A New Host and Geographic Record for *Subulura nevadense* (Nematoda: Subuluroidea: Subuluridae) from Rio Grande Ground Squirrel, *Ictidomys parvidens* (Rodentia: Sciuromorpha: Sciuridae), from West Texas

Chris T. McAllister
Science and Mathematics Division, Eastern Oklahoma State College, Idabel, OK 74745

John M. Kinsella
HelmWest Laboratory, 2108 Hilda Avenue, Missoula, MT 59801

Abstract: There is only one report of any helminth parasite from Rio Grande ground squirrels, *Ictidomys parvidens*. In April 2020, an adult *I. parvidens* was found dead on the road in Tom Green County, Texas, and examined for parasites. It was found to harbor 27 individual nematodes, *Subulura nevadense*. Here, we report *S. nevadense* for the first time from this host as well as provide a new geographic record for this nematode.

Introduction

The Rio Grande ground squirrel, *Ictidomys parvidens* (Mearns, 1896) is a small to medium-sized member of the genus that occurs in the United States in southern New Mexico and throughout much of southern and western Texas, north to almost the Red River just east of the Panhandle, and east as far as Erath and Travis counties (Schmidly and Bradley 1994; Helgen et al. 2009). It is a burrowing species inhabiting sandy and gravelly soils of the desert grasslands sometimes associated with cactus flats, mesquite, and shrub species at elevations between 200 and 3,000 m (Young and Jones 1982; Schmidly and Bradley 1994). This ground squirrel feeds on larval and adult insects, green plants, forbs, and grasses (Zimmerman 1999).

Although there is information on the natural history and ecology of this ground squirrel (as formerly included as a subspecies of Mexican ground squirrel, *I. mexicanus parvidens* (see Young and Jones 1982), there is only one report concerning its helminth parasites. Eads and Hightower (1952) reported the only endoparasite as an unknown species of "microfilaria" nematode taken from one of 14 (7%) individuals (as *Citellus mexicanus*) trapped in southwest Texas. Here, we document a new host and geographic record for a nematode from *I. parvidens*.

Methods

On 30 April 2020, a single *I. parvidens* was found dead on the road in San Angelo, Tom Green County, Texas, and immediately examined for parasites. This specimen appeared to be recently killed and showed no sign of putrefaction. The pelage was vigorously brushed over a white enamel tray in an attempt to find ectoparasites. A mid-ventral incision was made from the anus to throat to expose the viscera and the gastrointestinal tract and associated organs were placed in individual Petri dishes containing 0.9% saline. Feces from the rectum was collected and placed in an individual vial

containing 2.5% (w/v) potassium dichromate ($K_2Cr_2O_7$) and, after flotation in Sheather's sugar solution (sp. gr. 1.30), examined for coccidians and parasite ova by brightfield microscopy. Visceral contents were examined at 20 to 30× under a stereomicroscope and parasites found were rinsed of mucus. Nematodes were fixed in near boiling water and preserved in 70% (v/v) ethanol. They were later cleared and identified in temporary mounts of lacto-phenol and then returned to the preservative.

A host photovoucher was deposited in the EOSC collection, Idabel, Oklahoma. Voucher specimens of nematodes were deposited in the Harold W. Manter Laboratory of Parasitology (HWML), University of Nebraska, Lincoln, Nebraska.

Results

Twenty-seven nematodes were found in the small intestine and cecum of this ground squirrel. There were no ectoparasites present nor was this individual passing coccidian oocysts. Information on the nematode species follows.

Nematoda: Subuluroidea: Subuluridae

Subulura nevadense Babero, 1973 (Fig. 1)

Type host(s): White-tailed antelope squirrel, *Ammosphermophilus leucurus* (Merriam, 1889). Round-tailed ground squirrel, *Xerospermophilus tereticaudus* (Baird, 1858); Babero (1973) did not designate either species as type host.

Type specimen: USNM Helm. Coll. No. 70547.

Type localities: Clark, Lincoln, and Nye counties, Nevada; Babero (1973) did not designate any site within these counties as the type locality.

Prevalence and intensity: Not given (Babero 1973).

Site of infection: Cecum.

