The Hatching Rate of Climbing Perch (*Anabas testudineus*) Eggs in The extract of Lempuyang (*Zingiber zerumbet*) and Sour Eggplant (*Solanum ferox*)

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Abstract

Dewi Yulianti, Esti Handayani Hardi, and Gina Saptiani. 2020 The Hatching Rate of Climbing Perch (*Anabas testudineus*) Eggs in The extract of Lempuyang (*Zingiber zerumbet*) and Sour Eggplant (*Solanum ferox*). *Aquacultura Indonesiana*, 21 (2): 87-93. This research is aimed to observe the effect of Lempuyang extract (*Zingiber zerumbet*) and Terung asam (*Solanum ferox*) on the hatchability of betok’s eggs fish (*Anabas testudineus*). This study applies completely randomized design with four treatments and replications. The treatment is combination of lempuyang extract (200 mg/L) and Terung asam (600 mg/L) with ratio 1:1, then 4 treatments were carried out in 4 container or plastic jar, each containing 1000 ml distilled water, and each plastic jar was given 0 ml, 1 ml, 2 ml, and 2.5 ml from the combination extracts. The parameters are egg hatching rate, larval survival rate, and several water quality parameters the some parameters were analyzed using variance (ANOVA). The results showed that the addition of combination extracts did not provide a significant difference in the rate of hatching eggs (P> 0.05). Larval survival rates at the 24th, 72th, and 96th hours showed no significant difference (P> 0.05), but were significantly different at the 48th and 120th hours (P <0.05). The addition of lempuyang extract and Terung asam into the culture media of betok’s fish eggs did not significantly influence the hatchability of the eggs, but had a significant effect on the survival of the larvae at 48 and 120 hours.

Keywords: Climbing Perch (*Anabas testudineus*), hatching rate, lempuyang, and sour eggplant

Introduction

Kutai Kartanegara Regency, East Kalimantan has several important economical fisheries commodities including goldfish, tilapia, catfish, and climbing perch (*Anabas testudineus*). In the Loa-Kulu area, fish cultivation is not popular among fish farmers, even though it has a promising market potential, because it has delicious taste, so the cost is 50,000 IDR / kg. According to Murjani (2011) Betok fish is a local potential Kalimantan fish species to be cultivated. So far, the fish are obtained by fishing them in nature, so it is worrying that one day the population will decrease.

The supporting aspect to the fish cultivation industry is hatchery. In the Loa-Kulu area, Kutai Kartanegara Regency, The availability of Betok fish fry is very rare until now. Some fish cultivators get fish from both naturally and enlargement of the frys
sold by farmers in other areas. According to Lingga and Susanto (1987), fish can be spawned naturally on a small scale by using aquariums, but in the reality, natural spawning cannot guarantee that the fish have mature gonads, so spawning is induced breeding using gonadotropin hormone stimulants to accelerate the process of ovulation and spawning (Lutz, 2001).

Stages of successful cultivation in the hatching process can be seen from the hatchability of fish eggs. If the hatchability is low, the productivity of the fries will also decrease. One of the causes of low hatchability of female fish eggs is destructive pathogens such as fungi, so there must be effective prevention and treatment to solve these problems. Precautionary measures or improper handling of pathogens such as the use of chemicals will endanger the host and the environment. According to Sinta (2013), the use of chemicals and antibiotics continuously at inappropriate doses can cause new problem from increased microorganism resistance to these materials. To avoid the use of chemicals and antibiotics in dealing with pathogenic attack natural ingredients from traditional plants that are antimicrobial can be used. One traditional plants that can be used as antimicrobials is Lempuyang (Zingiber zerumbet) and terung asam (Solanum ferox).

Lempuyang extract and terung asam contain of phytochemicals such as alkaloids, flavonoids, steroids and carbohydrates used as antimicrobials. Lempuyang extract can inhibit the growth of Aeromonas hydrophila bacteria and the terung asam extract can inhibit the growth of the bacterium Pseudomonas sp. (Hardi et al., 2016). Alkaloid compounds have inhibitory mechanisms by disrupting the components of peptidoglycan in bacterial cells, so that the cell wall layer is not formed intact and causes cell death (Juliantina, 2008). Flavonoid is antibacterial and anti-inflammatory so they can prevent oxidation and inhibit the rapid spread of wounds (Wahjuningrum et al., 2010).

Relating to the obstacles in hatching fish eggs, there has been no research about effect of lempuyang extract and terung asam on the hatchability of fish eggs. The author is interested to do research about it. It is a hope that lempuyang extract and terung asam can prevent the growth of pathogenic microbes in fish eggs, so they can increase the hatchability of eggs.

