

Detection of *Trichodina* sp. in Nile Tilapia (*Oreochromis niloticus*) Cultivated in Tanjung Bunga Lake, Makassar City Maya Jayanti Sari Risal¹, Muhammad Fadhullah Mursalim^{2*}

Affiliation: ^{1,2} Veterinary Medicine, Hasanuddin University, Makassar

*Correspondence author: mayajayanti.00@gmail.com

Abstract

Tilapia is a popular freshwater fish widely cultivated in Indonesia, and the problem experienced by many tilapia farmers is the emergence of disease attacks. Inadequate water quality and high density play a role in causing stress and increasing the risk of disease in fish. Changes in natural conditions such as temperature, pH, and dissolved oxygen (DO) can affect water quality. One of the diseases that often occurs in Tilapia aquaculture with poor water quality is diseases caused by ectoparasites. One type of ectoparasite that commonly attacks tilapia is *Trichodina* spp. This study aimed to determine the presence of *Trichodina* sp. ectoparasite infection in tilapia cultivated in Tanjung Bunga Lake, Makassar. Sampling was performed using a random sampling method with a sample size of 58 fish. Ectoparasite examination of the body surface mucus and gills was performed using a microscope at 400x magnification. Detection of as many as 58 tilapia samples revealed 50 (86.2%) positive tilapia samples infected with *Trichodina* sp. ectoparasites, including 40 (80%) positive samples in the body surface mucus and gills, 8 (16%) positive samples only in the gills, and 2 (4%) positive samples only in the body surface mucus. The range of water quality examinations at seven points had temperatures ranging from 29-31°C, pH 6, salinity 0 mg/L, DO 2.24-10.24 mg/L, nitrate 0.0141-0.1857 mg/L, nitrite 0.0451-0.5555 mg/L, and ammonia 0.0028-0.0096 mg/L. The results of this study revealed that farmed tilapia may be infected with *Trichodina* sp.

Keywords: Ectoparasite, Lake, Tilapia, *Trichodina* sp.

1. INTRODUCTION

Tilapia is a freshwater fish commodity with good immunity and adaptation and is widely cultivated in Indonesia, especially in Java, Sumatra, Kalimantan, and Sulawesi (Fuadi *et al.*, 2021). This fish is a type of freshwater fish that is favored by the community and has a high economic value; therefore, tilapia cultivation has become a business prospect (FAO, 2024). However, tilapia is also subject to parasitic diseases, which can cause massive economic losses. Parasitic diseases cause massive mortality owing to physical deterioration, which results in a reduction in quality that is rejected in the commercial market (Shinn *et al.*, 2015; Paladini *et al.*, 2017). Among parasitic infections, ectoparasites such as *Trichodina* sp. are commonly reported and can cause tissue damage, reduced growth, and increased mortality rates (Anshary *et al.*, 2023; Gay and Verrez-Bagnis, 2023). Severe *Trichodina* inflicts harm on the skin and gill epithelium of host fish, creating an opportunity for secondary infections by other pathogens, including bacteria and fungi, which further stress the host and can ultimately result in death (Valladão *et al.*, 2019). *Trichodina* has been reported to infect tilapia most often in several places around the world (Valladão *et al.*, 2016; Anshary *et al.*, 2022; Sari *et al.*, 2024).

Tanjung Bunga Lake in Makassar is situated in the Tanjung Bunga region on the western side of Makassar. It is formed by the flow of the Jeneberang River, which typically drains into the city's western coastline; however, a dam or sluice gate now contains the lake. Stretching from the southeast to the west, the lake receives water from the lower part of the

Jeneberang River and discharges it near Akkarena Beach. Many communities around the lake use it for recreation and tilapia farming (Sulfikar, 2014). Nonetheless, if many fish have *Trichodina* parasite infections, tilapia farmers operating tilapia farms may suffer losses. Numerous fish with parasitic infections have the potential to die, become less productive, and have an impact on their economic value.

