Caryospora kalimantanensis sp. n. (Apicomplexa: Eimeriidae) from the mangrove snake Boiga dendrophila (Serpentes: Boiginae) from Kalimantan

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Abstract. A new coccidian parasite of the genus Caryospora Léger is described from the colubrid snake Boiga dendrophila Boie, 1827 imported from Kalimantan. Oocysts of Caryospora kalimantanensis sp. n. are spherical, 18.7 (17.0–20.0) μm in diameter, with a bilayered slightly pitted and brownish oocyst wall. A micropyle and oocyst residuum are absent. One globular polar granule is present in 45% of sporulated oocysts. Sporocysts are ovoidal to ellipsoidal, 14.5 (13.0–15.5) × 10.5 (10.0–11.0) μm, with prominent Stieda and substieda bodies. Sporocyst residuum is present as small granules scattered among sporozoites. Sporozoites are elongate, lying lengthwise and parallel within the sporocyst and completely filling the sporocyst. Each sporozoite contains a spherical anterior and posterior refractile bodies.

Forty one species of the genus Caryospora Léger, 1904 have been described from reptilian hosts (Upton et al. 1986, 1992a,b, 1994, Lainson et al. 1991, Modrý and Koudela 1994). Although hundreds of mangrove snakes, Boiga dendrophila Boie, are imported into Europe and the USA each year, no coccidian species has been described from this snake. In this paper, a Caryospora species is reported for the first time from mangrove snakes and is described as new.

MATERIALS AND METHODS

In May 1995, an adult mangrove snake, Boiga dendrophila (Serpentes, Colubridae, Boiginae), was caught by hand in the rain forest area of the State of Sabah in Kalimantan by the Czech zoologist Vílem Borůvka. The animal was imported into the Czech Republic, where it was singly housed in a private reptile collection.

Faecal samples were placed in 2.5% (w/v) potassium dichromate solution and submitted for parasitological examination to the Department of Parasitology, University of Veterinary and Pharmaceutical Sciences in Brno four months after the import. Samples were screened routinely for parasites using flotation in Sheather’s sugar solution, and were found to contain sporulated coccidian oocysts. Thirty sporulated oocysts were measured using bright-field microscopy (100 × objective), equipped with a calibrated ocular micrometer to obtain morphologic data. All measurements are given in micrometers (μm), given as the mean followed by the range in parentheses. Isolated oocysts were examined and photographed using Nomarski interference contrast (NIC) microscopy.

RESULTS

The examined snake was found to be passing numerous caryosporan oocysts. Closer examinations revealed the oocysts to represent a previously undescribed species of the genus Caryospora, whose description is provided below.

Caryospora kalimantanensis sp. n. Figs. 1–4

Oocysts spherical, 18.7 (17.0–20.0), with brownish and bilayered oocyst wall ca. 1.5 thick. Outer layer slightly pitted, 1.0 thick. Micropyle and oocyst residuum absent. One globular polar granule, 2.0 in diameter, present in 45.4% of sporulated oocysts. Sporocysts ovoidal to ellipsoidal, 14.5 (13.0–15.5) × 10.5 (10.0–11.0), with smooth, colourless and unilayered sporocyst wall; shape index (length/width) 1.39 : 1 (1.2–1.5 : 1). Stieda body present, dome-like, 1.0–1.5 high and 2.0 wide. Homogenous substieda body present, 1.0–1.5 high and 2.0–2.5 wide. Sporocyst residuum

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Figs. 1–2. Nomarski interference contrast (NIC) photographs of sporulated oocyst of *Caryospora kalimantanensis* sp. n. **Fig. 1.** Longitudinal view of oocyst demonstrating Stieda (SB), substieda (SSB) bodies and refractile bodies (RB), and slightly pitted oocyst wall. Scale bar = 5 μm. **Fig. 2.** Apical view of oocyst demonstrating Stieda (SB) and substieda (SSB) bodies and polar granule (PG) attached to the inner surface of the oocyst wall. Scale bar = 5 μm.

Figs. 3–4. Composite line drawings of sporulated oocyst of *Caryospora kalimantanensis* sp. n. **Fig. 3.** Lateral aspect of sporocyst. **Fig. 4.** Sporocyst turned upside down. Scale bar = 10 μm.
present as small granules of irregular size scattered among sporozoites. Sporozoites elongate, 11.8 (10.0 to 13.5) \( \times \) 2.8 (2.0–3.5) (in situ) lying lengthwise and parallel within sporocyst. Each sporozoite with prominent spherical anterior and posterior body. Single, spherical nucleus located centrally between refractile bodies.

**Type host**: Mangrove snake *Boiga dendrophila* Boie, 1827 (Serpentes: Colubridae, Boiginae)

**Type locality**: Malaysia, Kalimantan, State of Sabah – lowland rainforest area, alt. ca. 350 m.

**Type specimens**: Phototypes deposited in the Institute of Parasitology, Academy of Sciences of the Czech Republic in České Budějovice, collection No. R 295/95. Symbiotype was not preserved as the snake is still alive in a private herpetological collection.

**Site of infection**: Unknown, oocysts recovered from faeces.

**Sporulation**: Unknown but probably exogenous. Twenty four hours after defecation, when the faeces were examined for the first time, about 90% of oocysts were fully sporulated.

**Etymology**: The specific epithet, *kalimantanensis*, is derived from the name of the island where the host was caught – Kalimantan.

**DISCUSSION**

Forty one species of the genus *Caryospora* have been reported previously from reptilian hosts and twenty six were described from snakes belonging to the family Colubridae (Upton et al. 1986, 1992a,b, 1994, Lainson et al. 1991, Modry and Koudela 1994).


However, only *C. brygoii*, *C. heterodermus* and *C. serpentis* are known to have bilayered oocyst wall pitted externally (Upton et al. 1990, 1992a). Only one of these species, *C. serpentis*, has a similar mean sporocyst size as *C. kalimantanensis* (see Upton et al. 1990), whereas *C. brygoii* (Upton et al. 1990) and *C. heterodermus* (Upton et al. 1992a) have larger sporocysts.

Oocysts of *C. serpentis* are distinctive because there sporocysts have different attributes of Stieda and sub-stieda bodies and more clustered sporocyst residuum (Upton et al. 1990). In addition, the host and the geographical distribution distinguish *C. kalimantanensis* from all hitherto described *Caryospora* species from snakes. Therefore, *C. kalimantanensis* is considered to be a new species.

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**REFERENCES**


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