Global Journal of Science Frontier Research: E
Marine Science
Volume 18 Issue 1 Version 1.0 Year 2018
Type : Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-4626 & Print ISSN: 0975-5896

A Study of Mangrove Crab (S*cylla serrata*) Aquaculture Cultivated by Means of Silvofishery Method with Different Doses of Waste Fish Feed

By Muhammad I. Wamnebo,Andi Niartiningsih & Muhammad Y. Karim

Hasanuddin University

Abstract- The study aims to investigate the influence of the doses of waste fish feed treatment on the crab,s chemical composition energy, evaluate the survival rate and growth, and determine the appropriate dosage for the mangrove crab (Scylla Serrata) to be cultivated thesilvofishery pattern. The study was carried out in mangrove area in Sanleko Village of Namlea District of Buru Regency, Maluku Province. The proximate analysis was performed in the laboratory of the chemistry and livestock feed of the department of nutrition and livestock feed of the faculty of Animal Husbandry, Hasanuddin University. The containers used in the study are 12 bamboo cages with a size of each 1,5 x 1,5 x 1,5m. The experimental subject is male mangrove crab (S. Serrata) with and average shell width 3.38±0.24cm and average body weight of 22.3±0.01g. The study is un Random complete design with four treatments and three recurrences.

Keywords: mangrove crab (Scylla Serrata), waste fish feed, proximate, silvofishery, survival rate and growth.

GJSFR-E Classification: FOR Code: 040399, 070499

Strictly as per the compliance and regulations of:

A Study of Mangrove Crab (*Scylla serrata*) Aquaculture Cultivated by Means of Silvofishery Method with Different Doses of Waste Fish Feed

Muhammad I. Wamnebo [α] Andi Niartiningsih [σ] & Muhammad Y. Karim [ρ]

Abstract- The study aims to investigate the influence of the doses of waste fish feed treatment on the crab's chemical composition energy, evaluate the survival rate and growth, and determine the appropriate dosage for the mangrove crab (*Scylla Serrata*) to be cultivated the*silvofishery* pattern. The study was carried out in mangrove area in Sanleko Village of Namlea District of Buru Regency, Maluku Province. The proximate analysis was performed in the laboratory of the chemistry and livestock feed of the department of nutrition and livestock feed of the faculty of Animal Husbandry, Hasanuddin University. The containers used in the study are 12 bamboo cages with a size of each 1,5 x 1,5 x 1,5m. The experimental subject is male mangrove crab (*S. Serrata*) with and average shell width 3.38±0.24cm and average body weight of 22.3±0.01g. The study is un Random complete design with four treatments and three recurrences. The four treatment are: treatment A= 0 (control); B= 5%; C= 10%, and D= 15%. The study proves thatb the most significant change of the chemical composition particular protein of the body occurs in the treatment with a dose of feed 15% (4.15±0.52) while the highest fat, BETN and energy occurs respectively in the treatments with the doses of feed 10% (6.55±0.25), (19.25±0.19), and (221.998±6.09). The highest survival rate occurs in the treatment with the doses of 10% and 15% (83.33%). The largest grow of the shell occurs in the treatment with the doses of feed 15% (4.00cm). The highest absolute growth and specific daily growth occur in the treatment with a dose of 10% (55.0±0.55) and (2.11%/day). The treatments with the doses of feed 10% result in the highest growth andv survival rate.

Keywords: mangrove crab (Scylla Serrata), waste fish feed, proximate, silvofishery, survival rate and growth.

I. Introduction

Indonesia has a vast potential of mangrove forests (4.25 million ha) and is spread across several islands such as Java, Sumatra, Kalimantan, Sulawesi, Maluku and Irian Jaya; the area is suspected to be habitat and fishing ground for mangrove crabs (Rangka, 2007).

Mangrove crabs (*Scylla Serrata*) are favored by consumers as a quality food because they have good meat taste, texture and nutritional value, are very potential to be commercially cultivated in the Indopasifik region (Blackshaw, 1999 in Trino and Rodriguez, 2002).

Cultivation management systems that are associated with mangrove forests are being developed and are known as *silvofishery*or wanamina, meaning intercropping between fisheries and mangrove forests. Initially, the system was the management of ancient mangrove forest areas which needed a more modern research and assessment approach (HTTP: // Mangrove Resource Utilization Through Silvofishery.com. 2010, Accessed December 5, 2011).

The success of enlarging mangrove crabs in ponds or a controlled container is determined by the suitability of the feed provided, both in dosage and type (Fujaya, 2008).

