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Identification of ectoparasites in Fry Tilapia (*Oreochromis Niloticus*) in Aquaculture Pond

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Identification of ectoparasites in Fry Tilapia (*Oreochromis Niloticus*) in Aquaculture Pond

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Abstract. This study was to determine of ectoparasite type in Fry Tilapia (*Oreochromis niloticus*) in aquaculture, 30 of tilapia were used for this experiment. This research investigated on April to May 2018. The taking of fish samples was carried out in the Aquaculture pond of Desa Baru of Ladang Bambu District of Medan Tuntungan. Aspects of identification of ectoparasite were obtained in gills, body mucus, and fin. The results were infected to Fry Tilapia (*Oreochromis niloticus*). There are 4 types of ectoparasites were infect to Fry Tilapia, that is *Trichodina* sp., *Ichthiophthirus multifiliis* sp., *Dactylogyrus* sp., and *Gyrodactylus* sp.

1. Introduction

Cultivation of freshwater fish lately in various regions in Indonesia has developed rapidly as human needs for animal protein continue to increase [1]. A number of fishery commodities that are usually cultivated in freshwater include Carp, Gurame, Catfish, Nila, Mujaer, Patin, Baung, Belut, Bawal, Prawns, and Freshwater Lobster. In cultivation, the type of commodity that will be cultivated becomes important to be adapted to the quality of the environment in the cultivation location because each commodity has a different life response to its environment, if the environment is not suitable then disease will arise.

Diseases in fish, especially those caused by parasites, can be caused a decrease in the quality of fish and health problems in humans. The presence of parasites can cause deadly effects on host populations and their consequences can cause large losses to the fishing industry [2]. The existence of these parasites will be detrimental to fish farming entrepreneurs, especially Tilapia (*Oreochromis niloticus*) which commonly great demand in Indonesian.

The problems of the effect that parasite to fish fry has very sensitive compared the other fish, for examples we have to know that fish took it, seeds produced by many farmers still small experience and also regarding the death of fish. Judging from physical characteristics, some fish have white spots on their body parts and fins. Judging from the movement there are some fish that appear on the surface and the respiratory frequency is faster than usual from the observation, the parasites are exposed to the fish seeds, this is the reason behind this research.



2. Materials and methods

2.1 Location of sample

This research investigated on April to May 2018. The taking of fish samples was carried out in the Aquaculture pond of the New Village of Ladang Bambu District of Medan Tuntungan, and the study of ectoparasites identification at the Laboratory of Plant Pests and Diseases Agroecotechnology Study Program, Faculty of Agriculture, Universitas Sumatera Utara

2.2 Methodology

The water quality data such as temperature, pH, DO, Nitrate, Phosphate, and ammonia was analysed, fish fry was used of tilapia fish (*Oreochromis niloticus*) in the fish hatchery pond, and body length of 3-7 cm. The number of fishes were used 10% from 30 fish sample. The ectoparasite examination procedure was carried out based on [3] begins with scrapping on the surface of the body fish, from gill examination is done by cutting the operculum so that the gill sheets are then done scarping on the gill lamella then put it above the object glass and give a little physiological solution, then observed under a microscope. The results of the scrapings are placed above the object glass and given a little physiological solution then observed under the microscope. Furthermore, fin examination was done by cutting all fish and placing them in petri dishes that had been given physiological solutions. The preparation is placed on the object's glass and observed under a microscope.

3. Results and discussion

3.1 Water quality

Table 1. Mean of water quality during the experiment

Parameter	Quality Standards	Value
Physical:		
Temperature	28 -32°C	28°C
Chemical:		
DO	≥4 mg/l	5.1 - 5.3 mg/l
pH	6 – 9	6.3 - 6.5
Phosphate (PO ₄)	0.2 mg/l	0.04 - 0.1 mg/l
Nitrate (NO ₃)	10 mg/l	3.86 - 4.85 mg/l
Ammonia (NH ₃ N)	≤0.02 mg/l	<0.001 – 0.01 mg/l

The results of water quality were found at a temperature of 28°C, DO 5.1-5.3 mg / l and of pH 6.3-6.5. With the condition of water in this experiment were found good for fish life as consistent with [4], which according [4] that tilapia (*Oreochromis niloticus*) was able to tolerate temperatures between 14-38°C, followed dissolved oxygen levels with a value of 5.35-5.72 mg/l. Optimal oxygen content for the growth of tilapia 4 mg / l. and Tilapia was tolerance to salinity conditions. According to [5] as good pH range for Tilapia between of 6.5-9 and the good pH in the water around 7-8.

