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The mouth openings size and plankton consumed by climbing perch larvae, in bangkau lake

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Key words: Mouth opening, Plankton, Climbing perch, Bangkaulake.

Abstract

So far the availability of seeds is still from the natural and seasonal. Therefore, the provision of seeds should be continuously developed. However, the problem is the mortality rate of fish larvae is very high. This is due to the period of the larvae is a critical period, which is among others related to the ability of larvae to take the feed and feed suitability with the size of the mouth opening. From this case, it is necessary to do research to know the size of the mouth opening of the larvae and the type of plankton consumed. So it is expected that the mortality of the seeds is low and is always available at all times. Method of climbing perch larvae sampling in Bangkau Lake waters is collecting climbing perch larvae sampled as many as 10 fish, taken 3 days after the eggs hatch, and then 3 days interval for 31 days. The results of this study were climbing perch larvae 3 days old the mouth opening size of 103.110 ± 1.709 µm (mean ± SD) until the climbing perch larvae were 23 days mouth opening size of 162.463 ±4.001 µm (mean ± SD), an increase in the size of the mouth opening is still small. But after climbing perch larvae were 23 days to 31 days old mouth opening size of 1019.15± 6.106 µm (mean ± SD), an increase in the size of a very large mouth opening.Based on the percentage frequency of the presence of plankton in the digestive tract, the predominant type of plankton eaten by climbing perch larvaenamely:*Coconeis* sp, *Mougeotia* sp,*Brachionus* sp, *Diatoma* sp,*Navicula* sp dan *Keratella* sp.Plankton waters as a natural food that is consumed by climbing perch larvae has made changes to the size of his mouth opening. Plankton consumed by fish changes with the growth and morphology changes.

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Introduction

According to Uttam, *et al* (2005), the fish populations of betok have been reduced, this fish belongs to the category easily extinct and included in the criteria of International Union for Conservation of Nature and Natural Resources (IUCN). Conservation efforts and the development of intensive fish rearing is urgently needed to preserve these fish species.

Climbing perch research conducted by several researchers only leads to the enlargement of business as reported by Mohammed (1987), Normalinda (2002), Robianti (2006), and Morioka (2009).

Improvement of fish farms faces constraints in the provision of seeds. Seed availability is seasonal, which is abundant in the natural spawning season at the beginning of the rainy season and rare in other seasons. Therefore, continuous supply of fish seeds is needed.

Seeding efforts are alternative solutions to overcome the gap between supply and demand for seed. Even so, business continuity is limited by the survival rate of climbing perch larvae (*Anabas testudineus* Bloch, the local name in South Kalimantan "papuyu") is very low (Marlida, 2001).

This is caused by the larval period is a critical period in the life cycle of fish. These conditions relate to the ability of larvae in the natural food form plankton received from outside at the time of transition and during the endogenous feeding to exogenous feeding. This transition is related to the ability of larvae to consume plankton with the mouth opening size (Kamler, 1992). Natural food in the form of plankton larvae phase that must be given in accordance with the size of the larval mouth opening, thus greatly affecting larval survival.

However, information about the development of the mouth openings size and type of plankton consumed by climbing perch larval in the waters has not been investigated so that there is no information. Therefore, it is necessary to do research to know the size of the mouth openings and the type of plankton that needed by larvae betok. So expect larvae mortality is lower and seeds betok always available at all times. So finally the goal of maintenance and preservation of fish betok can be achieved.

Materials and methods

Place of research

Research conducted in the waters of the BangkauLake South River Upper District, Water Quality Laboratory of the Faculty of Fisheries and Marine Unlam Banjarbaru, and Freshwater Fish Culture Hall Mandiangin South Kalimantan.

The mouth opening measurement of climbing perch larvae

You do this by measuring the length of the upper jaw (PRA) of climbing perch larvaein the microscope then included in the formula UBM = length of upper jaw x $\sqrt{2}$. Or another way is when the fish's mouth open wide, at the end of the terminal is measured from top to bottom. Way of measuring the length of the upper jaw (PRA) of fish as shown in Fig. 1.

