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Effect of Meniran Extract (*Phyllanthus niruri*) on Egg Hatcability of Carp (*Cyprinus carpio* L.) with Different Soaking Time

Pengaruh Ekstrak Meniran (*Phyllanthus niruri*) Pada Daya Tetas Telur Ikan Mas (*Cyprinus Carpio* L.) Dengan Waktu Perendaman Berbeda

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ABSTRACT

Goldfish (*Cyprinus carpio*) is a freshwater fish species that is highly favored in aquaculture due to the ease of its seed production, and the demand for goldfish seed sales is increasing. A constraint that affects the success rate of goldfish farming is the emergence of fungal infections during egg hatching stages. One of the efforts that can be made to prevent fungal infections during goldfish egg hatching is by immersing the eggs in meniran extract (*Phyllanthus niruri*) for a certain duration to achieve the best results. The purpose of this study was to determine the effect of the duration of meniran extract immersion on carp eggs, which provides the best hatching rate and larval survival and is free from fungal attacks. The test materials used were meniran extract solution and carp eggs. The method used was an experiment with a completely randomized design (CRD) with 5 treatments, each with 3 replications with different durations of meniran extract immersion. Treatments A (0 minutes), B (10 minutes), C (20 minutes), D (30 minutes), and E (40 minutes) The results of the study showed that the immersion of Phyllanthus niruri extract solution had a significant effect (P 0.05) on the hatchability and survival rate of Cyprinus carpio with regards to the prevalence of fungus but did not have a significant effect (P > 0.05) on the yolk sac absorption time. The optimal immersion time for Phyllanthus niruri extract on Cyprinus carpio eggs with regards to the prevalence of fungus, hatchability, and survival rate of the larvae was in treatment D (30 minutes), which resulted in a prevalence of fungus of 5.33 2.52%, a hatching rate (HR) of 94.54 2.52%, and a larval survival rate (SR) of 93.1 1.62%.

ABSTRAK

Ikan mas (*Cyprinus carpio*) adalah salah satu jenis ikan budidaya air tawar yang memiliki aspek potensi tinggi pada bidang perikanan. Kendala yang mempengaruhi tingkat keberhasilan budidaya ikan mas yaitu munculnya serangan jamur pada stadia penetasan telur. Salah satu upaya yang dapat dilakukan untuk mencegah serangan jamur pada penetasan telur ikan mas yaitu dengan melakukan perendaman telur ikan mas menggunakan ekstrak larutan meniran (*Phyllanthus niruri*) dengan lama waktu yang terbaik. Tujuan penelitian ini untuk mengetahui pengaruh lama waktu perendaman ekstrak meniran pada telur ikan mas yang memberikan daya tetas telur dan

kelulushidupan larva terbaik dan terhindar dari serangan jamur. Bahan uji yang digunakan adalah larutan ekstrak meniran dan telur ikan mas. Metode yang digunakan adalah eksperimen dengan Rancangan Acak Lengkap (RAL) dengan 5 perlakuan dan masing-masing 3 ulangan dengan lama waktu perendaman ekstrak meniran yang berbeda. Perlakuan A (0 menit), B (10 menit), C (20 menit), D (30 menit), E (40 menit). Hasil penelitian menunjukan bahwa pengaruh perendaman larutan ekstrak meniran terhadap daya tetas telur dan kelulushidupan ikan mas berpengaruh nyata (P<0,05) terhadap prevalensi jamur tetapi tidak berpengaruh nyata (P>0,05) terhadap waktu penyerapan kuning telur. Lama waktu terbaik perendaman ekstrak meniran pada telur ikan mas terhadap prevalensi jamur, daya tetas telur dan kelulushidupan larva adalah pada perlakuan D (30 menit) yang menghasilkan prevalensi jamur 5,33 ± 2,52%, derajat penetasan atau hatching rate (HR) 94,54 ± 2,52%, dan kelulushidupan larva 93,1 ± 1,62%.

Kata Kunci	*Cyprinus carpio, ekstrak meniran, perkembangan embrio, penyerapan kuning telur.*
Keywords	*Cyprinus carpio; meniran extract; embryonic development; egg yolk absorption.*
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INTRODUCTION

Goldfish (*Cyprinus carpio*) is a type of freshwater cultured fish that has good tolerance to the surrounding environment. Every year goldfish production continues to increase significantly. Based on data released by the Central Statistics Agency (2019), in 2018 carp production reached 8,456 tonnes and production increased in 2019 to 14,939 tonnes. Public interest in goldfish cultivation is quite high, because goldfish grow quickly and easily adapt to the environment. Goldfish can be cultivated in reservoirs, ponds, fast-flowing rivers, and public waters in cages (Syafar et al., 2017).

