

**ACANTHOSTOMUM SPINICEPS (DIGENEA: CRYPTOGONIMIDAE:
ACANTHOSTOMINAE), A PARASITE OF THE AFRICAN SNOOK *LATES
NILOTICUS* (PERCIFORMES: LATIDAE). A LIGHT AND SCANNING
ELECTRON MICROSCOPIC STUDY**

By

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Abstract

The morphology of the adult stage of *Acanthostomum spiniceps* recovered from the African snook, *Lates niloticus* (Perciformes: Latidae) of the river Nile, Egypt was studied with both light and scanning electron microscopy. The most important morphological features differentiating this species are the number of circumoral spines, body shape, ratio of body length to width, sucker sizes, and the presence or absence of spines on the ventral sucker. Sixteen out of forty fish (40%) was found to be naturally infected with this digenetic trematode belonging to family: Acanthostominae. The infection was recorded in the intestinal wall of the host fish. Body was elongate, 1.203-2.074 mm long, maximum width 0.311-0.534 mm. Oral sucker was terminal, funnel-shaped, 0.201-0.353 mm long and 0.245-0.310 mm wide. Simple peribuccal spines 0.042-0.066 mm long. Ventral sucker was circular, 0.110-0.140 mm long, 0.120-0.204 mm wide, situated approximately at 1/3 of body length. Ratio of oral and ventral suckers was 1: 0.5. Testes tandem or slightly diagonal, located near posterior end of body being of irregular rounded shape. Size of anterior testis was 0.130-0.220 mm long, 0.314-0.358 mm wide, that of posterior testis was 0.180-0.274 mm long, 0.390-0.327 mm wide. Ovary transversely oval, smaller than testes, measured 0.102-0.166 mm long, 0.100-0.164 mm wide, situated just anterior to anterior testis. By comparison with some of the previously described species of this genus, the present one showed all morphological characters and the most morphologically similar species was *A. spiniceps*.

Key words: *Acanthostomum spiniceps*, Acanthostominae, *Lates niloticus*, A light and scanning electron microscopic study.

Introduction

Lates niloticus is a species of freshwater fish of family Latidae of order Perciformes. It is widespread all over the Afrotropic ecozone. It was originally described as *Labrus niloticus*, among the marine wrasses, and also

referred to as *Centropomus niloticus*. Common names include African snook, capitaine, Victoria perch (a misleading trade name, as it is not native to Victoria Lake). It is silver in colour with a distinctive dark-black eye, with a bright-yellow outer ring. It reaches a

maximum length of nearly 2 m (more than 6 ft), weighing up to 200 kg. Adult Nile perch occupy all habitats of a lake with sufficient oxygen concentrations, while juveniles are restricted to shallow or nearshore environments.

Genus *Acanthostomum* was described by Braun (1899) as *Distomum* or *Scyphocephalum* while surveying trematodes infecting *Testudo matamata*. In Egypt, few studies were done on *Acanthostomum* infecting fish of the River Nile (Fischthal and Kuntz, 1963; Imam *et al.*, 1991; Soliman and El-Damarany, 1995). *A. spiniceps* was recorded from *Bagrus filamentosus* (Ariidae) by Tadoros *et al.* (1978) and from *Morone labrax* (Percichthyidae) by El-Shahawi and Al-Bassel (1992). This species was also recovered by Dollfus (1932) from *Bagrus filamentosus* (Ariidae) and *Chrysichthys furcatus* (Ariidae) from Mali and by Pogoreltseva (1952) from *Mullus barbatus ponticus* (Mullidae) from the Black Sea. Moravec (1976) redescribed *A. spiniceps* from *Bagrus docmac* (Ariidae) based on 41 specimens, observing great morphometric variability. They are characterized by elongated bodies, covered with fine spines, more distinct and more numerous on anterior portion of the body; and absent from the posterior quarter. Oral sucker armed with row of large, simple peribuccal spines, ventral one circular approximately at 1/3 of body length. Ratio of oral and ventral suckers 1: 0.5. Mansour (2012) in Egypt reported *A. spiniceps* in *Bagrus bayad* and *B. docmac* caught from the River Nile of Damietta branch at Dakahlia Governorate.

In the present study, the natural prevalence of *Acanthostomum spiniceps* (Digenea: Cryptogonimidae: Acanthostominae) was described during a recent survey from the African snook, *Lates niloticus*.

