

# ***Isospora scinci* (Apicomplexa: Eimeriidae) from Five-Lined Skinks, *Plestiodon fasciatus* (Sauria: Scincidae): Additional Records from Arkansas and First Report from Oklahoma**

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A moderate amount of information is available on coccidian parasites (Apicomplexa) of snakes of Oklahoma (McAllister et al. 1995, 2011, 2013), and, although another reptile from the state, the ground skink (*Scincella lateralis*) has been thoroughly surveyed (McAllister et al. 1994, 2014), nothing, to our knowledge, has been published on coccidia of any lizard in Oklahoma. Yet, Oklahoma supports 19 species and subspecies of lizards in its diverse habitats (Sievert and Sievert 2011). Here we report, for the first time, a species of coccidian from the five-lined skink, *Plestiodon fasciatus* (L.) from Oklahoma and add information on this coccidian from additional isolates obtained from *P. fasciatus* from Arkansas.

Between February 2010 and August 2014, 37 juvenile and adult (mean  $\pm$  1SD snout-vent length [SVL] = 57.6  $\pm$  10.5, range 40-74 mm) *P. fasciatus* were collected by hand from McCurtain County, Oklahoma ( $n = 14$ ) and Bradley ( $n = 1$ ), Calhoun ( $n = 2$ ), Faulkner ( $n = 1$ ), Greene ( $n = 1$ ), Hempstead ( $n = 1$ ), Marion ( $n = 2$ ), Searcy ( $n = 1$ ), and Union ( $n = 14$ ) counties, Arkansas. Fresh fecal samples were collected from the rectum of each

individual for examination of coccidia and placed in individual vials containing 2.5% (w/v) aqueous potassium dichromate ( $K_2Cr_2O_7$ ). They were examined by light microscopy after flotation in Sheather's sugar solution (specific gravity = 1.30). Measurements were taken on 5–30 sporulated oocysts from three lizards using a calibrated ocular micrometer and reported in micrometres ( $\mu$ m) with means followed by the ranges in parentheses; photographs were taken using Nomarski interference-contrast optics. Oocysts were up to ~257 days old when measured and photographed. Descriptions of oocysts and sporocysts follow guidelines of Wilber et al. (1998) as follows: oocyst length (L) and width (W), their ranges and ratios (L/W), micropyle (M), oocyst residuum (OR), polar granule(s) (PG), sporocyst length (L) and width (W), their ranges and ratio (L/W), sporocyst (SP), Stieda body (SB), substieda body (SSB), parastieda body (PSB), sporocyst residuum (SR). Photovouchers of the parasites are deposited in the Harold W. Manter Laboratory of Parasitology (HWML), Lincoln, Nebraska. Host vouchers are deposited in the

**Table 1.** Select measurements for oocysts and sporocysts of *Isoospora scinci* from *Plestiodon fasciatus*.

Isolate (no. oocysts measured)	Oocysts	Sporocysts	Reference
	(L × W) μm (mean L/W ratio)	(L × W) μm (mean L/W ratio)	
Van Buren Co., AR (n = 25)	26.5 × 24.3 (22–31 × 18–27) (1.1)	14.9 × 10.4 (12–16 × 9–12) (1.4)	Upton et al. (1991)*
Bradley Co., AR (n = 20)	25.3 × 22.9 (23–27 × 22–24) (1.1)	13.3 × 8.6 (12–14 × 8–10) (1.5)	This report
Marion Co., AR (n = 5)	25.1 × 23.3 (22–27 × 21–25) (1.1)	14.4 × 8.9 (13–16 × 8–10) (1.6)	This report
McCurtain Co., OK (n = 30)	26.0 × 22.9 (24–31 × 21–25) (1.1)	13.8 × 9.2 (11–16 × 8–10) (1.5)	This report

\*Original description

Arkansas State University Museum of Zoology (ASUMZ) Herpetological Collection, State University, Arkansas. Lizard taxonomy follows the TIGR reptile database (Uetz and Hošek 2014).

