Morphometric analyses of one digenean species from *Synodus saurus*: *Anahemiurus microcercus* Manter , 1947 from the Mediterranean Sea, bordering Misurata-Libyan coastal waters

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Submittion data: 16.6.2021 Acceptance data: 4.7.2021 Electronic publishing data: 1.8.2021

Abstract

Adults of *Anahemiurus microcercus* Manter , 1947 were found in the stomach and intestine of *Synodus saurus* from the coastal waters of Misurata, Mediterranean Sea, north Libya. Quantitative parasitological examinations were performed on all of the fish samples. The stained, mounted specimens of digenean were identified. Data concerning morphology of this worm was obtained. The morphological data confirmed the validity of this species and showed that specimens identified as *A. microcercus* are closely related to specimens of *A. microcercus* found in Florida. Out of 96 *S. saurus* examined, 60 fish (62.50% prevalence) had one digenetic trematodes belonging to the family Hemiuridae. This digenean are recorded here for the first time from the north coast of Libya in the state of Misurata bordering the Mediterranean Sea and in *S. saurus*, representing a new host record.

Keywords: Marine fish, Digenetic trematodes, Hemiuridae, Mediterranean Sea, Libya-Misurata coast.

Introduction

Digeneans are one of the most diverse groups of metazoan endoparasites with a few species living mainly as ectoparasites, found inhabiting under the scales of fish. It is estimated that 18,000 species of digenetic trematodes were found in the world. They are known as digenetic trematodes, digeneans, or flukes [1], the biggest subclass of class Trematoda, and the most important medically and economically. This subclass includes schistosomes and blood flukes that are generally considered to be the most dangerous to human health [2]. They are mostly found in the gastrointestinal canal of vertebrates and many of the related organs, such as the liver, bile duct, gall bladder, lungs, the swim bladder of fish, the eye, coelom and ureter, with other sites such as the blood system and urinogenital system [3]. Most of digenetic trematodes have a heteroxenous and a similar developmental cycle involving one or more intermediate hosts, the first of which is usually a mollusc (snail), which is usually living in water, the second is often a fish. The definitive hosts are mostly vertebrate, including fish, birds, reptiles, amphibians, and mammals, in which the adult digenetic trematode (or fluke) lives with the largest number of genera being found in teleosts [4,5].

Limited studies have reported digenetic trematodes from Mediterranean Sea in Libya. These studies have found the presence of *Haplosplanchnus* Looss 1902 and *Prohaplosplanchnus* Tang and Lin, 1978 in mullet fish [6] and three marine digenetic trematodes, *Haplosplanchnus mugilis* Nahhas and Cable , 1964, *Haplosplanchnus indica* Gnpta and Ahmed, 1979, *Prohaplosplanchnus diorchis* Tang and Lin , 1978 in *Mugil cephalus* [7]. The research conducted in Tripoli observed the presence of *Lecithocladium excisum* (Rud , 1819) Luhe , 1901 in *Scomber scomberus, Boops boops* and *Trachurus trachurus* [8]. Five new species of digenetic trematodes were described in marine fishes from Misurata (Libya) as follows: *Gymnotergestia chaetodipteri* Nahhs and Cable , 1964 from *Serranus scriba* and *Opechona sardinellae* Nahhas and Cable , 1964 from *Labrus bergylata* and *Monorchis monorchis* (Stossich, 1890) Looss , 1902 from *Trachurus mediterraneus* and *Myorhyuchus pritchardae* Nahhas and cable , 1964 from *Labrus bergylata* and *Hysterolecitha sigandaresi* Nahhas and Cable , 1964 from *Mullus surmuletus* [9-13]. Two new species of digenetic trematodes namely, *Propycnadenoides naffari* n. sp. and *Acanthocolpoides libyacus* n. sp. were described from the marine fishes, *Mullus surmuletus* in Misurata, Libya [14].

Members of the family Hemiuridae Looss, 1899 are among the most frequently encountered digeneans in marine teleosts. They are usually parasitic in the gut, especially the stomach of fishes [15]. *Anahemiurus microcercus* was illustrated and described as possessing a small and oblong-oval body, cuticle covered with large spines, the presence of ecsoma, small oral sucker and pharynx, ceca not extending into tail, acetabulum larger than oral sucker, testes separated, ovoid and undivided vesicula seminalis, long pars prostatica, fairly long ductus hermaphroditicus, genital pore close to the mouth, postesticular ovary and vitellarium composed of two oval or lobed masses [16].