II. Materials And Methods

a) Material

The test animals used in this study were mangrove crabs (*S. Serrata*) with an average body weight of 22.3 ± 0.01 g and an average carapace width of 3.38 ± 0.02cm obtained from the catch of fishermen in the village Sanleko, Namlea District, Buru District, Maluku Province.

b) Methods

The container used in this study is a bamboo cage of length, width, and height of 1.5 x 1.5 x 1.5m, totaling 12 units. The bamboo is divided into 5 x 200cm width and height which are plugged the 50cm deep mud. The distance between the bamboo blades with one another is 1 cm, each cage contains ten crabs. The feed used was trash fish in the form of red anchovy (Stolephorusheterolobus) with a dose: 0.5%, 10%, and 15% of the weight of biomass given twice a day for two months.

c) Analysis of Nutrient Content and Growth

The proximate analysis includes protein, fat, and BETN, following the AOAC procedure, (1999), while energy is measured with a Bomb calorimeter. The research data obtained were analyzed using variance (ANOVA) and W-Tukey test (Gasperz, 1991).

Author α ρ: Department of Fishery, Hasanuddin University, Makassar, South Sulawesi, Indonesia. e-mail: ikhsanwamnebo25@gmail.com
Author σ: Department of Aquaculture, Iqra Buru University, Buru Regency, Maluku, Indonesia.

III. Results and Discussion

The average value of increasing chemical composition (protein, fat, carbohydrate) and body energy of mangrove crabs (S. *Serrata*) is presented in Table 1.

Table 1: The average increase in chemical composition and body energy of mangrove crabs during the study

Dosen of feed (%)	Protein (%dry weight)	Fat (%dry weight)	Carbohydrate (%dry weight)	Energy (kcal/kg)
0	0,77 ± 0,24[a]	1,82 ± 0,16[a]	14,88± 0,63[a]	156,352 ± 0,60[a]
5	1,44 ± 0,09[a]	3,25 ± 0,09[a]	16,18± 1,0[a]	181,513 ± 0,44[b]
10	4,28 ± 0,27[b]	6,55 ± 0,25[b]	19,05± 0,19[b]	243,998 ± 2,16[c]
15	4,51 ± 0,52[b]	4,67 ± 0,08[b]	18,45± 0,59[b]	221,998 ± 6,09[d]

Note: Different letters in the same column show significant differences between treatments at 5% level (p <0.05).

The results of the analysis of variance showed that different doses of trash feed had a very significant effect (p <0.01) on increasing the chemical composition (protein, fat, BETN) and body energy of mud crabs. The average values of survival of mangrove crabs (S. *Serrata*) are presented in Table 2.

Table 2: The average survival rate of mangrove crabs (S. Serrata) maintained by silvofishery patterns with different feed doses

Dosen offeed (%)	Survival (%)
0	46,67 ± 5,77[a]
5	66,77 ± 5,77[b]
10	83,33 ± 5,77[c]
15	83,33 ± 5,77[c]

Note: Different letters in the same column show significant differences between treatments at 5% level (p <0.05).

The results of variance analysis showed that the administration of trash feed with different doses had a very significant effect (p <0.01) on the survival of mud crabs.

The survival of mangrove crabs at the 5% feed dose treatment was significantly lower than the 10 and 15% feed dose treatment, and the highest survival rate was produced at 10 and 15% feed dosage treatments, and there was no difference between the two. This is because the control treatment is not given additional feed and maintained in limited confinement. Thus crabs only utilize natural feed that is in the maintenance environment. The high survival rate of crabs produced in the treatment of 10 and 15% feed doses is due to the dose of feed provided to meet crab requirements for various needs including for motion activity and maintaining survival.

Carapace width growth, absolute growth, and daily specific growth (SGR) Mangrove crabs are presented in Table 3.

Table 3: The average growth of carapace width, absolute growth and daily specific growth (SGR) of mangrove crabs (S. Serrata) maintained by silvofishery patterns with different feed doses

Doseoffeeed (%)	Carapace (cm)	Absolute growth (g)	SGR (%/hari)
0	3,38 ± 0,24[a]	36,6 ± 0,17[a]	1,64 ± 0,02[a]
5	3,61 ± 0,04[a]	41,1 ± 1,00[b]	1,79 ± 0,02[b]
10	3,74 ± 0,07[ab]	55,0 ± 0,55[c]	2,11 ± 0,01[c]
15	4,00 ± 0,08[bc]	52,5 ± 2,21[d]	1,99 ± 0,06[d]

Note: Different letters in the same column show significant differences between treatments at 5% level (p <0.05).

The results of the analysis of variance (Appendix 17) showed that giving different doses of feeding had a very significant effect (p <0.01) on the growth of mangrove crab carapace width.

