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Analysis of Ectoparasites in Tilapia Fish (Oreochromis Niloticus) in The Riyan Political Harehood Unit (UPR)

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ABSTRACT

Tilapia is a fishery commodity with high economic value and great demand among farmers. Tilapia fish production in Indonesia recorded an increase from 371 thousand tons in 2021 to 401 thousand tons in 2022, making it one of the largest cultivated fish after shrimp and salmon according to FAO. The advantages of tilapia lie in its high protein content, delicious taste, stable price, ease of cultivation and ability to adapt to new environments and tolerance to low oxygen conditions. However, the main challenge in cultivating tilapia is the attack of non-pathogenic diseases which can cause prolonged stress, decreased body resistance, slow growth and death. Identification of this disease based on water quality is crucial to maintaining fish health and the continuity of cultivation. This study focuses on the identification and analysis of ectoparasites that infect tilapia in the Riyan Community Hatchery Unit (UPR), with the discovery that Dactylogyrus sp. and Trichodina sp. are the two main ectoparasites that affect the health and productivity of fish in that location. Further attention and development of effective control methods are needed to reduce the negative impact of this ectoparasite infection.

INTRODUCTION

Tilapia is a type of fish that has important economic value, making it one of the fish that is in high demand by cultivators and a cultivation commodity that has large market prospects (Siregar et al., 2024; Nurhadi et al., 2023). Based on data from the Ministry of Maritime Affairs and Fisheries of the Republic of Indonesia in 2022, the fish with the highest fisheries production is tilapia. In 2021, fish production only reached 371 thousand tons, while in 2022 there was an increase of around 8.01% or 401 thousand tons. According to data from the Department of Fisheries and Aquaculture FAO (Food and Agriculture Organization), tilapia is ranked third as the most successful fish commodity in world aquaculture, after shrimp and salmon (Kordi M., 2013).

Tilapia fish is in great demand by the community because tilapia fish not only has protein content but also has a savory taste, and a fairly stable market price

ranging from Rp. 30,000 to 35,000. Tilapia fish is also easy to cultivate because it is easy and able to adapt to new environments and is easy to develop or spawn, and is able to survive in environmental conditions that have low oxygen values.(KM Kordi, 2010). However, crop failure also occurs during the process of tilapia cultivation activities, this is due to disease attacks, which can cause a decrease in the value of harvest production, and can even result in tilapia cultivation failing to be harvested by farmers.

Non-pathogenic diseases in tilapia occur due to environmental factors that affect the physiological system of the fish. This condition can cause prolonged stress, decreased immunity, slow growth, and even death (Afrianto et al., 2015). Therefore, it is important to identify non-pathogenic diseases in tilapia based on water quality parameters. This step is a crucial preventive effort to maintain fish health and ensure the sustainability of fish farming (Rumondang et al., 2020; Rumondang, Harmayani, et al., 2022).

Diseases that attack fish have resulted in reduced income for farmers, which has caused economic losses for the community, especially tilapia farmers. In 2004, based on information collected in Indonesia, losses reached 100 billion rupiah based on cumulative data obtained for the islands of Java, Sumbawa, Bali, and Sumatra (Nuryati, 2010). Fish diseases are spread due to the transportation activities of aquatic resource commodities, especially in the fisheries sector to be cultivated as consumption needs. If the disease is not treated, it will become a serious cause in the fish farming business sector (Rumondang et al., 2016). Steps that can be taken to overcome diseases that attack farmed or kept fish are to detect the signs that appear and identify as quickly as possible the spread of the disease (Rumondang, Batubara, et al., 2022). The results of the analysis of the types of protozoa parasites in farmed fish are expected to be useful as data and as a basis for managing the quality of aquaculture water, purification and cleaning of tanks or aquaculture ponds.When aquatic commodities are transported for cultivation or consumption, fish diseases can easily spread. In the process of developing a fish farming business, fish disease is a major problem. The first step that must be taken to combat diseases that attack domesticated fish is to find the symptoms and sources of the disease. It is hoped that data on parasitic protozoa in freshwater fish can help clean breeding tanks, improve pond management, and improve pond water quality. Thus, it is important to conduct a study entitled: "Analysis of Ectoparasites in Tilapia (Oreochromis niloticus): Case Study at the Riyan Community Seeding Unit (UPR). This study aims to understand more deeply the types and impacts of ectoparasites that affect the health of tilapia in the location.

