

A Survey on Ectoparasite Fauna of Cold Water Fish Farms in Mazandaran Province, Iran

¹Shohreh Poulin, ²Mehdizadeh Mood Sara and ³Sahandi Javad

¹Faculty of Veterinary Medicine, Ferdowsi University, Mashhad, Iran

²Faculty of Veterinary Medicine, Semnan University, Semnan, Iran

³Faculty of Natural Resource, Gonbad Kavous University, Gonbad, Golestan, Iran

Abstract: The present study was carried out to survey on ectoparasite fauna of cold water fish farms in Mazandaran province (Iran). For this aim 500 samples were obtained from 50 fish farms and after arriving to the laboratory parasite examination started immediately. At the end of 12 month study on parasites. After parasitic examinations *Ichthyophthirius multifiliis*, *Trichodina sp.*, *Chilodonella sp.*, *Gyrodactylus sp.* and *Dactylogyrus sp.* were detected. The highest infestation was related to *Ichthyophthirius multifiliis* (16.40 %) that is member of protozoan ectoparasites and the lowest infestation was related to *Chilodonella sp.* (1 %).

Key words: Infestation • Ectoparasite • Rainbow trout • Mazandarn Province

INTRODUCTION

Fish are continuously exposed to stressful procedures in rearing facilities e.g. transport, over handling and overcrowding [1, 2]. One stressor influencing fish health is that imposed by parasites. External parasites are the most common parasites encountered in aquatic animals raised in both ponds and aquaria [3]. This group is a diverse array of mainly ciliates and flagellates that feed on the most superficial skin layer. Clinical signs are due to damage caused by parasite feeding activity. Parasites are irritating which often cause a reactive hyperplasia of the epithelium and increased mucus production. All protozoan ectoparasites have a direct life cycle, which is faster at higher temperature. Generation time of some species may be as little as 24 hours under optimal conditions. Thus, these parasites can quickly overwhelm a host population. Ectoparasite infestations can cause severe skin damage such as abrasions and ulcerations on the body surface, hemorrhagic spots on the skin and eroded fins resulting in economic losses due to reduced growth, fecundity and increased morbidity and susceptibility to secondary infections [4]. Furthermore in affected fish respiratory function can be drastically impaired because of hyperplasia, degeneration and necrosis of the gills. Therefore due to importance of ectoparasite infestations and their

significant economic losses in aquaculture, knowledge of the parasites, their hosts and their prevalence is an essential prerequisite of preventative procedures for the parasite problem in aquaculture. The aim of present study was to identify ectoparasites of cold water fish farms and their prevalence in Mazandaran Province of Iran.

MATERIALS AND METHODS

Five hundred samples of rainbow trout (*Oncorhynchus mykiss*) of weighing 1-150 g were sampled randomly from 50 cold water fish farms in Mazandaran Province of Iran from April 2009 to March 2010. Specimens were transferred alive to an aquatic laboratory in Amol (Mazandaran- Iran). The parasitic examination immediately begins with checking samples for any abrasion or ulceration on body surface. Fish skin is not keratinized and thus is susceptible to iatrogenic damage. Two major methods are used to obtain skin biopsies: skin scraping and fin clipping. After that wet smear of skin, fins and gills were prepared and observed carefully under the light microscope (LABOVAL 4) with 40 X magnification. For this process basic required equipment were latex gloves, simple surgical instruments (scalpel, fine and coarse forceps and etc.) microscope slides and cover slip. Finally the prevalence of each parasite was estimated.

RESULTS

From a total of 500 specimens, 182 fish (36.4%) were infected with ectoparasites. Through the parasitic examinations five species of parasites including in: *Ichthyophthirius multifiliis*, *Trichodina sp.*, *Chilodonella sp.*, *Gyrodactylus sp.* and *Dactylogyru sp.* were detected (Fig. 3).

The results that explained in Figure 1 and 2 showed that from total percentage (36.4 %) of detection 31.4% of detected parasites were protozoan (16.4% *Ichthyophthirius multifiliis*, 14% *Trichodina sp.* and 1% *Chilodonella sp.*) and 5% were monogenic trematodes (3% *Dactylogyru sp.* and 2% *Gyrodactylus sp.*). The highest prevalence of parasites in our study belonged to the *Ichthyophthirius multifiliis* (Figure 1) causative agent of White Spot Disease.