The results of water quality in the Aquaculture Pond of the New Village of the Bamboo Field Medan District was not exceeding the threshold and in accordance with the Quality Standards [6] although the environment was suitable but there are some parasites has infected to tilapia. Otherwise, the infected ectoparasite for tilapia fish may be the fish was smaller and easy to be stress or because of transportation. This result was similar accordance with [7], however, when the fish get stress caused the different environment, different location, will make tilapia were dropped the immune system, and increased of disease for fish.

3.2 The types of ectoparasites

The results of identification of ectoparasites on the seeds of Tilapia (*Oreochromis niloticus*) in the Aquaculture pond in New Village of Ladang Bambu district of Medan Tuntungan have been found 4 types of ectoparasites was infected for tilapia species, that is *Trichodona* sp., *Ichtioptirus multifiliys*, *Dactylogyrus* sp., and *Cichlidogyrus* sp. was found in Tilapia (*Oreochromis niloticus*) shown in table 2.

Table 2. Grouping infect ectoparasite in Tilapia (*Oreochromis niloticus*)

Species	Sample	Description of fish	Type of Ectoparasites
<i>Oreochromis niloticus</i>	1	The condition of the body is limp, there are white spots on the top of the head and near the pectoral fins.	<ul style="list-style-type: none"> • <i>Trichodina</i> sp. • <i>Ichtioptiru smultifilyis</i>
	3, 4, 5, 6, 11, 12, 13, 14, 15, 16, 20, 21,22, 23, 25, 26, 27, 29	Active, there are no defects in red scales and gills.	
<i>Oreochromis niloticus</i>	2, 7, 8, 9, 10, 17,18, 19, 24, 28, 30	Active, always on the surface, there are no defects in scales and visible pale gills.	<ul style="list-style-type: none"> • <i>Dactylogyrus</i> sp. • <i>Cichlidogyrus</i> sp.

3.3 Classification of Ectoparasites

3.3.1. *Trichodona* sp.

According to [8] the classification of *Trichodina* sp. are as follows:

- Kingdom : Animalia
- Phylum : Protozoa
- Class : Ciliata
- Order : Mobilina
- Family : Trichodinidae
- Genus : Trichodina
- Species : *Trichodina* sp.

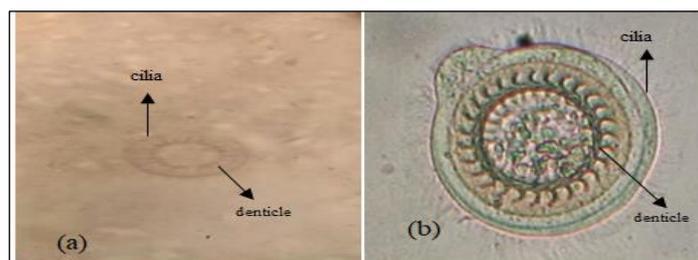


Figure 1. (a) *Trichodina* sp. on Fish Body Samples with 400 Times Enlargement (b)*Trichodina* sp. [9]

Figure 1 is fish samples number 1 (one) there is a white spot on the fin, over the head and skin and its movements are slow or weak. After the identification of parasites on a microscope, there is *Trichodina* sp. in the mucus of the body and *Ichthyophthirius multifiliis* in the mucus fin. Similar with accordance [10], which the symptoms of fish attacked by *Trichodina* sp. there are white spots especially on the head and back, the appetite of the fish is lost, the fish becomes very weak, mucus production increases so that the fish become shiny.

From the observations of *Trichodina* sp. round, there is a circle in the middle and the hairs around it, *Trichodina* sp., looks attached for the fish sample. This is accordance with [11] which that *Trichodina* sp., is the type of protozoa was included ectoparasites in fish. A form of *Trichodina* sp. round when seen from sampling its shape resembles a bicycle bell, when seen from below around its mouth that is exactly in the middle will be seen denticle (a kind of tooth teeth) and around the fur shakes. This denticle usually amounts between 20-30 pieces and is often used to identify this species. This parasite moves against the surface of the fish's body.

