

INVENTORY OF ECTOPARASITES IN AFRICAN CATFISH (*Clarias gariepinus*) AT AQUACULTURE SITES IN SUNGAI RAYA DISTRICT, KUBU RAYA REGENCY

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ABSTRACT

The african catfish (*Clarias gariepinus*) is one of the freshwater aquaculture species susceptible to ectoparasite infestations. This study aimed to identify the types of ectoparasites and determine the infestation levels in african catfish farmed in Sungai Raya Subdistrict, Kubu Raya Regency. The study was conducted from February to March 2026 using a survey method with purposive random sampling. A total of 95 catfish from five aquaculture sites were examined for mucus, fins, and gills using wet mount preparation and microscopic observation. Data were analyzed descriptively by calculating prevalence, intensity, and dominance. The results showed that African catfish were infected by three types of ectoparasites *Dactylogyrus* sp., *Gyrodactylus* sp., and *Trichodina* sp. with a total of 209 parasite individuals. *Dactylogyrus* sp. was the most dominant ectoparasite, with prevalence values ranging from 26.32–36.84% and dominance values ranging from 36.17–64.52%. Ectoparasite intensity values ranged from 2.33–6.00 individuals per fish, indicating a low to moderate level of infestation. Water quality parameters during the study remained within the optimal range for catfish farming. The presence of ectoparasites is believed to be influenced by environmental conditions and farming management practices. The results of this study can serve as baseline information for monitoring fish health and controlling diseases in African catfish farming.

Keywords: *Clarias gariepinus*; Dominance; Ectoparasites; Intensity; Prevalence

1. INTRODUCTION

The African catfish (*Clarias gariepinus*) is a freshwater aquaculture commodity with high economic value that is widely cultivated in Indonesia. This commodity offers the advantages of rapid growth, high survival rates, and the ability to adapt to various environmental conditions. In Kubu Raya Regency, catfish is one of the primary aquaculture commodities contributing to the region's fisheries production¹.

Increased catfish farming intensity is often accompanied by a higher risk of disease outbreaks, including those caused by

ectoparasites. Ectoparasites are organisms that live on the surface of a fish's body, such as the skin, fins, and gills. Ectoparasite infestations can cause irritation, tissue damage, increased mucus production, respiratory distress, stunted growth, and even death at high infestation levels². Suboptimal water quality, high stocking density, and poor farm management are known to increase the risk of ectoparasite infestations in farmed fish³.

Several studies have reported that catfish can be infected by various types of ectoparasites, including *Dactylogyrus* sp., *Gyrodactylus* sp., and *Trichodina* sp., with

varying prevalence rates across different aquaculture sites⁴. The presence of these parasites can reduce fish quality and productivity, potentially causing economic losses for farmers.

Although catfish farming is growing quite rapidly in Sungai Raya Subdistrict, information regarding the types of ectoparasites and their infestation levels in african catfish in the region remains limited. In fact, data on the prevalence, intensity, and dominance of ectoparasites are crucial as a basis for monitoring fish health and developing effective disease control strategies.

This study aims to identify the types of ectoparasites and analyze their infestation levels based on prevalence, intensity, and dominance in African catfish farmed in Sungai Raya Subdistrict, Kubu Raya Regency.

2. RESEARCH METHOD

Time and Place

This study was conducted from February to March 2026. Sampling was carried out in the Sungai Raya subdistrict of Kubu Raya Regency, covering five locations. The first location was in Kapur Village at coordinates 00°04'40"S - 109°23'11"E; the second location was in Mekar Sari Village at coordinates 00°13'516"S - 109°29'603"E; the third location was in Kuala Dua Village at coordinates 00°11'193"S - 109°24'462"E; the fourth location is in Limbung Village at coordinates 00°08'737"S - 109°24'956"E; and the fifth location is in Arang Limbung Village at coordinates 00°07'733"S - 109°23'227"E. Subsequently, the examination and identification of ectoparasites were conducted at the West Kalimantan Animal, Fish, and Plant Quarantine Center Laboratory.

The selection of these five research sites was based on the presence of active african catfish farming operations, which made it possible to collect fish samples for ectoparasite examination.