Materials and Methods

During the period from September 2012 to June 2013, forty specimens of the African snook, *Lates niloticus* (Perciformes: Latidae) were caught from a location along the River Nile at Beni Suef Governorate. They were kept alive in aquaria, immediately transported in water tanks to the research lab at the Zoology Department, Faculty of Science, Beni Suef University. Fish identification was based on Randall (1983) and modern names follow (Froese and Pauly, 2004). The alimentary canal was dissected and trematodes were carefully removed from the stomach and intestines washed out with normal saline and observed alive under a dissecting microscope. Some worms were fixed in alcohol-formalin-acetic acid (AFA) under a slight coverslip pressure and preserved in 75% ethanol. Whole-mounts were stained in alum carmine, cleared in xylene and mounted in Canada balsam. Identification of the digenea was carried out after Yamaguti (1971), Surekha and Lakshmi (2005). Illustrations were made using a drawing tube. 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. For SEM, specimens were fixed in 4%

buffered gluteraldehyde, washed in cacodylate buffer and dehydrated in ascending ethanol series. After passing through 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 SEM.

Results

Sixteen out of forty fish (40%) were naturally infected with *Acanthostomum spiniceps* of family: Acanthostominae. The infection was in the intestinal wall of the African snook, *Lates niloticus* (Perciformes: Latidae).

Morphologically, Body was elongate measured 1.203-2.074 mm long with a maximum width 0.311-0.534 mm. Oral sucker was terminal, funnel-shaped with 0.201-0.353 mm long and 0.245-0.310 mm wide. Outer surface of sucker armed with row of 23 large, simple peribuccal spines which was 0.042-0.066 mm long. Ventral sucker was circular measured 0.110-0.140 mm long, 0.120-0.204 mm wide and situated approximately at 1/3 body length. Ratio of oral and ventral suckers 1:0.5 Pharynx large, oval, strongly muscular measured 0.163-0.177 mm long and 0.150-0.190 mm wide. Oesophagus relatively short. Intestinal bifurcation in front of ventral sucker and intestinal branches run along body to caudal end. Seminal vessicle located posterior to ventral sucker. Testes tandem or slightly diagonal, located near posterior end of body being of irregular rounded shape. Size of anterior testis 0.130-

0.220 mm long, 0.314-0.358 mm wide; posterior testis 0.180-0.274 mm long, 0.390-0.327 mm wide. Ovary transversely oval, smaller than testes, measured 0.102-0.166 mm long, 0.100-0.164 mm wide situated just anterior to anterior testis. Uterus filling space delimited by ovary, ventral sucker and vitellaria. Genital pore median, just in front of ventral sucker. Mature eggs yellow-brown. Vitellaria follicular situated on sides of posterior body half extending posteriorly to anterior part of anterior testis. Excretory vesicle opened by a median pore on posterior end of body.

Taxonomic position

Type-host: *Lates niloticus* (Perciformes: Latidae)

Type-locality: River Nile, Egypt.

Site of infection: Intestine.

Prevalence: 16/40 fish (40%).

Deposition: at Zoology Museum, Department of Zoology, Faculty of Science, Beni Suef University, Egypt.

Etymology: Specific name derived from the outer surface of sucker armed with row of large, simple peribuccal spines, hence the name *spiniceps*

Discussion

The taxonomy of acanthostomatid trematodes is confused, due to genera delimitation. There are several attempts to solve this problem (Yamaguti, 1971; Nasir, 1974; Brooks, 1980), but the unsatisfactory situation in this group of trematodes remains to date. The genus *Acanthostomum* (Looss, 1899) includes *A. spiniceps* (Looss, 1896) of family Acanthostominae (Poehle, 1926). 21 species of the same genus were also in-

