PERFORMANCE OF *RED CHERRY* SHRIMP LARVAE (*Neocaridina heteropoda*) WITH DIFFERENT INITIAL FEED

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Abstract

Ornamental *Red cherry* shrimp (*Neocaridina heteropoda*) is one of the commodities that are potential to be developed. The development will be conducted through rearing techniques to improve the performance of larvae. Improved maintenance techniques larvae can be done through several approaches, including the feed. The aim of this study was to determine the performance of red cherry shrimp larvae with different initial feed.. Research using Complete Randomized Design (CRD) with 3 treatments and 3 replications. Treatments are food type, there are (A) Water Plant, (B) *Artemia*, (C) *Rotifera*, (D) *Artemia* + water plants (E) *Rotifera* + water plants. Research vessel in the form of an aquarium measuring 14 X 14 X 14 cm^3, with a volume of 1 liter of freshwater and equipped with aeration. The number of larvae per aquarium are 15 larvae that 5 days after hatching with an average length 0.3 ± 0.05 cm. Results showed that the highest achieving for absolute growth in the average length is in treatment D (*Artemia* + water plants) that are 0.94 ± 0.11 cm, and the highest specific growth lenght reached in treatment D, amounting to 0.032 ± 0.05 cm/day. The highest survival rate achieved in treatment D with 100%.

Key words: Red Cherry Shrimp (Neocaridina heteropoda), Artemia, aquatic plants, Rotifera, growth

1. INTRODUCTION

One of the ornamental shrimp species that has been developed at this time is *Neocaridina heteropoda* better known by the name of *Red cherry shrimp* (Picture 1). Shrimp is a genus of ornamental origin Sulawesi island with shrimp come from South Asia, has a color which is quite interesting and is usually used to beautify *aquascape* hobbyists. Ornamental shrimp size 2-3 cm in total length of the parent phase has a high resistance to environmental conditions fluctuate so that quality has a high survival rate anyway. With these advantages, ornamental red cherry shrimp potential to be developed and improved its cultivation variability. However, current research on red cherry shrimp farming is still a lot to do so we need further observations to improve performance. One of the factors that influence the success of red cherry shrimp farming is feed, especially in the early larval rearing. The quality and quantity of feed on larval rearing phase to determine the successful cultivation of the next phase so that the feed in accordance with the character and habits of eating cherry red larvae are expected to increase the variability of growth and survival rate. One characteristic of red cherry shrimp larvae metamorphosis is not the case as in the other shrimp, so the larvae have red cherry shrimp look like adults. In addition, decorative red cherry shrimp are omnivores and detritus feeders that are able to take advantage of detritus on the substrate and the plants are in cultivation as feed. In its life cycle, red cherry shrimp also need plant food sources as a stimulant to maintain color, such as can be derived from vegetables and plants in the water.

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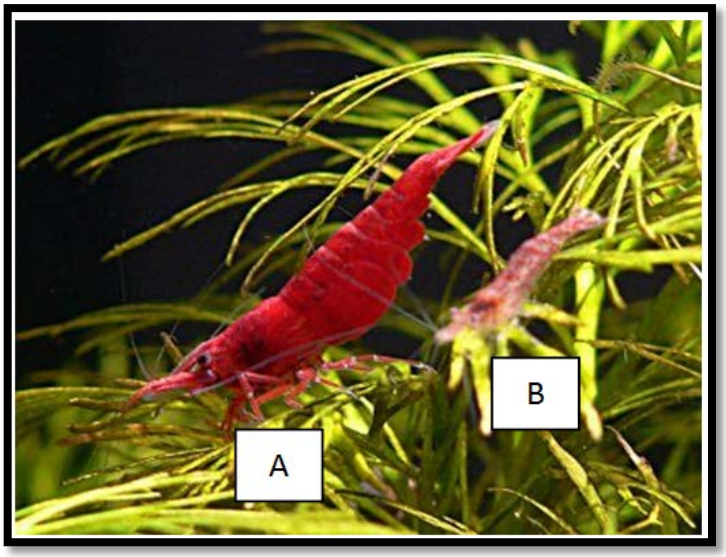

Picture 1. Red cherry shrimp (*Neocaridina heteroppoda*) adult, Female (A) and Male (B).

