J. Appl. Environ. Biol. Sci., 5(11S)103-105, 2015

ISSN: 2090-4274
Journal of Applied Environmental and Biological Sciences
www.textroad.com

Studying the Prevalence of Parasitic Infections of the Skin and Gills of Rainbow Trout in Fish Farms of Sistan Province

Abolghasem Safdari*[1], Mahdiye Fadaii Rayeni[2]

[1]Department of Clinical Sciences, Special Center of Domesticated Animal Research, University of Zabol, Iran
[2] High Education Complex of Saravan, Iran

Received: May 14, 2015
Accepted: August 27, 2015

ABSTRACT

Parasitic infections in aquatics accounts for an important part of their diseases. To investigate the prevalence of parasitic infections of the skin and gills of rainbow trout in the fish farms of Sistan province, we visited8 rainbow trout farms and thus, 260 fishes were randomly collected and tested. According to this survey, out of 2080 samples in 8 fish farms, 21 samples contained Ichthyophthirius (1%), 673 samples contained Trichodina (32.4%), 29 samples contained Dactylogyrus (1.39%), 89 samples contained Gyrodactylus (4.3%) and 1268 samples (60.9%) were free from parasite. The highest rate of infection was related to the Trichodina parasite.

KEYWORDS: Rainbow trout, Sistan, Parasite infection

INTRODUCTION

Development of aquaculture plays a very important role in supplying human food in economy of different countries. One of the conditions for reproduction of aquatics is maintaining hygiene and preventing diseases in them. Fishes constitute a large group of animals and have a high nutritional value and hence, identifying them and assessing their diversity and biology are of great importance. Also, identifying factors that endanger fish life cycle and health are also important. Meanwhile, parasites as a large group of invertebrates are to be considered bothin terms of health issues and zoology. Parasites may reduce the growth and lead tomortality, infertility and delayed sexual maturity and often provide grounds for bacterial and viral diseases.

A parasite population includes all members of a species in a particular region. Parasites normally have a high proliferative capacity. If all members of a parasite population can remain in a host, a very dangerous situation will be created. Host and parasite balance has a significant role in net reproduction of a parasite. If the growth of a parasitic population is not prevented like any free-living creature, they will continue to grow exponentially. Iran, due to its geographical location, climatic conditions and different water resources, includes various species of fish, each of which can accommodate a variety of different parasites. This highlights the importance of studying fish parasites. The aim of this study was to determine the prevalence of some common parasites in trout farms in the Sistan region. Parasitic infection in aquatics accounts for an important part of their diseases. Less parasites causes reduced losses incurred during breeding and so, food energy will more be used for fish growth and health care and side costs will be reduced.

MATERIALS AND METHODS

For research, we visited 8 trout farms and 260 were collected at random for testing. When sampling, to prevent contact with skin and possible damages caused by parasites of fish surface, samples were taken individually using special buckets from the pools. Then, the fish were caught alive in the water and transferred to the pool.

At the first stage, each fish became unconscious with head injury after being caught from the tank. In the laboratory, after registration of fishing location, they were biometeried and their information was recorded in a form. Then, the various body parts of fishes were parasitologically investigated. First, the body of fishes were examined for the presence of macroscopic parasites like Lernaeaor leeches. By removal of mucus from different parts of the skin and fins, wet slides were prepared and searched with an optical microscope of ×4 to ×100 magnification. To check the gills, macroscopic lesions on gills were investigated by lifting the cap. Then, each of the gill arches were separately cut off and placed on the slides. Then, both its mucosa and crushed parts were investigated under a microscope with magnification of ×4 to ×100. To check the eyes, both eyeballs were taken out and placed on a slide. Then, the eye lenses were removed and by placing another slide on them, their contents were respectively checked under a microscope with low and high magnification. Extensions taken from the skin and gills were placed in the vicinity of fixative solution based on Fernando instruction (26) for 15 minutes. Then, it was rinsed for a few minutes with 70% ethanol containing a few drops of iodine. After that, using Canada glue, they were adhered. The samples were identified using identification keys of loam and Daykova (33) and Jalali (7). To fix and detect these parasites, the mature parasite cysts were separated from the infected tissue and placed on the slide. Then, the spores were released by tearing the cysts and were fixed using glycerine–gelatine. According to Lomo

