World Journal of Fish and Marine Sciences 4 (2): 175-178, 2012
ISSN 2078-4589

DOI: 10.5829/idosi.wjfms.2012.04.02.61127

Determination of *Alosa caspia persica* Parasites in Fresh and Brine Water of Caspian Sea

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Abstract: The parasites fauna of *Alosa caspia persica* (Iljin, 1927) were investigated in both environments either Caspian Sea and freshwater habitats. As result, in 50 specimens examined from Caspian Sea, we found *Mazocraes alosae* (Monogenea) in gills, *Diplostomum spathaceum* metacercaria in the lens of eyes, *Pronoprymna ventricosa* (Digenea) and *Hysterothylacium* sp (Anisakidae) in the intestine, while only two of them namely *Mazocraes alosae* in the gills and *Diplostomum spathaceum* in eyes are recorded in freshwater environment. According to our finding, hosts are infected by *Mazocraes alosae* when they entered to freshwater and then carry it into Caspian environment when returned. *Diplostomum spathaceum* metacercaria infects fish hosts in freshwater environment, Anzali Lagoon (situated in Southwest of Caspian Sea) and lives with host during its return to Caspian Sea. In the present study the routes of parasites infection found in both environments are presented and discussed.

Key words: Metazoan % Helminthes % Freshwater % Caspian Sea % *Alosa Caspia Persica* % Iran

INTRODUCTION

Among factors influence on the parasites fauna of fishes, the migration of the hosts must be taken into consideration. Migration of the hosts into new environment, completely differing from the original condition, may evoke some reaction on the parasites species composition, prevalence and intensity [1].

Alosa caspia persica inhabit in both environments the Caspian and Black seas. Subspecies of this type was the most important subspecies in the herring family in the Caspian Sea. It is caught off the coasts of Dagestan and Azerbaijan for research purposes and comprises 85% of the clupeid catch [1], 80-90% of the Caspian commercial catch [2].

In the southern part of Caspian Sea the subspecies *persica* is found in the southeast, near Gorgan or Astrabad Bay. Holcik and Olah reported *Alosa caspia* from the western basin of the Anzali Lagoon and this species is reported from the Safid River and Anzali Lagoon as subspecies *persica* and from the Anzali Lagoon as *knipowitschi* [3, 4].

Males migrate in large numbers at the beginning and end of the migration, females in the middle while Heckman in Hoestlandt (1991) stated that two waves of migration occur, one usually in late April at 7.6-10.2°C comprised of over 80% males and the second in the first half of May at 10.8-14.0°C comprised of over 70% females [5]. The young, which hatch in the spring, leave the summer feeding grounds before the adults and migrate south before October-November. Adults follow as temperatures fall. Some populations do not migrate north and spend their whole life in the southern Caspian Sea. Spawning of the subspecies *persica* takes place in Gorgan Bay and Holcik and Olah suspected from catches of mature and spent fish that it also occurs in the Anzali Lagoon [3]. Furthermore this subspecies will enter almost to freshwaters to spawn in addition to spawning in the open Caspian Sea. The Caspian Seal, *Phuca caspica*, is a predator on this species [6] and it forms a substantial part of the diet of *Silurus glanis* in the Anzali Lagoon [3]. The aim of this study was determining the prevalence of *Alosa Caspia Persica* Parasites in Fresh and Brine Water of Caspian Sea in north of Iran during 2010.

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MATRIALS AND METHODS

Totally 50 specimens of *Alosa persica caspia* in both environment Caspian Sea and freshwater were examined for detection of metazoan parasites. Fish host were seined during fishery seasons in Caspian Sea (autumn and winter) in 2005-2006. Fresh dead fish host were then transferred to laboratory of biology (Islamic Azad University-Babol- branch) for metazoan parasites investigation.

The identification of fish hosts was carried out by Iranian Ichthyologist in accordance to, Berg, Coad and Abdoli, [7-9] and then whole specimens were fixed in 4% formalin and transferred to the Zoological Institute of the Slovak Academy of Sciences for confirmation.

Methods used for collecting, fixing, staining and mounting of parasite specimens were carried out according to Fernando [10] and Gussev, [11]. The identification of parasites was carried out in accordance with the keys given by Gussev [12] and Jalali [13].

RESULTS

Totally four Helminthes species were found in examined fishes and identified to species level (Table 1).