Feed required in addition to the growth as well in order to survive. According to Huet (1971), growth is influenced by factors inside and out. Factor in dealing with the state of shrimp itself include heredity, age, disease resistance and the ability to utilize food shrimp. While external factors related to the environment where the shrimp live, including physical and chemical factors of water, space, quality and quantity of feed. Growth and survival of larval shrimp also depend on the success of the larvae during moulting. At the time of moulting, the larva takes a lot of energy to the success of the new form of chitin exosceleton. This energy is mostly derived from the feed consisting of fats, carbohydrates and proteins. In crustaceans, the material was kept in reserve until the hepatopancreas organ is converted into energy, especially during moulting. Feeding appropriate to the needs of cherry red shrimp larvae in determining the success of cultivation. Optimal variability during larval rearing will increase its production phase of enlargement. In addition to the availability, suitability when the larvae feed on the larvae associated with the ability to acquire and digest the food that it needs. The growth or formation of new tissue most affected by the balance of protein and energy in feed. Food that has high levels of protein can accelerate the growth is not necessarily an energy content of feed is low. Since the energy used to feed first standard metabolic activity (maintenance) as for respiration, ion transport and regulation of body temperature and other physical activities. Energy for the entire event is expected to mostly come from non-protein nutrients (fats and carbohydrates). If the contribution of non-protein material is low, then the protein would be degraded to produce energy, so that the protein functions as a tissue builder nutrients is reduced. In other words, the addition of non-protein nutrients act as producers of energy (protein sparing effect) so as to improve the function of the protein to support growth (Furuichi 1988). According to (NRC, 1993), the existence of an optimum level of energy in the diet is very important because excess or shortage of energy resulting in decreased growth rate.

In this research will use the feed used in the cultivation of the brine shrimp and rotifers, combined shrimp with aquatic plants that serve as shelter and a source of additional food in the form of detritus that sticks to the plants as red cherry shrimp are detritus feeders. This study aims to determine the variability red cherry shrimp larvae with different food.

2. MATERIAL AND METHODS

Research using a completely randomized design with five treatments and three back. Treatment in the form of early feeding: (A) water plants (*Hydrilla*), (B) *Artemia*, (C) *Rotifera*, (D) *Artemia* + water plants, and (E) *Rotifera* + water plants. Container research using aquarium measuring 14 X 14 X 14 cm3 with a volume of 1 liter, equipped with

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aeration. Laboratory animals such as red cherry shrimp larvae aged 5 days after hatching, the number of stocking the aquarium as much as 15 per head. The total length of the average initial 0.3 cm ± 0:05 of the same age and from the results of mass spawning. Giving *Rotifers* and *Artemia* by *adlibitum* done twice a day, morning and afternoon. The length of time the study 20 days. During the maintenance period observed water quality include DO, pH, temperature, ammonia, nitrite, and nitrate..

3. RESULT

The results showed that the long end of the highest average achieved during maintenance treatment D (*Artemia* + water plants) of 0.94 cm ± 0:11, followed by treatment B (Artemia), E (*Rotifera* + water plants), C (*Rotifera*), and A (water plants), respectively for 0.78 ± 0.04 cm; 0.6 ± 0.07 cm; 0.56 ± 0.05 cm and 0.52 ± 0.08 cm (Figure 1.)