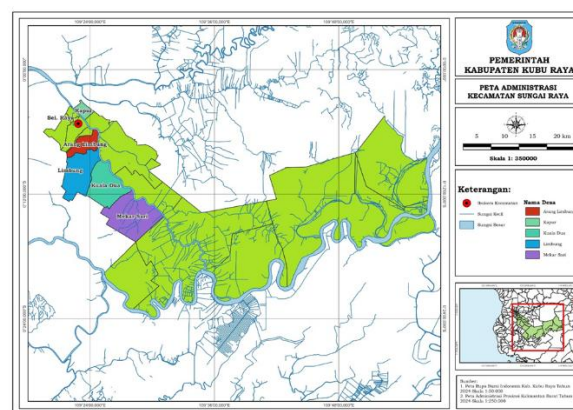


Figure 1. Administrative map of Sungai Raya Subdistrict

Method

This study used a survey method that began with interviews with farmers regarding the farming system and management of African catfish. The sampling technique used purposive random sampling based on the rearing age, specifically 1–2 months, with a body length of 10–15 cm.

Procedures

Sampling

The research samples consisted of African catfish from selected aquaculture sites. The sample size was determined based on the population size and an assumed disease prevalence of 15% with a 95% confidence level, in accordance with Amos's Table⁵⁻⁶. Sampling was conducted using the purposive random sampling method. The fish were caught using nets, then placed in containers filled with water and transported to the laboratory in oxygenated plastic bags for ectoparasite examination.

Determination of Sample Size

The number of fish to be examined is determined based on the population size and the estimated prevalence of infection. If prevalence data are not available, a prevalence assumption of 15% is used in accordance with the HPIK Monitoring Guidelines (Decision of the Deputy for Fish Quarantine No. 7 of 2024). The number of samples is determined based on the Amos

(1985) Table, which has been adopted in SNI 7306:2009.

Table 1. Calculation of the number of test samples

Population	Prevalence						
	2%	5%	10%	20%	30%	40%	50%
50	46	29	20	10	7	5	2
100	76	43	23	11	9	7	6
250	110	49	25	10	9	8	7
500	127	54	26	10	9	8	7
1000	136	55	27	10	9	9	8
2500	142	56	27	10	9	9	8
5000	145	57	27	10	9	9	8
10.000	146	57	27	10	9	9	8
100.000	147	57	27	10	9	9	8
>100.000	150	60	30	10	9	9	8

Sample Preparation

Prior to examination, the fish are observed for clinical symptoms and morphological conditions, followed by measurement of body length and weight. The fish are anesthetized using a clove oil solution before necropsy is performed. The organs examined include the body surface, fins, and gills as the primary sites of ectoparasite infestation.

Examination and Identification of Ectoparasites

Ectoparasite examinations were conducted at the West Kalimantan Animal, Fish, and Plant Quarantine Center Laboratory. Mucus samples were obtained by scraping the entire body surface of the fish, while fin and gill samples were obtained by cutting tissue, which was then placed on a microscope slide containing physiological NaCl solution.

The preparations were examined under a microscope at 20–40× magnification for worms and 100× for protozoa. To enhance the clarity of morphological structures, Semichon's Acetic Carmine staining was applied to worms and Giemsa staining to protozoa. Ectoparasite identification was based on morphological characteristics as described by Kabata⁷.

Aquaculture Data Collection

Aquaculture data were obtained through field observations and structured interviews with aqua culturists. Observations were conducted to gather information on aquaculture systems, including tank types, sizes, water sources, environmental conditions, stocking density, and the cleanliness of the culture medium.

Interviews were conducted to gather information on aquaculture management, including the origin of fry, initial fry size, feed type, feed protein content, feeding frequency, as well as disease history and medication use. These data were used as supporting information in interpreting the results of ectoparasite infestations.

Research Variables

The main variables observed included the type of ectoparasites, prevalence, intensity, and dominance of ectoparasite infestations in African catfish. Supporting variables included aquaculture characteristics, clinical symptoms in the fish, and water quality in the rearing tanks.

Clinical Symptoms

Clinical symptoms were observed visually by monitoring changes in the fish's behavior and physical condition. The parameters observed included swimming activity, feeding response, mucus

production, fin condition, the presence of lesions on the body, and changes in gill color as early indicators of ectoparasite infestation³.

