

Redescription of *Acanthostomum spiniceps* (Digenea) Infecting *Lates niloticus* (Perciformes: Latidae) on the Basis of Light Microscopy

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Abstract: The adult stage of *Acanthostomum spiniceps* was recovered from the African snook *Lates niloticus* (Perciformes: Latidae) of the river Nile, Egypt. It was morphologicalolly studied by light microscopy. It was differentiated by the body shape, number of circumoral spines, ratio of body length to width, size of suckers and the presence or absence of spines on the ventral sucker. Twenty two out of fifty fish (44%) was naturally infected with this trematode attached to the intestinal wall of the host fish, it was classified belonging to the family: Acanthostominae. Body was elongate, 1.102-2.062 mm long, maximum width 0.332-0.624 mm. Oral sucker was terminal, funnel-shaped, 0.301-0.441 mm long and 0.245-0.310 mm wide. Simple peribuccal spines 0.042-0.066 mm long. Ventral sucker was circular, 0.130-0.170 mm long, 0.110-0.223 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 0.110-0.230 mm long, 0.332-0.398 mm wide, that of posterior testis was 0.170-0.244 mm long, 0.330-0.322 mm wide. Ovary transversely oval, smaller than testes, measured 0.102-0.133 mm long, 0.090- 0.129 mm wide, situated just anterior to anterior testis. By comparison between some of the previously recorded species of the same genus, we found that the present species possessed all of the morphological characteristics of its genus and the most morphologically similar species was *A. spiniceps* reported by except for the number of cephalic spines which were 27 compared with those of the present species which were 23, so the present described species should be classified as *A. spiniceps* with some morphometric differences which may be related to the process of preparation. Since this species was not recorded before from *Lates niloticus*, the present study was reported as a new host record in Egypt.

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 throughout much of the Afrotropic ecozone. It was originally described as *Labrus niloticus*, among the marine wrasses, the species has also been referred to as *Centropomus niloticus*. Common names include African snook, capitaine, Victoria perch (A misleading trade name, as the species is not native to Lake Victoria). 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 [1].

Genus *Acanthostomum* was described firstly by Braun [2] as *Distomum* or *Scyphocephalum* during a survey on trematodes infecting *Testudo matamata*. In Egypt, few studies were carried out on *Acanthostomum* infecting freshwater fish of the River Nile [3-5]. *A. spiniceps* was recorded from *Bagrus filamentosus* (Ariidae) by Tadros *et al.* [6] and from *Morone labrax* (Percichthyidae) by El-Shahawi and Al-Bassel [7]. This species was also recovered by Dollfus [8] from *Bagrus filamentosus* (Ariidae) and *Chrysichthys furcatus*

(Ariidae) from Mali and by Pogoreltseva [9] from *Mullus barbatus ponticus* (Mullidae) from the Black Sea. Moravec [10] redescribed *A. spiniceps* from *Bagrus docmac* (Ariidae) based on 41 specimens, observing great morphometric variability. Parasites of this genus are characterized by elongated bodies, their surface is covered with fine spines, these being more distinct and more numerous on anterior portion of the body; spines appearing to be absent from posterior quarter of body. Oral sucker armed with row of large, simple peribuccal spines. Ventral sucker is circular approximately at 1/3 of body length. Ratio of oral and ventral suckers 1: 0.5.

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*. Furthermore, the morphological and morphometric characterization were carried out using light and scanning electron microscopy.

MATERIALS AND METHODS

Fifty individual specimens of the African snook *Lates niloticus* (Perciformes: Latidae) was caught from a location along the River Nile, Giza Governorate, Egypt during the period from September 2016 to June 2017. Then they were kept alive in aquaria, immediately transported in water tanks to the laboratory. Fish identification was based on Randall [11] and modern names follow [12]. Standard parasitological techniques were used to examine the alimentary canal of the fish. The trematodes which were removed from the stomach and intestines washed out with normal saline under a dissecting microscope and observed alive under a compound microscope. Some worms were fixed in alcohol-formalin-acetic acid (AFA) under a slight cover pressure and preserved in 75% ethyl alcohol. Whole-mounts were stained in alum carmine, cleared in xylene and mounted in Canada balsam. Identification of the recovered parasite was carried out based on a scheme provided by Yamaguti [13] and Surekha and Lakshmi [14]. Illustrations were made using a drawing tube. Prevalence, mean abundance and morphometric measurements followed the guidelines of Bush *et al.* [15] minimum and maximum values were given, followed in parentheses by the arithmetic mean. For scanning electron microscopy, specimens were fixed in 4% buffered glutaraldehyde, washed in cacodylate buffer and dehydrated in ascending alcohol 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 scanning EM.