Mouth opening size observation of climbing perch larvaestarted after larvae were 3 days old in which the yolk (reserve egg yolk) larvae have absorbed nearly exhausted and the larvae begin to open your mouth. Interval of three days of observations made at the time the larvae aged 3 days, 7 days, 11 days, 15 days, 19 days, 23 days, 27 days and 31 days.

Gastrointestinal uptake and observations of climbing perch larvae

Method of climbing perch larvae sampling in Bangkau Lake waters is collecting climbing perch larvae sampled as many as 10 fish, taken 3 days after the eggs hatch, and then 3 days interval for 31 days; samples of larvae dissected stomach and digestive tract removed, inserted into the sample bottle and given a 4% formalin preservative; observation that there are types of plankton larvae in the stomach by using an electric microscope and identified plankton

found.

Data analysis

Aperture size of fish larvae betok mouth

According Affandi *et al.* (2005) (Fig. 1), the size of the mouth opening fish was calculated using the following formula:

$$UBM = PRA \times \sqrt{2}$$

Descriptions:

UBM = The size of the fish's mouth opening

PRA = length of upper jaw fish

Digestive tract of climbing perch larvae

To find the presence of plankton species that consumed by climbing perch larvae used method of frequency of occurrence. The frequency method carried out by recording occurrence of each plankton that found in each stomach contents, as well as a totally empty channel. Each plankton contained in the stomach that contains a number expressed in percent of all gastric larvae studied, but does not cover the stomach that does not contain. With this method obtained different types of plankton are consumed, but does not show the quantity or amount of plankton consumed and does not take into account the digested plankton.

The method of frequency occurrence obtained by using the formula Effendie (1997):

$$Oi = \frac{Fk}{ln} \times 100\%$$

Description:

Oi = percentage frequency of the presence of one type of feed (%)

Fk = frequency of the presence of one type of feed

ln = Number of fish larvae containing gastric

The results of measurements of mouth opening and the percentage frequency of the plankton species presence in the digestive tract of climbing perch larvae subsequently tabulated.

Measures taken according to the above plankton Shirota (1996).Interpretation of the results of the tabulation is poured into the form of tables and graphs.

All data collected and then processed with simple statistical analysis, data averaged and calculated Deviation Standards and graphics created using Microsoft Excel.

Results

The mouth openings of climbing perch larvae

The increasing mouth opening size of climbing perch larvae along to the morphological changes of body and the increasing age of climbing perch larvae. On climbing perch larvae 3 days old the mouth opening size of 103.110 ± 1.709 µm (mean ± SD) until the climbing perch larvae were 23 days mouth opening size of 162.463 ±4.001 µm (mean ± SD), an increase in the size of the mouth opening is still small. But after climbing perch larvae were 23 days to 31 days old mouth opening size of 1019.15±6.106 µm (mean ± SD), an increase in the size of a very large mouth opening.

Table 1. The Development of Mouth Opening Size Average of Climbing Perch Larvae for 31 Days.

Larval age	Mouth opening size Average ± SD (µm)
3 days	103,110 ± 1,709
7 days	106,018 ± 2,875
11 days	114,355 ± 3,095
15 days	120,227 ± 3,504
19 days	131,622 ± 3,948
23 days	162,463 ± 4,001
27 days	997,401 ± 5,317
31 days	1019,15 ± 6,106

The mouth opening size development data average of climbing perch larvae completely can be seen in Table 1.

The increase graphsof the opening mouth size of climbing perch larvae from 3 days to 31 days of age can be seen in Fig. 2 and morphological changes in shape and mouth opening size of climbing perch larvae can be seen in Fig. 3.