cluded; *A. absconditum* (Looss, 1901), *A. atae* (Tubangui and Masilungan, 1936), *A. burminis* (Bhalerao, 1926), *A. caballeroi* (Cruz, 1953), *A. coronarium* (Cobbold, 1861), *A. crocodili* Yamaguti, 1954, *A. diploporum* (Stunkard, 1931), *A. clongatum* (Tubangui and Masilungan, 1936), *A. gnerii* (Szidat, 1954), *A. gonotyl* (Dollfus, 1950), *A. gymnarclii* (Dollfus, 1950), *A. imbutiforme* (Molin, 1859), *A. indicum* (Sinha, 1942), *A. marajoantm* (de Freitas and Lent, 1938), *A. minimum* (Stunkard, 1938), *A. praeterium* (Loo-ss, 1901), *A. productum* (Odhner, 1902), *A. qitasitirm* (Nicoll, 1918), *A. scyphwcephalum* (Braun, 1901), *A. spiniceps* (Looss, 1896) Looss 1899, *A. vicinum* (Odhner, 1902). Besides, two more species, namely *A. diploporum* (Stunkard, 1931) and *A. minimum* (Stunkard, 1938) were included by Dollfus (1950) in view of the fact that the vitelline glands extend to posterior extremity in this species. The recorded species is compared with most morphologically similar species, it was distinguished from *A. bagri*, *A. absconditum*, *A. imbutiforme*, *A. minimum* and *A. praeterium* by possessing oral spines more than twenty and from *A. atae*, *A. burminis*, *A. coronarium*, *A. crocodili*, *A. diploporum*, *A. gnerii*, *A. gymnarclii*, *A. marajoavum*, *A. minimum* and *A. scyphocephalum* in having a pharynx appreciably smaller than ventral sucker. The most morphologically similar species of *Acanthostomum* was those reported by Fernandes, (2002) except for the number of the cephalic spines which are 27 compared with those of the present species which are 23.

Thus, by comparison, the present species possessed all morphological characteristics of its genus and the most morphologically similar species was *A. spiniceps* reported by Fernandes (2002) except in number of cephalic spines which were 27 compared to 23 in present species.

Conclusion

The outcome described species was classified as *A. spiniceps* with some morphometric differences which may be related to processing. Since this species was recorded from *Lates niloticus* for the first time, the present study was reported as a new host record in Egypt.

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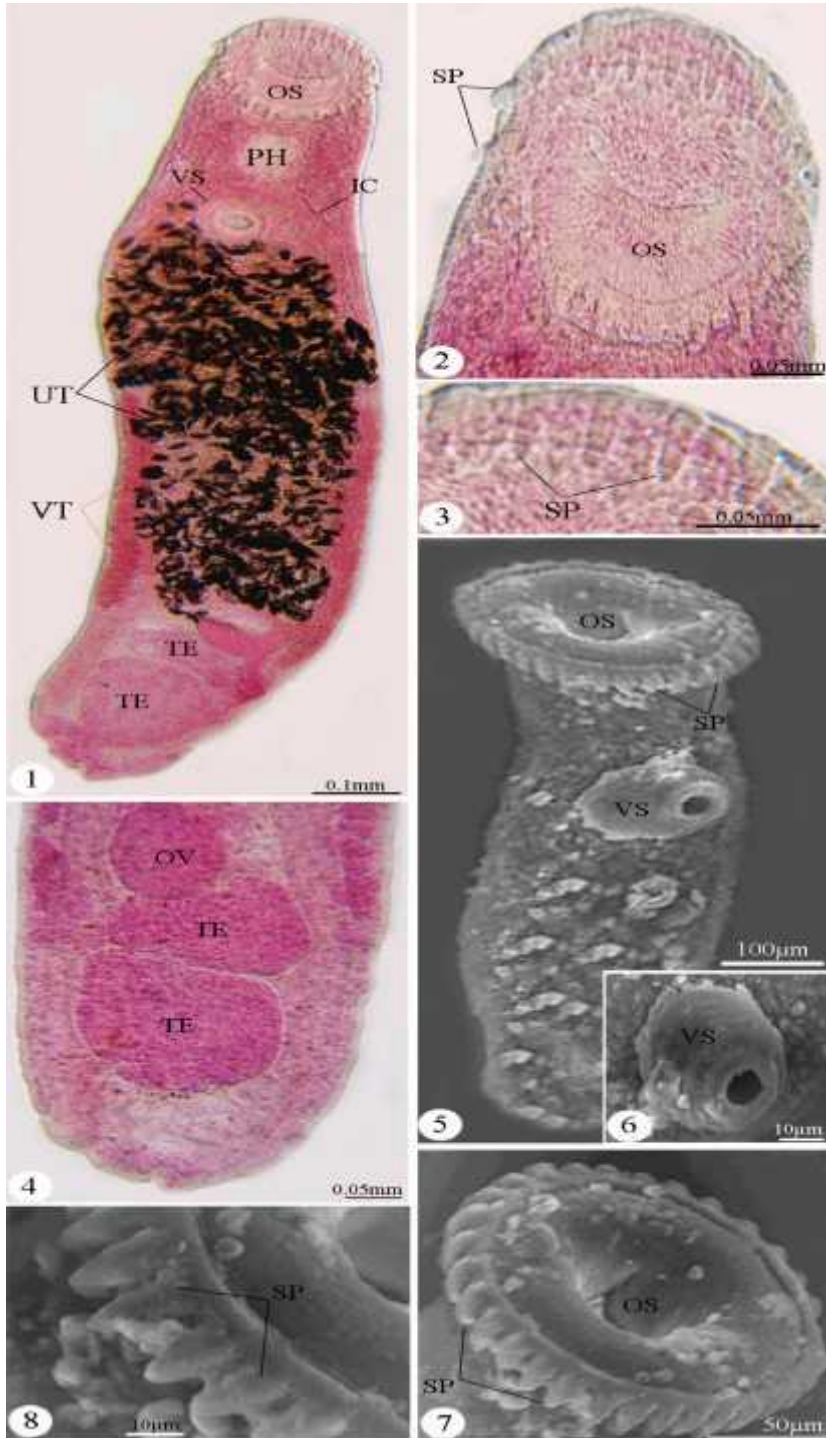
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Explanation of Figures