***Corresponding Author:** Abolghasem. Safdari, Department of Clinical Sciences, Special Center of Domesticated Animal Research, University of Zabol, Iran. Email: Drsafdari@uoz.ac.ir

Arthur (29), an average of 30 spores were measured from the mature cysts separated from the infected tissues. The measured items contained the spore width and length, and length of the polar capsule.

After preparing the wet slide and observing the parasite under a microscope, it was removed with a Pasteur pipette and placed on another slide. Then, the sample was covered by a cover slip and after placing a blotting paper on it, the parasite went under some pressure. In this way, its water was absorbed by the paper and its hooks were opened. Fixing the parasite was performed according to the instructions of Fernando (26) and Gossau (28) using ammonium picrate or glycerine gelatin. For the diagnosis of monogenic parasites to the species level, some of the indicators were measured in the parasites with the use of scaled slides so that from each of the Dactylogyrus genera, five fixed samples on the slide were measured. According to Fernando (26), the respective components were measured. Then, according to morphologic, morphometric and morphomeristic properties of the parasite, the specimens were detected using identification keys of Gossau (28) and Jalali (7).

RESULTS

Based on the results of this study, the frequency and percentage of parasites on the skin and gills of rainbow trout in the 8 pools was as below: From a total of 2080 samples in 8 pools, 21 samples contained Ichthyophthirius (1%), 673 samples contained Trichodina (32.4%), 29 samples contained Dactylogyrus (1.39%), 89 samples contained Gyrodactylus (4.3 %) and 1268 samples (60.9%) were free of parasites. The highest rate of infection was for the Trichodinaparasite.

DISCUSSION AND CONCLUSION

Identifying the monogenic parasites in freshwater fishes of Iran began in 1949. Bykofski (1949) released the first report on Monogeneas of Iran's freshwater fishes and introduced four species of this parasites from the gills of fishes in the Karkheh River. Following that, many researchers introduced nearly one hundred species of Monogeneas of freshwater fishes in Iran - both farmed and wild fishes. In Menogeaparasites, tendency is more towards special hosts rather than specific organs. Dactylogyrus Lankorani was first reported by Molnar and Jalali (1992) from the gills of Capoetafish of Jajrud River. The same species of fish were then reported from Tar Lake, Kor and Tonekabon rivers (35). This parasite is also reported by Mahdipour (2006) from the gills of Capoeta Aculeata and Capoeta Damacina fishes from Zayandeh Rood River.

Other reports include Dactylogyrus Lankorani from the gills of Capoeta Capoeta Gracilis and Capoetadamascina from the source of Zayandeh Rood River (20) as well as the gills of Capoetaaculeata and Capoeta Damacina from the Behesht Abad river of Chahar Mahal Bakhtiari. First report on Dactylogyrus Lynstovywas made by Molnar and Jalali (1992). These researchers first reported the mentioned parasite in the country from the gills of species of Barbus Polybius, Barbus Lasertasyry, Barbus Capito and Capoeta Gracilis. About DactylogyrusLankorany, comparison of the previous results with the present study suggested that this parasite can only be seen in different species of the genus Capoeta and owns more hosting features than Dactylogyrus Lynostovi, which is seen in different species of the genus Barbus and Capoeta. Ichthyophthirius is proliferated with the development of fish farming industry and increase of density per area unit because of the chance of meeting with new hosts in conditions of intensive fish breeding.

Mokhayar (1980), Jalali (1993), Rohani (1995), Moghinemi (1995), and Molnar (1993) reported Ichthyophthirius infection in most freshwater fishes of a large part of the country (15, 6, 5, 4, 1).