DISCUSSION

The present study revealed that the overall parasites prevalence was 36.4% and demonstrated the increasing concern of parasitic infestation in cultured rainbow trout in the Mazandaran Province of Iran.

There is not enough information about prevalence of ectoparasites in cultured rainbow trout (*Oncorhynchus mykiss*) of Mazandaran Province (Iran).

Ichthyophthiriosis is highly contagious and spreads rapidly from one fish to another so if it is detected, treatment should be applied before it becomes too serious. Because of the parasites life cycle, only the free-swimming stage of the parasite is susceptible to treatment. Neither the trophonts under the epithelium nor the tomont cysts can be killed, so repeated treatments continually, can kill the juvenile tomites. *Ichthyophthirius multifiliis* is a serious problem for fish farmers and it is the cause of heavy economical losses. So careful management such as quarantine and multiple treatments can minimize economic losses of this disease [5]. Detected monogeneans in this study were *Dactylogyru* and *Gyrodactylus*, which are gill and skin parasites. They have a series of hooks that attach to the fish causing irritation, excessive mucus production and create an open window for bacterial invasion. A few flukes on a healthy mature fish are not usually significant; however, moderate numbers on a young fish can cause significant mortalities. Prevention of monogenean infestations by quarantine practices is preferable to treating the parasites after they have become established in a system. Formalin and potassium permanganate baths are effective for controlling monogenean infestations in freshwater fish. Members of the genus *Dactylogyru* are egg layers. The eggs can be resilient to chemical treatment, therefore multiple treatments (1 dose per week) are appropriate to

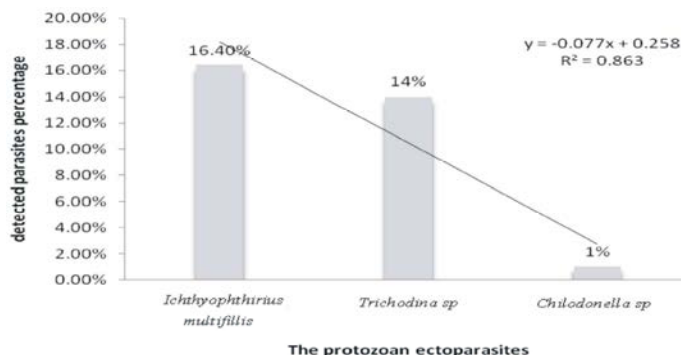


Fig. 1: The performance of protozoan ectoparasites infestation ratio (%)

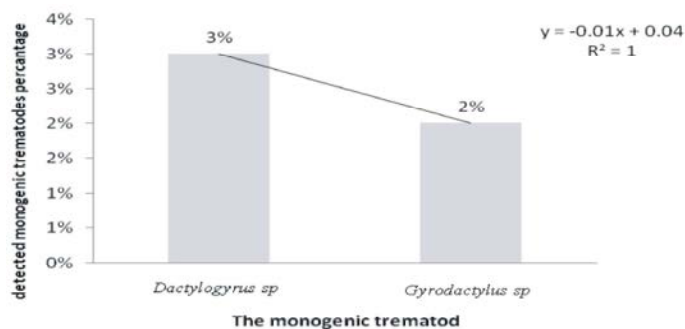


Fig. 2: The performance of monogenic trematodes infestation ratio (%)

