on the ratio of adults per host. *Aplectana incerta* was originally described by Caballero y C. (1949) from *Bufo marinus* from Chiapas, Mexico, and *A. itzocanensis* was originally described by Bravo Hollis (1943) from *S. multiplicata* from Puebla, Mexico. Both species were redescribed by Baker (1985). *Aplectana incerta* has been reported from Arizona *S. couchii* (Goldberg and Bursey, 1991a), and New Mexico *B. debilis* and *S. multiplicata* (Goldberg et al., 1995). *Aplectana itzocanensis* has been reported from Arizona *Bufo alvarius*, *B. cognatus*, and *B. punctatus* (Goldberg and Bursey, 1991a, b) and New Mexico *B. cognatus*, *B. debilis*, and *S. multiplicata* (Goldberg et al., 1995) and is also known from *B. marinus* and *B. woodhousii* (Brenes and Bravo Hollis, 1959; Caballero Deloya, 1974; Baker, 1985). In our current sample, only 1 *B. retiformis* was not infected with *Aplectana*. Simultaneous infections by *A. incerta* and *A. itzocanensis* were found on 10 occasions, infection by only *A. incerta* was found on 20 occasions, and infection by only *A. itzocanensis* was found on 18 occasions.

Oswaldocruzia pipiens was harbored by a single *B. retiformis*. It has been reported from Arizona *B. alvarius*, *B. cognatus*, *B. punctatus*, and *S. couchii* (Goldberg and Bursey, 1991a, b) and is also known from *Bufo americanus*, *Bufo houstonensis*, *B. woodhousii*, and *Scaphiopus holbrookii* (Brandt, 1936; Rankin, 1945; Campbell, 1968; Ashton and Rabalais, 1978; Baker, 1978a; Thomas et al., 1984).

Larval physalopterans have been reported from Arizona *B. alvarius* and *B. cognatus* (Goldberg

and Bursey, 1991a) and New Mexico *B. cognatus*, *B. debilis*, and *S. multiplicata* (Goldberg et al., 1995) and are also known from *B. americanus*, *Bufo microscaphus*, *Bufo speciosus* (= *compactilis*), and *B. woodhousii* (Kuntz, 1940; Parry and Grundmann, 1965; Ashton and Rabalais, 1978). Apparently, no cases of parasitism of toads by adult physalopterans have been reported.

Hosts for *R. americanus* include Arizona *B. alvarius* and *B. cognatus* (Goldberg and Bursey, 1991a), New Mexico *B. cognatus* and *B. debilis* (Goldberg et al., 1995), and also *B. americanus*, *B. woodhousii* (= *fowleri*), and *B. speciosus* (Kuntz, 1940; Reiber et al., 1940; Fantham and Porter, 1948; Campbell, 1968; Baker, 1978b; Williams and Taft, 1980).

North American southwestern desert toads appear to share a common helminth community: 1 monogenean species, *Pseudodiplorchis americanus* (see Tinsley, 1990); 2 cestode species, *D. bufonis* and *Nematotaenia dispar*; and 6 nematode species, *A. incerta*, *A. itzocanensis*, *O. pipiens*, *Physaloptera* sp. (larva), *Physocephalus* sp. (larva), and *R. americanus* (Goldberg and Bursey, 1991a, b; Goldberg et al., 1995). Subsequent examination of additional toad species will be required before this helminth community is completely known.

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