

Some Helminth Parasites of *Anolis stratulus* and *Anolis cristatellus* (Sauria: Polychrotidae) in Puerto Rico

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ABSTRACT

The gastrointestinal tracts of 3 *Anolis stratulus* and 2 *Anolis cristatellus* from Puerto Rico were examined for helminths. Three helminth species were present: *Mesocoelium danforthi*, *Spauligodon anolis* and *Parapharyngodon cubensis*. *Spauligodon anolis* in *A. stratulus* constitutes a new host and geographic locality record. *Parapharyngodon cubensis* in *A. stratulus* and *A. cristatellus* represent new geographic locality records and in *A. stratulus* a new host record.

INTRODUCTION

Anole lizards of the West Indies are perhaps one of the most comprehensively studied groups of vertebrates in the world (Schwartz and Henderson, 1991). While detailed studies on their genetics, ecology, evolutionary relationships and helminth fauna have been reported from several geographic localities, with the exception of the reports by Cofresi-Sala (1964) and Acholonu (1976), there remains a paucity of information on anole helminths in Puerto Rico. The purpose of this report is to add to our knowledge of the helminths of *Anolis stratulus* Cope, 1862 and *A. cristatellus* Duméril and Bibron, 1837 from this area.

MATERIALS AND METHODS

Three *Anoles stratulus* (930614), (930616), (930714), and two *A. cristatellus* (930625-2), (941007) were examined for helminths. The esophagus, stomach, small intestine, and large intestine were examined separately utilizing a dissecting microscope. Nematodes were fixed in steaming acetic alcohol (1 part glacial acetic acid and 3 parts 95 percent

alcohol) and cleared for study in glycerine. Digeneans were fixed in AFA (alcohol formalin-acetic acid) stained with Harris' hematoxylin, dehydrated, cleared in beechwood creosote, and mounted in Canada balsam. Lizards were deposited in the herpetological collection of Southern Illinois University Carbondale (R2468-2469).

RESULTS AND DISCUSSION

Anolis stratulus is restricted to Puerto Rico and some satellite islands including Isla Vieques, Isla Culebra, and the U.S. and British Virgin Islands (Schwartz and Henderson, 1991). While the biology of *A. stratulus* is well known (Wolcott, 1923; Schmidt, 1928; Heatwole, 1968; Schoener and Schoener, 1971; Rivero, 1978; and Regan, 1986), *Mesocoelium danforthi* Hoffman, 1935 is the only helminth parasite reported from this lizard (Hoffman, 1935; Cofresi-Sala, 1964).

A single digenetic trematode found in the small intestine of one *A. stratulus* (930614) taken on 14 June 1993 and a single digenetic trematode found in another *A. stratulus* (930714) taken on 14 July 1993 in Guama, San German, (18° 5.3' N, 67° 0.4' W) were identified as *Mesocoelium danforthi* Hoffman, 1935. Another *A. cristatellus* (930625-2) taken on 25 June 1993 from the same locality housed 80 specimens of *M. danforthi*. The parasite was originally described from the intestine of a lizard, *Celestus pleii* collected by Dr. S. T. Danforth at an elevation of 610 meters on El Yunque, a mountain in the Luquillo National Forest, Puerto Rico on 29 March 1934 (Schwartz and Henderson, 1991). Hoffman (1935) stated that *M. danforthi* is closely related to *M. sociale* (Lühe, 1901), *M. microon* Nicoll, 1914, *M. americanum* Harwood, 1932, *M. meggitti* Bhalero, 1927 and *M. monodi* Dollfus, 1929 but differs in having the longitudinal diameter of the oral sucker approximately twice that of the acetabulum, in the small size of its eggs, and with the exception of *M. americanum*, in its ovary being larger than either testis. It was not clear as to the number of specimens Hoffman examined. Of the 80 specimens examined in the present study, the size of the ovary relative to that of either testis revealed a great degree of intraspecific variation, in that in some the ovary is larger than either testis, in some the ovary is smaller than either testis and in some they are of equal size. Cofresi-Sala (1964) reported *M. danforthi* in *Anolis evermanni* Stejneger, 1904, *A. cristatellus*, *A. gundlachi* Peters, 1876, *A. stratulus*, *A. poncensis* Stejneger, 1904, *A. cuvieri* Merrem, 1820, *A. pulchellus* Duméril and Bibron, 1837, *A. krugi*, Peters, 1876 and *Ameiva exsul* Cope, 1863. He found Hoffman's (1935) description of *M. danforthi* from *C. pleii* lacking in a number of details and supplemented the original description with an amended description based on seventy-five specimens taken from 1199 lizards from various localities in Puerto Rico including the wet mountain rain forest of El Yunque, the coastal plain in Mayagüez, the arid area of Ensenada, and the coffee belt of Maricao. He found similar variation in the size of the ovary relative to that of either testis. Later, Acholonu (1976) reported *M. danforthi* in 76 of 234 (32%) *A. cristatellus* and 2 of 8 (25%) *A. exsul* from Puerto Rico but did not elaborate on morphological variation. This species is the most common trematode reported from anoles in Puerto Rico and exhibits a wide geographic distribution. This is the second report of the parasite from *A. stratulus* and the third from *A. cristatellus* in Puerto Rico. Voucher specimens have been deposited in the U.S. National Parasite Collection, U.S. Department of Agriculture, and designated by the accession numbers USNPC Nos. 090929.00,