Perhaps partly due to the difficulty in the identification of the digeneans rather than helminthic fish parasites. Thus, extensive work need to be done on digenean from Mediterranean Sea and their distribution. The paper describes the digenetic

trematodes found in marine fish from Mediterranean Sea, site infection, mean prevalence and intensity. The present study reports the one digenean of *S. saurus*, belonging to family Hemiuridae.

Materials and methods

The collected fish, *S. saurus* obtained from Misurata-Libyan coast bordering the Mediterranean Sea, have been regularly examined for a period of one year (2007). A total number of 96 fishes were examined during the period out of which only 60 fishes were infected with metazoan parasites. As soon as the fish were collected they were examined immediately. Parasitic helminthes (Digenea) were collected, the data was recorded. The fish was cut open with a mid ventral incision for search of endoparasites. Stomach, intestine, rectum, liver and gall bladder were taken in separate Petri dishes filled with a saline solution. The gut contents were dissipated and were decanted many times to remove mucosa and observed under a dissecting microscope. The obtained trematodes were fixed in normal saline and alcohol 70%. Pressure is applied for proper flattening of the digeneans depending on the size and thickness of these parasites. Later these worms were thoroughly washed and stained in alum carmine. After proper dehydration in graded alcohol (70%, 80, 90%, 100% and 100%) the parasites were cleared in clove oil, and then mounted with Canada balsam on microscopic slides [17]. Identification of the digenea was carried out based on a scheme provided by some previous studies [16], [18]. Digenetic trematodes were drawn with the aid of camera Lucida and measurements were given in micrometers unless or otherwise mentioned.

Results

Family: Hemiuridae Looss, 1899
Genus: *Anahemiurus* Manter, 1947
Anahemiurus microcercus Manter, 1947 (Fig. 1).
Description: Based on 10 worms. Body small, oblong-oval, with short tail, longer than wide, 1975 1859 – (1895) µm in length, 646 – 666 (656) µm in width at level of ovary; oral sucker small, 100 – 110 (103) µm in length, 124 – 131 (127) µm in width; prepharynx absent; pharynx small 71 – 82 (74) µm in length, 54 – 64 (54) µm in width; caeca double, not extended into tail, intestine bifurcated in forebody, ventral sucker much larger than oral sucker 223 – 237 (230) µm in length, 232 – 242 (239) µm in width; gonads separated by uterus, testes double, pre-ovarian, separated on each side, just posterior to acetabulum, anterior testis 74 – 84 (82) µm in length, 150 – 160 (154) µm in width; ovary posterior to midbody 100 – 110 (105) µm in length, 190 – 200 (194) µm in width; uterus extening to posterior end of body proper 690 – 700 (694) µm in length; seminal vesicle posterodorsal to acetabulum, thick-well, ovoid, undivided 144 – 156 (150) µm in length; par prostatica long, not coiled; the duct connecting seminal vesicle with the hemaphroditic duct is long; ductus hemaphroditicus fairly long, straight; genital pore opposite oral sucker; excretory arms united dorsal to pharynx; vitellaria post-ovarian consisting of two large masses; eggs small, oval, numerous 40 – 47 (43) µm in length, 20 – 25 (21) µm in width.
Host: *Synodus saurus*.
Site: stomach and intestine.
Locality: Misurata city.
Prevalence: 62.50% (see Table 1).
Intensity: 31.30.

Table (1): prevalence (%) (P) of *Anahemiurus microcercus* found infecting *Synodus saurus* from the Misurata coastal water.

Host	No. of fish examined	No. of fish infected	P (%)	Parasite species
Synodus saurus	96	60	62.5	*Anahemiurus microcercus*

