

Isospora arabica n. sp. (Apicomplexa: Eimeriidae) from the
Ocellated Skink, *Chalcides ocellatus* (Lacertilia: Scincidae)
from Saudi Arabia

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ABSTRACT. In this study, a new species of *Isospora* parasitizing desert skinks capture in Riyadh region (Saudi Arabia) is described. Sporulated oocysts of this isosporan are subspheroidal 32.5×25 ($27.5-34 \times 24.5-26.5$) μm with a 2-layered wall. A micropyle, oocyst residuum and polar granules are absent. Sporocysts are ovoid, measuring 19×13.5 ($17.5-21 \times 11-14.5$) μm with a distinct Stieda body at the narrower end. The sporozoites lie head to tail around a diffuse sporocysts residuum composed of large granules.

Introduction

Little is known about the coccidia of Saudi Arabia. The first attempt to throw some light on this matter was made by Kawasmeh and El-Bihari^[1]; further thoughts on mammals were given recently by Kasim and Al-Shawa^[2-4]; Kasim, Hussein and Al-Shawa^[5]; Kasim and Al-Shawa^[6]; Hussein, Kasim and Al-Shawa^[7]; Kasim and Al-Shawa^[8]; on birds, Amoudi^[9,10]; Amoudi^[11,12]; Amoudi^[13]; on reptiles, Amoudi^[14,15]; Kasim and Al-Shawa^[16].

During a limited survey for coccidian infections in some of the reptiles in Riyadh region between May and July, 1989, 18 specimens of the desert skink *Chalcides ocellatus* were captured alive. Upon examination of the desert skinks, 7 were found to have coccidian oocysts in their feces and intestinal contents. Detailed examination of the sporulated oocysts revealed an apparently new species of *Isospora* which does not resemble either any other species described from *Chalcides ocellatus* or the published descriptions of any species of *Isospora* found in other reptiles.

Material and Methods

The skinks were brought alive to the laboratory at King Saud University; they were kept separately in small tanks (measuring 35 × 30 × 30 cm) containing a substratum of sand. Fecal samples from each animal were collected, diluted and divided into two portions; one portion was examined by Sheather's solution floatation technique^[17]. Only seven of the ocellated skink examined were found to be slightly infected with a species of *Isospora* which is reported here as a new form. The other portion was placed in 2.5% potassium dichromate (K₂CR₂O₇) solution, mixed thoroughly, poured as a thin layer in petri dishes and kept at 25°C to determine the sporulation time. The oocysts were examined microscopically using a Zeiss Universal Photomicroscope III equipped with a 100X planapochromatic oil immersion objective. The oocysts were measured with a calibrated ocular micrometer and photographed with Panatomic X 35 mm film. The oocyst drawing was made by use of a camera lucida. Measurements are given in micrometers (μm) as ranges followed by the mean and ± SE in parentheses.

Results

Isospora arabica n. sp. (Fig. 1-3)

Description

(n = 20), oocysts sub-spheroidal measuring 27.5-34 × 24.5-26.5 (32.5 ± SE 0.37 × 25 ± SE 0.13) μm; shape index (length/width) 1.12-1.34 (1.28 ± SE 0.01). The wall is 1.0-1.4 (1.3 ± SE 0.03) μm thick and composed of a coarse outer layer which becomes detached from part of the oocysts. Oocysts lack a micropyle, polar granules, and an oocyst residuum. Sporocysts ovoid 17.5-21 × 11-14.5 (19 ± SE 0.14 × 13.5 ± SE 0.13) μm shape index (length/width) 1.33-1.59 (1.43 ± SE 0.01) μm; the wall con-