Fig. 1: *Mazocraes alosae in* the gills

Fig. 2: *Diplostomum spathaceum* metacercaria in the lenses of eyes

Fig. 3: *Pronoprymna ventricosa* in the intestine

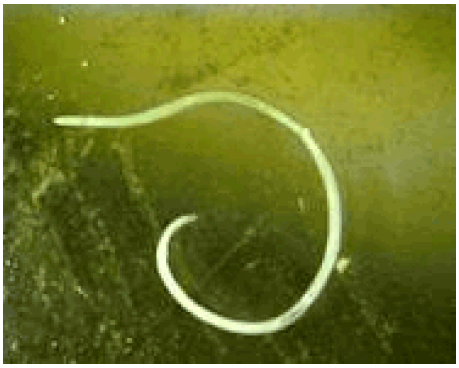

Fig. 4: *Hysterothylacium* sp in the intestine

Table 1: Helminthocoenosis of *Alosa caspia persica* in Iran

Parasites species	Locality	Date	Infected organ (s)	Prevalence %	Reference (s)
Mazocraes alosae Hermann, 1782 (Fig 1)	Farah abad & shahed (marine)	Winter, 2006	Gills	55	Jalali & vatandoost (1989), Shamsi & Jalali (1997)[13]
Diplostomum spathaceum (metacercaria) Rudolphi, 1819 (Fig 2)	Farah abad (marine)	Winter	Lens of eyes	22	Present study
Pronoprymna ventricosa Rud, 1819 (Fig 3)	Farah abad, shahed & Shahid Madani (marine)	Winter	Intestine	100	Kornijchuk & Barzegar (2006)[2]
Hysterothylacium sp (Fig 4)	Farah abad (marine)	Winter, 2006	Intestine	22	Present study

DISCUSSION

According to Dogiel *et al*. [14] among factors influence on the parasites fauna of fishes, the migration of the hosts must be taken into consideration. Migration of the fishes into new environment in this case from Caspian Sea with salinity 13 ppt to the freshwater river which is completely differing from the original condition are largely determined by changes in physiological condition of host to the degree which may evoke some reaction on the parasites species composition, prevalence and intensity. In fact those parasites which are coelozoic and histozoic species and not exposed to the direct influence of the environment, are not affected by the migration of the host in new live mode. According to finding of the present study, hosts are infected by *Mazocraes alosae* when they entered to estuaries (or sometimes to freshwater) and then carry it into Caspian environment when returned.

The reproductive period of *M. alosae* is even more restricted. This species live on the gills of *Alosa* caspia *persica*, a semianaderomous migratory fish in Caspian Sea. For most of the year adults are dispersed throughout the sea and so are the young *Alosa* caspia *persica* but there is not any contact between the young and the old fish. In April and May when adults mass off the estuaries Gorgan Bay prior to their upstream spawning migration *Mazocraes alosae* produces eggs. These develop and hatch out rapidly and reproduction and infection confined to this month. For the parasites this is the only opportunity in the whole of the host's life history for infection to take place.

The same happens for many species of monogenean which have life cycle closely related to those of their hosts. *Dactylogyrus vastator* parasites of carp are a good example of advanced co-ordination [15].

The mechanism of co-ordination is unknown but probably a common response by both host and parasites to climatic factors such as temperature and day length.

It must be presumed that the life cycle of the many other species of parasites of solitary marine fish are synchronized with those of their hosts in a similar way.

Such chronological overlapping of presence of breeders (migrated to estuaries) and fries and fingerlings (already produced in freshwater) close to shore of Caspian Sea can be the most practicable way of *M. alsoa* transmission to fingerling from breeders. Similar way of transmission of *Dactylogyrus frisii* in *Rutilus frisii kutum* in Caspian Sea was studied by Shamsi and Jalali [16], although overwintering eggs might be the other source of infection which is not fully known in *M. alosae.*

According to Gussev [12] all 7 species of Genus, *Alosa* can be infected by *M. alosae* which is the only monogenean parasites found in the gills of *Alosa* spp.

Larval stages of the nematode *Hysterothylacium* sp was found in the intestine of infected *Alosa caspia* are become adult in the Caspian Seal *Phuca caspia* which is the main predator on this species where the *Hysterothylacium* sp larvae reach to maturation stages [14].

Parasites of the member of the genus *Alosa* in Caspian Sea has no much similarity with the same in Black Sea and only two specific parasites species are common to both seas: *Mitraspora caspialosae* and *M. alosae*. The other two common species are non-host specific ides *Diplostomum spathaceum* and *protocephalus* sp [14] among 32 parasites species found in different survey. *Diplostomum spathaceum* metacercaria infects fish hosts in freshwater environment, ides Anzali Lagoon (situated in south west of Caspian Sea) where infected *Limnea* and *Phisa* spp as first intermediate host are commonly found and lives with host during its return to Caspian Sea.

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