Based on this background that has been stated and the paucity of information on the identification of *Trichodina* sp., this study aimed to detect *Trichodina* sp. in tilapia cultivated in Lake Tanjung Bunga, Makassar. By conducting early identification, this study is expected to prevent a decrease in tilapia production due to *Trichodina* sp. ectoparasite infestation.

2. METHODOLOGY

2.1 Sample Collection

From March to April, 58 tilapia, with a total range of 14-20 cm, were sampled from seven points at Tanjung Bunga Lake, Makassar City (Figure 1), using a fish scoop, and then placed in a plastic container filled with air. Healthy fish were examined at the Integrated Laboratory of Veterinary Medicine, Hasanuddin University.

Table 1. Sampling coordinates and water quality at Tanjung Bunga Lake

No	Sample station	Coordinates
1	Point 1	S: 5°11'00 E: 119°24'28
2	Point 2	S: 5°10'50 E: 119°24'12
3	Point 3	S: 5°10'46 E: 119°24'09
4	Point 4	S: 5°10'43 E: 119°24'04
5	Point 5	S: 5°10'58 E: 119°24'32
6	Point 6	S: 5°11'01 E: 119°24'34
7	Point 7	S: 5°11'04 E: 119°24'31



Figure 1. Research location map (Source : Personal document)

2.2 Isolation and Identification

Examination of *Trichodina* spp. using scraping or scraping mucus. Mucus scraping starts on the entire body surface from head to tail and fins using a sterile blade, slowly so as not to injure the fish body. The same procedure was performed for the gills. Mucus scraping

on the gills was performed on each gill filament. Each scraping result was collected in a Petri dish and then given a distilled water solution. The scrapings were then placed in distilled water using a drop pipette, placed on an object glass, and covered with a cover glass. The sections were then examined using a 400x magnification binocular microscope (Anshary *et al.*, 2022). Data analysis was performed by matching the morphology of these parasites with images obtained from existing literature. Data were presented in tabular form and analyzed descriptively by attaching a picture. The samples tested positive if *Trichodina* sp. ectoparasites were found.

2.3 Water Sample Examination

Water samples (100 ml) were collected simultaneously on the outside (the edge of the cage) and inside (the middle of the cage) of the pond and analyzed for temperature, pH, dissolved oxygen (DO), salinity, nitrate, nitrite, and ammonia. Temperature and DO were measured in situ using portable meters, whereas chemical parameters were analyzed in the laboratory following standard protocols (Amalia *et al.*, 2025).

2.4 Data Analysis

Data analysis was carried out by matching the morphology of *Trichodina* sp. parasites with images obtained from existing literature. Data were presented in tabular form and analyzed descriptively by attaching a picture. The samples tested positive if *Trichodina* sp. ectoparasites were found.

3. RESULT AND DISCUSSION

3.1 Result

3.1.1 Clinical sign

Gill pallor can also indicate a systemic disorder that restricts blood flow or damages gill tissue due to exposure to toxic substances or poor water quality, such as low dissolved oxygen levels or high ammonia concentrations. Figure 2a shows that the fish's gills appear paler than usual. This pale gill condition is a common clinical symptom in fish experiencing hypoxia, anemia, or gill infections caused by parasites or bacteria. Meanwhile, Figure 2b shows the fish's body surface appearing grayish and accompanied by excessive mucus production. This symptom is generally a defense response of the fish against ectoparasite infections. It can also occur due to skin irritation caused by poor water quality or the presence of irritating chemicals. Abnormal skin color can also be a sign of prolonged physiological stress. The combination of pale gills and excessive mucus production indicates that the fish is likely experiencing a serious health problem, either local (on the gills and skin) or systemic.