Identification of Ectoparasite Species

Ectoparasites were identified based on morphological characteristics observed in the mucus, fins, and gills of the fish through microscopic examination. The results of the examination were compared with relevant literature on parasite identification to determine the species of ectoparasites found.

Prevalence

Prevalence is the percentage of fish infested with ectoparasites out of the total number of fish examined. The prevalence value is calculated using the following formula:

$$\text{Prevalence} = \frac{\Sigma \text{ parasites infected fish}}{\Sigma \text{ sample fish}} \times 100\%$$

Prevalence categories are based on Williams & Bunkley in Maulana et al.⁸.

Intensity

Intensity indicates the average number of parasite individuals infesting each infested fish. Intensity is calculated using the formula:

$$\text{Intensity} = \frac{\Sigma \text{ parasites founded}}{\Sigma \text{ parasites infected fish}}$$

Intensity categories are based on Williams & Bunkley in Maulana et al.⁸.

Dominance

Dominance is used to determine the percentage of a particular type of ectoparasite relative to the total number of ectoparasites found in all fish samples. The dominance value is calculated using the following formula:

$$\text{Dominance} = \frac{\Sigma \text{ one type of parasite that infected}}{\Sigma \text{ total number of parasites that infected}} \times 100\%$$

The dominance criteria are based on Yudhistira⁹.

Water Quality

The observed water quality parameters included temperature, pH, and dissolved

oxygen (DO). Water quality data were used as supporting variables to describe aquaculture environmental conditions that could influence the level of ectoparasite infestation in African catfish. Suboptimal water quality has the potential to cause stress in fish and increase their susceptibility to parasitic infections

Data Analysis

The research data were analyzed descriptively to describe the types and levels of ectoparasite infestation in African catfish. The analysis was conducted by presenting the data in the form of tables and narrative descriptions, including the identification of ectoparasite species, as well as calculations of prevalence, intensity, and dominance. General data collected from fish farmers, observations of clinical symptoms, and water quality data were used as supporting information to help interpret the research results without conducting inferential statistical analysis.

3. RESULT AND DISCUSSION

Overview of the Study Site

The study was conducted at five African catfish aquaculture sites located in Sungai Raya Subdistrict, Kubu Raya Regency, West Kalimantan, namely the villages of Kapur, Mekar Sari, Kuala Dua, Limbung, and Arang Limbung. All sites used pond-based aquaculture systems with containers made of concrete, tarpaulin, or a combination of tarpaulin and netting. Pond sizes range from $2 \times 3 \text{ m}^2$ to $2.5 \times 5 \text{ m}^2$, with water depths of 60–80 cm. Water sources include rivers, wells, and ditches, and the farming system generally relies on static water flow.

The stocking density at the study site ranged from 1,000 to 3,000 fish per pond. The feed used consisted of commercial feed (pellets) with a protein content of 30–32%, as well as supplementary feed such as bycatch, broiler chicken, chicken offal, and azolla. Based on observations, several sites exhibited turbid water conditions and a history of fish health issues such as slimy

bodies, frayed fins, body lesions, and reddened fins.

These aquaculture characteristics indicate that most farmers employ a semi-intensive rearing system with relatively high stocking densities. These conditions have the potential to increase the accumulation of organic matter and accelerate the spread of diseases, including ectoparasite infestations. High stocking densities and suboptimal water quality are known to increase stress in fish and facilitate the spread of parasites through direct contact or via the water. Furthermore, aquaculture environments with

high organic matter content support the development of various types of ectoparasites that attack the skin and gills of fish¹⁰. High-density aquaculture practices also increase the frequency of contact between fish, thereby accelerating parasite transmission within the population and increasing the risk of disease outbreaks¹¹. Aquaculture systems with high stocking densities and limited water circulation can increase the likelihood of parasite development in farmed fish. The location of the sampling ponds is shown in Figure 2.



Figure 2. Ponds at the sampling sites for african catfish

Notes: 1: Kapur Village; 2: Mekar Sari Village; 3: Kuala Dua Village; 4: Limbung Village; 5: Arang Limbung Village

Clinical Symptoms

Catfish infected with ectoparasites exhibit clinical symptoms such as excessive mucus production (mucus hypersecretion), pale gills, frayed or damaged fins, and lesions on the body surface. These conditions indicate irritation and tissue damage caused by the activity of ectoparasites on target organs, particularly the skin and gills. Ectoparasite infestations can trigger a defensive response in fish in the form of increased mucus production; however, in more severe infestations, they can cause histopathological changes such as epithelial hyperplasia and hypertrophy, edema, telangiectasia, fusion of secondary lamellae, and even gill tissue necrosis, which

disrupts the fish's respiratory and osmoregulatory processes¹².