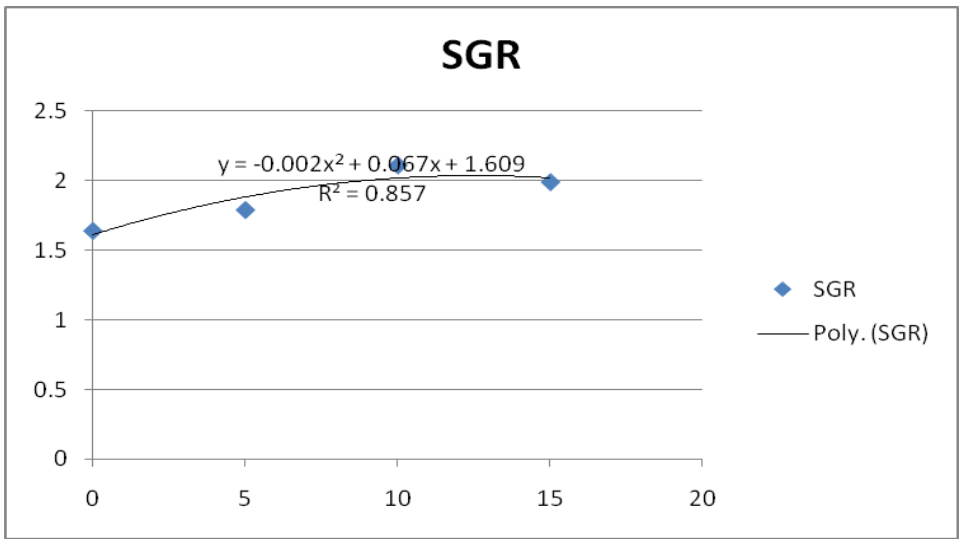

Fig. 1: Growth curve of mangrove crabs (S. *serrata*)

The value of water chemistry physical parameters is the temperature ranging from 28-32°C where the optimum temperature for mangrove crabs is 26-32°C (Christensen et al., 2005). Salinity from 5-13 ppt; mangrove crabs can tolerate the salinity range from <15 to> 30 ppt (Kasry, 1996 in Purnamaningtyas and Syam, 2010). pH ranges from 6.2-8.2 where the optimum pH for mangrove crabs is 7.5-8.5 (Christensen et al., 2005). Dissolved oxygen ranges from 5.1-7.6 ppm, the oxygen demand for mangrove crab life is> 4.0 ppm (Susanto and Murwani, 2006). Ammonia ranged from 0.0005 to 0.0038 ppm where ammonia levels for mangrove crab cultivation were <0.1 ppm (Christensen et al., 2005).

IV. Conclusion

The highest increase in chemical composition, especially protein, was obtained in the treatment of 15% feed dose (4.51 ± 0.52) while the highest fat, BETN and body energy were sequentially obtained in the 10% feed dose treatment (6.55 ± 0.25), (19.05 ± 0.19), and (243.998 ± 2.16).

Survival, growth in carapace width, absolute growth, and highest daily specific growth were produced at ten doses and 15%, respectively 83.33%, 4.00 cm, 55.0 g and 2.11% / day

The dose of feed that produces the highest survival rate and growth is achieved in the treatment of 10% feed dose while the lowest is in the control dose.

References Références Referencias

1. AOAC, 1999.Association of Official Analytical Chemists.Arlyngton, USA.
2. Christensen, S.M., D.J. Macintosh, and N.T. Phuong. 2005. Pond Production of the Mud Crab Scylla paramamosain (Estampador) and S. olivacea (Herbst) in the Mekong Delta, Vietnam, Using Two Different Supplementary Diets. Aqua. Res., 35: 1013-1024.
3. Fujaya, Y. 2008. World Commercial Crab. Citra Emulsi Foundation, Makassar. http: // Mangrove Resource Utilization Through Silvofishery. com. Accessed December 5, 2010.
4. Gasperz, V. 1991. Experiment Design Method. Armico, Bandung.
5. Purnamaningtyas, S.E and A.R. Syam, 2010. Water Quality Study in Supporting the Advancement of Mangrove Crab Stocks in Mayangan Subang, West Java. Limnotek 17 (1) Bulletin: 85-93.
6. Purnamaningtyas, S.E and A.R. Syam, 2010. Water Quality Study in Supporting the Advancement of Mangrove Crab Stocks in Mayangan Subang, West Java. Limnotek 17 (1) Bulletin: 85-93.
7. Rangka, N.A. 2007. Status of Mangrove Crab Business Judging from the Aspects of Opportunities and Prospects. Neptune Bulletin, Vol. 14, No.1: 90-100.
8. Susanto, G.N. 2006.Spawning of Mangrove Crab (Scylla serrata) in Confinement in Ponds Based on Gonad's Maturity Level. Seminar on Research and Community Service Results, Department of Biology F MIPA. University of Lampung, Bandar Lampung.
9. Trino, A.T., and E.M Redriguez, 2002.Pen Culture of Mud Crab Scylla serrata in Tidal Flats Reforested with Mangrove Aquaculture Department, South west Asian Fisheries Development Center, 5021 Tigbauan, Iloilo. Philippines. 125-134p.