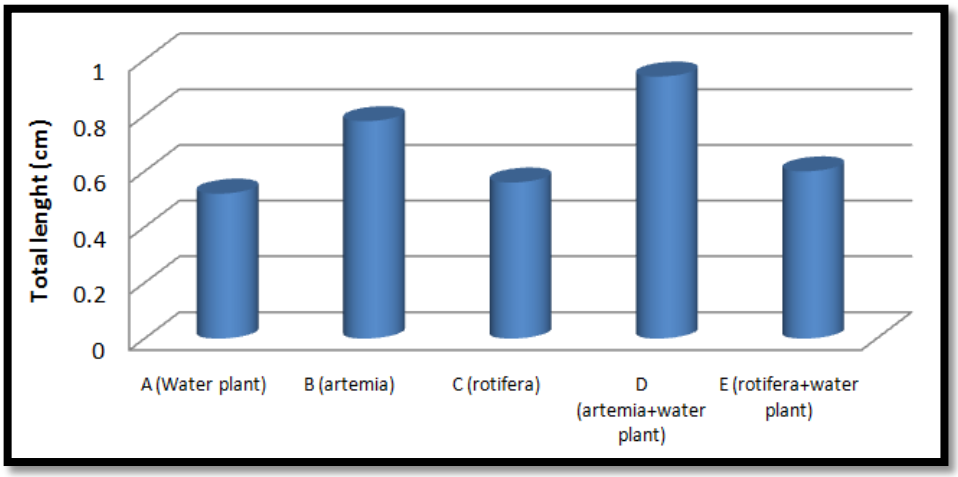

Figure 1. Graph the total length of the average end ornamental red cherry shrimp (*Neocaridina heteropoda*) each early feed treatment.

Similar conditions occur in the growth of specific length red cherry shrimp, where specific growth highest average achieved in treatment D, at 0032 ± 0:05 cm / day (Figure 2).

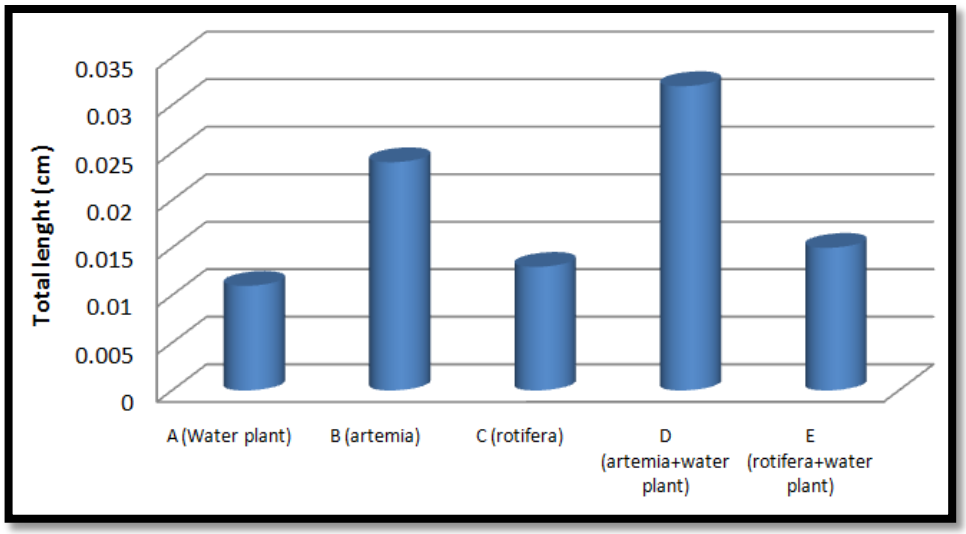

Figure 2. Graph of average specific growth of length red cherry shrimp (*Neocaridina heteropoda*) for 20 days maintenance period

During the maintenance period length growth observed every five days to determine the performance of a red cherry shrimp in each treatment (Figure 3)

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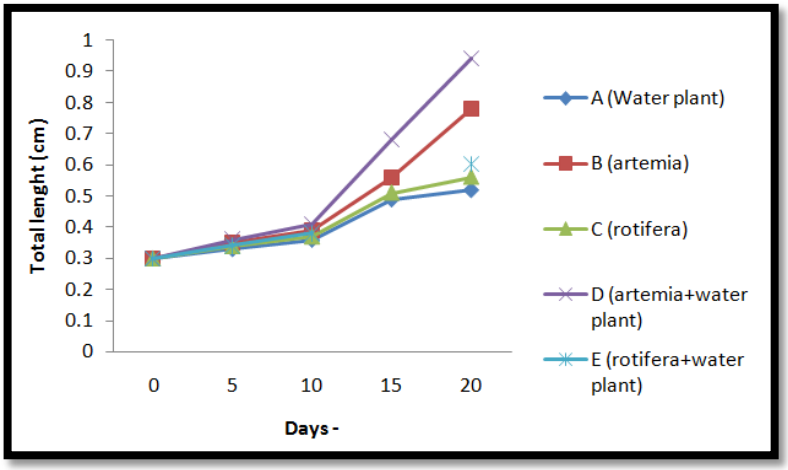

Figure 3. Graph of length growth of red cherry shrimp (*Neocaridina heteropoda*) every five days.

