



First Record of *Lecithochirium* sp. (Digenea: Hemiuridae) in the Marine Fish Red Porgy, *Pagrus pagrus* (Linnaeus, 1758) (Osteichthyes, Sparidae), from the Mediterranean Sea Cost of Libya.

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Abstract:

The present study is the first investigation of digenetic trematode parasites in *Pagrus pagrus* a commercially important fish species of the Mediterranean Coast of Libya, during the period from January to December 2012. A total of 40 *Pagrus pagrus* were examined. Out of 40, examined fish, only 6 (15%) were found to be naturally infected with *Lecithochirium* sp. (*Lecithochirium*: Hemiuridae). The adult worms exhibited an elongated body with anterior pointed and posterior broad ends. The adult worm measured body elongate with tail, 1.95 mm long x0.35mm wide at acetabular level. The present *Lecithochirium* species is characterized by its smaller dimensions and the presence of a large ventral sucker, two lobed testes. The recorded parasite herein has the same general morphology of its family but with different characteristics than their members. Host sex does not seem to affect prevalence of infection. The present work represented the presence of this parasite in *Pagrus pagrus* fish in Libyan coastal Mediterranean Sea water.

Keywords: Mediterranean Sea, *Pagrus pagrus*, *Lecithochirium*, Libya.

Introduction:

The red porgy *Pagrus pagrus* is a benthopelagic sparid fish with widely known distribution, in Mediterranean Sea [1]. It is an important commercially fish species of the Mediterranean Sea coast of Libya. It is a carnivorous fish feeding on crustacean and planktonic invertebrates, the mass production of this species is limited [2], so parasites play a very important part in the life of their hosts [3]. Parasites are accepted among the most detrimental effects on fish stocks all over the world. Parasites cause retardation in growth, lead to diseases and may cause the deaths. The digenea are one of the major taxa of

parasitic Platyhelminthes and they are invariably endo-parasites. There are many studies about digenean trematodes in fish in the world and they provided details on the morphology and anatomy of parasites species, their life cycle, infection rates, seasonal variations and geographical locations. Digeneans are heteroxenous and require more than one host to complete their life cycle. The most important limiting factor for digenean dispersal is the intermediate host such as gastropoda and bivalvia ^[4].The goals of this study is to determine the digenean parasite fauna of *Pagrus pagrus* fish collected of Libyan coast and to provide short descriptions of identified parasites.

Materials and Methods

Samples of 40 individual *Pagrus pagrus*, were collected from the Medeterranean cost of Libya throughout the period from May to October 2012. Fishes were immediately transported in water tanks to the laboratory. After dissection, the abdomen, the internal organs of the fish were transferred to Petri dishes with a saline solution at 0.7 % NaCl and were examined under the stereo-microscope. The flukes collected from the stomach and intestine were washed out with normal saline. The worm washing processes are repeated several times to remove any mucus or debris from their surface, then flukes were fixed in 5% formalin, flattened by repression and stained with aceto acid carmine. The specimens were then dehydrated in an alcohol gradient series, and mounted on D.P.X. as permanent slides. Taxonomic identification of the parasite was made according to relevant papers ^[5- 8]. Illustrations of the presented new species were made through measurements are given in millimeters. Drawing were made with the aid of camera Lucida.

Results

Lecithocherium n. sp. was collected from the small and large intestine of *Pagrus pagrus* fish. Six (15 %) out of examined fishes were infected.

Classification:

Phylum: Platyhelminthes

Suborder: Hemiurata

Class: Trematoda Rudolphi, 1808

Family: Hemiuridae Luhe, 1901

Subclass: Digenea VanBeneden, 1858

Subfamily: Hemiuroidea Faust, 1929

Order: Azygiida Schell, 1982

Genus: *Lecithochirium* Luhe, 1901

Description

Body elongate with tail, 1.95 mm long x 0.35 mm wide at acetabular level. Oral sucker subterminal, cup-shaped, 0.14 x 0.16 mm. Pharynx well developed, 0.086 x 0.078 mm. Ceca not extending into tail. Acetabulum prominent, 0.320 x 0.313 mm, ventral sucker much larger than oral sucker, near anterior extremity. Ratio of these 2 suckers 1:2. Testes 7, immediately postacetabular, 0.07 x 0.08 mm and 0.12 x 0.11 mm. Vesicula seminalis anterior to acetabulum, elongate, thick-walled, constricted, 0.031 x 0.031 mm; outer one, 0.12 x 0.05 mm. Pars prostatica present, 0.04 x 0.05 mm. Cirrus pouch present with 2 chambers, the outer 0.21 x 0.09 mm, the inner 0.06 x 0.05 mm. Ovary rounded, 0.16 x 0.16 mm, posttesticular in right body. Mehlis's gland 0.12 x 0.12 mm. Laurer's canal present, 0.031 mm long. Vitellaria 7, compact, rounded, postovarian, each 0.211 x 0.273 mm. Uterus descending and then ascending, 0.375 mm from the posterior extremity. Eggs numerous, 168-178 x 99-119 μ m. Genital pore ventral to oral sucker near its anterior margin (Figures. 1A and B).