RESULTS

Twenty two out of fifty fish (44%) were found to be naturally infected with the digenetic trematode *Acanthostomum spiniceps* (Acanthostominae) belonging to family: Acanthostominae. The infection was recorded in the intestinal wall of the African snook *Lates niloticus* (Perciformes: Latidae).

Description (Figs1-4): Morphologically, body was elongate measured 1.102-2.062 mm long with a maximum width 0.332-0.624 mm. Oral sucker was terminal, funnel-shaped with 0.301-0.441 mm long and 0.0245-0.310 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 0.130-0.170 mm long, 0.110-0.22 mm wide and situated approximately at 1/3 of 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 the intestinal branches run along body to caudal end. Seminal vesicle was 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 was 0.110-0.230 mm long, 0.332-0.398 mm wide while that of posterior testis 0.170-0.244 mm long, 0.330-0.322 mm wide. Ovary was transversely oval, smaller than testes, measured 0.102-0.133 mm long, 0.090-0.129 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 half of body and extended posteriorly to anterior part of anterior testis. Excretory vesicle opened by a median pore on posterior end of body.

Taxonomic Summary

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

Type-locality: River Nile, Egypt.

Site of Infection: Intestine.

Prevalence: Twenty two out of fifty fish (44%)

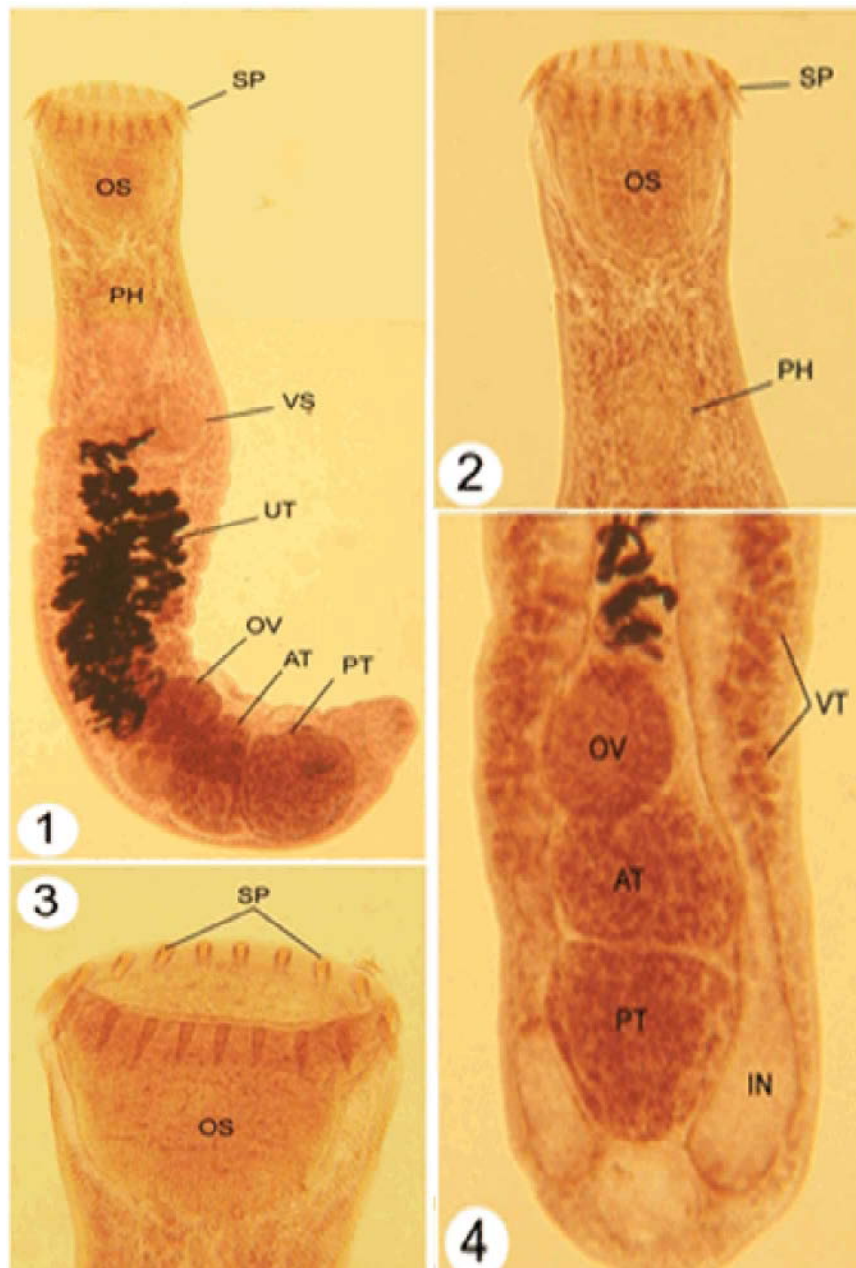


Fig. 1-4: Photomicrographs of the adult digenean parasite *Acanthostomum spiniceps*. 1: Whole mount preparation of the adult worms with elongated body consists of: funnel-shaped oral sucker (OS) armed with a row of large simple spines (SP), pharynx (PH), ventral sucker (VS), small oval ovary (OV), uterus (UT) filled with numerous and mature eggs, anterior testis (AT), posterior testis (PS) and laterally scattered vitellaria (VT). 2-5: High magnifications: 2,3: The anterior part of the worm showing the mouth opening surrounded with the oral sucker (OS) that armed with a row of spines (SP) and the pharynx (PH). 4: The posterior region revealing the ovary (OV), tandem testis; anterior testis (AT) posterior testis (PT) and a part of vitellaria (VT).

Etymology: The specific name of the parasite is derived from the fact that the outer surface of sucker armed with