The length of the analysis to be conducted from beginning to end of maintenance. The results showed that the length of treatment achieved the highest absolute D 0.64 ± 0.1 cm (Figure 4).

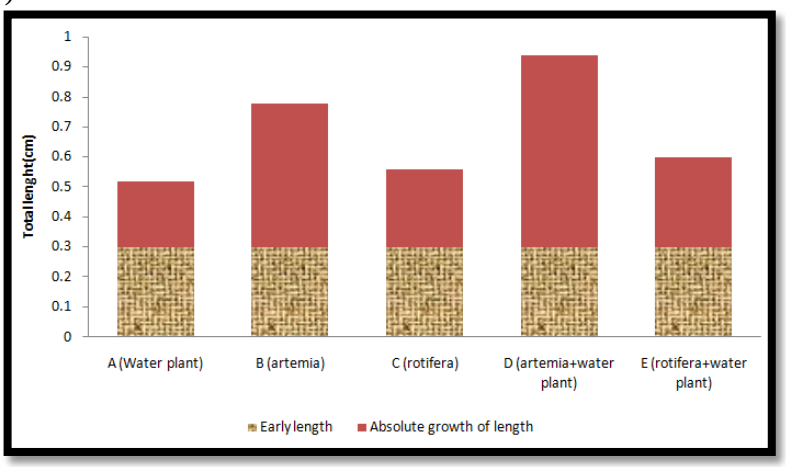

Figure 4. Graph absolute length of the red cherry shrimp (*Neocaridina heteropoda*) during the maintenance period.

Highest survival rate achieved in treatment D (Fig. 5), which reached 100% ± 0.0, followed by treatments B, A, C, and E, respectively for 90 ± 0.5%, 90 ± 0.5%, 80 ± 0 , 5%, and 80 ± 0.5%.

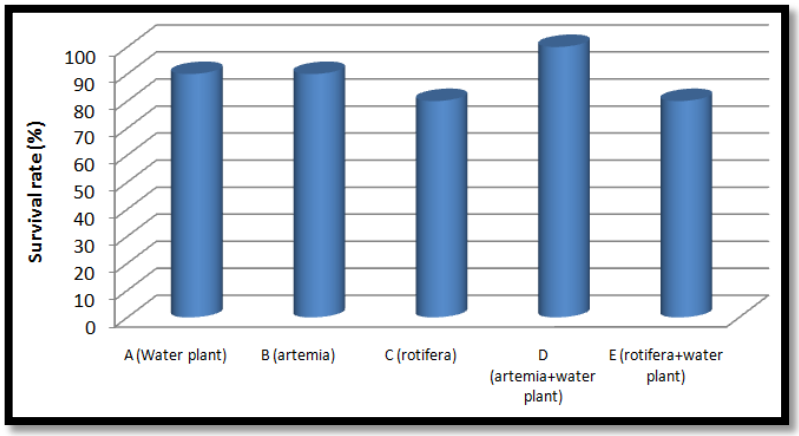

Figure 5. Graph of survival rate of red cherry shrimp (*Neocaridina heteropoda*) in each treatments at the end of the maintenance period.

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During the maintenance period to measure the water quality media as data capacity. Parameters measured include Dissolved Oxygen (DO), pH, temperature, ammonia, nitrite and nitrate. The analysis shows that the water quality maintenance media is still in the normal range for the life of the parent Red cherry shrimp during treatment (Table 1)

. Table 1. Water quality parameters during the maintenance period of red cherry shrimp (*Neocaridina heteropoda*) in maintenance

Water quality parameters	***Range***
DO (mg/L)	6,2-6,6
Temperature (^{0}C)	26,4-26,9
pH	6,7-7,4
Ammonia (mg/L)	0,07-0,08
Nitrite (mg/L)	0,01-0,04
Nitrate (mg/L)	0,07-0,09