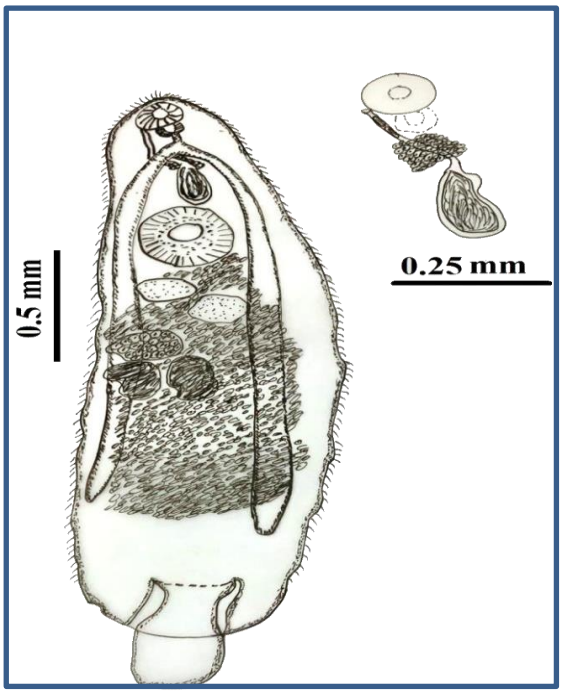

Figure 1: Whole-mount ventral view of *Anahemiurus microcercus* Manter, 1947 ex *Synodus saurus*.

Discussion

The genus was erected to include those species of *Anahemiurus* which are possess a small body, ecsoma, conspicuous scales and two large masses of vitellarium [16]. The genital opening was located

ventrally in relation to the oral sucker, near the mouth. Since that time the genus has generally been recognised and many additional species have been added to it, mostly by transfer from (*Anahemiurus*). According to previous study *Daniella* Sahai & Srivastava, 1977 and *Bapatina* Srivastava & Sahai, 1977 at face value appear to be synonyms of *Anahemiurus* Manter, 1947 [19]. However, another study considered the former to be a synonym of *Parahemiurus* Vaz & Pereira, 1930 [20], although one more study claimed that the body is scaled [21]. *Dentiacetabulum* Sihai & Srivastava, 1977 is here listed under *Parahemiurus*, as no crenulate plications ("scales") were mentioned. As the presence of crenulate plications is, in isolation, a feature of questionable generic value, and in view of the fact that it is readily misinterpreted in poorly preserved material, *Anabemiurus* is here considered a symonym of *Parabemiurus* [19].

Anahemiurus microcercus Manter, 1947 was described from *Calamus bajonado*, Florida-USA. This species was not actually described as having an crenulate plicatnions [16]. Clearly *A. microcercus* (in this study, fig. 1) is closely related to *A. microcercus* (Manter, 1947), and is possibly the senior synonym, and should, at least, be included in the same genus as *A. microcercus* [16]. We can see no reason to distinguish our digenean from *A. microcercus* Manter, 1947 and, therefore, consider them same species. At this stage we can find no good morphological distinction between our specimens from Misurata and the worms described by Manter [16]. My specimens are bigger (– 1975 1859 × 646 – 666 vs 375 – 926 × 150 – 331) with oval eggs (40 – 47 vs 20 – 28) and a few ratios may differ slightly, e.g. the ventral sucker to ovary distance is relatively slightly longer according to the illustration in this study (fig. 1) (25.2 vs 15 of body-length), but most ratios fall within the same ranges.

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التحاليل المورفولوجية والقياسية لنوع واحد من الديدان ثنائية العائل *Anahemiurus microcercus* Manter , 1947 من سمكة المكرونة *Synodus saurus* من المياه الساحلية لشواطئ مدينة مصراته الليبية المطلة على البحر الابيض المتوسط

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Abstract

الأطوار البالغة لطفيلي*Anahemiurus microcercus* Manter , 1947 وجدت في معدة و أمعاء سمكة المكرونة *Synodus saurus* التي تم جمعها من شواطئ البحر الابيض المتوسط بمدينة مصراته في شمال ليبيا. جميع عينات الاسماك تم فحصها من اجل التعرف على كمية الطفيليات بداخلها. تم التعرف على عينات المثقبات المصبوغة وتحديد نوعها و تم ايضاً الحصول على البيانات المورفولوجية لهذه الديدان. و أكدت التحاليل المورفولوجية صحت تسمية هذا النوع وأظهرت أن عينات *A. microcercus* التي تم تحديدها في هذه الدراسة على علاقة وثيقة ومتماثلة مع عينات *A. microcercus* التي وجدت في فلوريدا. من بين 96 سمكة من أسماك *Synodus saurus* المفحوصة وجدت 60 سمكة مصابة بنوع واحد من الديدان ثنائية العائل الذي ينتمي لعائلة Hemiuridae بنسبة إصابة 96.5%. وتعتبر هذه هي المرة الأولى التي يسجل فيها هذا الطفيل من شواطئ مدينة مصراته بليبيا ومن عائل سمكي جديد أيضاً.

الكلمات المفاتيح: الأسماك البحرية، المثقبات، عائلة Hemiuridae، البحر الابيض المتوسط، ليبيا- شاطئ مصراته.