

Full Length Research Paper

Helminths parasites of pompano, *Trachinotus ovatus* (L, 1758), from the harbour of Cap Water or Ras El Ma (Mediterranean Coast of Morocco)

Y. El Madhi*, H. Darif, T. Hassouni, D. Lamri, D. Belghyti, Kh. Elkharrim, B. Chiahou, H. Barkia, D. Lamrioui and H. El Halouani

Regional Centre for Education and Training jobs, RABAT, Morocco.

Accepted 1 April, 2015

Parasites communities of the pompano, *Trachinotus ovatus* (Linnaeus, 1758) (Pisces; Carangidae), were studied in terms of helminths parasites species composition and with descriptions of prevalence and intensity infection. This pelagic fish is commercial in Morocco and is performed on aquaculture. Between November 2012 to January 2013, 146 specimens were purchased from the harbour of Cap Water or Ras El Ma (Mediterranean Coast of Morocco) and examined for parasite infection. Four species of helminths parasites were collected and are reported in this work: Digenean : *Lepocreadium trachinoti* (Wang, 1989); Acanthocephala : *Pomphorhynchus françoise* (Golvan and Houin, 1963); *Rhadinorhynchus cadenati* (Golvan, 1964); and Nematoda : *Camallanus singhi* (Zaidi and Khan, 1975). These species were recorded for the first time on the Pompano in Mediterranean Coast of Morocco. *Rhadinorhynchus cadenati* was the dominant species with highest prevalence (55, 9%), mean intensity (5, 02) and abundance (6, 81).

Key words: Helminths, *Trachinotus ovatus*, prevalence, Mediterranean Coast of Morocco.

INTRODUCTION

The species of the genus *Trachinotus* is considered as potential mariculture candidates (Du and Luo, 2004). The pompano, *Trachinotus ovatus* (Linnaeus, 1758), with a potential value for aquaculture has importance for the future development of the aquaculture industry according to Chervinski and Zorn (1973). *T. ovatus* has essential importance for the future development of the aquaculture industry in USA, Venezuela, the Dominican Republic, Brazil and Israel, which culminated in several intensive aquaculture experiences in Israel (Chervinski and Zorn, 1973) and China (Zhang et al., 2000).

The parasites represent a serious problem on aquaculture of fish. The disease of infection slackens growth and increases mortality in fish, therefore it is a limiting factor on the success of aquaculture farm (Jeong-Ho, 2002; Montero, 2003). This lead is important to know these parasites (Barnabé and Sillard, 1986; Belghyti, 1996). The presence of these parasites frequently results in a general debilitation of their fish hosts, this being

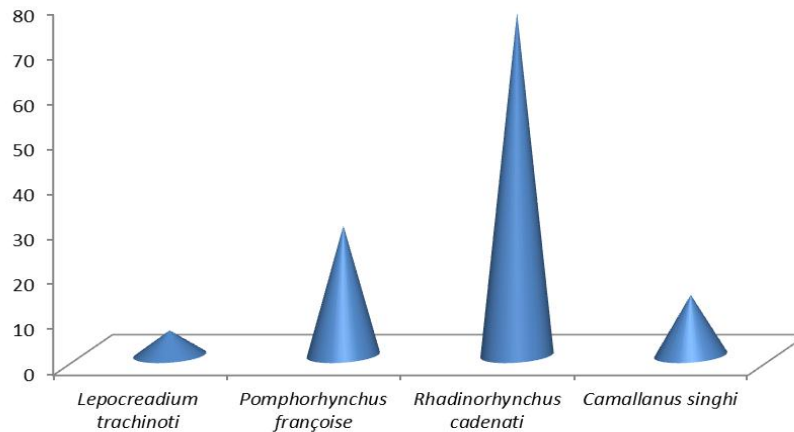
reflected in a decrease in fish resistance against various infections and the unfavourable influence of the environment, resulting in immediate decrease in yields in terms of fish production. On the other hand, it is worth mentioning that in some regions, fish parasites also represent an important public health problem, because fish may be a source of serious diseases to man (Chou and Lee, 1997).

In Morocco, Carangidae fish are present and commercial (7000 tons/year), but very little is known about their parasites. The objectives of this paper are to determine the helminths parasites, prevalence, abundance and mean intensity of pompano observed in the harbour of Cap Water of Mediterranean Coast of Morocco and with reference to their pathogenic potential.

*Corresponding author. E-mail: youssmad@yahoo.fr.

Table 1. Data about parasites of the pompano, *T. ovatus* (L, 1758), from the harbour of Cap Water or Ras El Ma (Mediterranean Coast of Morocco).

