SATIATION AND DIGESTION RATE OF MANGROVE SNAPPER FINGERLING (*Lutjanus argentimaculatus*)

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ABSTRACT

Mangrove snapper is an economically value in domestic as well overseas market, but supplies are mostly sourced from the wild. Observations on satiation and digestion rate of fingerlings was undertaken to provide basic information for culturing mangrove snapper. Ten fingerling mangrove snapper (body weight 3.8—19.5 g) were stocked into each of nine plastic 200 L tanks. After starvation for 24 hours, fish were fed with chopped 'trash' fish and the amount of eaten feed was record as satiation data. Feeding data was recorded after 4 hours feeding. The satiation rate for juvenile mangrove snapper followed the power regression line $Y=0.4503x^{-0.6472}$. Thus, in larger juveniles the satiation rate was lower. Digestion rate followed a polynomial regression line, indicating that digestive activity was not the same during observation time, and analysis of two linear regressions shown that the flection point for digestion rate occurring after 10 hours when digestion rate reached 72%. These results indicate that the optimum feeding rate for mangrove snapper fingerling was 72% of satiation, and optimum feeding frequency two times per day.

KEYWORDS: satiation, digestion, mangrove snapper

INTRODUCTION

Mangrove snapper (*Lutjanus argentimaculatus*) is an economically valuable fish in domestic and export markets, but the production from aquaculture is still in the experimental stage. The main obstacle in mangrove snapper culture is high larval mortality (Sarwono *et al.*, 1999) although demand for seed for aquaculture keeps increasing. There is thus a demand for immediate development of spawning and larval rearing techniques for this species. (Danakusumah & Ismail, 1988). Low survival rates of fingerlings may be related to feeding (Mayunar *et al.*, 1991), stocking density (Aslianti, 1996) or environmental factors (Rejeki & Mayunar, 1991). One factor which should be considered in improving the rearing technique is an efficient feeding regime. Some efforts have been made to increase the survival rate of mangrove snapper by examining feeding frequency and duration. The objectives of this trial were to evaluate the satiation level and feed digestion rate in mangrove snapper fingerlings in grow-out.

MATERIAL AND METHODS

Mangrove snapper fingerlings with range of body weight of 3.80 to 19.50 g were used in this trial. Nine plastic tanks with volume of 200 L were stocked with 10 individuals per tank. After starvation for 24 hours, the fingerlings were fed with chopped trash fish and the amount of eaten feed was recorded to provide satiation data. The amount eaten over the next four hours was recorded as feeding data. Satiation rate was analyzed from satiation data from every tank and was compared to amount of feed in the stomach from sampled fish taken from all tanks (four samples from each tank). Digestion rate was analyzed from feeding data and was calculated to the satiation data.

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RESULTS AND DISCUSSION

Biological Aspect

Individual length and body weight and length data were taken before the satiation trial. These data showed that bodyweight increased with increasing body length followed the regression $Y = 0.5255e^{0.3558x}$ (Figure 1).

A similar relationship is found between body length and length of the intestine. Morphologically the intestine is formed at the larval stage when the fish are 2.75--3.17mm TL (5--6 days old larvae) (Doi & Singagraiwan, 1993). Intestine length followed a linear regression to body length with equation Y= 0.5414 x + 1.9506 (Figure 2).

Satiation and Digestion Rate

Mangrove snapper fingerlings were fed with chopped 'trash' fish. 'Trash' fish is commonly used as a feed source for aquaculture in Asia and as mentioned by Bardach (1975*) in* Kim D Hyatt (1979) fish contains a good level of amino acids. Furthermore, NRC (1977) claimed that exceeding protein content in feed would be catabolized into energy since fish generally have poor efficiency in using carbohydrate. The satiation rate of the juveniles followed the power regression line: $Y= 0.4503x^{-0.6472}$ meaning that the bigger the juveniles, the lower the satiation rate (Figure 3).

Digestion rate was found to follow a polynomial regression line indicating that the digestion activity was different during the observation time. Analysis of two linear regressions showed that the flection point of digestion rate occurred at 10 hours where digestion rate was at a level of 72%. This indicates that digestion rate before 10 hours was more rapid and then slowed (Figure 4). These results pointed out that a maximum