In this study, among 2,080 samples taken from 8 rainbow trout farms in the province, 21 samples were infected with Ichthyophthirius, and infection level in Sistan was about 1 percent. Mokhayar (1980) reported the Trichodina Domerguei species on the skin and gills of sturgeon, carp and herbivorous fishes, especially fish agencies of Sefidrud areas. Niak et al. (1970) also reported a species of this genus on the skin of baby sturgeon. In a research conducted by Moghinemy (1995), the fishes of Barbus, Muge , Aspiusvorax, and carp were infected with some species of Trichodina (4, 16). Molnar (1990) reported the infection of Capoetadamascina, common carp, silver carp, and sickle fish of Zarivar Lake with some species of Trichodina (4, 16). It seems that the difference in results can be related to different factors such as weather, environment, and feeding conditions of the fishes. According to the studies conducted in this research, out of 2080 samples, 673 cases were infected with Trichodina and the percentage of infection at the regional level was obtained as 32.4 percent. This parasite exclusively lived in the gills of common carp and golden carp, trout; and it is reported from all parts of the world where carp lives. Studies in the Soviet Union and Poland showed that this parasite has a relative resistance to salinity and is sensitive to oxygen deficiency (6 and 16).

Hashem Zadeh et al. (2009), randomly collected and tested 386 rainbow trout with the weights of 250-300 grams from the industrial fish farms of East Azerbaijan province. According to the survey, out of 1930 samples in 5 fish farms,14 were infected with Ichthyophthirius (0.7%), 890 were infected with Trichodina (46.1%), 41 were infected with Dactylogyrus (2.1%), 111 were infected with Gyrodactylus (5.8%), and 874 cases had no parasites (45.3%). The highest rate of infection was related to the parasite Trichodina which is consistent with this study (2). Dactylogyrus extensus species are separated from the gills of wild common carp and freshwater breeding fishes in most parts of Iran and various water temperatures. This parasite is also reported from the carp fishes of the Caspian Sea (3). A large part of infection of the carps in fish farms of Khuzestan is caused by this species (4, 20). Infection of this kind is also reported in carp fishes of Hamoon pond (16). Saravani et al., (2009), randomly collected 5-10 fishes from 12 fish farms in the Sistan region. Out of 60 trout, 16 carcasses were infected with Dactylogyrus (3). According to Bauer (1987), the optimum temperature for the proliferation of this parasite is 17 °C and the temperature between 20 to 25 °C is a limiting factor of its proliferation due to the reduction of dissolved oxygen and reduction of fish eggs. In fact, one reason for the wide spread of this parasite is its relative ability to tolerate adverse conditions; salinity and low temperature conditions are not limiting factors of its spread (20, 4 and 1). It

seems that Dactylogyrus species have the ability to adapt to some ecological factors such as salinity, temperature, and water oxygen. Native species in Iran and Palestine are well accustomed to our climate (20). It was found in this study that among 2,080 samples taken from a total of 8 trout farms, only 29 samples were infected with Dactylogyrus parasite and according to the statistical results, infection with this parasite in the region was equal to 1.39 percent.

Dactylogyrus Derzhavin is a pathogenic species and is considered as a serious threat to salmon and trout fishes. So far, no successful treatment method is proposed to control it. However, anti-worms have been used successfully (15). According to the study, the prevalence of Gyrodactylusout of 2080 samples was89 and based on statistical results, percentage of infection with this parasite in the region was 4.3 percent.

As the survey results showed, the highest prevalence of parasitic infection among fishes was related to Trichodina and the lowest prevalence of parasites was related to Ichthyophthirius.

Hence, more attention must be paid to these parasites and effective factors in their reduction or increase.

REFERENCES

1-Barzegar, M, Asadollah, S. Hemmatzadeh, A. Rahnama R, Jalali, B (2004) "Parasitesof Fishes in Beheshtabad River (Chaharmahal and Bakhtiari Province)," Journal of Iran Veterinary Science, First Year, No. 1, pp. 67-74.