The low degree of hatching of eggs is a problem that is often faced in goldfish hatchery cultivation (Scabra, Marzuki, & Sudirman, 2022). The egg hatching process often fails due to fungal and bacterial attacks. According to research (Khasanah et al., 2022). Goldfish egg mortality reached 45.66% due to fungus. Fungal attacks that infect fish eggs, both unfertilized eggs and fertilized eggs, will impact the hatchability of the eggs. Fungal attacks from the Saprolegnia sp type can cause a decrease in egg hatching rates in goldfish.

In general, treatment for fungal attacks on fish eggs is carried out using chemical antibiotics such as Methylene blue, Nacl and Melatchite green (Fanitalya et al., 2012). Continuous use of chemicals should be avoided because it can have harmful effects on organisms and the environment. Efforts that can be made to improve and optimize the quality of eggs in goldfish and prevent fungal infections are by using natural ingredients in hatching media to inhibit the growth of fungus in eggs. One plant that can be used as an anti-fungal is meniran. The compounds contained in meniran have a useful mechanism for preventing fungi, bacteria and viruses and encouraging improving the body's immune system. Meniran has other important compounds such as polyphenols, triterpenes, flavonoids, tannins, sterols, alkaloids (Shanavas et al., 2019; Jayadi et al., 2022; Kusuma, 2005).

By administering meniran extract, it can prevent fungal attacks on eggs so that the eggs do not rot and can hatch optimally. Previous studies have focused more on the dose of meniran used to optimize egg hatchability. Therefore, this research focuses on the length of soaking time for meniran extract to increase the hatchability percentage of goldfish eggs. It is hoped that the many bioactive compounds contained in meniran extract will have a good effect in preventing egg rotting and treating fungal, bacterial and parasitic attacks on hatching eggs which have been treated using antibiotics or chemicals that can pollute the environment.

RESEARCH METHODS

The test eggs used in this research were carp (*Cyprinus carpio*) eggs obtained from the natural spawning of goldfish parents at the Balaikambang Fish Seed Center (BBI), Surakarta City, Central Java. Each treatment container was filled with 100 eggs, the total number of eggs used was 1500 eggs. The meniran extract used was meniran extract powder which was weighed according to the requirements for the treatment, namely 20 grams per treatment, the total used was 300 grams. The research was carried out experimentally. The experimental method is research that attempts to find the influence of certain variables on other variables (Asrin., 2022). The container used in the research is a basin or jar with a capacity of 5 liters filled with 5 liters of water for soaking eggs with meniran extract, while a 15 liter bucket filled with 5 liters is used for hatching 100 eggs, the density of 20 eggs/liter of water refers to in research by Alfath et al., (2020). The maintenance medium used is fresh water. The research was conducted at the Balaikambang Fish Seed Center (BBI), Surakarta City, Central Java.

The research design was designed using a Completely Randomized Design (CRD), 5 treatments and 3 replications. The treatment duration for soaking carp eggs with a dose of 4,000 ppm meniran extract is as follows:

A = Soaking time 0 minutes
B = Soaking time 10 minutes
C = Soaking time 20 minutes
D = Soaking time 30 minutes
E = Soaking time 40 minutes

Making a test solution for soaking egg samples in 5 liters of water each from the dilution of meniran extract. Extract was taken using a beaker with a dose of 4000 ppm. After adding a treatment dose of 4000 ppm to 5 liters of water, stir until the extract solution is evenly mixed and homogeneous. Preparation of test eggs begins with selecting goldfish broodstock that have mature gonads, selecting broodstock according to the SNI criteria for goldfish broodstock production, namely origin, age and weight of the broodstock. Goldfish spawning naturally occurs at night. After spawning, the spawned eggs are first selected and ensure that the eggs have been fertilized. Egg collection is done by manual counting on raffia kakaban. Select 1500 eggs or 100 eggs per treatment container. The fertilized goldfish eggs are then placed in a plastic jar filled with meniran extract solution with a concentration of 4000 ppm.

