Identification and Prevalence of Ectoparasites in Carp *(Cyprinus carpio)* Seeds From Central Local Fish Seed Center and Fish Farmers in West Koya Region

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Abstract

The needed for carp in Jayapura City was greatly increasing along with the high growth and increase of population in Jayapura City. Cultivation of carp (Cyprinus carpio) can be done intensively and semi-intensively by taking into account the economic value. However, from cultivation activities, the problems that were often faced in cultivation activities were the attack of dangerous types of pathogens such as parasites. Parasite was a fish disease that occurs more frequently. Parasites were organisms that live on the body of other organisms and generally have a negative effect on their host. This study aimed to identify and the prevalence of ectoparasites to determine the type and level of ectoparasite attack on carp (C. carpio) seeds and to reduce the impact of ectoparasites which was feared to reduce the amount of carp production from cultivation. The method used was a direct survey to the Local Fish Seed Center and fish farmers in the Koya Barat area. The fish used were carp in the seed phase where the fish's immune system was still weak, making it more susceptible to contracting parasites. This study showed that there were 4 types of parasites found during the study that infected carp seeds, namely Dactylogyrus sp, Gyrodactylus sp, Trichodina sp, and Lernea sp. The average prevalence rate of Dactylogyrus sp. at stations I, II, III, and IV was 25%, Gyrodactylus sp. 8.3%, Trichodina sp. 8.3% and Lernea sp. 5% with the lowest prevalence rate.

Keywords: *Cyprinus carpio, Dactylogyrus* sp., Ectoparasite

Introduction

Jayapura City has several locations which were fisheries centers, one of which was in Muara Tami District, Koya Barat which was typical for consumption fish and ornamental fish commodities. One of them was carp *(C. carpio)*. The carp were originally cultivated and hatched in the area. The need for carp in the city of Jayapura was greatly increasing along with the high growth and increase in population in the city of Jayapura. In addition, the large number of restaurants and food stalls in Jayapura that serve carp menus also has an impact on the demand for carp. Cultivation of carp *(C. carpio)* can be done intensively and semi-intensively by taking into account the economic value. However, from cultivation activities, the problems that were often faced in cultivation activities were the attack of dangerous types of pathogens such as parasites. Parasite was a fish disease that occurs more frequently. Parasites were organisms that live on the bodies of other organisms and generally cause negative effects on their hosts (Handayani et al., 2004). The disadvantages resulting from ectoparasite infection were not as big as those caused by infection with other organisms such as viruses and bacteria, but ectoparasite infection can be one of the predisposing factors for infection with more dangerous pathogenic organisms. Parasite attack makes the fish lose appetite then slowly become weak and lead to death. Other non-lethal losses can be in the form of organ damage, namely skin and gills, slow growth and decreased selling value (Bhakti, 2011).

Parasitic infections can occur due to differences in water conditions, fish age, size, feed given and cultivation activities (Bauer, 1970). According to Afrianto (1992), fish can be attacked by parasites caused by other organisms, then the accumulation of fish food scraps or the environmental conditions of the

fish. Parasites have different characteristics both in terms of biology, life cycle, pathogenicity and in terms of resistance to various chemicals.

Therefore, knowledge of the characteristics of parasites, especially the types and levels of infection, is very important in order to carry out an integrated disease control (Anshary, 2008). Based on the above problems, the purpose of this study was to identify and prevalence of ectoparasites to determine the type and level of ectoparasite attack on carp *(C. carpio)* seeds and to minimize the impact of ectoparasites which was feared to reduce the amount of carp production from cultivators from the Central Seed Center. Local Fish and fish farmers around the West Koya area.

Materials And Methods

The tools used in this study were hand shirts, scoops, buckets, rulers, drop pippets, dissecting set, preparatory glasses, cover glass, tissues, binocular microscope, stationery, camera, pH meter, thermometer and DO meter. The materials used in this study were Carp *(C. carpio)*) size 9-14 cm and water media.

It was endeavored took fish samples to represent the fish population at each station. Sampling will be carried out at 4 carp ponds in the West Koya area. The location selection was conditioned on the basis of logistical ease, distance and permission from the cultivator and is carried out actively without waiting for reports or information on the occurrence of parasitic infections. In-situ observations of fish sampling locations include observations on conditions outside the fish body, namely fins, eyes and operculum. The goal was to get an initial picture of the condition of the fish.

