

## Prevalence of *Ichthyophthirius multifiliis* parasite in fish farms of Rainbow trout (*Oncorhynchus mykiss*) from Zanjan province, Iran

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### ABSTRACT

Protozoan parasites of rainbow trout are one of the most important pathogen agents in this aquatic species. *Ichthyophthirius multifiliis* protozoa, causative agent of Ich disease can threat the health of these fish and even cause to death. So this study was carried out in order to detect the prevalence of *Ichthyophthirius multifiliis* infection in 107 fish farms of rainbow trout in Zanjan Province. Samplings were done in autumn and spring and during each of times 10 fish were collected from each farm. Then the samples were referred to Parasitology Laboratory of Islamic Azad University of Abhar branch and were examined for Ich parasite.

Totally, 33 and 36 fish farms in spring and autumn had Ich infection respectively. In the other words the prevalence of Ich, during our study was 32.24% in this province. The highest infestations were in the temperature range of 15-16 °C (14.1%) However, there was no significant relation among the types of pools materials, season and weight of fish With Infection.

According to high prevalence of this parasite in this region and the economic losses due to it, it's important to do more investigation in the other area for collecting more information of current statue of this disease in our country and finding the best controlling programs for increasing the health level of cultured fish beside decline the economic losses.

**KEYWORDS:** *Ichthyophthirius multifiliis*, Rainbow trout, Fish Ponds, Zanjan.

### INTRODUCTION

Reproduction and culture of fish are one of the most important industries in the world these days and the recent world statistics show the vast consumption of fish. So fish diseases not only cause to mortality and reduce the fish products but also consumption of infected fish can be dangerous for public health. A Few protozoan parasites are in natural environment usually but mismanagement in culture fields can cause to heavy infection and heavy loses. In order to detect of pathogen organism and decline the damages and prevent of disease in this industry, parasitological study seem to be very necessary. The parasites can cause loss of weight, mortality and sterility and also preparing the condition for invasion the others pathogens such as bacteria and viruses and high mortality in some conditions, but the fish infested by *I. multifiliis* can be easily treated by chemical bath or feed treatment strategies [1]. This study was done with the aim of detection of *I. multifiliis* parasite in rainbow trout (*Oncorhynchus mykiss*) that is one of the common cultured fish in Iran.

*Ichthyophthirius multifiliis*, a ciliated protozoan, is the most devastating and also the biggest ectoparasite protozoa of freshwater- fish [13]. This obligate parasite infects the skin and gills of fish and causing scratching and white salt-like spots that are visible with the naked eye [5]. Naive fish usually die following infection [4].

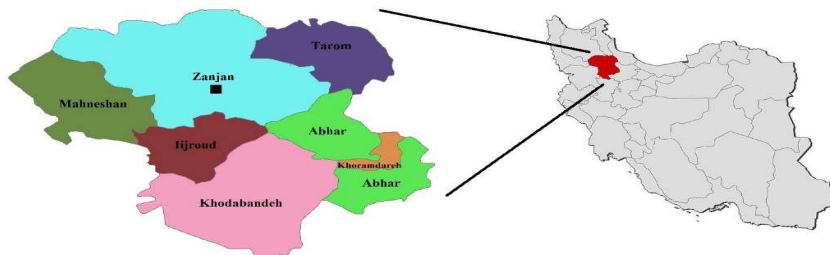


Figure 1: Zanjan Province

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## MATERIAL AND METHODS

This study was done between 2012 and 2013 on fish of 107 fish farms that randomly were selected among 148 fish farms of Zanjan province include; 23 farms in Abhar, 50 farms in Ijroud, 12 farms in Khodabande, 2 farms in Khorramdarre, 31 farms in Zanjan, 6 farms in Tarom and also 28 farms in Mahneshan. 10 fish of each farm were collected once in spring and once in autumn and referred to Parasitology laboratory alive or beside ice for detecting *I. multifilis* and the other parasites. Skin, fins and the other external organs were examined visually and with a hand lens. For gills examination after prepare a wet smear gills were dissected and its filaments were placed in a petri dishes containing the isotonic solution of NaCl (9 gr NaCl in a liter of water) and each of them were examined for the presence of parasites such as monogenea and crustacea with a light microscope carefully [6]. Parasitic smear were immersed in the diluted Boen solution (1:4) for 24 hours and were dried in room temperature and finally stained by Gimsa.