After soaking the extract solution at each experimental unit, the eggs were then transferred to an egg hatching jar that had been given aeration. During the egg hatching process, observations were made of the level of fungal prevalence and egg development as well as calculation of hatched eggs (HR). Then the carp larvae that have hatched are maintained until the larvae are 7 days old, with water quality measurements (dissolved oxygen, temperature and pH) carried out twice a day in the morning and evening. Larval

rearing is carried out to observe the survival rate (SR) or the survival rate of the fish seed being reared.

Prevalence of Fungi

The prevalence of fungal parasites was calculated to see the percentage of eggs attacked by fungi in goldfish after soaking treatment using meniran extract. The prevalence of fungal parasites was calculated based on the formula of Karina et al., (2016).

Egg Development

Egg development is observed microscopically, namely observing the embryological development of the egg. Starting after the soaking treatment using a meniran extract solution until the eggs hatch at intervals of every hour. The stages of egg development are observed from the cleavage, morula, blastula, gastrula, organogenesis phases, until the embryo hatches and emerges from the egg shell or larva (Ardhardiansyah et al., 2017). Egg development data was observed qualitatively and descriptively.

Degree of Egg Hatching

Calculation of egg hatching rates is carried out after the eggs completely hatch into larvae. Calculation of the percentage of egg hatching rate in each treatment was calculated using a formula based on Said (2008).

Egg Yolk Absorption Time

The time of egg yolk absorption was observed by recording the time the pre-larvae started to hatch until the egg yolk was almost completely used up (hours). Calculated using a formula based on Adriana et al, (2013) as follows:

Egg Yolk Absorption Time = Hatching Time – Egg Yolk Runs Out Time

Survival Rate

Survival Rate is a parameter used to determine the survival rate of fish seeds being kept. The calculation technique is calculated using a formula based on Effendie (1997).

Water quality

Water quality is a variable that can influence egg hatching rates. Water quality is a limiting factor for living creatures in waters (Monalisa et al., 2010). The results of water quality measurements in this study include: temperature measurements carried out using a thermometer and measurement of the degree of acidity (pH) using a pH meter and DO measurements using a DO meter.

The data obtained during the research was analyzed statistically. Data analysis to test treatment was carried out using Analysis of Variance. The data analysis used is the normality test, homogeneity test and anova test (analysis of variance). Analysis requirements tests are really needed, in testing the proposed statistical hypothesis, test the requirements for analysis of variance in the form of a homogeneity test and a normality test (Usmadi, 2020). If the analysis of variance produces results that are significantly different or very significantly different ($P < 0.05$), then the multiple area test (Duncan) is continued with a level of 95% to determine the difference in the mean value between the treatments. Analysis was carried out using SPSS ver 24 with a 95% confidence interval. Meanwhile, water quality data analysis is tabulated and analyzed descriptively.

RESULT AND DISCUSSION

Result

a. Prevelance of Fungi

Based on the results of observations on the prevalence of fungi carried out in hatching goldfish (*Cyprinus carpio*). The prevalence of carp eggs attacked by fungus can be seen in Figure 1. Observations were then made on fish eggs attacked by fungus. It was found that the type of ectoparasite that attacks goldfish eggs is Saprolegnia sp. Eggs attacked by the fungus Saprolegnia sp. can be seen in Figure 2.

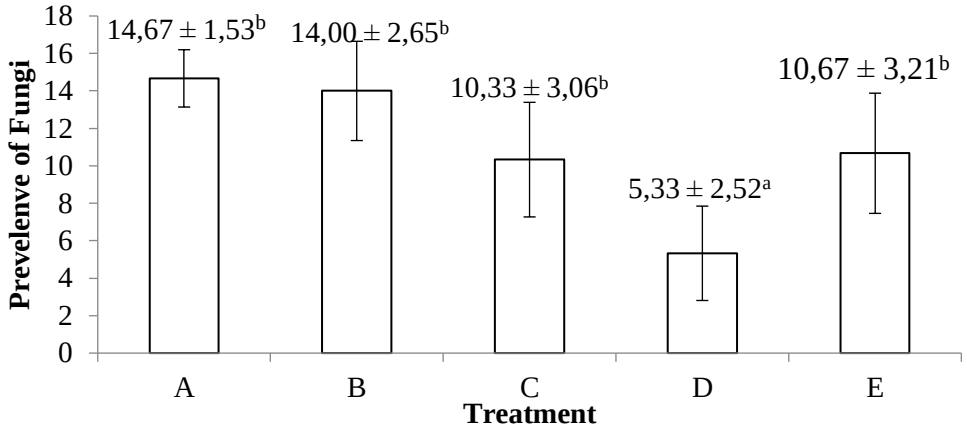


Figure 1. Prevalence of Fungi in Goldfish Eggs (*C. carpio*)