Furthermore, gill damage caused by ectoparasite infestations can reduce the gas exchange surface area, thereby decreasing oxygen uptake efficiency and leading to a decline in the fish's overall health. The higher the level of ectoparasite infestation, the greater the extent of tissue damage, which increases the risk of stress, stunted growth, and secondary infections by other pathogens.

Based on the research results, out of a total of 95 african catfish observed, 77 showed no clinical symptoms, while the remaining 18 exhibited external clinical symptoms. The observed symptoms included lesions on the fish's back and body,

pale gills, and damage (fraying) to the caudal and dorsal fins.

Identification of Ectoparasite Species

An examination of 95 catfish from five aquaculture sites in Sungai Raya Subdistrict, Kubu Raya Regency, revealed ectoparasite infestations on the fish's skin, fins, and gills.

Three types of ectoparasites were successfully identified: *Dactylogyrus* sp., *Gyrodactylus* sp., and *Trichodina* sp. A total of 209 ectoparasites were found, consisting of 139 on the gills, 59 on the body mucus, and 11 on the fins. The results of the ectoparasite identification are presented in Table 2.

Table 2. Types of ectoparasites

Location	a	b	c	Organ Target			N (Ind)
				L	S	I	
Location 1	19	<i>Dactylogyrus</i> sp.	6	0	3	17	20
Kapur Village		<i>Trichodina</i> sp.	3	8	0	3	11
Location 2	19	<i>Dactylogyrus</i> sp.	6	0	0	17	17
Mekar Sari Village		<i>Gyrodactylus</i> sp.	4	0	0	11	11
		<i>Trichodina</i> sp.	5	13	0	6	19
Location 3	19	<i>Dactylogyrus</i> sp.	6	0	0	22	22
Kuala Dua Village		<i>Gyrodactylus</i> sp.	3	0	3	4	7
		<i>Trichodina</i> sp.	5	12	0	3	15
Location 4	19	<i>Dactylogyrus</i> sp.	7	0	3	25	28
Limbang Village		<i>Gyrodactylus</i> sp.	3	0	0	9	9
		<i>Trichodina</i> sp.	6	19	2	0	21
Location 5	19	<i>Dactylogyrus</i> sp.	5	0	0	17	17
Arang Limbung Village		<i>Trichodina</i> sp.	2	7	0	5	12
Total Number of Ectoparasites				59	11	139	209

Notes: a: Number of samples examined; b: Types of Parasites Found; c: Number of infected fish; L: Mucus (Individual); S: Fins (Individuals); Gills (Individuals); N: number of individuals

Dactylogyrus sp.

The results of the study indicate that *Dactylogyrus* sp. is the most dominant ectoparasite of the Monogenea group found in catfish at the study site, with a total of 104 infected individuals, primarily infecting the gills. The high infestation rate in the gills is believed to be due to the continuous water flow through this organ, which supports the parasite's attachment, growth, and development. Morphologically, *Dactylogyrus* sp. has an elongated, flattened body with an adhesive organ (haptor) equipped with hooks at the posterior end that serve to firmly attach to the fish's gill tissue (Figure 4).

Infected fish exhibited pathological changes, including pale gills, hyperplasia, and damage to the gill lamellae. These findings indicate impaired respiratory function due to parasitic activity in the gill tissue.



Figure 4. *Dactylogyrus* sp.

These results are consistent with those reported by Putri et al.¹³; Fransira¹⁴, who noted that the high prevalence of *Dactylogyrus* sp. is closely associated with high-density aquaculture systems and suboptimal water quality, which support the development and spread of the parasite. Furthermore, the characteristics of *Dactylogyrus* sp. which has a direct life cycle without an intermediate host and a high reproductive capacity-contribute to

rapid population growth in aquaculture environments, potentially increasing the severity of infestation if rearing conditions are not properly controlled.