3.3.2. *Ichthyophthirius multifiliis*

According to [12] the classification of *Ichthyophthirius multifiliis* is as follows:

Kingdom : Animalia
 Phylum : Ciliophora
 Class : Oligohymenophorea
 Order : Hymenostomatida
 Family : Ichthyophthiriidae
 Genus : *Ichthyophthirius*
 Species : *Ichthyophthirius multifiliis*

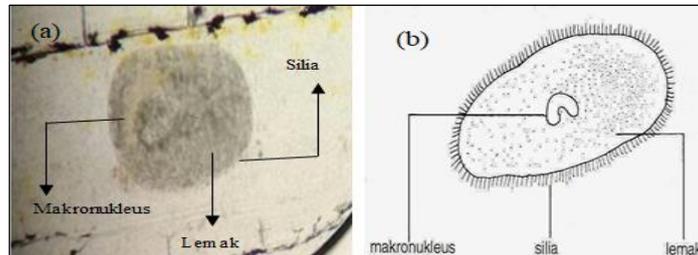


Figure 2. (a) *Ichthyophthirius multifiliis* in a fish fin sample with 400 Times Enlargement (b) *Ichthyophthirius multifiliis* [10]

When identifying on the microscope, *Ichthyophthirius multifiliis* moves with fine hairs and like peanuts in the body called the nucleus. This is in accordance with [13] which states that the morphology of *Ichthyophthirius multifiliis* is somewhat rounded (Spherical) with a growing diameter of ± 40 μ m. The whole body is covered by fine hairs (Cilia) which can be used to swim looking for its host with a nucleus that looks like a peanut.

In this study, *Ichthyophthirius multifiliis* only had one fish sample from 30 fish samples. This is because *Ichthyophthirius multifiliis* attacks fish in the rainy season with a temperature of 20-24°C while sampling is taken in the summer. This is consistent with [12] which states that *Ichthyophthirius multifiliis* attacks generally occur during the rainy season when the temperature drops to 20-24°C. Whereas in the dry season the attack is sporadic.

3.3.3 *Dactylogyrus* sp.

According to [12] Classification of *Dactylogyrus* sp. are as follows:

Kingdom : Animalia
 Phylum : Platyhelminthes
 Class : Trematoda
 Order : Monogenea
 Family : Gyrodactilydae
 Genus : *Dactylogyrus*
 Species : *Dactylogyrus* sp.

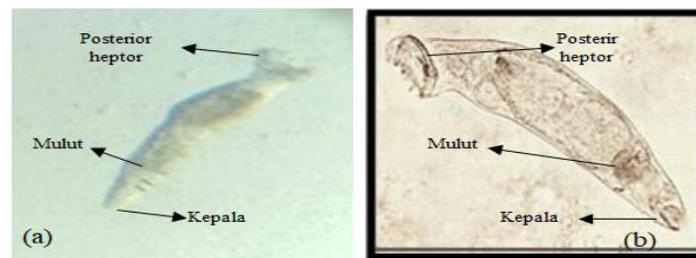


Figure 3. (a) *Dactylogyrus* sp. on fish gills sample with 400 times enlargement, (b) *Dactylogyrus* sp. [7]

In this study, *Dactylogyrus* sp. attached to the gills. *Dactylogyrus* sp. is a low-level worm that has the characteristics of having 2 pairs of eyes near the pharynx and found 4 protrusions on the head. This is in accordance with [13] which states that *Dactylogyrus* sp. is a monogenea that lay eggs and has two pairs of anchors. On the body part is the posterior haptor. The adapter does not have a cuticular structure and has one pair of hooks with one cuticular line. The head has 4 lobes with two pairs of eyes located in the pharynx area. The attack begins with adult worms attached to the gills or other body parts.

In this study, it was seen that fish attacked by *Dactylogyrus* sp. the gills are pale reddish in color. And in this study *Dactylogyrus* sp. there are on the gills and fish that are attacked by these parasites breathe faster than others. This is in accordance with [10] which states that *Dactylogyrus* sp. prefers to attack fish gills. The fish attacked by this parasite will usually become thin and the skin does not look clear anymore. The process of respiration and osmoregulation is disrupted (fish seem to gasp like a lack of oxygen), excessive white blood cells, also often seen fish rubbing their bodies against the bottom or pond.

3.3.4 *Cichlidogyru* ssp.

According to [8] Classification of *Dactylogyrus* sp. are as follows:

Kingdom : Animalia
 Phylum : Platyhelminthes
 Class : Trematoda
 Order : Monogenea
 Family : Ancyrocephalidae
 Genus : *Cichlidogyrus*
 Species : *Cichlidogyrus* sp.