Figure 2. (a) Pale gills, (b) Excessive mucus production, shiny and greyish skin color

3.1.2 Isolation and Identification

As presented in Table 1, 58 tilapia fish samples were collected from seven points of cages in Lake Tanjung Bunga, Makassar City, and 50 (86.2%) positive tilapia fish samples were infected with *Trichodina*. Of the 50 positive samples, 40 (80%) were positive for *Trichodina* sp. found in the mucus part of the body surface and gills, 8 (16%) were only found in the gills, and two (4%) were found only in the mucus part of the body surface. This result indicated that *Trichodina* is mostly found in the gills and mucous parts of the body surface. Figure 3 shows a clear picture of the morphology of *Trichodina* sp. viewed at 400x magnification.

Table 2. Fish samples infected with *Trichodina* sp. At Tanjung Bunga Lake

Location	Number of Fish	Infected fish code	Number of infected fish	Percentage (%)
Point 1	8	A1, A2, A3, A4, A5, A6	6	10.3
Point 2	8	B1, B2, B3, B4, B5, B6, B7	7	12.1
Point 3	8	C1, C2, C3, C4, C5, C6, C7	7	12.1
Point 4	8	D1, D2, D3, D4, D5, D6	6	10.3
Point 5	9	E1, E2, E3, E4, E5, E6, E7, E8, E9	9	15.5
Point 6	9	F1, F2, F3, F4, F5, F6, F7	7	12.1
Point 7	8	G1, G2, G3, G4, G5, G6, G7, G8	8	13.8
Total	58	Number of Infected Fish	50	86.2

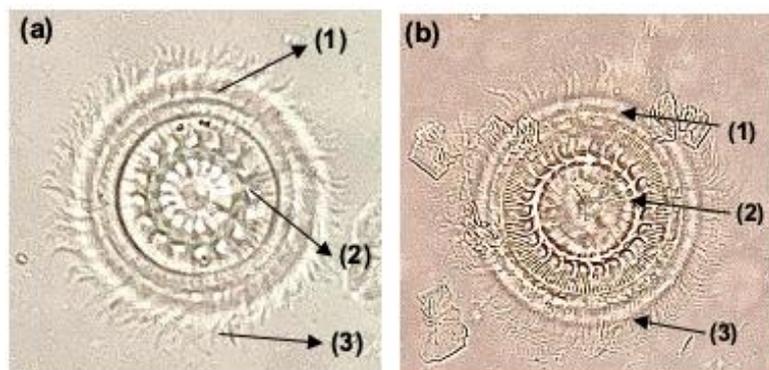


Figure 3. *Trichodina* sp. in (a) the body surface and (b) the gill with magnification 400x. Description: (1) Radial pins, (2) Denticles, (3) Cilia

3.1.3 Water Quality Result

According to the water quality result examination in Table 2, it can be seen that the range of examination at the seven points has a temperature ranging from 29-31°C, pH 6, salinity 0 mg/L, DO 2.24-10.24 mg/L, nitrate 0.0141-0.1857 mg/L, nitrite 0.0451-0.5555 mg/L, and ammonia 0.0028-0.0096 mg/L. Temperature, pH, nitrate, and ammonia concentrations were within the normal limits for tilapia growth. The DO values at several locations (points 2, 5, and 6) were below the normal limit of less than 5 or 5 ppm.

Table 3. Results of water quality inspection of Tanjung Bunga Lake

Parameters		Location							Normal range
		1	2	3	4	5	6	7	
Temperature (°C)	Outside	30°C	30°C	29°C	30°C	31°C	31°C	31°C	24-32 °C
	Inside								
Salinity (mg/L)	Outside	0	0	0	0	0	0	0	0-30 mg/L
	Inside								
pH	Outside	6	6	6	6	6	6	6	6-8
	Inside								
Dissolve Oxygen (mg/L)	Outside	7,36	2,88	10,24	5,76	3,48	4,48	6,08	>5 mg/L
	Inside	5,12	2,24	6,08	5,44	4,16	5,44	8,31	
Nitrate (mg/L)	Outside	0,1495	0,1365	0,0218	0,1875	0,1318	0,1241	0,0164	≤10 mg/L
	Inside	0,1372	0,1565	0,0195	0,1326	0,1265	0,1226	0,0141	
Nitrit (mg/L)	Outside	0,0869	0,5555	0,0848	0,0597	0,0576	0,0493	0,0514	<0,05 mg/L
	Inside	0,0869	0,0597	0,0535	0,0618	0,0514	0,0576	0,0451	
Amonia (mg/L)	Outside	0,0081	0,0078	0,0034	0,0034	0,0066	0,0043	0,0032	<0,02 mg/L
	Inside	0,0095	0,0088	0,0039	0,0033	0,0055	0,0039	0,0028	