***Gyrodactylus* sp.**

Gyrodactylus sp. is an ectoparasite of the class Monogenea that has a flat, microscopic body and is equipped with an adhesive organ (haptor) on its posterior end to attach to the host⁷. In this study, 27 individuals of *Gyrodactylus* sp. were found infecting the gills and fins of catfish, with the highest prevalence in the gills (Figure 5).



Figure 5. *Gyrodactylus* sp.

The results of the study show that the level of *Gyrodactylus* sp. infestation in the fish samples examined was relatively low. This indicates that the parasite infestation is still mild and has not yet caused significant clinical effects in farmed fish. These findings are consistent with those of Sufardin et al.¹⁵, who stated that *Gyrodactylus* sp. reproduces viviparously and has a very short life cycle, giving it the potential to rapidly increase its population when environmental conditions are favorable. However, in this study, no significant population increase has occurred, presumably because the aquaculture environmental conditions remain relatively stable.

In contrast, Dewi et al.¹⁶ reported that ectoparasites in farmed fish tend to increase under poor water quality conditions and high stocking densities, which accelerate transmission between fish through direct contact. Furthermore, Shinn et al.¹⁷ explained that *Gyrodactylus* sp. infection

can cause damage to epithelial tissue, increased mucus production, and a decline in the fish's physiological condition when infestation is severe; however, these symptoms were not clearly observed in this study.

***Trichodina* sp.**

The results of the study showed that 78 individuals of *Trichodina* sp. were found, with the highest prevalence on the skin/mucus, followed by the gills and fins of catfish. Its dominance on the skin and mucus indicates that the fish's body surface serves as both the primary habitat and the optimal attachment site for this parasite. This finding aligns with the work of Kabata⁷; Woo², who described *Trichodina* sp. as a disc-shaped ciliated protozoan with a ring of denticles that function as a strong attachment mechanism to the host's body surface (Figure 6).

Furthermore, Noga³ states that the presence of *Trichodina* sp. tends to increase in aquaculture environments with high organic matter content, as this parasite utilizes microorganisms and organic particles on the fish's body surface as a source of nutrition. Additionally, Sigit et al.¹⁸ reported that high stocking densities and suboptimal water quality can accelerate the spread of ectoparasites by increasing the frequency of contact between fish and the accumulation of infectious agents in the rearing environment; thus, these conditions are suspected to contribute to the high infestation of *Trichodina* sp. at the study site.



Figure 6. *Trichodina* sp.

Prevalence

The results of the ectoparasite identification include prevalence rates in

several aquaculture ponds in Sungai Raya Subdistrict, Kubu Raya Regency, as well as infection level criteria classified based on

the frequency of fish infected with parasites. These prevalence rates are presented in the following Table 3.

Table 3. Prevalence of ectoparasites in African catfish

Location	Type of Parasite	Prevalence (%)	Criteria for Infection
Location 1	<i>Dactylogyrus</i> sp.	31,58	Common
Kapur Village	<i>Trichodina</i> sp.	15,79	Frequent
Location 2	<i>Dactylogyrus</i> sp.	31,58	Common
Mekar Sari Village	<i>Gyrodactylus</i> sp.	21,05	Frequent
	<i>Trichodina</i> sp.	26,32	Frequent
Location 3	<i>Dactylogyrus</i> sp.	31,58	Common
Kuala Dua Village	<i>Gyrodactylus</i> sp.	15,79	Frequent
	<i>Trichodina</i> sp.	26,32	Frequent
Location 4	<i>Dactylogyrus</i> sp.	36,84	Common
Limbang Village	<i>Gyrodactylus</i> sp.	15,79	Frequent
	<i>Trichodina</i> sp.	31,58	Common
Location 5	<i>Dactylogyrus</i> sp.	26,32	Frequent
Arang Limbung Village	<i>Trichodina</i> sp.	10,53	Frequent

The study results show that the prevalence of ectoparasites in catfish in Sungai Raya Subdistrict ranged from 10.53 to 36.84%. *Dactylogyrus* sp. had the highest prevalence across all study sites, ranging from 26.32 to 36.84%, with infection categories ranging from “frequent” to “common.” Meanwhile, the prevalence of *Trichodina* sp. ranged from 10.53– 31.58% and that of *Gyrodactylus* sp. ranged from 15.79–21.05%, which generally fell into the “frequent” category (Table 3).

