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HISTOPATHOLOGICAL AND PARASITOLOGICAL STUDIES ON LOMA SPECIES (MICROSPORA: PANSPOROBLASTINA) INFECTING SOME ARABIAN GULF FISH AT EASTERN PROVINCE, EL-QATEEF, SAUDIA ARABIA

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SUMMARY

A total of 2300 samples of *Epinephelus* fish species (Hamoor) in addition to some other commercial marine fish species at a large scale local markets at El-Qateef, Saudi Arabia were examined for the presence of parasitic cysts in the gill arches, throughout the year, 1996. The investigation revealed the existence of yellowish white nodular cysts on the gills of *Epinephelus* species while other commercial fish species were found free. Parasitological examination cleared that the infection was induced by the microsporidian protozoan parasites identified as Loma sp. Seasonal variation, incidence and intensity of infection have been studied. The histopathological examination of the infected gills revealed proliferative changes associated with cellular infilteration mainly with lymphocytes .

INTRODUCTION

Epizootics of *Microsporidia* are caused by different species which have been reported among fish population as being of considerable economic importance(Summerfelt, 1946; Putz, *et al.*, 1965; Reichenbach-Klink and Elkan, 1965; Putz 1969; Haulk, 1984; Sindermann, 1990 and Edward, 1996).

Members of Microspora as *Pleistophora, Glogea and Nosema* are considered as dangerous pathogens causing serious problems in marine fish species . Morrison and Sprague, 1981 and Sindermann, 1990 reported intracellular parasites in the gills of *Haddock* and *Melanogrammus aeglefinus* fishes and identified them as *Nosema branchialis* which renamed by them as *Loma branchialis* . In 1984, Haulk reported another Nosema spp. that caused 10 % mortalities among juvenile *Chinnok Salmon*, and *Oncorhynchus tshawgtscha* .

In the present study, parasitological survey was carried out during 1996 at a large scale local market in El-Qateef, Saudia Arabia where large numbers of different fish species were transported after being captured from the coast of arabian Gulf, in order to spot light on the identification, incidence, distribution as well as the histopathological alterations of the protozoan infection that cause fish marketing problem in the investigated area .

MATERIALS AND METHODS

Five commercial marine fish genera were identified as: 1-Grouper, (hamoor) of species, *Epinephelus chlorostigma*, *E. microdon* and *E. tauvina* 2-*Spanish mackerel* of species *Scombeomous commerson (Canad)* 3-*Emperor, Lethrinus* species *(Sheiry)* 4-*Marbelled spinefoot, Siganus rivulatus (Sigan)* 5-Black banded bream of species, *Myliobifasciatus (Fasker)* were subjected to macroscopic examination at a large scale fish market in El-Qateef, Saudi Arabia for the presence of external cysts . The affected samples were collected and examined microscopically after making wet preparations by squeezing of the detected cysts with drops of normal saline on clean slides and cover slips. Other samoles were fixed with methanol and stained with Geimsa . For histopathological examination, parts of the affected regions were immediately fixed in formaline 10 % then transferred into 70 % ethanol, dehydrated, series sections at 5 um and routinely stained with Hematoxyline and Eosin (H and E) . Also, Gram stain and periodic acid Schiff (PAS) were used for investigation of the spores (Preece, 1972). The detected cysts as well as spores were measured, drawen and microphotographed .

RESULTS

Oval to elongated yellowish white nodular cysts of size ranged from 0.5 - 0.6 mm. in length were easily seen in the gill arches of the affected fish (Fig. 1). Examination of wet preparation as well as the stained one revealed the presence of numerous uninucleated spores with thick wall . They were eleptical to pyriform in shape of about 8-10 um. (Fig. 2) . It gave positive reaction with stain and also positive for PAS.

It was found that, the three examined *Epinephelus* fish (Grouper) were found infected while the other examined fish species were found free .

Incidence of infection with *Microsporidia* among *Epinephelus* fish was shown in Table 1 revealing that, E. tauvina (3.57 %) was the highly susceptible species .