METHOD

Time and Place

This study was conducted in January 2024 by sampling tilapia from aquaculture ponds at the Riyan Community Seeding Unit (UPR) located on Jalan

Besar Sei Silau Timur, Buntu Pane District, Asahan Regency, North Sumatra Province. Fish disease analysis was carried out at the Aquaculture Laboratory, Faculty of Agriculture, Asahan University.

Tools and materials

In the observation of ectoparasites, the tools used include a microscope to enlarge and observe the parasites, a glass object to place the sample, water as a medium, and alcohol for disinfection. The materials used during the study included salt (NaCl) and tilapia as the main specimen.

Research Procedures

The method used is a microscopic method of observing parts of the ectoparasite, observing the external parasites such as the tail fin, mucus, gills, and skin.

The stages of observation of ectoparasite preparations in tilapia are;

1. Prepare the sample fish to be tested
2. Fish samples are taken one by one from the media, then arranged or placed on a prepared container such as a tray, then the fish samples are measured using a ruler.
3. The fish sample's head is pierced using a needle to paralyze its brain nerves until the fish preparation that will be used as a sample is completely dead.
4. To observe the mucus parasite, the skin is slowly ground to remove the mucus, then the preparation is placed on a glass object, then a physiological solution is added and then observed under a microscope.
5. For the tail and fins, these parts are cut and placed on a glass object to which physiological solution has been added, to then be observed under a microscope.
6. In the gill section, the gills are first cut into pieces and then given a physiological solution and then observed under a microscope.

Data Analysis

This study was conducted with the aim of observing and analyzing data on the types of diseases that infect tilapia (Oreochromis niloticus). The data collection process was carried out by covering various types of parasites that can be found in tilapia, both ectoparasites and endoparasites. Ectoparasites are parasites that live on the surface of the fish's body such as skin, fins, and gills. After the disease and parasite data were successfully collected, the next step was to analyze and present the information in descriptive form. This descriptive presentation aims to provide a clear and detailed picture of the types of ectoparasites that infect tilapia. This study was conducted at the Riyan Community Seeding Unit located in Sei Silau Timur, Buntu Pane District, Asahan Regency.

RESULTS AND DISCUSSION

Results of ectoparasite analysis ontilapia (oreochromis niloticus) case study in the Riyan People's Seeding Unit (UPR). Based on the results of microscopic analysis, two types of parasites were found, namely*Dactylogyrus sp. andTrichodina sp.* In this study, the results obtained from observations of the types of ecoparasites and endoparasites that infect tilapia (*Oreochromis niloticus)*In the Riyan People's Breeding Unit, ecoparasites were found on the injured gills and fins.

1. *Dactylogyrus sp.*

Based on observations of the ectoparasite Dactylogyrus sp., where this parasite has an elongated and slender body. The head of this parasite is unique because it has four distinctive corners that make it easy to identify under a microscope. The eyes of Dactylogyrus sp. are located at the front of its body (anterior) which helps in the process of orientation and movement of the parasite. Dactylogyrus sp. is equipped with special structures that support its life as a parasite. This parasite has a pharynx that functions to swallow food and an intestine that functions in the digestion process. At the rear end of its body (posterior) there is an anchor that allows this parasite to attach itself firmly to its host. This anchor is very important because it allows Dactylogyrus sp. to remain on the gills of tilapia even though there is a fairly strong water flow.