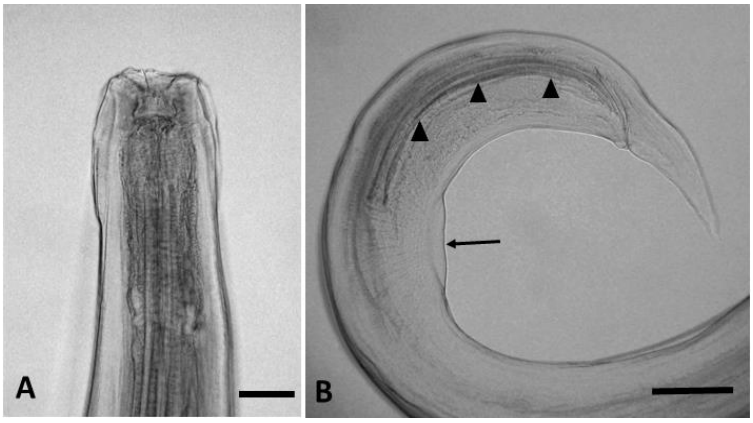
Other host and locality: Richardson's ground squirrel, *Urocitellus richardsonii* (Sabine, 1822), Beaverhead County, Montana (see Ubelaker et al. 2007).

New host: Rio Grande ground squirrel, *Ictidomys parvidens* (Mearns, 1896), adult lactating female.

Specimens deposited: HWML 112104.

Locality: USA: Texas: Tom Green County, San Angelo off Country Club Road (31° 22' 15.6252'' N, -100° 28' 22.1448'' W).

Prevalence and intensity: 1/1 (100%); 18 fourth-stage larvae, six females, and 3 males.



Figures 1A-B. *Subulura nevadense* from *Ictidomys parvidens*. (A) Female, anterior end showing buccal capsule; scale bar = 50 µm. (B) Posterior end of male showing spicules (arrowheads) and preanal sucker (arrow); scale bar = 200 µm.

Site of infection: Small intestine and cecum.

Remarks: Gravid females were 30 mm long and a single male was 20 mm long; spicule length ranged from 795 to 975 µm (mean 910) in three males. These measurements fit the description of *S. nevadense* given by Babero (1975).

Discussion

There are only two recognized species of *Subulura* from North American ground squirrels, *S. nevadense* and *S. novomexicanus* Ubelaker, Easter-Taylor, Marshall, and Duszynski, 2007 (Ubelaker et al. 2007). The latter was described from spotted ground squirrel, *Xerospermophilus spilosoma* Bennett, 1833, from Socorro County, New Mexico (Ubelaker et al. 2007, 2010). It differs from *S. nevadense* in being longer, having a larger egg size, and smaller spicules.

Acknowledgments

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References

Babero BB. 1973. Nematodes of Nevada ground squirrels, with description of two new species. Trans Amer Microsc Soc 92:265–272.

Eads RB, Hightower BG. 1952. Blood parasites of southwest Texas rodents. J Parasitol 38:89–90.

Helgen KM, Cole FR, Helgen LE, Wilson DE. 2009. Generic revision in the Holarctic ground squirrel genus *Spermophilus*. J Mamm 90:270–305.

Schmidly DJ, Bradley RD. 1994. The mammals of Texas. Seventh Edition. Austin (TX): University of Texas Press. 694 p.

Ubelaker JE, Chudri SI, Clifford PP, Duszynski DW. 2010. Helminth parasites of the spottedground squirrel, *Xerospermophilus* (syn. *Spermophilus*) *spilosoma* (Bennett, 1833) Helgen, Cole, Helgen, and Wilson, 2009, from Central New Mexico, U.S.A. Comp Parasitol 77:178–182.

Ubelaker JE, Easter-Taylor R, Marshall A, Duszynski DW. 2007. A new species of *Subulura* (Nematoda: Subuluroidea) from ground squirrels, *Spermophilus spilosoma* Bennett, 1833, in New Mexico. J Parasitol 93:1199–1201.

Young CJ, Jones JK Jr. 1982. *Spermophilus mexicanus*. Mamm Spec 164:1–4.

Zimmerman EG. 1999. Mexican ground squirrel, *Spermophilus mexicanus*. In: Wilson DE, Ruff S, editors. The Smithsonian book of North American mammals. Washington (DC): Smithsonian Institution Press. p. 422–423.

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