row of large, simple peribuccal spines, hence the name *spiniceps*

Remarks: The taxonomy of acanthostomatid trematodes seems to be rather confused, especially as to the delimitation of genera. Although there were several attempts to solve this problem (e.g., Yamaguti [13], Nasir [16] and Brooks [17]) the unsatisfactory situation in this group of trematodes remains to date. The genus *Acanthostomum*, erected by Looss [18] to include *A. spiniceps* Looss [19] was placed in the family Acanthostomatidae by Poehe [20] and in the subfamily Acanthostomatinae by Nicoll [21]. Twenty-one species in addition to *A. bagri* have been included in the genus *Acanthostomum*. They are as follows: *A. absconditum* Looss [22] *A. atae* Tubangui and Masilungan [23] *A. burminis* [24] *A. caballeroi* [25] *A. coronarium* [26] *A. crocodili* [27] *A. diploporum* [28] *A. clongatum* [23] *A. gncrui* [29] *A. gonotyl* [30] *A. gymnarclii* [30] *A. imbutiforme* [31] *A. indicum* [32] *A. marajoantm* [33] *A. minimum* [34] *A. praeterium* [22] *A. productum* [35] *A. qitasitirm* [36] *A. scyplwceplialum* Braun [37], *A. spiniceps* Looss [19], *A. vicinum* Odhner [35]. On the other hand, two other species, namely *A. diploporum* [28] and *A. minimum* [34] were included by [30] in view of the fact that the vitelline glands extend to the posterior extremity in this species. Our recorded species is 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 the ventral sucker. The most morphologically similar species of *Acanthostomum* is those reported by Fernandes *et al.* [1] except for the number of cephalic spines which are 27 compared with those of the present species which are 23. By comparison between some of the previously recorded species of the same genus, we found that the present species possessed all of the morphological characteristics of its genus and the most morphologically similar species was *A. spiniceps* reported by Fernandes *et al.* [1] except for the number of cephalic spines which were 27 compared with those of the present species which were 23, so the present described species should be classified as *A. spiniceps* with some morphometric differences which may be related to the process of preparation.

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