The results of the analysis of variance in fungal prevalence data (%) in each treatment from highest to lowest were treatment A at 14.67 ± 1.53%, followed by treatment B at 14.00 ± 2.65%, treatment C at 10, 67 ± 3.21%, treatment E was 10.33 ± 3.06% and the lowest was treatment D by soaking meniran extract for 30 minutes, the results were 5.33 ± 2.52%.

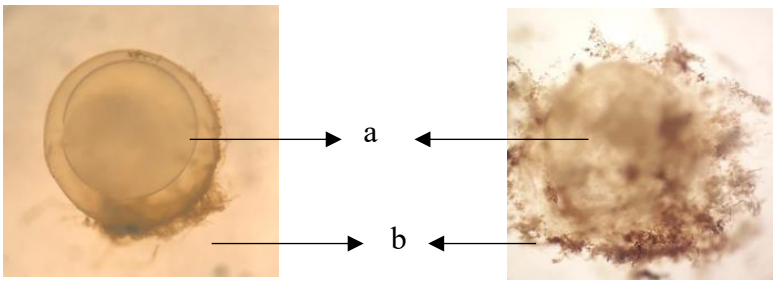


Figure 2. Microscopic observation of eggs infected with Saprolegnia sp. (a) Egg cells, (b) Fungal hyphae

When observing eggs attacked by the fungus *Saprolegnia* sp. It was found that the fungal hyphae blocked the entry of water into the eggs, thereby disrupting the respiration process in the eggs.

b. Egg Development

Based on the research that has been carried out, the results of observing the development of carp (*C. carpio*) eggs that were soaked using a solution of meniran (*P. niruri*) extract for different lengths of time are obtained as presented in Table 1.

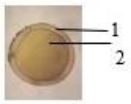
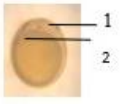
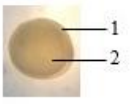
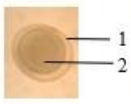
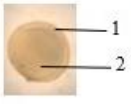
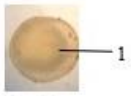
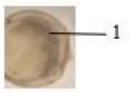
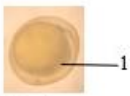
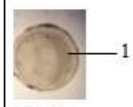
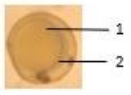
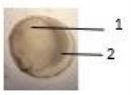
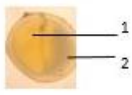
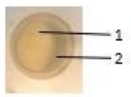
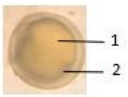
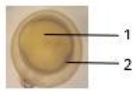
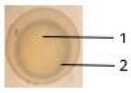
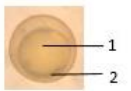
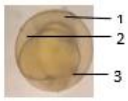
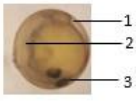
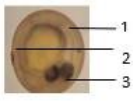
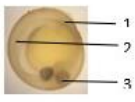
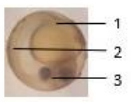
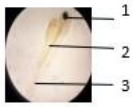
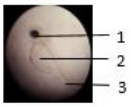
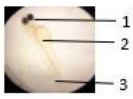
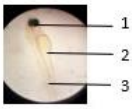
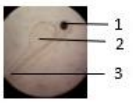
Waktu Perubahan Fase	Perlakuan					Referensi	Keterangan
	A	B	C	D	E		
Jam ke-1	 Cleavage	 Cleavage	 Cleavage	 Cleavage	 Cleavage	 Cleavage Period (Nica *et al*., 2012)	Cleavage : 1. Lapisan chorion 2. Zigot
Jam ke-3	 Morula	 Morula	 Morula	 Morula	 Morula	 Morula stage (Nica *et al*., 2012)	Morula : 1.Perkembangan Sel Blastodisk
Jam ke-6	 Blastula	 Blastula	 Blastula	 Blastula	 Blastula	 Blastula Period (Nica *et al*., 2012)	Blastula : 1. Blastocoel 2. Blastoderma
Jam ke-12	 Gastrula	 Gastrula	 Gastrula	 Gastrula	 Gastrula	 Gastrula Period (Nica et al., 2012)	Gastrula : 1. Endoderm 2. Blastoderma
Jam ke-16	 Organogenesis	 Organogenesis	 Organogenesis	 Organogenesis	 Organogenesis	 Organogenesis (Nica et al., 2012)	Organogenesis 1. Ekor 2.Perkembangan tulang belakang 3. Mata
Jam ke-24	 Larva	 Larva	 Larva	 Larva	 Larva	 Larva (Nica et al., 2012)	Larva : 1. Mata 2. Kuning telur 3. Ekor