Figs.1-4: Photomicrographs of adult digenetic trematode *Acanthostomum spiniceps*. 1 Whole mount preparation of worm with an anterior oral sucker (OS) surrounded by a row of cephalic spines (SP), a ventral sucker (VS) in front of pharynx (PH), two intestinal caeca (IC) runs along two lateral sides of body ended blindly, two testes (TE) arranged in tandem, a spherical ovary (OV) in front of anterior testis, vittelaria (VT) laterally situated and occupied body posterior side, uterus (UT) fills most of space between ventral sucker and ovary. 2-4 High magnifications: 2 Anterior part showing row of cephalic spines surrounding oral sucker. 3 Cephalic spines (SP). 4 Posterior part of worm showing two tandem testis (TE) and ovary (OV).

Figs.5-8: SEM showing 5 adult worm. 6-8 High magnifications of: 6 Ventral sucker (VS), 7 Oral sucker (OS) with surrounding cephalic spines (SP), 8 Cephalic spines (SP).

Fig. 9: Line diagram of adult *Acanthostomum spiniceps*. EX Excretory pore.



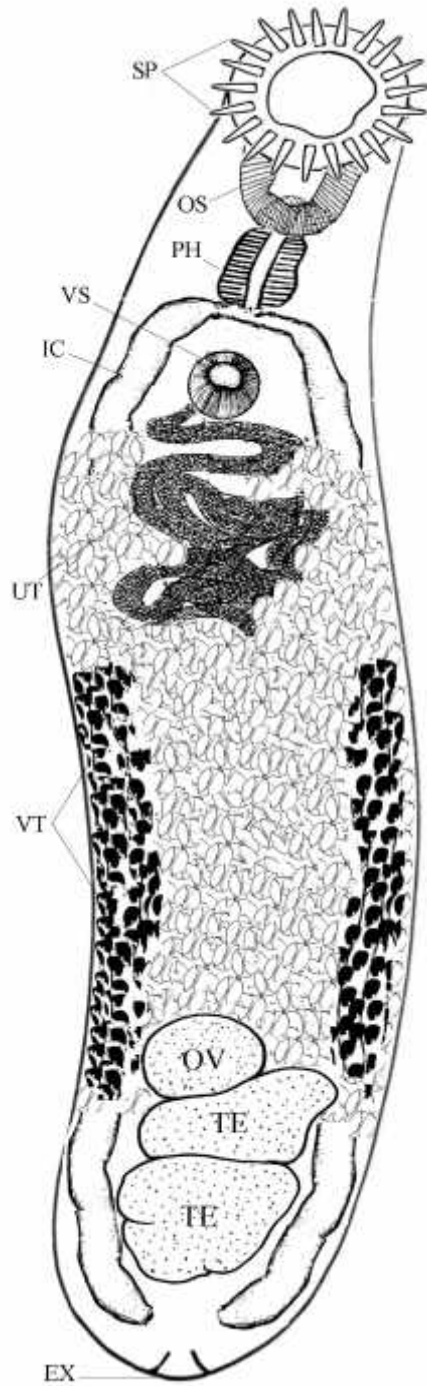


Fig. 9

0.1 mm