One *Anolis stratulus* (930616) captured on 16 June 1993 in Guama, San German contained one mature female, 4 immature females and 20 mature male nematodes in the stomach and small intestine identified as *Spauligodon anolis* (Chitwood, 1934) Bursey and Goldberg, 1998. This species was described from the large intestine of *Anolis conspersus* Garman, 1887 from Grand Cayman Island, British West Indies. Other species reported from lizards in the Neotropical Realm include *S. antillarum* Baruš and Coy Otero, 1974, *S. cubensis* (Read and Amrein, 1953) Skrzjabin, Schikhobalova and Lagodovskaja, 1960, *S. maytacapaci* (Vicente and Ibáñez, 1968) Baruš and Coy Otero, 1974, *S. oxkutzcabiensis* (Chitwood, 1938) Skrzjabin and Schikhobalova and Lajodor-skaja, 1960 and *S. viracochai* (Freitas, Vicente and Ibáñez, 1968) Baruš and Coy Otero, 1974. The finding of *Spauligodon anolis* in *Anolis stratulus* from Puerto Rico constitutes a new host and geographic locality record. Voucher specimens are designated as USNPC No. 090926.00.

Four female *Parapharyngodon cubensis* (Baruš and Coy Otero, 1969) were found in the intestine of one *Anolis stratulus* (930614) taken from Guama, San German, La Parguera on 14 July 1993 and one male and female found in *A. cristatellus* (941007) from Isla Mayagües on 7 October 1994. This nematode has been reported from a large spectrum of reptiles throughout the West Indies. Baruš and Coy Otero, (1969), Baruš, (1973), and Coy Otero and Baruš, (1973, 1979) reported this parasite from several hosts in Cuba including lizards (*Ameiva auberi* Cocteau, 1838 or 1839, *Anolis allisoni* Barbour, 1828, *A. allogus* Barbour and Ramsden, 1919, *A. bartschi* Cochran, 1928, *A. bremeri* Barbour, 1914, *A. homolechis* Cope, 1864, *A. jubar* Schwartz, 1968, *A. lucius* Duméril and Bibron, 1837, *A. luteogularis* Noble and Hassler, 1935, *A. porcatus* Gray, 1840, *A. quadriocellifer* Barbour and Ramsden, 1919, *A. sagrei* Duméril and Bibron, 1837, *A. vermiculatus* Duméril and Bibron, 1837, *Gonatodes albogularis* Duméril and Bibron, 1836, *Hemidactylus brooki* Gray, 1845, *Leiocephalus carinatus* Gray, 1827, *L. cubensis* Grey, 1840, *L. marcopus* Cope, 1863, *Sphaerodactylus cinereus* Wagler, 1830, and *S. torrei* Barbour, 1914), snakes (*Alsophis cantherigerus* Bibron, 1840, *Trophidophis melanurus* Schlegel, 1837, and *T. semicinctus* Gundlach and Peters, 1865) and an amphisbaenid (*Amphisbaena cubana* Gundlach and Peters, 1878). Goldberg and Bursey, (1996a), Goldberg et al., (1996c), and Goldberg et al., (1998) reported *P. cubensis* from *Anolis baborucoensis* Noble and Hassler, 1933, *A. barahonae* Williams, 1962, *A. brevirostris* Bocourt, 1870, *A. chlorocyanus* Duméril and Bibron, 1837, *A. coelestinus* Cope, 1863, *A. cristatellus* Duméril and Bibron, 1837, *A. eugenegrahami* Schwartz, 1978, *A. monticola* Shreve, 1936, and *A. oculatus* Cope, 1879 from Hispaniola. Bundy et al., (1987) and Vogel and Bundy (1987) reported *Anolis grahami* Gray, 1845, *A. lineatopus* Gray, 1840, *A. sagrei* and *A. valencienni* Duméril and Bibron, 1837 as hosts from Jamaica. Hosts from the Lesser Antilles include *Anolis bimaculatus* Sparrman, 1784, *A. ferreus* Cope, 1864, *A. gingivinus* Cope, 1864, *A. lividus* Garman, 1888, *A. pogus*, *A. sabanus* Garman, 1887, *A. schwartzi*, and *A. watsi* Boulenger, 1894 (Dobson et al., 1992). Goldberg et al., (1996a) and Goldberg and Bursey (1996b) reported this nematode in *Anolis maynardi* from the Cayman Islands, Goldberg et al. (1996b) in *A. scriptus* Garman, 1888 from the Caicoas Islands and Goldberg et al. (1997) in *A. acutus* from St. Croix, U.S. Virgin Islands.

The finding of *P. cubensis* in *A. stratulus* and *A. cristatellus* from Puerto Rico are new geographic locality records and *A. stratulus* a new host record. Voucher specimens are deposited in the USNPC Nos. 090925.00 and 090924.00.

Additional helminthological investigations of reptiles from Puerto Rico are warranted in order to understand parasite-host ecology relationships, the systematics of the host and as a contribution to our knowledge of the helminth biogeography of Caribbean reptiles.

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