Sampling was carried out randomly (random sampling) twice, the first was taken on August 4 by taking 10 carp seeds from each carp pond in the West Koya region. So that the total sample observed was 40 individuals. The same thing was done on August 10, 2020. Water quality measurements were also carried out at the time of sampling. Then the samples that have been taken were put into a plastic container that was given sufficient oxygen and then taken to the Sentani Class I Fish Quarantine Laboratory. The identification method was carried out after the necropsy process, then observed under a microscope and identification of the family, genus, and species of the sample is carried out and refers and follows the instructions from Kabata (1985).

The main parameter observed was the type of ectoparasite that attacks the operculum, gills and fins of the carp seeds originating from the center of the Local Fish Seed Center and fish farmers around the Koya Barat area. Supporting parameters in this study were fish size which included length and body weight of fish, as well as water quality such as temperature, pH, and dissolved oxygen. This supporting parameter data was used as a complement to the main parameters.

The method used was a direct survey to the Local Fish Seed Center and fish farmers in the Koya Barat area. The fish used were carp in the seed phase where the fish's immune power was still lacking so they were more susceptible to contracting parasites. Fish in the seed phase is a phase that is prone to parasitic attacks so that it will reduce the production of fish seeds (Diani, 1995). Black and Pickering (1998) added that in the nursery phase, fish were very susceptible to parasite attack and can lead to death.

Results And Discussions

Ectoparasite diversity

Based on Table 1, carp seeds *(C. carpio)* originating from Station I, Station II, Station III, and Station IV were infected with ectoparasites *Dactylogyrus* sp., *Gyrodactylus* sp., *Trichodina* sp. and *Lernea* sp.. parasites of *Dactylogyrus* sp and *Gyrodactylus* sp were found in all organs of the fish samples that were positive for ectoparasites such as skin, gills and fins. Meanwhile, *Trichodina* sp. was only found on the skin and the parasite *Lernea* sp was only found on the skin of the fish samples. Judging from the diversity, stations III and IV have sufficient diversity compared to stations I and II. This can be seen from the presence of 4 types of ectoparasites that infect carp seeds, namely *Dactylogyrus* sp., *Gyrodactylus* sp., *Trichodina* sp. and *Lernea* sp.

Table 1. Ectoparasite diversity in carp *(C. carpio)* seeds

No	Station	Date of Sampling	Parasites		
			Organs examined		
			Skin	Gill	Fin
1	I	4-10 /8/20	*Dactylogyrus Trichodina*	*Dactylogyrus*	*Dactylogyrus*
2	II	4-10/8/20	*Dactylogyrus Gyrodactylus*	*Dactylogyrus*	*Dactylogyrus Gyrodactylus*
3	III	4-10/8/20	*dactylogyrus Lernea sp Trichodina*	*Dactylogyrus Gyrodactylus*	*Dactylogyruss*
4	IV	4-10/8/20	*Dactylogyrus Lernea Trichodina*	*Gyrodactylus Dactylogyrus*	*Dactylogyrus*

Source : Primary Data (2020)

Organs infected with ectoparasites

Some of the organs of carp *(C. carpio)* infected with ectoparasites can be seen in Table 1. The table above showed that ectoparasites dominate the three organs of carp such as gills, fins and skin surface. Such as the dactylogyrus parasite which dominates the gills, skin and fins, *Lernea* sp. and *Trichodina* sp. which were found on the skin surface, and Gyrodactylus sp which were found on the skin, gills and fins organs.

According to Kordi (2004), the transmission of this parasite was through direct contact between individual fish. If the fish was infected by this parasite, the fish will show changes or clinical symptoms such as red spots in certain areas, grayish-white skin, abnormal mucus production, darker color in some or all of the body, scales and peeled skin, respiration and osmoregulation processes were disrupted. However, when direct observation, the sample fish did not have any of the signs as above. This was because the number of *Trichodina* sp was still very small, namely 1 individual / head. So that the impact of the infection does not really affect the health of the carp.

