

**A NEW SPECIES OF *OCHORISTICA* (EUCESTODA: CYCLOPHYL-
LIDEA) PARASITE OF *AGAMA MUTABILIS* (REPTILIA: AGAMIDAE)
FROM EGYPT**

By

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Abstract

The morphological and morphometric characterization of *Oochoristica mutabili*, an anoplocephalid cestode infecting the small intestine of the Egyptian changeable lizard, *Agama mutabilis* (F: Agamidae) in South Sinai were described by light and scanning electron microscopy as a first description from this host in Egypt. Ten out of fifty six (17.9%) of the examined specimens were infected with *Oochoristica*. Strobila was 14.6 (11.5-22.3) mm long; composed of 34 (30-45) proglottids; 7 (6-11) undifferentiated, 8 (6-10) contained sexual primordia, 14 (13-20) mature and 5 (3-9) gravid. Scolex 324 (300-360) μ m wide with four circular suckers measuring 100 (97-124) μ m in diameter; neck region is evident. Genital pores irregularly alternating, situated in the anterior quarter of proglottid; testes in median mass situated in the posterior half of proglottid extending laterally to vitellarium; ovary bilobed and situated in the centre of proglottid, vitellaria entire, slightly wider than one lobe of the ovary. Gravid proglottids contained in a uterine capsule containing numerous oncospheres. The described parasite is compared with different species of the same genus from different hosts, it was found that morphometrically the present species was more or less different from the comparable species and the only morphologically similar species was *O. parvovaria*. Both species were similar in the presence of the cirrus sac, which lied anterior to the ovary, and the bilobed ovary situated in the center of proglottids. However, it can be differentiated by possessing more proglottids, fewer testes, and the lack of primordial development in immature proglottids of the comparable species.

Key words: Egypt, South Sinai, Lizard, *Agama mutabilis*, Cestode, *Oochoristica mutabili* n.sp.

Introduction

Generally, adult cestodes inhabit the intestines of their hosts, being anchored to intestinal wall by the type-specific holdfast organs (Basse, 2011). The

genus *Oochoristica* (Luhe, 1898) is a large complex of species parasitizing more than 56 species of reptiles and mammals (Kennedy *et al*, 1982; Bursley and Goldberg, 1996a, b; Bursley *et al*, 1996, 1997; Brooks *et al*, 1999).

Forty-six species infect lizards worldwide of which 7 species were described from annelid, gekkonid, iguanid, scincid, and teiid lizards of North America. These include *Oochoristica anolis* (Harwood, 1932) in the green anole (*Anolis carolinensis*) from Texas; *O. eumecis* (Harwood, 1932) in the five-lined skink (*Eumeces fasciatus*) from Texas; *O. parvula* (Stunkard, 1938) in the banded gecko (*Coleonyx elegans*) from the Yucatan, Mexico; *O. parvovaria* (Steelman, 1939) in the Texas horned lizard (*Phrynosoma cornutum*) from Oklahoma; *O. bivitellobata* (Loewen, 1940) in the prairie-lined race runner (*Cnemidophorus sexlineatus viridis*) from Kansas; *O. anniellae* (Stunkard and Lynch 1944) in the black legless lizard (*Anniella pulchra nigra*) from California and *O. scelopori* (Voge and Fox, 1950) in the northwestern fence lizard (*Sceloporus occidentalis occidentalis*) from California. The anoplocephalid parasitize lizards, snakes, turtles, and a few marsupials (Schmidt, 1986; Beveridge, 1994).

The present study described a species of *Oochoristica* infecting the small intestine of the Egyptian changeable lizard, *Agama mutabilis* from South Sinai as a new host record based on descriptive morphology by using the light and scanning electron microscopy (SEM).

Materials and Methods

Fifty six specimens of the Egyptian changeable lizard, *Agama mutabilis* (F: Agamidae) were examined for cestode parasites. Lizards were collected by hand or noose from south Sinai, Egypt during the period from February to Oc-

tober 2012. Each lizard was killed within 8-24 hr after capture with an intra-peritoneal injection of a dilute solution of sodium pentobarbital or exposure to chloroform, fixed in 10% formalin and stored in 70% ethanol.