## RESULTS

Totally 2140 fish were collected from 107 of fish farms and determined the *I. multifilis* infestation was 32.24%. In spring 33 farms (30.84%) and in autumn 36 farms (36.64%) were infested.

- *I. multifilis* in each city

According to the results the most infestation was in Tarom (66.7%) and the lowest was in Mahneshan city (17.85%) (Chart 1).

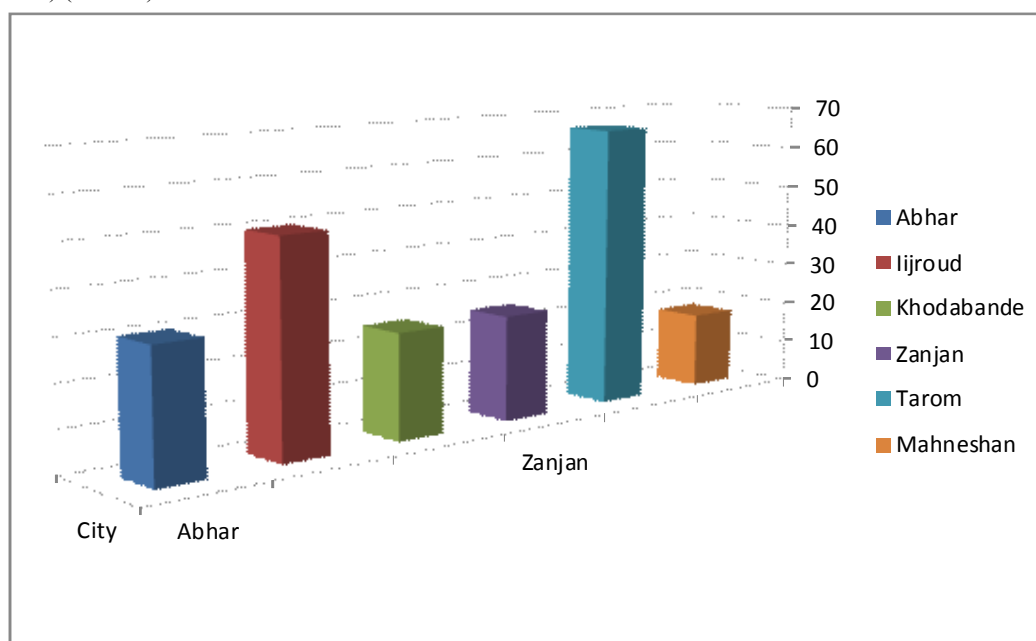


Chart 1: Ich prevalence in each city

- *I. multifilis* and water temperature

The highest infestations were in the temperature range of 15-16 ° C (14.1%). in range of 13-14° C the infestation was 11.68% and in 11-12° C was 2.80%. But according to P value there is no significant relation between the water temperature and presence of *I. multifilis* in this region.

- *I. multifilis* and pools materials

In Concrete pools the *I. multifilis* infestation was 31.42%, in soil pools was 36.54% and in concrete-soil Pools was 27.27%. But there was no significant relation between the types of pools materials and *I. multifilis* existence (Table 1).

Table 1: Ich prevalence and Pools material

| Pool            | <i>I. multifilis</i> |            | Prevalence   |
|-----------------|----------------------|------------|--------------|
|                 | Positive             | Negative   |              |
| Concrete        | 44                   | 96         | 31.42        |
| Soil            | 19                   | 33         | 36.54        |
| Concrete - Soil | 6                    | 22         | 27.27        |
| <b>Total</b>    | <b>69</b>            | <b>151</b> | <b>31.36</b> |

- *I. multifilis* and season

The results show 30.84% of farms was infested in spring and 33.64% in autumn. Despite the higher level of infestation in autumn; there is no significant relation between season and infection (Chart 2).