Two (14%) *P. fasciatus* (two males, 71 and 65 mm SVL) collected on 4 July 2013 and 15 September 2014 from Hochatown, McCurtain County, Oklahoma (34.171321°N, 94.751792°W) was found to be passing sporulated oocysts (Fig. 1A) matching the description of *Isoospora scinci* Upton, McAllister and Trauth, 1991 (Upton et al. 1991). Oocysts (n = 30) were ovoidal, (L × W) 26.2 × 22.8 (24–31 × 21–25) with a L/W ratio of 1.1 (1.0–1.3); a M, OR and PG were absent. The oocyst wall was smooth and bilayered, measuring 1.0 (inner 0.4, outer 0.6). SP were ovoidal with a distinct point on the end opposite the SB, 13.8 × 9.2 (11–16 × 8–10) with a L/W ratio of 1.5 (1.3–1.7). A SB with a distinct knob was present as well as a distinct SSB; PSB absent. The SR was composed of dispersed granules. When compared to the original description of *I. scinci* from *P. fasciatus* from Arkansas (Table 1), measurements were well within the ranges reported except for SP width, which was slightly smaller (9.2 [8–10] vs. 10.4 [9–12] μm) in our isolate.

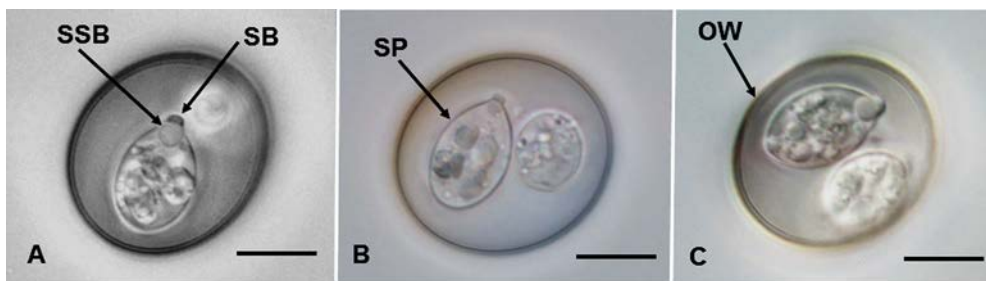
Of the 23 five-lined skinks from Arkansas, two (9%) *P. fasciatus*, one (male, 74 mm SVL) collected on 1 May 2013 from 1 km N

of Ouachita River at US 63, Bradley County (33.311446°N, 92.34189°W) and the other (female, 58 mm SVL) collected on 14 June 2013 from Mull off 448 St. Hwy 268E, Marion County (36.080216°N, 92.597427°W) were also found to be passing oocysts of *I. scinci* (Table 1, Figs. 1B, C). *Isoospora scinci* was originally described from three of 13 (23%) *P. fasciatus* from Arkansas (Upton et al. 1991). In addition, McAllister et al. (1994) reported *I. scinci* from one of four (25%) broadhead skinks, *Plestiodon laticeps* from Arkansas. Prevalence of infection with this coccidian was reported to be moderate (23%) in Arkansas *P. fasciatus* (Upton et al. 1991; McAllister et al. 1994) while in the current study, it was much lower (9%) in our sample of *P. fasciatus* from the state. However, measurements of these two isolates from Arkansas *P. fasciatus* were within the ranges reported for *I. scinci* (Table 1).

In summary, we document *I. scinci* in Oklahoma for the first time. More importantly, this is the initial coccidian reported from any lizard of the state. Additional surveys are certainly warranted on other lizards which should increase our knowledge of the coccidian biodiversity of Oklahoma and the southwestern U.S.

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**Figure 1.** Three isolates of *Isospora scinci* from *Plestiodon fasciatus*. **A.** HWML 75059 from McCurtain County, Oklahoma. **B.** HWML 75060 from Bradley County, Arkansas. **C.** HWML 75061 from Marion County, Arkansas. Abbreviations: OW (oocyst wall); SP (sporocyst); SB (Stieda body); SSB (substieda body). Scale bars = 10  $\mu$ m.

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