Table 1. Goldfish Egg Development

The results of the analysis of the goldfish embryogenesis process consist of 6 developmental phases, namely the cleavage, morula, blastula, gastrula, organogenesis and larval phases. It can be seen from this research that soaking carp eggs using meniran extract with different soaking times did not show any differences in the embryogenesis process and the length of hatching time for the eggs.

c. Degree of Egg Hatching

Based on the results of the calculation of the degree of egg hatching or hatching rate which was carried out after the goldfish eggs hatched, the goldfish hatching rate data in this study can be seen in Figure 3.

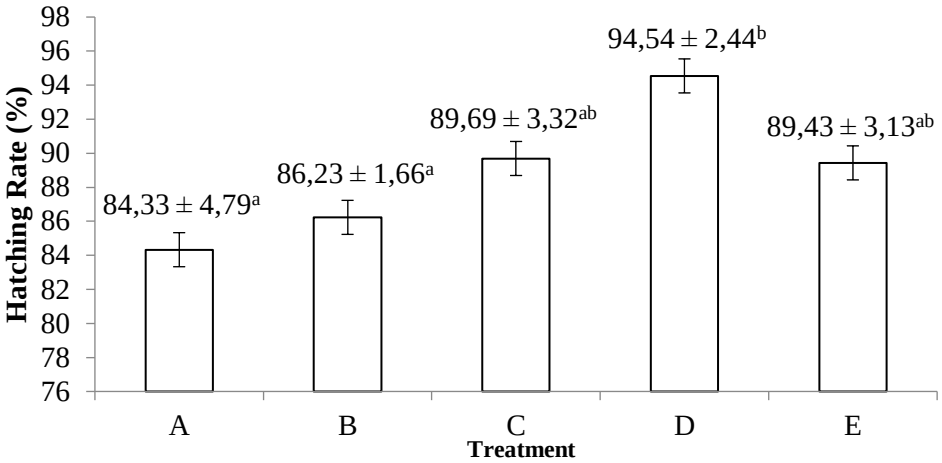


Figure 3. *Hatching Rate* of Goldfish Egg

The results of the analysis of variations in hatching rate data for each treatment from highest to lowest were treatment D at 94.54 ± 2.44%, followed by treatment C at 89.69 ± 3.32%, treatment E at 89.43 ± 3 .13%, treatment B was 86.23 ± 1.66%, and the lowest was treatment A without soaking in the meniran extract solution, the results were 84.33 ± 4.79%.

d. Egg Yolk Absorption Time

Based on the calculation of the absorption time for goldfish larvae egg yolk, data on the absorption time for goldfish egg yolk can be seen in Table 2

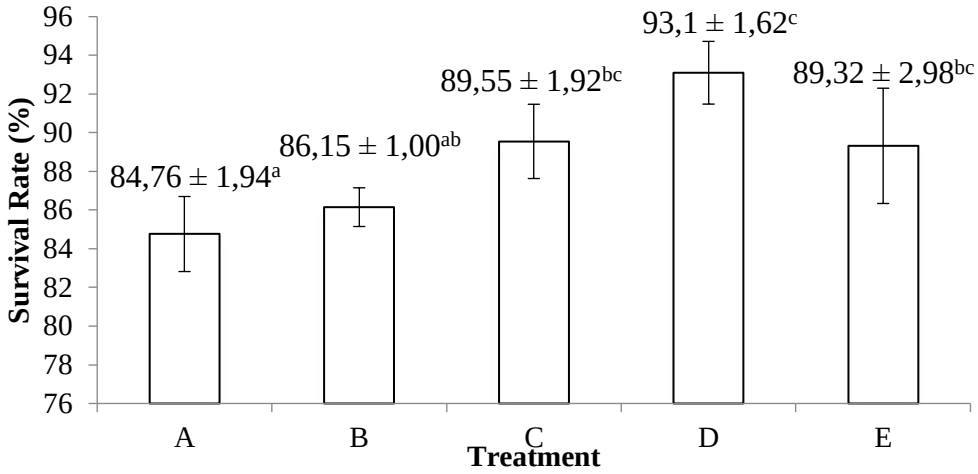
Table 2. Time of Absorption of Carp Larval Egg Yolk