After dissection, cestodes were isolated in an isotonic saline solution (7%) in a Petri dish and left to relax between two slides in the fixative, washed with distilled water to remove excess fixative and then stained in acetic acid alum carmine (Carleton, 1967) for 5-10 min for permanent whole mount preparations. Dehydration was done by passing the specimens in ascending series of ethanol. Specimens were cleared in clove oil and xylene then mounted in Canada balsam (Ergens, 1969). Drawings were made with the help of a Zeiss microscope supplied with a phase contrast unit. Prevalence, mean abundance and morphometric measurements followed the guidelines of Bush *et al.* (1997), minimum and maximum values were given, followed in parentheses by the arithmetic mean. Measurements are in micrometers unless otherwise stated.

For SEM, specimens were fixed in 4% buffered glutaraldehyde, washed in cacodylate buffer and dehydrated in ascending alcohol series. After passing in an ascending series of Genosolv-D, they were processed in a critical point drier "Bomer-900" with freon 13 and sputter coated with gold-palladium in a Technics Hummer V and examined with an Etec Autoscan at 20 kV Jeol scanning EM.

Results

Ten out of fifty six (17.9%) specimens

of the Egyptian changeable lizard, *Agama mutabilis* were infected with cestodes of the genus *Oochoristica* (Luhe, 1898).

Description based on ten specimens (Figs. 1-5): Strobila flat with a total length 14.6 (11.5-22.3) mm; each includes 34 (30-45) proglottids; 7 (6-11) undifferentiated, 8 (6-10) with sexual primordia, 14 (13-20) mature and 5 (3-9) gravid. Scolex 324 (300-360) μm with 4 circular suckers measuring 100 (97-124) μm in diameter, and with neck region. Undifferentiated proglottids distinctly wider than long; mature proglottids (n=20) 627 (478-884) μm long x 526 (403-624) μm wide. Genital pores irregularly alternating and situated in the anterior quarter of proglottid; genital atrium was somewhat muscular. Testes (n=14) 33 (24-36) μm in median mass situated in the posterior half of proglottid, 36 (31-40) μm in diameter, extended laterally to vitellarium. Vas deferens, initially coiled, runs laterally to middle of segment then turned posteriorly to pass between lobes of ovary. Ovary bilobed situated in the proglottid centre; vitellaria entire slightly wider than one lobe of the ovary. Gravid proglottids (n=5) 853 (639-1,014) long x 355 (326-368) μm wide with numerous oncospheres (n=10) measuring 39 (36-41) long x 25 (23-27) μm wide, each oncosphere contained in a uterine capsule with a diameter of 54 (49-60) μm .

Taxonomic summary:

Type host: *Agama mutabilis* (Reptilia: Agamidae).

Type locality: South Sinai, Egypt.

Infection site: Small intestine.

Prevalence: 10 out of 56 (17.9%).

Type specimen: Slides deposited at the Zoology Museum, Department of Zoology, Faculty of Science, Ain Shams University, Egypt.

Etymology: Specific name *mutabili* is derived from that of the type host.

Discussion

The present cestode belongs to genus *Oochoristica* (Luhe, 1898), order Anoplocephalidae (Cholodkovsky, 1902), class Eucestoda (Wardle *et al*, 1974). *Oochoristica* species of lizards can be divided into 2 groups according to the length of the unsegmented region behind the scolex, traditionally termed neck. The first group contains 3 species without neck or a very short neck region: *O. anniellae* (Stunkard and Lynch, 1944) *O. crotaphyti* and *O. bivitellobata* (Loewen, 1940). The second group has a long neck region and consists of approximately 43 species (Tab. 1). The present species differs from *O. bivitellobata* in having an entire vitelline gland, more proglottids, and fewer and smaller testes and from *O. anniellae* in strobila length, scolex width, testes diameter, uterine capsule width and oncosphere hook length. But, *O. crotaphyti* can be differentiated from *O. anniellae* by possessing more proglottids, fewer testes, and a genital aperture in the anterior one fourth of the mature proglottids rather than in the anterior one-half, and by lacking primordial development in immature proglottids. The present species belongs to the second group of *Oochoristica* but it is only morphologically similar to *O. parvovaria* (Steelman, 1939), in the