Parameter Parasite	Prevalence (%)	Mean intensity (parasites per fish)	Mean abundance	Organ infected
<i>Lepocreadium trachinoti</i>	2.28	1.70±1.3	0.09±0.20	Operculum
<i>Pomphorhynchus françoise</i>	8.17	3.52±1.42	0.32±0.21	Intestine
<i>Rhadinorhynchus cadenati</i>	55.9	6.37±4.38	4.02±1.95	Intestine
<i>Camallanus singhi</i>	1.96	1.26±0.25	0.03±0.01	Pyloric ceca + Anus

**Figure 1.** Relative dominance of parasites of the pompano, *T. ovatus* (L, 1758), from the harbour of Cap Water or Ras El Ma (Mediterranean Coast of Morocco).

MATERIALS AND METHODS

Monthly samples of *T. ovatus* were purchased from the harbour of Cap Water between November 2012 and January 2013. A total of 146 specimens with total length of $8.1 \text{ cm} \leq \text{TL} \leq 30.2 \text{ cm}$ were examined for parasite infection. The determinations of host fish were carried out using the key of Lioris and Rucubado (1998).

In the laboratory, parasites were examined under a light microscope affixed with AFA, stored with 70% ethanol, stained in Mayer's haematoxylin, dehydrated through a graded series of ethanol solution, cleared in xylol and mounted in Canada balsam. The digestive tract was opened longitudinally and the contents were examined under a light microscope. Digenea were fixed with AFA, colored in acetic carmine after dehydration in the set of alcohol 70, 80, 85, 90, 95 and 100% (Amato, 1994). Then resolved with alcohol-xylol and xylol and mounted in Canada balsam. The nematodes and acanthocephale were fixed in the liquid of Bouin and mounted in Glycerin-Gelatin (William et al., 1998). The prevalence, abundance and mean intensity were calculated according to Zaidi and Khan (1975). Relative dominance was calculated according to Bush et al. (1997).

Identification of the parasites was based on

morphology, and dimensions are given in micrometre. Parasites systematic was done according to Golvan (1969), Margolis and Kabata (1984), Moravec (1994), Euzet and Ktari (1970), Wang (1989), Zaidi and Khan (1975), and Hayward and Rohde (1999).

RESULTS

A parasitological investigation on pompano, *T. ovatus* (L, 1758), from the harbour of Cap Water of Mediterranean Coast of Morocco revealed the presence of four species of helminths parasites, and they are: one species of Digenea (*Lepocreadium trachinoti*); two species of Acanthocephalan (*Pomphorhynchus françoise* and *Rhadinorhynchus cadenati*) and one species of Nematoda (*Camallanus singhi*).

The epidemiological index (prevalence, abundance, mean intensity) are presented for each parasite population in Table 1. A total of 431 parasites specimens were harvested. All fish were harboured from one or more parasite species and the mean intensity of species per host was 5.91 ± 1.26 (SD). *Rhadinorhynchus cadenati* observed throughout the year, was the dominant species (Figure 1) with 241 specimens (55.9%) (125 males and 116 females), and all standard development was detected (mature and immature). But only 27

specimens of *Pomphorhynchus françoise* were collected. On the other hand, the Digenean and Nematoda were observed to be low. A total of 10 *Camallanus singhi* were collected from the anus and pyloric ceca and the intensity of infection was very low (1.35 ± 0.11).

DISCUSSION

This study presented the structure of the *T. ovatus* parasites helminths communities from Cap Water of Mediterranean Coast of Morocco (four endoparasites). The *R. cadenati* and *P. françoise* described in this study showed similarity with the species described by Golvan (1969). For *R. cadenati*, a dominant species with high prevalence and intensity values of infection which can intermediate the hosts is abounding in the Cap Water of Mediterranean Coast of Morocco.

The Nematoda *Camallanus singhi* and Trematoda *Lepocreadium trachinoti* showed similarity with species described by Zaidi and Khan (1975) and Wang (1989) respectively. The parasitic infection was a common problem in fish on aquaculture (Boyce, 1979).

According to Dezfuli (1991), the acanthocephalans attach to the gut using an eversible spiny proboscis and penetrate the gut wall, causing a pronounced host inflammatory response. The proboscis of genus *Rhadinorhynchus* was long and their displacement in fish intestine causes the formation of inflammatory nodules (Oliva et al., 1990). The trunk of genus *Pomphorhynchus* precedes the damage to the epithelial lining of the fish intestine according to McDonough (1981). For aquaculture, the low prevalence of *C. singhi* was a positive factor, though Petter et al. (1974) suggested that this genus was aquaculture noxious and was restricted to the mucosal layer causing complete destruction of the columnar epithelium. According to Jeong-Ho (2002), the mortality of *Camallanus cotti* (guppy) of *Tetrahymena corlissi* in tropical fish farm reached up to 30%. The *Mongean* infection was associated with the pathology of the *Trachinotus* in cultured marine fishes of pompano, *Trachinotus falcatus* L., from Singapore proceeding the gill disease associated with *Paramoeba* sp (Monogean) (Athanasopoulou et al., 2002).

In conclusion, none of the examined pompano from the Cap Water of Mediterranean were free of helminths, but the prevalence of parasites in *T. ovatus* fishes was high. However, the impact of the parasitic infection was not investigated; as such, further studies are needed in order to determine the extent to which the infections influenced the mortality and performance of the pompano, *T. ovatus*, on aquaculture.