Dactylogyrus sp. had the highest prevalence compared to other ectoparasites in catfish at the study site. This finding indicates that this parasite is the dominant parasite infecting the observed aquaculture systems. This is consistent with Fautama et al.¹⁹ who explained that *Dactylogyrus* sp. has a direct life cycle without an intermediate host and a high adaptive capacity, allowing for population accumulation under favorable aquaculture conditions.

Meanwhile, *Trichodina* sp. and *Gyrodactylus* sp. were also found in this study, though at lower infestation rates than *Dactylogyrus* sp. The presence of these two parasites is believed to be related to

aquaculture environmental conditions, such as water quality and stocking density, which can influence the likelihood of contact and the development of ectoparasites in fish. This is consistent with Sigit et al.¹⁸, who stated that increased stocking density and decreased water quality can increase the risk of ectoparasite infestation by increasing fish stress and the intensity of transmission between individuals

Thus, the results of this study indicate that differences in infestation levels among ectoparasite species are primarily influenced by the biological characteristics of each parasite and the aquaculture environmental conditions at the study site.

Intensity

Intensity is a parameter used to indicate the number of ectoparasite individuals infecting each African catfish host. This parameter describes the severity of the parasitic infection in the fish; the higher the intensity value, the greater the number of ectoparasites found on the fish’s body. Data on the intensity of ectoparasite infestation are presented in the following Figure 7.

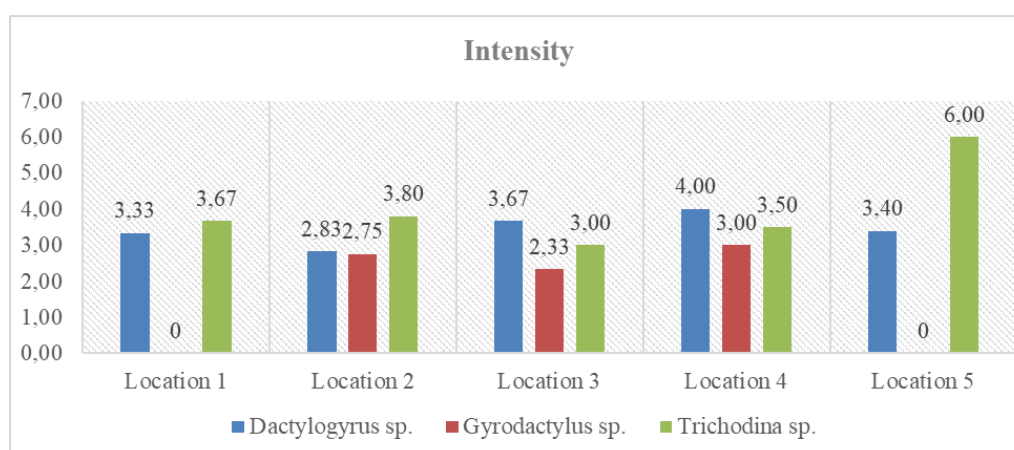


Figure 7. Intensity of ectoparasites infecting catfish at 5 study sites in Sungai Raya Subdistrict
Note: Legend: <1: Very low, 1–5: Low, 6–55: Moderate

The ectoparasite intensity in African catfish in Sungai Raya Subdistrict ranged from 2.33 to 6.00 ind/fish. In general, the observed ectoparasite intensity was classified as low, with the highest intensity recorded for *Trichodina* sp. in Arang Limbung Village at 6.00 ind/fish, which falls into the moderate category (Figure 7). These results indicate that although infestation levels are relatively low, certain locations still support increased intensity of specific parasites.

The high prevalence of *Dactylogyrus* sp. in this study indicates that this parasite has a direct life cycle without an intermediate host, thereby enabling faster spread within farmed fish populations²⁰. Meanwhile, *Trichodina* sp. and *Gyrodactylus* sp., which were also found in this study, are common ectoparasites in freshwater fish farming systems with a high ability to adapt to aquatic environmental conditions²¹. When compared with the results of previous studies, the variations in intensity and prevalence observed indicate that the presence of ectoparasites is strongly influenced by aquaculture environmental factors such as water quality, stocking density, and the accumulation of organic matter, which can increase stress in fish and heighten the risk of infestation²².