4. DISCUSSION

The total length of the end of the highest average in treatment D (Fig. 1) red cherry shrimp supposedly more optimal use of feed in the form of brine and water plants so that a positive effect on growth in absolute term. Besides allegedly on treatment D, *Artemia* available can be digested more optimal because it is easier due to the weakening of the movement captured *Artemia* in freshwater media. As is known, *Artemia* has a high protein content so positive influence especially on the length cherry red shrimp. Protein is a nutrient for the body's largest shrimp and prawns, and therefore protein feed should be used as efficiently as possible for growth. In order for efficient utilization of feed protein and protein must be balanced by the energy of non-protein in sufficient quantities, so that most of the protein feed used for growth. One of the non-protein energy sources are found in aquatic plants.

The high growth in specific length of treatment D (Fig. 2) allegedly red cherry shrimp feed requirements are always met and utilized effectively. The combination of brine and water plants in treatment D red cherry shrimp can be exploited and converted into growth, it is due to a combination of the two produces an optimal energy for red cherry shrimp. Low energy content of feed can cause shrimp to use most of the protein as an energy source for metabolism, so that the protein for growth is reduced. Conversely, if the energy content of the feed is too high can limit the amount of feed eaten. This situation may limit the amount of food you eat protein, resulting in a relatively low growth, (lovell, 1988).

Based on Figure 3 above, the growth length cherry red shrimp in treatment D relatively quickly, especially starting on the 10th day of the maintenance period. It is alleged at day 10 red cherry shrimp are more optimal for feed and morphologically cherry red shrimp are similar to adult shrimp. Optimal growth at treatment D was also allegedly helped by the availability of detritus found on aquatic plants as red cherry shrimp also are detritus feeders. Benefits of the detritus can reduce the use of energy sources as protein known as protein-sparing effect. The protein sparing effect can lower production costs (feed) and reduce spending waste nitrogen into the environment (Shiau and Huang, 1990).

The length of the absolute in treatment D (Fig. 4) reached the highest value, it is thought to relate to the ability of red cherry shrimp to digest and utilize detritus and vegetable food sources found on aquatic plants. According to Cho and Watanabe (1988), young animals generally require a higher energy per unit of body weight for maintenance function than adult animals, although the process of reproduction increases the energy requirements for adult animals.

Highest survival rate achieved in treatment D was allegedly due to the treatment of cherry red shrimp can utilize feed optimally thus improving endurance (fitness) and the

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ability to adapt to its environment. The effective of feed utilization also supported more easily capture *Artemia* by red cherry seeds because it was in a weakened state so easily captured and digested.

During the maintenance period observed water quality (Table 1). As a limiting factor, the range of dissolved oxygen at 6.1 to 6.6 mg / L in this study is still in the category of good and sustaining life Red cherry shrimp because of the oxygen used in the combustion of fuel (food) to generate activity, such as swimming activity, growth , reproductive or otherwise. The water temperature is very important for the life of aquatic animals because it affects growth, metabolism and affects the solubility of gases in water such as oxygen and carbon dioxide. Temperature range from 26.4 to 26.9 0C, still quite optimal for shrimp life and spawning activity. Metabolism in the body cold-blooded (poikilothermal) depending on the temperature of their environment. PH range from 6.7 to 7.4 in a range of activities which are within the range of Red cherry shrimp are still able to grow and thrive, because the pH scale is closely related to the activity for skin (moulting) for growth and reproduction. Similarly, the range of values for Ammonia, Nitrite and Nitrate, still in normal condition and not harmful to red cherry shrimp. Ammonia is a nitrogen gas effluent from the shrimp by the reshuffle protein metabolism, either in the form of shrimp own excrement (feces and urine) as well as from the rest of the feed.

5. CONCLUSION

- The total length of the end of the highest average achieved in the treatment of D (*Artemia* + water plants), which reached 0.94 cm ± 00:11
- Specific term growth achieved in treatment D (*Artemia* + water plants), which reached 0032 ± 0:05 cm / day.
- The highest average survival rate achieved treatment D (Artemia + water plants) amounted to 100 ± 0.0%

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