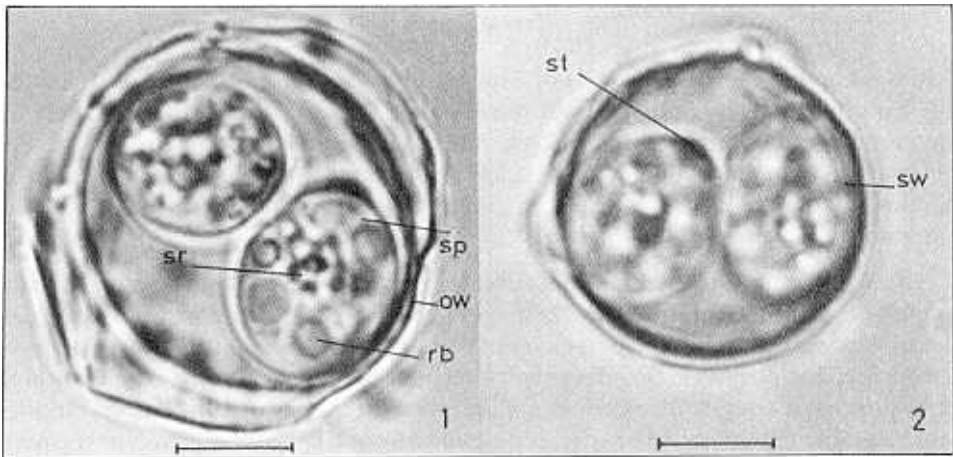
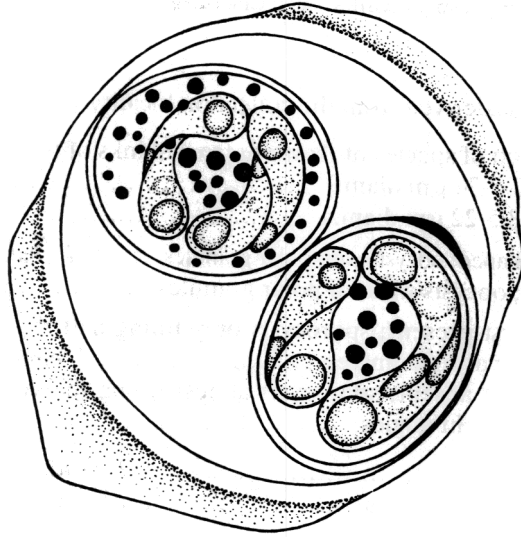


FIG. 1, 2. Photomicrographs of living, sporulated oocysts of *I. arabica* n. sp. ow, oocyst wall; rb, refractile body; sp, sporozoite; sr, sporocysts residuum; sw, sporocyst wall; st, Stieda body.



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FIG. 3. Line drawing of living, sporulated oocysts of *I. arabica* n. sp. by camera lucida (bar = 10 μ m).

sists of a single layer, 0.4-0.7 ($0.5 \pm SE 0.02$) μ m thick; sporocysts with a Stieda body on the narrower end and a fairly large residuum consisting of diffuse granules. The sporozoites lie ahead to tail and carry large and of small refractile bodies at the broad and narrow ends, respectively.

Type Host

Desert Skink *Chalcides ocellatus* Forsskal, 1775.

Type Specimens

Oocysts (preserved in 10% formalin) were deposited in the Collection of the King Saud University, College of Science, Riyadh (KSUC. 25623), July 22, 1989.

Location in Host

Unknown, oocysts recovered from intestinal contents and feces.

Sporulation Time

2 days at 25°C.

Type Locality

85 km north of Riyadh, Saudi Arabia

Prevalence

7/18 (~ 39%) of the Desert Skinks were discharging oocysts in their feces

Etymology

The specific name is derived from the collection locality, Arabia.

Key to identification of species of *Isospora* from skinks of the genus *Chalcides*.