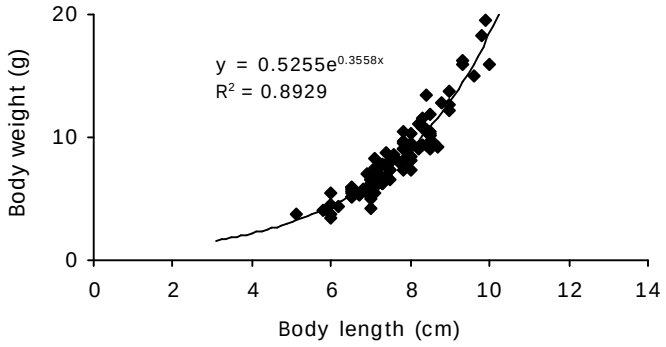

Figure 1. Relation between length and body weight of juvenile mangrove snapper

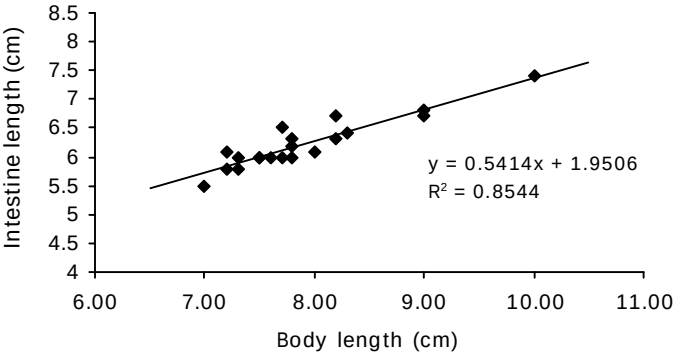

Figure 2. Relationship between body length and intestine length in juvenile mangrove snapper

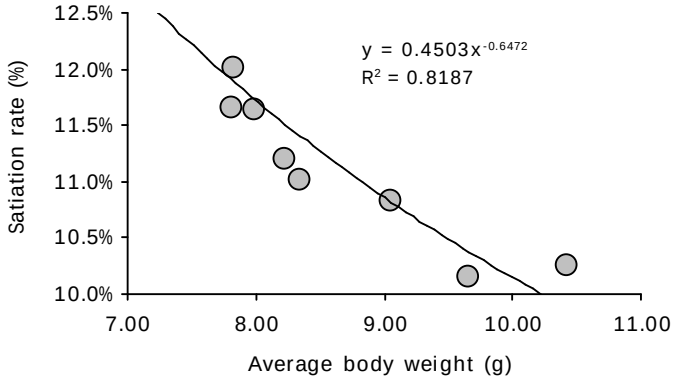

Figure 3. Relationship between average body weight and percentage satiation rate in juvenile mangrove snapper

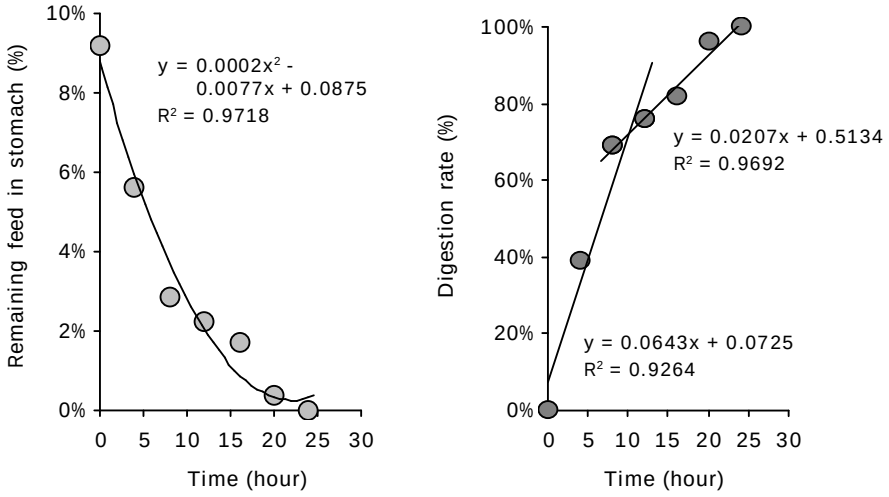

Figure 4. Remaining feed in stomach and percentage of satiation and digestion time

feeding rate in fingerling size was 72%. Mangrove snapper is a carnivore marine fish with a broad spectrum of feeding such as small fish, shrimp and any benthic organisms (Parrish, 1987). Digestion rate depended on the kind of feed eaten. Digestion rates showed remaining feed in stomach which emptied quickly in 16 hours and feed digestion slowed within 25 hours digestion with a polynomial regression: $Y= 0.0002x^2-0.0077x + 0.0875$.

CONCLUSION

- Results of this trial showed that the bigger the juveniles, the satiation rate was lower or the satiation rate decreased in line with age.
- The flections point of digestion rate occurred at 10 hours where digestion rate was at a level of 72%, and digestion rate before 10 hours was higher and after that was lower.
- Mangrove snapper juveniles in grow-out should be fed with chopped 'trash' fish twice daily.

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