Repitition	**Treatment**				
	A	B	C	D	E
1	69	72	72	73	72
2	71	69	73	71	71
3	70	71	70	72	74
∑ x	210	212	215	216	217
Rerata	**70 ±1**	**70,67±1,53**	**71,67±1,53**	**72±1**	**72,33±1,53**

Based on the table above, the average time for goldfish larval egg yolk absorption in each treatment from the fastest to the longest is treatment A, namely (70 ± 1) hours, followed by treatment B (70.67 ± 1.53) hours, treatment C (71.67 ± 1.53) hours, then treatment D (72 ± 1) hours and the longest egg yolk absorption in treatment E was (72.33 ± 1.53) hours.

e. Survival Rate

Based on the calculation of the survival rate of goldfish larvae, goldfish survival rate (SR) data was obtained, which can be seen in Figure 4.



Gambar 4. *Survival Rate* Goldfish Larvae

The results of analysis of various data on the survival value of carp larvae in each treatment from highest to lowest were treatment D at 93.1 ± 1.62%, followed by treatment C at 89.55 ± 1.92%, treatment E at 89, 33 ± 2.98%, treatment B was 86.15 ± 1.00% and the lowest was treatment A without soaking in the meniran extract solution, the results were 84.76 ± 1.94%.

f. Water quality

Water quality parameters measured during the research included temperature, dissolved oxygen (DO) and acidity degree (pH). The results of water quality measurements during the research can be seen in Table 3.

Table 3. Results of Water Quality Measurements in Carp Larvae Rearing

Keterangan :

Treatment	Water Quality Range					
	Temperature (C)		DO (Mg/L)		pH	
	Morning	Evening	Morning	Evening	Morning	Evening
A	24,2-25,9	27-29,1	6,7-7,5	5,9-6,9	7,52 - 8,64	8,89 - 9,03
B	24-25,9	26,7-29,2	6,5-7,4	5,7-6,9	8,21 - 8,58	8,94 - 9,05
C	24,3-25,4	26,7-29	6,3-7,4	5,8-6,9	8,29 - 8,62	8,94 - 9,07
D	24,2-25,9	26,8-28,9	6,4-7,4	5,8-6,7	8,03 - 8,61	8,90 - 9,04
E	24-25,5	26,8-29,3	6,6-7,3	5,8-6,8	8,25 - 8,63	8,9 - 9,04
Appropriateness	24°C – 30°C[a]		>4 mg/L[a]		6,5 – 9[a]	

a. Waris, (2018)

The results of measuring water quality parameters during the research showed that th water quality parameter values during the research were still in a suitable condition for rearing goldfish larvae.

Discussion

a. Prevalence of Fungi

Based on the research results, it is suspected that the type of ectoparasite that attacks goldfish eggs is Saprolegnia sp. Diansyah et al. (2018) stated that fish eggs attacked by the fungus Saprolegnia sp. will show signs that around the egg there are fine threads like cotton. Saprolegnia sp. has hyphae that are senotic, non-separated, branched, and there is a zoosporangium at the end of the hyphae which contains zoospores. When the egg is exposed to fungus, fine threads that resemble cotton will grow on the surface of the egg. The high fungal attack in treatment A (without soaking) with an average of 14.67% is thought to be because the eggs were not soaked with meniran extract so that the carp eggs were not protected by anti-fungal compounds, namely phyllanthin and hypophyllanthin contained in meniran extract. Filanthin in the meniran plant is the main component which functions as an antifungal and protects body organs from toxic substances such as ectoparasites and fungi (Sumahiradewi et al. 2021). Then the lowest fungal prevalence rate in this study was obtained in treatment D (30 minutes) with an average of 5.33%, this is thought to be because the absorption of meniran extract is quite good, able to inhibit fungal infections in goldfish eggs. Meniran contains flavonoids, tannins, phyllanthin and alkaloids (Kasim et al., 2021). However, the prevalence of fungus increased again in treatment E (40 minutes), allegedly because the soaking time was no longer effective in preventing fungal attacks. This is confirmed by Fanitalya et al. (2012) that too much extract absorbed by eggs within an intolerable time limit will be toxic to the eggs. Previous research shows that soaking in meniran extract solution can reduce the prevalence of fungus in gourami fish eggs (Andika et al., 2014), catfish eggs (Sumahiradewi et al., 2021), and koi carp eggs (Mortiga et al., 2022).