1. Oocysts large, (27.5-34 μm diam.) *I. arabica* n. sp.
Oocysts small, (18.5-22 μm diam.) 2
2. Sporocysts lemon-shaped; oocysts with polar granules *I. chalcidis* Amoudi, 1989
Sporocysts ovoid; oocysts without polar granules 3
3. Micropyle of oocyst present; sporocysts only filling half the volume inside the oocyst and crossing at right angles *I. eimanae* Amoudi, 1989
Micropyle of oocyst absent; sporocysts almost filling the volume of the oocyst and not crossing at right angles 4
4. Oocyst wall smooth *I. viridanae* Matuschka, 1989
Oocyst wall thick with 2 layers *I. camillerii* Hagenmuller, 1898

Discussion

Thirty four species of *Isospora* have been described from lacertilian hosts, thirty two of which were reviewed recently by Matuschka and Bannert^[18] and Matuschka^[19]. However, only three species of *Isospora* are known from *C. ocellatus* [*I. camillerii*^[20] syn. *Diplospora camillerii*^[21], *I. chalcidis*^[14] and *I. eimanae*^[14]], and only one additional species has been reported from other species of the same host genus *Chalcides* [*I. viridanae*^[19]]. By comparing the isosporan species from lacertilian hosts, I found only four species whose oocysts approach the size of those of *I. arabica*. However, there are some significant differences. The oocysts of *I. arabica* differ from those of each of these four species as follows: from oocysts of *I. basilisci*^[22] in being subspheroidal rather than ellipsoidal, having a double-layered wall rather than a single-layered wall and in lacking polar granules rather than with polar granules; sporocysts of *I. arabica* differ from those of *I. basilisci* in being ovoid rather than ellipsoidal: from oocysts of *I. mesnili*^[20] in being slightly larger and having ovoid rather than pyriform sporocysts: from those of *I. tarentolae*^[23] in being much larger (32.5 \times 25 μm compared to 26.9 \times 24.7 μm): sporocysts of *I. arabica* measure 19 by 13.5 μm , making them clearly larger than the sporocysts of *I. tarentolae* (13.8 by 10.2 μm); in addition, their shape is ovoid rather than lemon-shaped as reported for *I. tarentolae*: oocysts of *I. arabica* also differ from those of *I. calotesi*^[24] in lacking an oocyst micropyle or polar granules, and the sporocysts are ovoid rather than ellipsoidal. In addition to differences noted above, *I. arabica* is distinct from all four *Isospora* species mentioned above in terms of both host and geographic distributions.

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وصف نوع جديد من الطفيليات الأولية من جنس الايزوسبورا (ايزوسبورا أرابيكا) التابع لعائلة إيميريديا المتطفل على السحالي الصحراوية كالسيدس اوسلاتس من العائلة السقنقورية في المملكة العربية السعودية

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المستخلص . دلت الدراسة على وجود نوع جديد من الأوليات الطفيلية لجنس الايزوسبورا *Isoospora spp.* من السحالي الصحراوية من العائلة السقنقورية Skinks الموجودة بمنطقة الرياض . وقد دل الوصف المجهرى الدقيق أن الكيس الجرثومي لهذا الطفيلي شبه مستدير يتراوح قطره بين ٢٧,٥-٣٤,٥ × ٢٤,٥-٢٦,٥ ميكرون ، أي إن متوسط قطره هو ٣٢,٥ × ٢٥ ميكرون . كما أن له جدارين سمكهما ١,٣ ميكرون ، ولا يحتوي الكيس الجرثومي على نقر micropyle ولا حشوة سيتوبلازمية ولا على اقطاب حبيبية ، ويوجد بداخل الكيس الجرثومي كيسين بوغيين لها شكل بيضاوي طول كل منهما يتراوح بين ١٧,٥-٢١ × ١١-١٤,٥ ميكرون أي بمتوسط قدره ١٩ × ١٣,٥ ميكرون . وللكيس البوغي استديا واضحة في مقدمة الكيس البوغي عند الطرف المدبب . وتتخذ الأبواغ الجرثومية في كل كيس بوغي وضع طولي متعاكس بحيث يكون رأس أحد البوغين مع ذيل البوغ الآخر ، ويحيط بهما حشوة سيتوبلازمية مبعثرة مكونة من حبيبات كبيرة .