presence of cirrus sac anterior to ovary, and bilobed ovary situated in the middle of proglottids. However, it differs in having more proglottids, fewer testes, and lack of primordial development in immature proglottids. The life cycle of the present parasite has not been studied. However, the basic host sequence in known life cycles includes tenebrionid beetles or other insect hosts alternating with various amniote definitive hosts (Conn, 1985). The life cycle of four *Oochoristica* species was reported. Millemann and Read (1953) reported that cysticercoids of *O. scelopori* formed in larvae or adults of tenebrionid beetle, *Tribolium confusum*. Hickman (1954; 1963) reported the life cycle of *O. vacuolata* from Australian scincid lizards, but didn't follow experimental infections of the definitive host. Widmer and Olsen (1967) reported that *O. osheroffi* metacestode developed in insects and followed cestode development in rattle snakes with immature proglottids.

Conclusion

From the outcome findings, the Sinai species, differs apparently from all the described *Oochoristica* species and thus considered a new species; *Oochoristica mutabili*.

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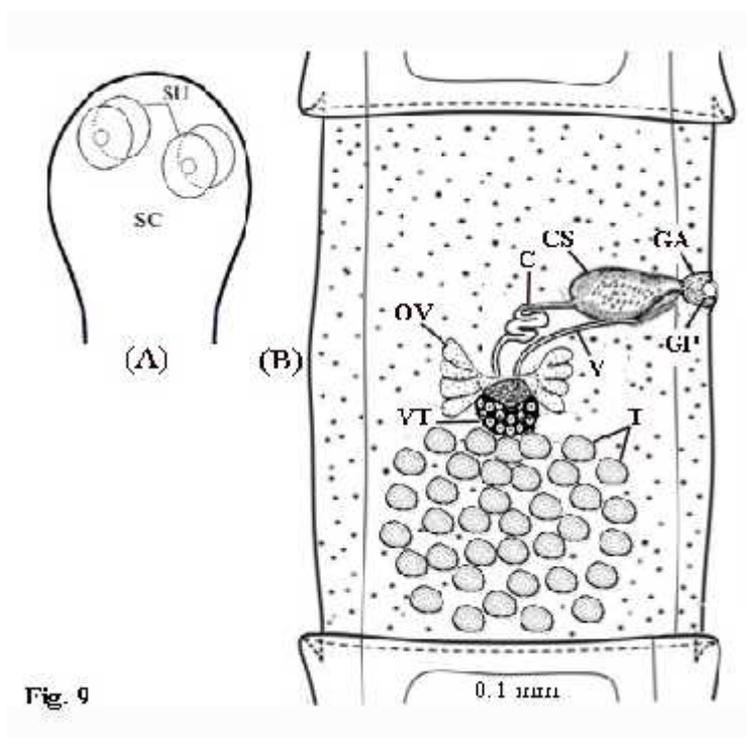
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Fig. 9 Line diagrams of *O. mutapili*: (A) Scolex, (B) Mature segment.



Explanation of figures

Figs. 1, 2: Scolex (SC) with circular suckers (SU) long neck (N) (X40, X160 respectively). Fig. 3: Immature proglottids immediately behind SC. with development of sexual primordia (X50). Fig. 4: Mature proglottids (MS) (X50). Fig. 5: Mature proglottid (MS) with a bilobed ovary (O), laterally to vitellaria (VT), mass of testis (T), vagina (V), cirrus (C), cirrus sac (SC), and genital pore (GP) (X170). Figs. 6, 7: High magnifications of MS, genital atrium (GA) (X400). Fig. 8: SEM showed scolex (SC) with two equal suckers (SU).