2. Hashemzade Farhang, Notash, Sh. Sa'eedi, M. Studying the prevalence of parasitic infections of the skin of rainbow trout (250-300 g) in industrial trout farms of East Azerbaijan province, Veterinary Journal of Tabriz Islamic Azad University, Volume 3, No. 1. Spring2009.

3-Saravani, L. Dehmardeh, H. Heydarzadeh, M. Studying the prevalence rate of Dactylogyrus in the trout gills in the fish farms of Zabol. 2nd National Congress of Veterinary Laboratory Sciences 22-23, November 2012, University of Semnan.

4-Pazooki, J., Masoomian, M., Qobadian, M. (2005) "Identifying parasites of some fishes in Iran water resource", Journal of Fisheries of Iran. Fourteenth year. No. 1, pp. 23-40.

5. Jalali, B. (1998) "freshwater fish parasites and parasitic diseases in Iran," Publications ofIran's Department of Fisheries and aquaculture, Second Edition, pp. 274-271

6-Jalali, B., Barzegar, M. Asadollah, S. Mehdi-Pour, M, Maghsoudloo, A, Gheshlaghi, P. Abdollahi, F. Maghsoudi, H. Fakhri, Z (2007) " Identifying parasites ofsome fishes inthe source of the Zayandehroudriver and the first report on ?in Iran, "Iranian Journal of Veterinary Sciences", fourth year, No. 1, pp. 63-70.

7-Jalali, B. (1991). Monogeneas of Iranfreshwater fishes, Publications of Iran's Department of Fisheries and aquaculture, pages 11-97.

8-Jalali, b. (1993): Common diseases of Iran's farmed fish, Publications of Iran's Department of Fisheries and aquaculture, pages 11-97.

9. Drummond Sedvik and Abdollah Masha'ee, M. (2000): A Guide to breeding trout, Nourbakhsh Publications, pages: 133-142.

10-Roberts, A and Jalal Ja'fari, B (1999): diseases of salmon and trout, Nourbakhsh Press, Pages: 30-39.

11-Rohani, M. (1994), "Studying the infections and parasitic fish diseases of Sistan region, Proceedings of the Second Symposium of IranVeterinary Clinical Sciences, 18-20 November, Tehran, Pages: 26-81.

12-Rohani, M. (1995). Studying the parasitic infection of fishes in Hamoon pond, Consulting Engineers of Abzi-Gostar, Tehran, Pages 14-17.

13-.Sattari, M. (2002): ichthyology (anatomy and physiology), Naghsh-e-Mehr Publications, Pp. 1-50.

14-Shamsi, Sh. (2000). "the checklist of freshwater fish parasites of Iran, Iran Fisheries Research and Training Institute, Pages: 17-47.

15-Shari'ati, A. (2004). Fish of the Caspian Sea and itsCatchment area, Naghsh-e-Mehr Publications, 1st edition, Page 75

16-Abdoli, A. (2008). The of fish inland waters of Iran. naghgh-e Manapublications, 1st edition, p. 377.

17-Abdi, K. (1996): Identification and study ofthe fish parasites in Khabaddam lake. Veterinary PhD thesis ofUrmia Azad University. No. 219.

18. Araghi, Soureh, A. JalaliJa'fari, B. Chapter (2005). "Studying of Monogenea parasites in fishgills of Mahabad river with the introduction of two new species for the parasitic fauna of Iran" Journal of Research and development, No. 66,39-45.

19-Ma'soomian, M., Pazooki, J. (1998) "Infection of some fish of Gilan and Mazandaran with the Myxosporea parasites" Iran Journal of Fisheries, 7th year, No. 3, pp 57-74.

20-Mehdipour, M. (2006) "Native and introduced fishparasites of Zayanderud river of Isfahan". PhD thesis ofAquatic Animal Health, Islamic Azad University, Science and Research branch, pp. 12-35.

21-Nazari, F., Pazooki, J. Ebrahimi, M., Ma'soomian, M. (2009) "Capoetadamascina, a new host for the Myxozoaparasite of Halil-Rud River, Kerman Province", Journal of Veterinary Research, 2009, Volume 64, No. 4, 323-327.