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Influence of Reference Feed on The Growth of Freshwater Crayfish

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ABSTRACT

Freshwater crayfish is one of the marine commodities in Indonesia which has many benefits, from aquaculture, cultivation, processing, to ready-to-eat food. The growth of freshwater crayfish can be influenced by both internal and external factors, one of the internal factors that can affect the growth of freshwater crayfish is the food or feed given both type of feed, feed dose, feed content, and timing of feeding itself can affect the growth of the freshwater crayfish. The purpose of this journal review is to describe the freshwater crayfish feed that can affect its growth. In conclusion, water conditions, eating habits, the addition of symbiotics, probiotics, mixed feed, and so on can affect and/or can stimulate the growth performance of freshwater crayfish.

Keywords: hatchery, freshwater crayfish, feeding habits, growth, feed dose, fresh feed, alternative feed

I. INTRODUCTION

Fisheries in Indonesia include aquaculture and capture fisheries. Cultivation fisheries carried out in Indonesia include marine cultivation, freshwater cultivation, brackish water cultivation, public waters, and rice fields [1]. One of the commodities that can be cultivated is lobster, both sea and freshwater lobsters. Freshwater lobster cultivation is one of the cultivations that can be better developed in Indonesia considering that the freshwater crayfish has a relatively large body size and has a life cycle only in freshwater. The habitat of the freshwater crayfish itself can include lakes, swamps, or rivers located in mountainous areas, but because these crayfish are endemic, there are specifications for the species of crayfish found in certain natural habitats causing the spread of crayfish to be included in a narrow range 2]. One example is the freshwater crayfish (Cherax quasricarinatus) which is an alien species in the waters of Lake Manijau, West Sumatra [3].

One of the challenges is to cultivate freshwater crayfish that can produce high production (meet market needs) and with optimal growth. The growth of freshwater crayfish itself can be influenced by several factors such as internal factors and external factors.

II. FRESHWATER LOBSTER CULTIVATION

2.1 Condition of Freshwater Lobster Cultivation

Good water sources and water quality can affect the growth of freshwater crayfish to accelerate their growth. The ideal water temperature for freshwater crayfish cultivation is around 24-31 ℃ and with a level of acidity (pH) ranging from 6-8, the ammonia content in culture water is a maximum of 1.2 ppm and the turbidity level is 30-40 cm [4]. This can also be covered by the results of research which stated that the optimal temperature for the daily growth rate and survival rate of freshwater lobster seeds is 28 ℃ [9]. And DO levels range from 5.2-6 ppm [5]. It can be strengthened by the opinion that the recommended DO level is at least more than 5 ppm [16].

2.2 Freshwater Lobster Hatchery

Freshwater crayfish is one of the aquatic commodities that have a character that is not susceptible to stress and is not susceptible to disease. Freshwater crayfish can grow and develop rapidly and have a high egg-laying capacity as long as hatchery techniques feed requirements, and water quality is met [5]. The lobster hatchery stage can include container preparation, maintenance of prospective broodstock, parent selection, broodstock spawning, egg incubation, and hatching, seed maintenance, feeding, water quality management, pest and disease prevention, and seed harvesting and measurement [6].

2.3 Effect of Feeding on Freshwater Lobster Growth

The administration or addition of the enzyme papain in butane feed can significantly affect the efficiency of feed utilization, protein efficiency ratio and growth rate, but it does not significantly affect the survival rate (SR) [7]. The addition of calcium minerals (CaCO_3) to the water and treatment of the number of shelters did not significantly affect the growth in length, weight, and survival of freshwater crayfish [8]. According to [10], feeding doses to freshwater crayfish has no significant effect on the growth and survival of freshwater crayfish. Different feeding frequencies did not result in a different increase in carapace length, molting frequency and survival rates for freshwater crayfish [14]. This can also be supported by differences in the variation in the frequency of feeding that does not significantly affect the growth and survival performance of freshwater crayfish [13]. The provision of mixed feed in the form of pellets and blood worms can significantly affect the growth rate of freshwater crayfish [11]. And feeding made from fish visceral waste silae has no significant effect on the growth and survival of freshwater crayfish [12]. The addition of Keong Mas shell flour has no real effect on the daily growth rate, feed efficiency and survival rate (SR) of freshwater crayfish, however, Keong Mas shell flour can replace 100% fish meal in the artificial feed of freshwater crayfish [15].

Suggestions for optimal feeding of freshwater crayfish is a balanced diet between plant and animal content and the amount of feed must be adjusted to the length of the carapace of the freshwater crayfish [17]. Age determination of freshwater crayfish can be performed using ossicular growth marks [18]. The use of synbiotics (prebiotic alginate and probiotic Micrococcus spp) can induce an immune response, increase growth performance, and resistance to pathogens [19]. The general growth performance of marron is not affected by the replacement of fish meal in the feed and alternative protein materials can be used as protein source to replace fish meal in marron feed so that the use of fish meal can be reduced [20]. Atrazine could be causing an endocrine disruption on the hormonal system responsible for the sexual differentiation of crayfish, increasing the proportion of female proportion without disturbing the gonad structure [30]. The addition of amylolytic lactic acid bacteria probiotic into feed with different composition of carbohydrate-protein could stimulate the growth of freshwater crayfish within cultivation period [21]. The fish waste has potential as a source of proteases to feed addditives for crayfish [28]. The highest temperature effected adversely growth, feed intake, food efficiency, and metabolism of crayfish, whereas the lowest temperature and feeding restriction induced a more efficient growth of the crayfish [22].

The optimum protein level for 1 g juvenile C. quadricarinatus in least-cost diets is 31%, which corresponds to 0.055 g protein day-1, when using a diet with 19.69 kJ g-1 of gross energy [23]. The optimum protein level for C. quadricarinatus pre-adults over 22 g in a least-cost diet is 19.4% DP, with 15.21 kJ g-1 digestible energy [24]. Seafoods supplement dietary have better performance attributes that could be used to combat depression, protein-energy malnutrition such as kwashiorkor and marasmus and also promoted the rate of growth responses; biological values were comparable to that of white egg [25]. Crayfish production in rice field should be limiting the area and density of crayfish farming should be regulated checked [26]. The feeding level below 60% satiation could decreased the growth performance, but muscle composition (the moisture and ash contents of muscle) didn't vary significantly decreased when the feeding level are 40% satiation [27]. SCA could showed high dietay overlap among all cray fish size classes but SIA could showed that small crayfish had limited overlap with large crayfish [29].

III. CONCLUSION

In conclusion, water conditions, eating habits, the addition of symbiotics, probiotics, mixed feed, and so on can affect and/or can stimulate the growth performance of freshwater crayfish.

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