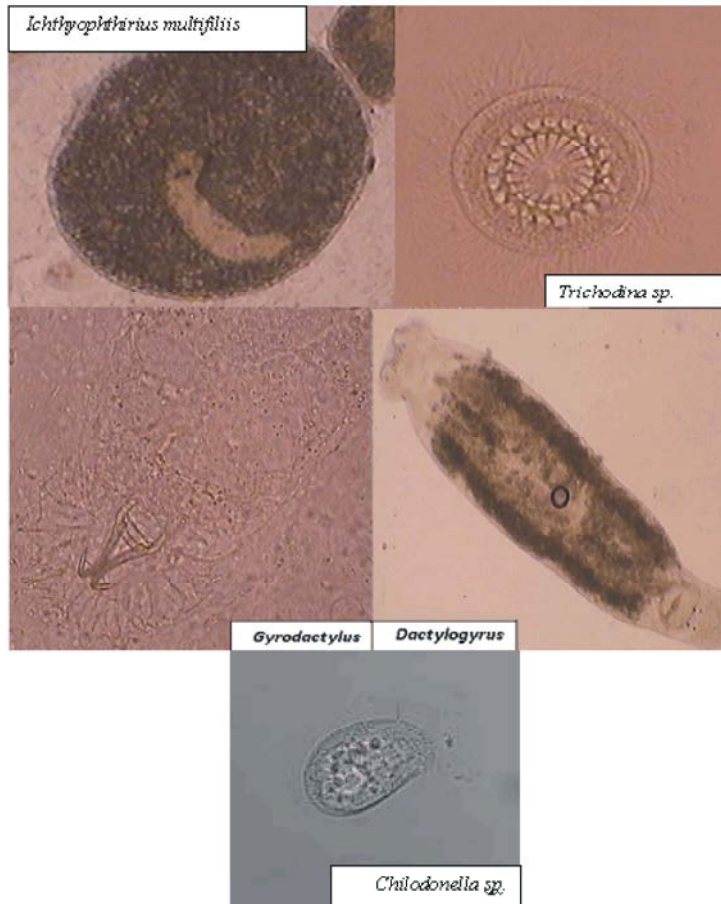


Fig. 3: Isolated ectoparasites

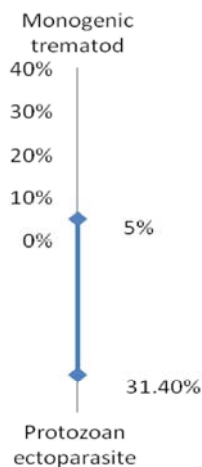


Fig. 4: The comparison of protozoan and monogenic trematodes infestation ratio

control this group of organisms [6]. Predisposing stressors including over handling, overcrowding of the fish, poor quarantine conditions, poor sanitation practices

and poor bio-security can accelerate the disease outbreaks [7], therefore enhance the health management through improving water quality and bio-security of fish farms are the most effective way to prevent the parasite infestation. Control of fish parasites requires knowledge of the parasites of each region, their hosts and their prevalence, therefore periodic parasitological examination can contribute to the control of fish parasites and their economic losses.

CONCLUSION

The present study surveyed on ectoparasite infestations which is important in fish farm monitoring. Rainbow trout is commercial species that breed in all over the world and Mazandaran Province is one of important area of this industry. Ectoparasite infestations can be controlled and it needs to know the species of ectoparasite for using the best treatment.

REFERENCES

1. Barton, B.A. and G.K. Iwama, 1991. Physiological changes in fish from stress in aquaculture with emphasis on the response and effects of corticosteroids. *Annual Review of Fish Diseases*, 1: 3-26.
2. Wendelaar Bonga, S.E., 1997. The stress response of fish. *Physiological Reviews*, 77: 591-625.
3. MacMillan, J.R., 1991. Biological factors impinging upon control of external protozoan fish parasites, *Ann Rev Fish Dis.*, 1: 119-131.
4. Pike, A.W., 1989. Sea lice-major pathogens of farmed Atlantic salmon. *Parasit. Today*, 5: 291-297.
5. Omidzahir, S.H., H. Ebrahimzadeh Mousavi and M. Hoseini, 2010. Study of Ichthyophthiriosis in Shubunkin goldfish (*Carassius auratus*). 2nd International Congress on Aquatic Animal Health Management and Diseases, Iran.
6. Reed, P., R. Francis-Floyd and R. Klinger, 2005. *Monogenean Parasites of Fish*.
7. Shoemaker, C.A., J.J. Evans and P.H. Klesius, 2000. Density and dose: factors affecting mortality of *Streptococcus iniae* infected tilapia (*Oreochromis niloticus*). *Aquaculture*, 188: 229-235.