Procedure

a. lempuyang and terung asam Extract

The process of extraction was carried out at the Wood Chemistry Laboratory, Faculty of Forestry, Mulawarman University. The extraction process uses the procedure done by Harikrishnan and Balasundaran (2005) and the method of Hardi et al. (2016). The process begins with washing the plants clean, then thinly sliced and dried in oven at 40-45 °C for 48 hours. Dried plants were mashed using a blender into fine powder. A total of 100 g of the dried sample was mixed with 100 ml of 96% ethanol in an Erlenmeyer flask at room temperature for 72 hours. Then the separation between the ethanol solution and the powder that has been blended using Whatman filter paper 0.5 µm. followed by separating the plant extract from the remaining ethanol solution using an evaporator for 3-5 hours. Extracts obtained were stored in an oven at 45 °C for 24 hours and solid extracts were obtained. The final stage is the dilution process by weighing each extract for extract of eggplant acid as much as 600 mg and as much as 200 mg of lempuyang extract then dissolving it in 1000 ml of distilled water.

b. Preparation container for spawning

First to do is that provide and clean the container. The spawning container
uses a plastic tub 50 cm for diameter with the height of 22 cm, the water is fresh water from a drilled well that has been deposited, then added aeration.

c. Selection of fish parent

Parent fish that are used come from one of the fish farmers in the Loa-Kulu area, Kutai Kartanegara Regency which has been maintained for ± 10 months. The size of the female of betok is ± 90 g with a range of 15-17 cm and for male betok fish is over 30 g with a length of 13-15 cm, then the breeders are not deformed, appetite is high, growth is fast, fins are not flattened, agile movements and body look fresh. After being selected, the mother is transported to the Aquatic Microbiology Laboratory using a wet transportation system, then dredging and environmental adaptation are carried out for 2 days before spawning.

d. Spawning

Parent fish experiences damping and adaptation for 2 days, injected ovaprim (gonadotropin hormone). According to research conducted at the Mandiangin Freshwater Aquaculture Fisheries Center, South Kalimantan, the dosage of ovaprim use must be as well as the ratio of males and females for spawning are as follows:

1. Female parent uses a dose of 0.5 ml/kg, mixed with 0.5 ml aquabidest with ratio 1:1.

2. Male parent using a dose of 0.25 ml/kg, mixed with 0.75 ml of aquabidest with a ratio 1:3

Giving hormones is done once by injection on the back of the fish in the intramuscular, near the lateral line by taking 7 scales from the first scales on the head and 3 scales from the upper dorsal fin. Male parent (2) and female (1) female which has been given hormones, put into a spawning container and then covered with a black net so that the fish does not jump out. The spawning process will occur 8-10 hours after the injection.

e. Preparation a container for eggs hatching

Preparation of hatching media starts from the preparation of the plastic jars with a diameter of 50 cm, then each hatching media is added with 1000 ml of distilled water and added extract of lempuyang 25% or 200 mg and sour eggplant 75% or 600 mg with each type dissolved in 1 liter of water, then taken for each type at 50% to be mixed, then 4 treatments were carried out in 4 tub, each containing 1000 ml distilled water, and each plastic jar was given 0 ml, 1 ml, 2 ml, and 2.5 ml from the lempuyang and sour eggplant. Then each treatment and test is given aeration so that the solution is homogeneous.

f. Observation on eggs hatching

Fertilized eggs are put into a container that contains a solution of Lempuyang extract and acid eggplant using a spoon in each treatment and repetition of 50 eggs, eggs soaked in the hatching media until hatching, then in the range of 20-24 the hour of the egg was observed using a magnifying glass to find out the time of hatching as seen from the eggs that first hatched in one container and after the eggs hatched all the eggs were hatched.

g. Maintenance of larvae

The container that will be used for larva rearing still uses a hatching container only with the addition of water with fresh water that has been deposited as much as 500 mL and carried out daily pipette using a dropper. Larvae that have been aged 3 days, are given additional food in the form of a suspension of boiled chicken yolk until the larvae are 5 days old. Provision of chicken egg yolk suspension is given to taste and 2 times a day.

Data Analysis

Data from the results of the hatchability of eggs and survival of the fish were analyzed through variance test (Anova) 95% confidence level, then if P
< 0.05 (significantly different) continued with Duncan Multiple Range Test (DMRT) 95% confidence level based on coefficient diversity (KK) > 10%, the data analysis uses the SPSS 18.0 application, while for water quality data it is explained descriptively.

a. Eggs hatchability

b. The results of variance test (ANOVA) showed the effect of giving lempuyang extract and terung asam on egg hatchability shows no significant difference in each treatment P > 0.05

**Result**

![Graph showing egg hatchability](image)

Figures-1. Eggs hatchbility of ikan betok in media given extract of lempuyang and terung asam description: P1 = 0 mL, P2 = 1 mL, P3 = 2 mL, P4 = 2.5 mL.

Picture 1. shows that the hatchability of female eggs at P1 94.5%, P2 95.5%, P3 96.5%, while the hatchability of P4 eggs is equals to 93%. Although giving lempuyang and terung asam extract with a dose of 2 mL (P3) is relatively better hatching eggs.