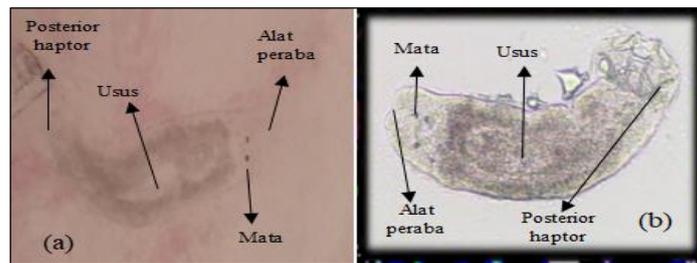


Figure 4. (a) *Cichlidogyrus* sp. In the gill of the sample fish with an enlargement of 400 times, (b) *Cichlidogyrus* sp. [14]

In this parasite commonly were found in the gill fish samples and all of the parasites were shown of *Cichlidogyrus* sp. This similar accordance with [12] which the *Cichlidogyrus* sp parasite were attacks specific hosts and specific organs as an attack for gills tilapia fish. In general, each type of parasite has a specific host, this specification can occur in a species, one genus or in one family.

Cichlidogyrus sp. parasites from gills fish sample damage with their anchors so that the gills fish of the sample fish turn pale. *Cichlidogyrus* sp. stick to the gills can damage it later clinging and sucking the blood of through the gills of fish samples. Similar accordance with [12] which monogenea damages the skin and gills fish with their anchors, eventually if the infection is very severe it can cause death. Both absorption of food, parasites take nutrients from the host, as is done by parasites that attack the intestine. These parasites digest the host's food or eat blood or tissue, thus absorbing a nutrient substance from the host.

4. Conclusions

Parasites were infecting tilapia (*Oreochromis niloticus*) in Aquaculture Pond of the New Village of the Ladang Bambu District of Medan Tuntungan are *Cichlodogyrus* sp., *Trichodina* sp., *Ichtiophtirius multifiliis*, and *Dactylogyrus* sp.

References

- [1] Anshary H, Sriwulan and Talunga J 2013 Level of parasitic infections Thaparocleidus sp. on Patin Gills (*Pangasianodon hypophthalmus*) *Fisheries Journal* **15** 55-61.
- [2] Lianda N, Fahrimal Y, Daud R, Rusli, Aliza D and Adam M 2015 Identification of parasites in Tilapia (*Oreochromis niloticus*) in Barabung Irrigation, Darussalam Aceh Besar District *Jurnal Medika Veterinaria* **9** 101-103.
- [3] Fernando C H, Furtado J I, Gussev G H and Kakonge S A 1972 Methods for the study of Freshwater Fish Parasites *Biology Series, University of Waterloo* **12** 1-44
- [4] Arie U 2001 *Hatchery and Enlargement of Gift Tilapia* (Jakarta: Self-helpers).
- [5] Boyd C E 1990 *Water Quality in Pond for Aquaculture* (Alabama: Brimingham Publishing Co.).
- [6] Government Regulation No. 82 of 2001.
- [7] Handajani H and Samsundari S 2005 *Parasites and Fish Diseases* (University of Publisher: Muhammadiyah Malang).
- [8] Ali K S, Koniyo Y and Mulis 2013 *Identification of Ectoparasites on Tilapia (Oreochromis niloticus) in Limboto Lake, Gorontalo Province. Gorontalo* (Gorontalo: State University)
- [9] Smith S and Schward M 2009 *Commercial Fish dan shelfish Technology Fact Sheet Dealing with Trichodina and Trichodina-like Species* (Virginia Polytechnic Institute and State University: Communication and marketing, Collage of Agriculture and life science).
- [10] Kordi G H K 2004 *Control of Pests and Fish Diseases* (Jakarta: Publishers of Bina Adiaksara and Rineka Cipta).

- [11] Setiadi R 2008 Effectiveness of 24-Hour Immersion of Dumbo Catfish Seeds on *Clarias* sp. in Pacipaci Solution (*Leucas Lavan dulanefolia*) on the Development of the Population of *Trichodina spp.* [Essay] Faculty of Fisheries and Marine Affairs Institut Pertanian Bogor, Bogor.
- [12] Kabata Z 1985 *Parasites and Disease of Fish Culture in the Tropics* (London: Taylor and Francis).
- [13] Gusrina 2008 *Volcanic Fish Cultivation 3* (Jakarta: Directorate of Vocational Secondary School Development).
- [14] Eliyani Y 2017 *Identification of ectoparasitic infection in Goldfish (Cyprinus carpio) in the Waters of Darma Reservoir, Kuningan Regency, West Java Province* (West Java: Fisheries College).