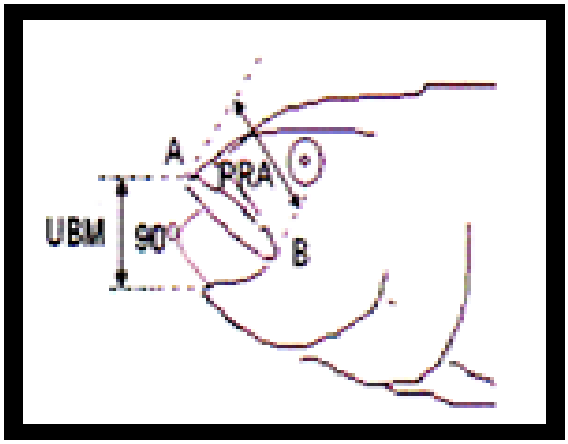

Fig. 1. The Measurement of Mouth Opening of Climbing Perch Larvae.

Gastrointestinal analysis results of climbing perch larvae

The types of plankton are consumed as a natural feed was changed in accordance with age and mouth opening size of climbing perch larvae. Climbing perch larvae consume plankton in the waters began at age 3 days, because yolk reserves (yolk) is almost absorbed out and have started to open his mouth.

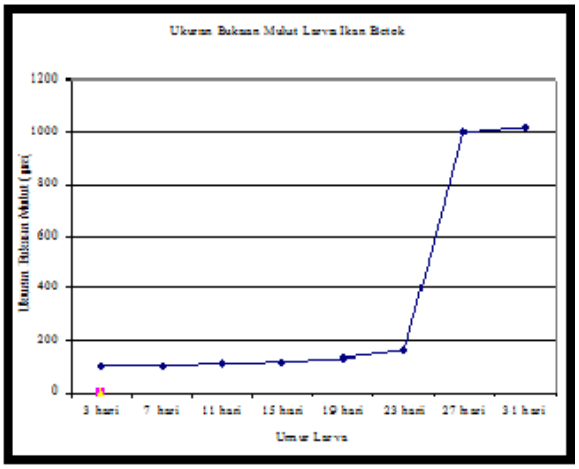

Fig. 2. The development of mouth opening size of climbing perch larvae during the age of 31 days.

According Waynarovich and Horvart (1980), larval fish with the yolk of the egg can live longer without food from outside. Along with the reduction in egg yolks, then the mouth opening and digestive tract is also growing. Feed fish larvae start looking outside at the time of yolk remaining 20% -30%.

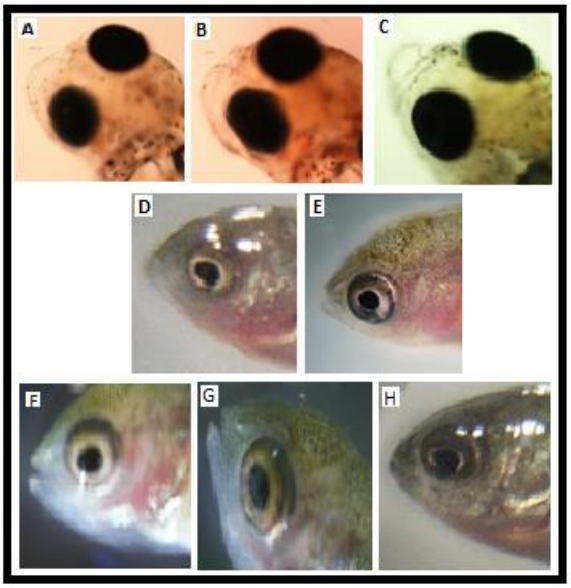

Fig. 3. Morphological changes in shape and mouth opening size of climbing perch larvae.

A - C (magnification 40x, camera Olympus DP20)

D - H (magnification 15x, Canon 8-megapixel camera)

Description:

A = 3 day old age

E = 19 days old age

B = 7 day old age

F = 23 days old age

C = 11 day old age

G = 27 days old age

D = 15 day old age

H = 31 days old age

Plankton waters as a natural food that is consumed by climbing perch larvae has made changes to the size of his mouth opening, it can be seen from the percentage of plankton being consumed by climbing perch larvae. Plankton consumed by fish usually changes with the growth and morphology changes.