REFERENCES

- Athanasopoulou F, Cawthorn R, Lytra K (2002). Amoeba-like infections in cultured marine fish: systemic infection in pompano *Trachinotus falcatus* L. from Singapore and gill disease associated with *Paramoeba* sp. in sea bream *Sparus aurata* L. from Greece. *J. Vet. Med. B Infect. Dis. Vet. Public Health* 49(8): 411-412.
- Bush AO, Lafferty KD, Lotz JM, Shostak AW (1997). Parasitology meets ecology on its own terms: Margolis et al. revisited. *J. Parasitol.*, 83: 575-583.
- Chervinski J, Zorn M (1973). Pompano, *Trachinotus ovatus* L. (Pisces, Carangidae) and its adaptability to various saline conditions. *Aquaculture*, 2(3): 241-244.
- Chou R, Lee HB (1997). Commercial marine fish farming in Singapore. *Aquacul. Res.*, 28(10): 767-776.
- Cole WM, Rakocy JE, Shultz KA, Hargreaves JA (1997). Effects of feeding four formulated diets on growth of juvenile palometa, *Trachinotus goodei*. *J. Appl. Aquacul.* 7(2): 51-60.
- Dezfuli BS (1991). Histopathology in *Leuciscus cephalus* (Pisces: Cyprinidae) resulting from infection with *Pomphorhynchus laevis*. *Parassitologia*, 33(2-3): 137-145.
- Du T, Luo J (2004). Comparison study on artificial breeding between *Trachinotus ovatus* and *Trachinotus blochii*. *Marine Sci.*, 28(7): 76-78.
- Francisco EM, Silvia CF, Padrós FG, Antonio G, Juan AR (2003). Effects of the gill parasite *Zeuxapta seriola* (Monogenea: Heteraxinidae) on the amberjack *Seriola dumerilli* Risso (Teleostei: Carangidae). *Aquaculture*, 232(1-4): 153-163.
- Gaspar AG (1997). Selección de peces marinos para cultivos intensivos en el nororiente de Venezuela. *Proceedings of the Gulf Caribbean. Fisheries Institute*, 50: 503-512.
- Golvan J (1969). Systématique des Acanthocéphales (Acanthocephala Rudolphi, 1810). Paris: Mém. Mus. Nat. hist. Nat, 1969; Fascicule Unique, p. 37.
- Hayward CJ, Rohde K (1999). Revisions of the monogenean family Gotocotylidae (Poyopisthocotylea). *Invertebrate taxonomy*. Melbourne, 13: 425-460, 92 Figures, 2 Tables.
- Heilman MJ, Spieler RE (1999). The daily feeding rhythm to demand feeders and the effects of timed meal-feeding on the growth of juvenile Florida pompano, *Trachinotus carolinus*. *Aquaculture*, 180: 53-64.
- Jeong-Ho K, Craig JH, Gang-Joon H (2002). Nematode worm infections (*Camallanus cotti*, Camallanidae) in guppies (*Poecilia reticulata*) imported to Korea. *Aquaculture*, 205(3-4): 231-235.
- Lazo JP, Davis DA, Arnold CR (1998). The effects of dietary protein level on growth, feed efficiency and survival of juvenile Florida pompano (*Trachinotus carolinus*). *Aquaculture*, 169(3-4): 225-232.
- Lioris D, Rucabado J (1998). Guide d'identification des espèces pour les besoins de la pêche. Guide d'identification des ressources marines vivantes du Maroc. Barcelona. P. 282.
- Molnar K, Szekeley C (2004). Occurrence and pathology of *Sinergasilus lienii* (Copepoda: Ergasilidae) a parasite of the silver carp and bighead, in Hungarian

- ponds. Acta Vet Hung, 52(1): 51-60.
- Petter AJ, Cassone J, France BM (1974). A new pathogenic nematode *Camallanus* in fancy fishes breedings. Ann. Parasitol. Hum. Comp., 49(6): 677-683.
- Sures B, Dezfuli BS, Krug F (2003). The intestinal parasite *Pomphorhynchus laevis* (Acanthocephal) interferes with the uptake and accumulation of lead (²¹⁰Pb) in its fish host chub (*Leuciscus cephalus*). Int. J. Parasitol., 33: 1617-1622.
- Wang PQ (1987). Digenetic trematodes of marine fishes in pingtan county Fujian Province South China. Wuyi Sci. J., 7: 151-163. 11.
- Zaidi DA, Khan D (1975). Nematode parasites from fishes of Pakistan. Pakistan J. Zool., 1975. 7:1, 51-73.
- Zhang Q, Hong W, Shao K (2000). Studies on the taxonomic characters of *Trachinotus ovatus* and *Trachinotus blochii* from net cage mariculture. J Oceanogr Taiwan Strait, 19(4): 497-505.