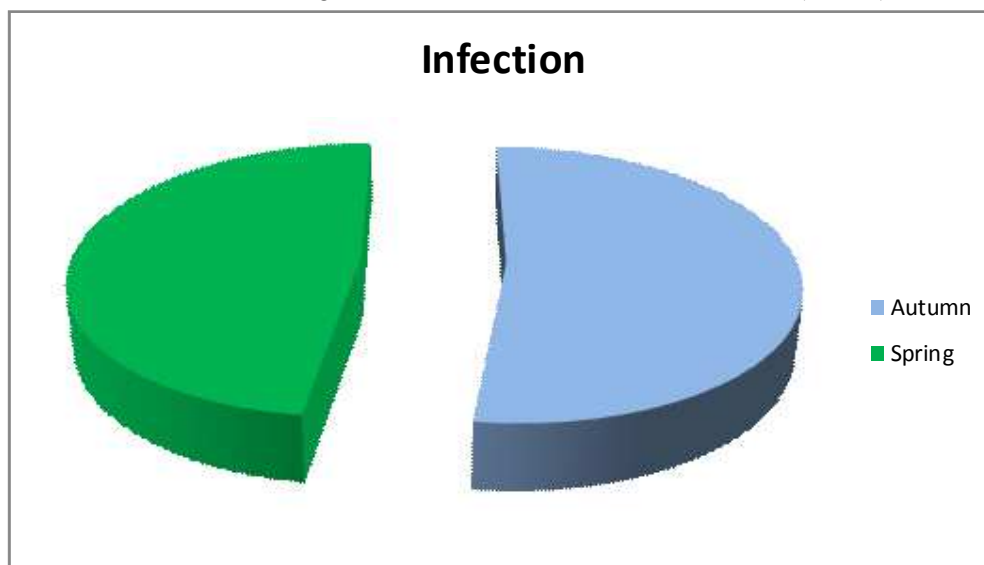


Chart 2: Ich prevalence in different season

- *I. multifilis* and weight of fish

According to the table the most infestation (14.01%) was related to the group with the weight of <10 gr and the lowest (0.93%) was related to the groups with the weight of 200-299gr. but there is no significant relation between fish weight and infection.

## DISCUSSION

Zanjan (48° 28' longitude and 36° 40' latitude), where the Zanjan University is located, is an ancient city. Zanjan now has a population of over 260,000. Agriculture is the principal occupation, and crops include rice, corn (maize), oilseeds, fruits, and potatoes. Poultry, cattle, and sheep are raised (Fig. 1) [14].

According to the results of weight and infestation that were related in groups <10 gr fish it is probably due to the infested fry that bought from culture farms and the lowest infestation in heavy fish can be due to the care and good management of fish culture especially at the end of culture course. Probably 300 gr. fishes were infested because of disregard the health and quarantine standards with the idea of fish resistance against the diseases.

The simple and direct parasites life cycle cause to spread rapidly [5]. The most fish health problems occur due to environmental problems such as poor water quality, crowding and dietary deficiencies, as well as stress [2, 12]. The best way to avoid any fish health problem is prevention. This means that good water quality management and proper fish culture techniques will eliminate the parasites.

Parasitic infections start in spring that water temperature is rising and reach its pick in summer. But in autumn parasite reproduction will be slower Fry are more sensitive for parasites.

Twenty four parasite species were found in eight native and exotic fish species in Zarivar Lake that *I. multifilis* was among them [7]. This parasite has been reported on the skin and gills of Goldfish in Kermanshah [2] and its show that this parasite not only can affect to food fish but also it involving the aquarium fish.

Nematollahi reported the losses because of parasitic infection such as *I. multifilis* in big head fishes of Mashhad [8].

Also this parasite was reported from others aquatics, for examples borji et al reported the 10% of infestation in common carp in Mashhad [3] and also it has reported from *Barbus sharpeyi* in khoozestan province [10]. In a study to detect the parasites in fish in Armand River of High prevalence of *Ichthyophthirius multifiliis* was reported beside 18 others parasites and they claimed parasitic infections can affect native fish population in some freshwater fish from Armand River [11].

In a study in Turkey on rainbow trout ranging from fry to marketing size was determined the most infested times for Ich was June to August [9] that is consistent with our investigation.

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