The mean value of ectoparasite prevalence

The prevalence value of ectoparasites in carp *(C. carpio)* seeds at stations I, II, III, IV can be seen in table 2. From this table, it can be seen that the average prevalence value of *Dactylogyrus* sp. was (25%) greater than the average prevalence. *Gyrodactylus* sp. (8.3), *Trichodina* sp. (8.3%) and *Lernea* sp. (5%).

Table 2. Average prevalence rate of ectoparasites in carp *(C. carpio)* seeds

Species	Prevalence of ectoparasites				Average (%)
	I	II	III	IV	
Dactylogyrus sp.	20	25	25	30	25
Gyrodactylus sp.	-	15	5	5	8.3
Trichodina sp.	10	5	5	5	8.3
Lernea sp.	-	-	5	5	5

Source: Primary Data (2020)

The highest prevalence of ectoparasites was *Dactylogyrus* sp. with a prevalence value of 30%. The high prevalence of *Dactylogyrus* sp. according to Huet (1979) was because this parasite can reproduce rapidly. Dactylogyrus sp reproduces by laying eggs and hundreds of parasites can infect one fish. The high attack of Dactylogyrus sp also resulted in the sample being carried with a small size, which was about 5-7 cm. This was in accordance with the opinion of William and Williams (1996) that fish with seed size were very susceptible to disease.

At stations II and III the parasite *Dactylogyrus* sp. also had the second highest prevalence value, namely 25%. This was because the water conditions were not good and the fish sampled were obtained from ponds with too high a density. so that rubbing against each other so that the transmission of ectoparasites occured rapidly. This was in accordance with the opinion of Iriana (2004) that high density can cause fish to become stressed and susceptible to parasites.

While at station I Dactylogyrus sp. parasites have the lowest prevalence value, namely 20%. which means that of the 20 samples examined only 4 were infected with Dactylogyrus sp. This was because the size of the fish samples used as research material was 12-14 cm in size. so that the condition of the fish's body defense against parasites was getting stronger and was not prone to parasite

infection. This was in accordance with the opinion of Iriana (2004) that the attack of ectoparasites in fish would decrease as the size of the fish increases and the bigger the body of the fish, the better its immune system will be. Environmental conditions and water quality also affect the high and low prevalence of ectoparasites Dactylogyrus sp.

W*ater Quality*

In this study, the measured water quality parameters consisted of temperature, dissolved oxygen and the degree of acidity of the waters. This was done to make it easier to find the indicators of the causes of parasites.

Table 3. Water Quality at each station

No	Station	Temperature (℃)	DO (ppm)	pH
1	ST. 1	28	5	6.4
2	ST. II	28	3	6,2
3	ST. III	29	4	7,2
4	ST. IV	31	3.64	7

Source: Primary Data (2020)

The results of the measurement of water quality parameters showed that the average water temperature of stations I, II, III, IV ranges from 27-31 ℃, DO ranges from 3-5 ppm and pH ranges from 6.2-7.2. station 4 with the highest temperature, which was 31 ℃. The highest oxygen solubility was at station 1 which coincides with the local fish seed center.

Based on Table 3, the measurement of water quality parameters showed that the average temperature of the research pool container indicates a high enough temperature ranging from 28-31 ℃, because the measurement was carried out at 09:30 WIT so that the surface temperature of the pond waters has increased.

The temperature increase occurred at station IV, namely 31 ℃ with an oxygen solubility of 3.64 ppm and a pH of 7. The low dissolved oxygen content in the carp pond waters was influenced by the high temperature. This was in accordance with the opinion of Agustiningsih (2012) that an increase in temperature in the waters would caused a decrease in dissolved oxygen levels in the waters. While at station II the temperature showed the number 29 ℃ with an oxygen solubility of 3 ppm and a pH of 6.2.

Conclusions

This study showed that there were 4 types of parasites found during the study that infected carp fry, namely *Dactylogyrus* sp., *Gyrodactylus* sp., *Trichodina* sp., and *Lernea* sp. The average prevalence rate of *Dactylogyrus* sp. at stations I, II, III, and IV was 25%, *Gyrodactylus* sp. 8.3%, *Trichodina* sp. 8.3% and *Lernea* sp. 5% with the lowest prevalence rate.

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