b. Egg Development

Fertilized eggs will develop into cleavage, morula, blastula, gastrula, organogenesis phases and hatch into larvae. The use of meniran as a natural ingredient in hatching eggs is not toxic if given in the right dose (Kasim at al., 2021). According to Husni et al. (2016) natural plant extracts containing active compounds are able to overcome fungal attacks, but do not really affect egg development from the cleavage phase to embryogenesis. This research did not show differences in the pattern and speed of embryo development in goldfish eggs and did not harm the development process in the eggs so it was safe to use.

c. Hatching Rate

Based on the research results, it shows that the highest hatching rate value with an average of 94.54 ± 2.44% was treatment D by soaking the meniran extract solution in goldfish eggs for 30 minutes, while the lowest hatching rate value was in treatment A with an average of 84.33 ± 4.79% without soaking meniran extract solution in goldfish eggs. Mortiga et al. (2022) reported that soaking eggs using meniran extract for a long time can increase egg hatchability, but if soaking for too long can reduce the percentage of egg hatchability. The active compounds of flavonoids, alkaloids, tannins, saponins, phyllanthin and hypophyllanthin contained in meniran extract, with a soaking time of carp eggs of 30 minutes at a dose of 4000 ppm are thought to be better utilized to inhibit the growth and development of fungi so as to increase the hatchability of eggs in fish. sir. Ramadhan (2022) showed that the soaking treatment of meniran extract with a dose of 4000 ppm had a fairly high hatchability of 89% because meniran contains the active compounds filantin, hypofilantin, Tetracontanal, flavonoids, alkaloids, tannins and steroids.

When soaking meniran extract in carp eggs treated with E for a soaking time of 40 minutes, egg hatchability decreased. It is suspected that if fish eggs are soaked for too long

it will cause the eggs to begin to lose balance with the extract content in the soaking medium. Apart from that, fish eggs also cannot tolerate the toxicity contained in the meniran extract solution. The longer the meniran extract is soaked, the higher the concentration of the solution and the more concentrated it is, so that there will be more active ingredients contained in it which can disrupt metabolic processes and inhibit egg hatching (Mortiga et al., 2022). Pane, (2018) also stated that one of the causes of the ineffectiveness of antibacterial soaking is due to the high concentration and long soaking time. One of the compounds that is dangerous for fungi and fish eggs if the dosage and soaking time are not appropriate is saponin. Inaya et al., (2015) also stated that saponin can act as an antimicrobial compound if used in certain doses, but if the dose is excessive it will become toxic.

d. Egg Yolk Absorption Time

Based on the research results, it shows that the fastest egg yolk absorption time was obtained in treatment A (carp eggs without soaking in meniran extract solution), namely with an egg yolk absorption time in larvae of 70 hours, the longest was treatment E (40 minutes) with an egg yolk absorption time in larvae of 72 hours. O'clock. This result is different from the research of Safrizal et al., (2020), the absorption time for goldfish egg yolk was 48 hours. This fast rate of egg yolk absorption is thought to be closely related to larval growth, maintenance of body condition and organ formation. Mulyani et al., (2015) stated that when the rate of absorption of egg yolk is fast, it is used for organogenesis and larval metabolism processes. Meniran extract with different egg soaking times did not affect the absorption time of egg yolk, this is thought to be because there was no temperature difference in the larval rearing medium. The egg yolk absorption time with relatively the same and stable incubation temperature produces no different egg yolk absorption time, it is suspected that the metabolic ability of the larvae is influenced by temperature. If the temperature in the environment is higher, the faster the larvae will absorb egg yolk because their metabolism will increase. If the egg yolk absorption time with different incubation temperatures results in a different egg yolk absorption time (Adriana et al. 2013). Several other factors that influence egg yolk absorption time and larval survival are egg size, this is thought to be because larger eggs contain more yolk. Larger eggs make the body's immune system higher than smaller eggs (Safrizal et al., 2020).