On climbing perch larvae selectivity is also seen in the search for food, both in terms of species abundance and the number of available food resources in the

waters. It can be seen from the plankton as feed consumed according to the size of mouth opening. Plankton abundance/natural food is high in aquatic habitats where fish larvae and live according to the size of the larval mouth opening will increase the chances of larvae ingested, so the amount consumed is a function of the density of the feed. According to Wootton (1994), factors that determine the selection of prey (natural food) is the availability of feed, which capture natural food will increase with increasing abundance of plankton, prey and predator characteristics, whether or not feed easily digestible and experience to feed predators. Feed consumed fish usually changes with the growth and morphology changes.

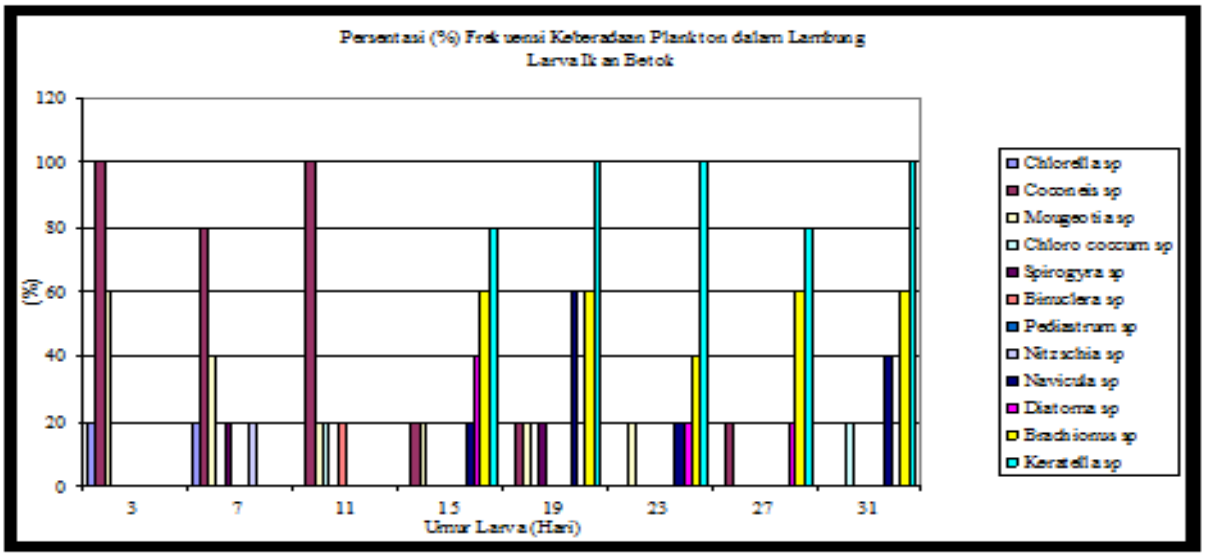

Fig. 4. The percent (%) of plankton frequency presence in the stomach (Gastrointestinal Tract) of climbing perch larvae in the waters of lake Bangkau.

According to Nikolsky (1963), that during the growth process of fish, there is a change in the feed, with respect to changes in the structure of the fish. If the fish managed to get his life started with a natural feed plankton according to the size of mouth openings, as an adult or growing larger fish feed that will change both in size and quality, if an adult fish will follow the pattern of its parent habits (Effendie, 1978). According to Moss (1980) feed the fish often change substantially in accordance with increasing fish size. Percentage frequency of the presence of plankton in the stomach (gastrointestinal tract) climbing perch larvaetaken from the Bangkau Lake waters can be seen in Fig. 4. Based on the percentage frequency of the presence of plankton in the digestive tract, the predominant type of plankton eaten by climbing perch larvaenamely: *Coconeis* sp, *Mougeotia* sp,*Brachionus* sp, *Diatoma* sp,*Navicula* sp dan *Keratella* sp.

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