3.2 Discussion

The findings of this study revealed a high prevalence of *Trichodina* sp. infection in tilapia, with 86.2% of the sampled fish harboring this parasite, highlighting the significant presence of this ectoparasite in the aquaculture environment of the lake. Trichodinid ectoparasites are important in tilapia aquaculture and are commonly found throughout fish farming systems. (Ghiraldelli *et al.*, 2006; Zago *et al.*, 2014). *Trichodina* sp. was found to infect both the body surface mucus and gills of tilapia, which aligns with previous studies demonstrating its affinity for these sites (Smith, 2019; El-Khayat *et al.*, 2024; Sari *et al.*, 2024). The gills are particularly susceptible due to the presence of red blood cells and epithelial cells, which serve as a nutrient source for the parasite (Rodrigues *et al.*, 2019; Rokhmani *et al.*, 2020). Infected fish exhibited clinical signs including excessive mucus production, pale or hyperemic gills, and fused gill filaments, all of which were consistent with trichodiniasis. Severe infections can lead to fatigue and death due to the disruption of the oxygen supply. Parasites attach to the skin, gills, and fins of fish, damaging the tissue and inhibiting their ability to breathe optimally (Sari *et al.*, 2024). Water quality analysis indicated that the temperature, pH,

nitrate, and ammonia levels were generally within the normal range for tilapia growth. However, dissolved oxygen (DO) levels are suboptimal in some locations, which can stress fish and increase their susceptibility to parasites (Larasati *et al.*, 2020). In contrast, nitrite levels exceeded the normal limits across all sampling sites. The high prevalence of *Trichodina* spp. can be attributed to a combination of factors. Although some water parameters were within the acceptable range, DO levels were below the acceptable level at some points, likely contributing to environmental stress on the fish and creating conditions conducive to parasite breeding. In a study on *Oreochromis niloticus*, *Trichodina* spp. accounted for 7.7% of the total parasitic infestations, with low dissolved oxygen contributing to higher susceptibility (Ageng'o *et al.*, 2024). Low dissolved oxygen levels have been linked to increased *Trichodina* reproduction, as observed in studies where organic fertilizers were used (Garcia *et al.*, 2009). While this study provides valuable insights into the prevalence of *Trichodina* sp. in tilapia in Lake Tanjung Bunga, it has certain limitations. The study relied on a single sampling event, and thus did not capture potential temporal variations in parasite prevalence or water quality parameters. Furthermore, while the study identified the presence of *Trichodina* sp., it did not include detailed species identification or quantification of parasite load, which could provide a more nuanced understanding of the intensity of the infection. The assessment of the water quality parameters was limited to a specific set, and other potentially influential factors were not measured.

4. CONCLUSION & SUGGESTION

This study revealed a high prevalence of *Trichodina* sp. infection in Nile tilapia cultivated in Tanjung Bunga Lake, Makassar City, with parasites predominantly found in the gills and skin mucus. Clinical signs such as pale gills, excessive mucus production, and suboptimal dissolved oxygen levels at several sampling points suggest that environmental stress may significantly contribute to the susceptibility of tilapia to ectoparasitic infections. These findings highlight the need to regularly monitor fish health and water quality in open aquaculture systems to prevent disease outbreaks and minimize economic losses. Moving forward, molecular identification of *Trichodina* species and long-term ecological studies are recommended to understand parasite dynamics and to support the development of more effective and sustainable management strategies in tilapia aquaculture.

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