e. Survival Rate

Based on the research results, it shows that the highest survival rate value with an average of 93.10% is treatment D by soaking goldfish eggs using meniran extract solution for 30 minutes. Soaking eggs using meniran extract can increase egg hatchability, but if soaked for too long it can reduce the percentage of egg hatchability (Mortiga et al., 2022). The survival ability of goldfish larvae is influenced by rearing methods, water quality, quality and amount of feed provided, as well as the risk of pest and disease attacks. The survival value of goldfish larvae in the treatment without soaking gave low results, allegedly because there was no layer of the anti-fungal compounds phylantin and hypophyllanthin which protected the eggs before they hatched into larvae. Treatment with a soaking time of 30 minutes showed the highest survival value. It is suspected that soaking goldfish eggs in a solution of meniran extract for 30 minutes can reduce the mortality of goldfish larvae because the fish larvae's immune system is better. These results are the same as previous research conducted by Mortiga et al., (2022) on the treatment of soaking carp eggs using meniran extract with a soaking time of 30 minutes

resulting in the highest survival percentage of 99.2% because in this treatment the fish died. only a few. However, in the treatment with a soaking time of 40 minutes, the larval survival rate decreased, namely 89.32%. This is thought to be because the soaking time was too long so that the larvae experienced abnormalities and could not survive. Susilo and Indah (2022) stated that the eggs experienced problems with embryonic development because they were submerged in the soaking medium for too long, so that the larvae that hatched experienced disturbances, physical and behavioral abnormalities that could lead to death.

f. Water Quality

Water quality is an important factor in egg hatching activities. The success rate of fish egg hatching is influenced by 2 factors, namely internal and external factors. Ariyani et al, (2016), stated that water quality is a direct or indirect variable that influences the survival, development and reproduction of fish. Chemical, physical and biological factors are included in water quality, and can be limiting factors for the life of organisms in water (Scabra & Setyowati, 2019). During the research, factors related to water quality that were observed included temperature, pH, and dissolved oxygen (DO) content.

Temperature measurements during the maintenance period are in the morning between 24 – 25.9°C, while in the afternoon it ranges between 26.7-7.5°C. The difference in water temperature is influenced by the air temperature at the research location. The temperature obtained is still within the feasible range. The ideal water temperature for goldfish to live is between 25-32°C, growth will decrease if the water temperature is 13°C (Muslim et al., 2021).

The dissolved oxygen obtained during the maintenance period, namely in the morning, ranges from 6.3-7.5 mg/l, while in the afternoon it ranges from 5.7-6.9 mg/l. The optimal dissolved oxygen concentration for rearing goldfish is 5-6.5 mg/l (Scabra, Marzuki, & Afriadin, 2022).

The degree of acidity or pH obtained during the maintenance period, namely in the morning ranges from 7.52 to 8.64, while in the afternoon it ranges from 8.89 to 9.07. Tatangindatu et al., (2013) stated that the optimal pH range for biota life in fresh waters is between 7-8.5. If the pH is too low, metals in the water will dissolve more easily and become toxic to aquatic biota. Conversely, if the pH is too high, the concentration of ammonia in the water can increase, which is also potentially toxic to aquatic organisms. The pH obtained during the maintenance period was still within the acceptable range.

CONCLUSION AND SUGGESTION

Konclusion

Based on the research that has been carried out, the following conclusions can be drawn:

1. The best length of time for soaking carp eggs using a meniran (P. niruri) extract solution is treatment D with a soaking time of 30 minutes at a dose of 4000 ppm.
2. Soaking carp eggs using meniran extract with different soaking times had a significant effect on treatment D (30 minutes, 4000 ppm) on fungal prevalence of (5.33 ± 2.52)%, egg hatchability of (94.54 ±2.44)% and the survival rate of carp larvae was (93.10±1.62)%, but it had no real effect on egg development with the results of observations for 24 hours, and the larval egg yolk absorption time was (72 ±1. 00) hours.

Suggestion

Based on the research that has been carried out, the following suggestions can be given:

It is advisable to carry out further research to determine the optimum length of time for soaking the meniran extract solution, carry out in vitro tests to control the observation of fungal attacks, and improve and confirm the research design that will be used so that it can be applied to research in goldfish hatchery activities to increase the degree of egg hatching and survival. larval life and reduces the prevalence of fungal attacks on eggs.

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