*Dactylogyrus sp.*known as a parasite that often infects tilapia, especially in the gills. This infection can cause various health problems in tilapia, including difficulty breathing and decreased immunity, which can ultimately affect the productivity of the fish (Yulianti et al., 2019). The following is Figure 1.*Dactylogyrus sp. from research results.*

Figure 1. Dactylogyrus sp.
(source: Personal Documentation)

The following is the classification of the parasite Dactylogyrus sp. according to Munawwaroh & Rahayu (2017)are as follows:

Kingdom : Animals
Phylum : Platyhelminthes
Class : Monogenea
Order : Monopisthocotylea
Family : Dactylogyridae
Genus : Dactylomorph
Species : *Dactylogyrus sp.*

Dactylogyrus sp. is a type of parasite that often attacks the gills of fish. This parasite lives and reproduces in the body of its host, and when the host dies hundreds of Dactylogyrus sp. larvae hatch and look for new hosts to survive (Mas'ud, 2011). Gills are an ideal habitat for Dactylogyrus sp. because they provide suitable conditions for their reproduction, especially since the gills have blood capillaries that are a source of nutrition for this parasite. Dactylogyrus sp. reproduce by attaching their eggs to the gills when the fish breathes, utilizing water movement for their distribution (Irwandi *et al.,* 2017*)*. This parasite is flat and is generally found attached to the gills of fish.

2. *Trichodina sp.*

This study revealed that ectoparasites Trichodina sp. has a significant impact on the health of tilapia. This parasite causes a decline in the physiological condition of the fish which is characterized by the weakening of vital body functions. In addition, Trichodina sp. also reduces the fish's immune system making it more susceptible to other more serious diseases and infections. Secondary infections often occur as a result of the presence of this parasite which further worsens the health of the fish.

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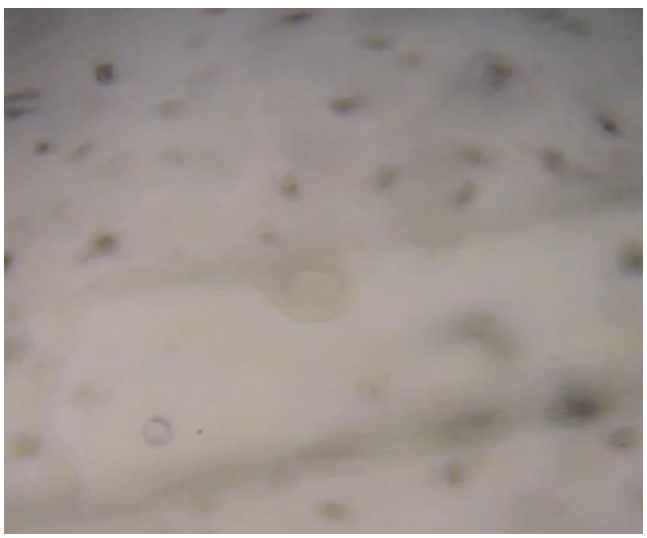

Figure 2. Trichodina sp.
(Source: personal documentation)

Trichodina sp. is usually found on the surface of the fish's body that has wounds. These wounds provide easy access for parasites to attach and reproduce. In terms of reproduction, Trichodina sp. has an efficient way, namely through cell division in the host's body. This process allows the parasite population to increase rapidly in a short time. Trichodina sp. has the ability to detach from its host and swim freely in water. This parasite can survive without a host for about two days which allows it to find a new host and spread more widely in the aquatic environment. This ability makes parasite control more difficult because they can survive outside the host for a certain period and remain infectious (Utami & Rokhmani, 2016)

The classification of Trichodina sp. according to Kabata (1985) in Pujiastuti (2015) is:

Phylum : Protozoa
Class : Ciliates
Order : Petrichida
Family : Trichodinidae
Genus : Trichodina
Species : *Trichodina sp*.

*Trichodina sp*cause effects that can be detrimental to farmers where this parasite can reduce fish appetite, reduce swimming activity in fish and can reduce fish weight and cause death. Fish that are attacked by this parasite usually have white spots on the head and back (Lestari, 2011).

Thus the existence of Trichodina sp. in tilapia in Riyan Community Seeding Unit is a serious problem that requires special attention. Control and prevention of this parasitic infectio n are very important to maintain the health and productivity of farmed tilapia. Further research and implementation of effective control methods are needed to reduce the negative impacts of Trichodina sp. on tilapia cultivation.

CONCLUSION

From this study it can be concluded that tilapia fish cultivated in UPR Riyan are more susceptible to attack by the parasites Dactylogyrus sp. and Trichodina sp. Infection from these two parasites can cause significant health problems for fish affecting the productivity and welfare of tilapia fish cultivated in that location.

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