With the exception of that fact, the result of the statistical analysis was not significantly different.

C. Survival of larvae

Variance test results (ANOVA) showed that the survival of the larvae in 24 hours, 72 hours, and 96 hours after soaking the extract produced no significant difference (P > 0.05), whereas it came in 48 hours and 120 hours after soaking the survival extract Climbing perch fish larvae gave significantly different results (P < 0.05). After doing Duncan's further tests, P2 treatment was significantly different from P4 in 48 hours survival after immersion of the extract, and in 120 hours survival P1 treatment was significantly different from P4, whereas P2 was significantly different from P3 and P4. However, P1 and P2 are not significantly different.
The Hatching Rate of Climbing Perch (Anabas testudineus) Eggs in The extract of Lempuyang (Zingiber zerumbet) and Sour Eggplant (Solanum ferox). (Dewi Yulianti et al.)

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Figure 2. Survival of larvae of ikan betok in media given extract of lempuyang and terung asam description:* significantly different ; P1=0 ml, P2=1 ml, P3=2 mL, P4=2.5 ml.

Figure 2. shows the survival of the female fish larvae from larvae aged 1-5 days or 24-120 hours, P2 provides the highest survival yield of 51.0%, then followed by P1 45.0% treatment, then P3 treatment is 12.6%, and survival of the lowest larval fish occurred in P4 treatment which was 1.7%. Decreased survival in P1 and P2 is still better than in P3 and P4.

Giving effective lempuyang and terung asam extract for larvae survival was 1 ml at P2, but it does not show significant result with P1, given the extract of lempuyang and terung asam larvae acid larvae can still maintain its survival of P2.

c. Water Quality

Observation of water quality is carried out at the time of spawning, soaking eggs, embryo development, hatching, and larval rearing are described in the following table

<table>
<thead>
<tr>
<th>Water Quality Observation</th>
<th>Temperature (°C)</th>
<th>DO (mg/L)</th>
<th>pH</th>
<th>Ammonia (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spawning</td>
<td>26.4</td>
<td>6.4</td>
<td>6.8</td>
<td>-</td>
</tr>
<tr>
<td>Egg Soaking</td>
<td>25.6-25.9</td>
<td>6.4-6.9</td>
<td>7.2-7.9</td>
<td>-</td>
</tr>
<tr>
<td>Hatching</td>
<td>28.2-28.5</td>
<td>4.9-5.4</td>
<td>7.1-7.8</td>
<td>-</td>
</tr>
<tr>
<td>Larvae Maintenance</td>
<td>28.3-30.2</td>
<td>4.6-5.5</td>
<td>8.4-8.8</td>
<td>0.175-0.716</td>
</tr>
</tbody>
</table>

**Discussion**

Lempuyang extract and Terung asam cannot increase the hatchability of the eggs (P> 0.05). It is because the fungi does not easily spread out from dead eggs to healthy eggs. According to Afrianto *et al.* (2015), eggs that are not spread evenly will be easily attacked by fungi and spread to other eggs. Eggs will be dead because they are not fertilized by male sperm and they will turn white within 24 hours. Eggs will become a substrate for fungi. When
there is fungal attack, the living egg becomes vulnerable to fungal attack.

Decreased survival occurred at 48 hour maintenance, and decreased at 72 hour maintenance up to 120 hours. This can occur when the larvae begin to be given additional feed in the form of boiled chicken egg yolk in 72 hours, so that the survival decline of the female larvae can be caused by improper feeding of larvae. According to Lingga and Susanto (1989), one of the efforts to overcome the low survival rate is by giving the right feed both in size, amount, and nutrient content of the feed. Larval stage is a very important and critical period because at this stage fish larvae are very sensitive to food availability and environmental factors (Raharjo et al, 2016).

The results of water quality observations showed that the temperature, DO, pH, and ammonia ranges were still within normal ranges for Betok fish maintenance. According to Boyd (1990), the results of water quality observations show the range of temperature, DO, pH, and ammonia are still in the normal range for raising reared fish. According to Boyd (1990), a good temperature range in increasing fish growth in the tropics ranges between 25-32 °C. The content of dissolved oxygen that is good for fish growth is 5 mg / L. Widodo et al. (2007), states that the fish can grow normally in waters with a pH range between 4-8. Tatangindatu et al. (2013), the concentration of ammonia that can support the life of freshwater fish is not more than 1 mg / L.

Conclusion

The conclusion of the study of the hatchability of the eggs in the media which were given the extract of lempuyang and sour eggplant was that the provision of the tempuyang and tamarind extract in the media for hatching of the hatchback did not affect the hatchability of the hatchback, as well as the viability of the larvae which were given 1 ml extract significantly different (P <0.05) with 2.5 ml at the 48th hour and at the 120th hour the treatment that was not given the extract was significantly different (P <0.05) with the 2.5 ml extract and the 1 ml dose was significantly different ( P <0.05) at a dose of 2 ml and 2.5 ml.

Bibliography