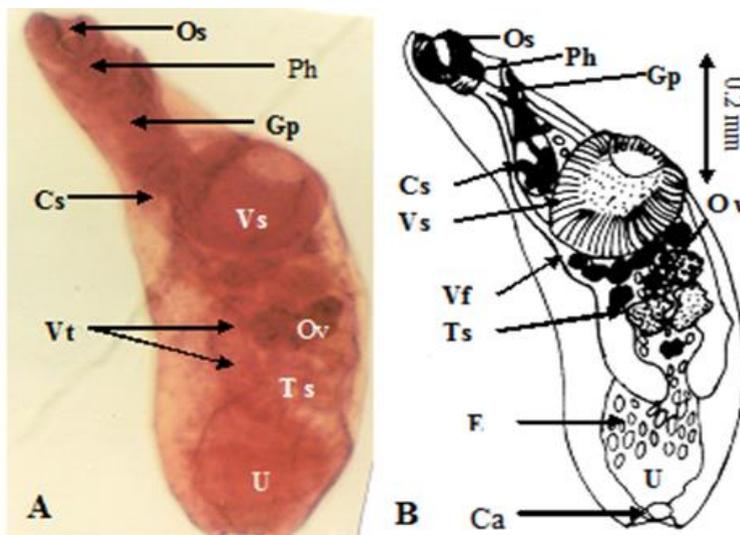


Figure (1): Photomicrographs (A) and Diagrammatic representation (B) of the adult *Lecithocherium n. sp.* Abbreviations: Os: Oral sucker, Ph: Pharynx, Gp: Genital pore, Sc: Sinus sac, Vs: Ventral sucker, Ts: Testis, U: Uterus, Ov: Ovary, Vt: Vitellaria, E: Eggs, Ca: Caudal appendage, (x 10).

Discussion

It is well known that marine fish may play roles of intermediate or definitive hosts for a number of helminth parasites. The feeding habitats and wide diet spectrum of marine fishes bring them in contact with marine parasites. The digenean family Hemiuridae is the most common digeneans found inside the digestive tract of marine fish, and the present isolate, *Lecithochirium* is the most common genus of this family^[9].

Lecithochirium species, characterized by one pair of hump-like thickenings projecting into the lumen of the oral sucker, by a well defined preacetabular pit, an “ejaculatory vesicle” rather than a “prostatic vesicle” in the sinus sac, short vitelline lobes and sub equal suckers. The hump-like elevations in the oral cavity do not occur in most described *Lecithochirium* species. Actually, the wall of the sinus sac of some species of *Lecithochirium* is more or less open posteriorly and seems partially to enclose one end of the prostatic vesicle^[10].

The genus *Lecithochirium* have many variations and combinations of characteristics that make selection of distinguishing characteristics difficult^[12]. The presence or absence of preacetabular pit; elevations in the wall of the oral cavity; and the characters of the male vesicle within the sinus sac characteristics seem most appropriate^[10].

The characteristics of all specimens collected during this study, such as: body form (elongated), ceca not extending into tail, testes (7 pair), Acetabulum prominent, ventral sucker much larger than oral sucker, uterus descending and then ascending, and site of infection (small and large intestine) in a marine fish host place this species within the genus *Lecithochirium*. The species described in the present study show some similarity to *L. tetraorchis*^[9], but may be distinguished from it by average total length (1.9 mm for the *Lecithochirium* species of the present study.

The genus *Lecithochirium* also contains other species parasitic in marine fish such as: *L. gravidum*; *L. physconluhe*; *L. Musculus*; *L. synodi*; *L. Furcolabiatum* *L. conviva*; *L. australis*; *L. magnaporum*; *L. genypteri*; *L. flexum* and *L. trichiuri*. Features of *Lecithochirium* species of this study do not conform to features of the above-mentioned *Lecithochirium* fish parasites. These worms are generally morphologically complex, the ecological, physiological, and environmental factors of the hosts and the adaptations of parasites might have led to morphological variations of flukes^[11, 1].

In this study the incidence of *Lecithochirium* sp. was low, 15%. This is in agreement with^[1], who reported that 14.3% of fishes was infected with *Lecithochirium* sp. Another study mentioned that the feeding habit,

geographic distribution of first and second intermediate host and the mobility of certain developmental stages have been postulated to limit the interaction between the digeneans and first record of *Lecithochirium* sp. their host ^[12]. The prevalence and mean intensity herein showed positive correlation with host length. This may be due to the diet of larger fish being more diverse than smaller size ones. The relation among the length and prevalence of several parasite species, possibly originated by accumulative infections ^[13]. It is apparent that large size fish can harbor more parasites. As a rule, in all host species that have been accurately studied for parasites, infection changes with age ^[14].

The differences in parasite infection between sexes can be expected and are explained as a consequence of difference in physiological status, in ecological niches, and in the diet ^[15 and 16]. In this study the incidence is not related to sex. This may be attributed to no differences in habitat and feeding habits of male and female *Pagrus pagrus*.

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