Dominance

The results of the study show that *Dactylogyrus* sp. is the ectoparasite with the

highest dominance value at most catfish farming sites in Sungai Raya Subdistrict, ranging from 48.28% to 64.52%. This indicates that *Dactylogyrus* sp. has a greater reproductive capacity than other ectoparasites in the observed aquaculture systems. Meanwhile, *Trichodina* sp. dominated at Location 5 (Mekar Sari Village) with a dominance value of 40.43%, while *Gyrodactylus* sp. had a relatively low dominance contribution across all study locations.

These differences in dominance patterns are related to the biological characteristics of each parasite. The high dominance of *Dactylogyrus* sp. is supported by its direct life cycle which lacks an intermediate host phase and its high reproductive capacity, enabling rapid population growth under aquaculture conditions with high fish density^{19,21}. This also increases the likelihood of contact between hosts, accelerating the spread of the parasite within the aquaculture environment. Conversely, the dominance of *Trichodina* sp. in certain locations is thought to be influenced by aquatic environmental conditions with higher organic matter content, which supports the growth and survival of this parasite²⁰.

Overall, variations in ectoparasite dominance across locations indicate that the structure of the parasite community in catfish is influenced by interactions between the biological characteristics of the parasites

and aquaculture environmental factors such as water quality, stocking density, and management practices^{20,22}.

Table 4. Ectoparasite dominance in African catfish at the study sites

Location	Parasite Type	Dominance (%)
Location 1	<i>Dactylogyrus</i> sp.	64,52
Kapur Village	<i>Trichodina</i> sp.	35,48
Location 2	<i>Dactylogyrus</i> sp.	36,17
Mekar Sari Village	<i>Gyrodactylus</i> sp.	23,40
	<i>Trichodina</i> sp.	40,43
Location 3	<i>Dactylogyrus</i> sp.	50,00
Kuala Dua Village	<i>Gyrodactylus</i> sp.	15,91
	<i>Trichodina</i> sp.	34,09
Location 4	<i>Dactylogyrus</i> sp.	48,28
Limbang Village	<i>Gyrodactylus</i> sp.	15,52
	<i>Trichodina</i> sp.	36,21
Location 5	<i>Dactylogyrus</i> sp.	58,62
Arang Limbung Village	<i>Trichodina</i> sp.	41,38

Table 5. Water quality values

Parameter	Loc.1	Loc.2	Loc.3	Loc.4	Loc.5	SNI 01-6484.5-2002
Temperature (°C)	28,3	28,1	27,3	28,9	28,7	25–30
pH	7,53	6,9	6,9	6,9	6,7	6,5–8,5
DO (mg/l)	9,7	7,5	5,3	5,7	10,3	> 4

Water Quality

Water quality parameters for the five ponds at the study sites are presented in the following table to illustrate the aquaculture environmental conditions during sampling (Table 5).

Water quality measurements show that the temperature ranges from 27.3–28.9°C, pH from 6.7–7.53, and dissolved oxygen (DO) from 5.3– 10.3 mg/L. All parameters remain within the optimal range for catfish aquaculture according to SNI 01-6484.5-2002²³ standards, thereby supporting fish growth and survival. Although water quality is considered good, ectoparasite infestations were still found at all study sites. This indicates that the presence of *Dactylogyrus* sp., *Gyrodactylus* sp., and *Trichodina* sp. is influenced not only by temperature, pH, and DO but also by other factors such as stocking density, a cultivation system that tends to be

static, and the accumulation of organic matter in the ponds. These conditions can increase stress in fish and support the development of ectoparasites³.

4. CONCLUSION

This study identified three types of ectoparasites infecting African catfish in Sungai Raya Subdistrict, Kubu Raya Regency: *Dactylogyrus* sp., *Gyrodactylus* sp., and *Trichodina* sp. *Dactylogyrus* sp. was the most dominant ectoparasite, with a prevalence of 26.32–36.84% and a dominance of 36.17–64.52%, compared to *Gyrodactylus* sp., and *Trichodina* sp. The level of ectoparasite infestation in catfish was generally classified as low to moderate, with intensity values ranging from 2.33 to 6.00 ind/fish. However, water quality parameters remained within the optimal range for catfish aquaculture.

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