Regarding the seasonal incidence (Table 2), it was noticed that, the peak of infection with *Microsporidian Loma spp.* was recorded during summer (6.23 %) while the lowest rate was during winter (0 %) .

It was worthy to mention that, the number of *Loma spp.* cysts per one gill arch was ranged from 3 - 60 cysts per fish of length ranged from 30-56 cm while fish of length less than 25 cm was found free.

Histopathological examination:

The parasitic cysts of Loma spp. occupied interlamellar space of the gill filaments and displacing the adjacent lamellae.

The *Microsporidian* spores infecting the gill filaments of the examined fish, the infected cells are hypertrophic forming xenomas in which numerous spores were found and the nuclear mass remaining single or appeared fragmented . The epithelial lining of the gill lamellae attached to the parasitic cysts were suffering from extreme proliferative changes characterized by hyperplasia and hypertrophy of the primary and secondary lamellae of the gill filaments associated with intensive cellular infiltration of polymorphic nuclear cells mainly lymphocytes and eosinophils (Fig. 3). The parasitic cysts appeared elliptical in shape with a thick cyst wall a huge numbers of spores inside it.

DISCUSSION

Existing information on the occurrence of *Microsporidia* infection among marine fish are world wide in distribution. Gill *Microsporidia* of genus Loma spp. is of a great importance in many marine fish species (Edward, 1996). The present study indicated the presence of yellowish white nodular cysts in the gill filaments where they attached to the gill lamellae of *Epinephelus spp.* . Similar observation were also reported by Kabata (1959) who found over 60 *Loma branchialis* cysts in the gills of marine cod fish.

The detected cysts and spores were identified as of *Loma spp.*, according to the description given by Lom and Laird (1976), Marrison and Sprague (1981a, b) and Loma and Dykova (1992).

Seasonally, it was found that the rate of infection in the gills of *Epinephelus* fish with *Microsporidia, (Loma spp.)* was higher during summer up to 6.23 %, this may lead to the assumption that the infection might be affected by the environmental temperture that could be affect the maturation and enhance the generation period of the parasite, this

opinion was confirmed by Chubb (1977). The histopathological examination of the infected gill induced by the immunological incompatible reaction between the parasitic agent and host tissues did not showed serious damage in the gills. The displacement of the adjacent gill lamellae at the site of attachment with pronounced proliferative changes associated with cellular infiltration mainly lymphocytes, these observations were also noticed by Putz and McLaughli, (1970).

It was important to mention that the present study may be the first record dealt with the *Microspridian Loma* species among the Arabian Gulf *Epinephelus* fish species.

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Table (1): Incidence of infection with Microsporidia among Epinephelus species

Species	No. of examined fish	No. of infected fish	% of infection
Epinepheluschlorostigma	740	12	1.62
E. microdon	720	20	2.77
E. tauvina	840	30	3.57
Total	2300	62	2.69

Table (2) : Seasonal incidence of Loma spp. among *Epinephelus* fish species

Season	No. of examined fish	No. of infected fish	% of infection
Winter	540	0.0	0.0
Spring	570	14	2.46
Summer	690	43	6.23
Autum	500	5	1.00

Fig. (1): The infected gills showing oval to elongated yellowish white nodular cysts of Loma spp

الملخص العربى

دراسة هستوباثولوجية و طفيلية علي ميكروسبوريديا من جنس اللوما التي تصيب بعض الأسماك البحرية بالخليج العربى - القطيف - المملكة العربية السعودية

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تم فحص عدد ٢٣٠٠ عينة من الأسماك البحرية بأحد اكبر مجمع لتسويق الأسماك بمنطقة القطيف بالسعودية خلال عام ١٩٩٦وتبين من الفحص تواجد حويصلات صفراء إلى بيضاء اللون علي خياشيم بعض الأسماك من نوع الهامور بينما باقي الأنواع الأخرى تحت الدراسة كانت خالية من الإصابة وقد تم التعرف علي نوع الميكروسبوريديا التي صنفت من نوع اللوما وتم دراسة العلاقة بين شدة الإصابة واختلاف فصول السنة وكذلك دراسة التغيرات الهستوباثولوجية علي الأهداب الخيشومية في الأسماك المصابة .