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Effect of different feeding regimes on reproduction and survival of ablated *Penaeus monodon* Fabricius

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Different feeds have been used for various penaeid broodstock such as fresh mussel meat for *Penaeus japonicus* (Laubier-Bonichon and Laubier, 1976); fresh mussel *Mytilus edulis* and frozen shrimp *Crangon crangon* for *P. merguiensis* (Beard, et al., 1977); salted mussel *Modiolus metcalfei* (Primavera, 1978; Primavera, et al., 1978), compounded pellets, squid flesh and fresh *Trochus niloticus* (Aquacop, 1979) for *P. monodon.*

To assess the effect of different feeds and their combinations on reproductive performance and survival of ablated *P. monodon,* pond-reared *P. monodon* were stocked in four 12 cu m flowthrough maturation tanks at 25 males and 50 females per tank, with females unilaterally ablated.

The different feed combinations for the morning and afternoon rations were pellet-pellet, frozen mussel-frozen mussel, frozen mussel-pellet and frozen squid-pellet. Prawns in each tank were given each of the four feeding regimes seven days per week and twice daily at 3% (dry matter) of their biomass per day for a period of 41 days.

The total number of first and subsequent spawnings was highest at 16 each for the mussel-pellet and mussel-mussel combinations followed by 12 for the squid-pellet diet and only 7 for the pellet-pellet treatment (Table 1). Total number of eggs produced was highest at close to 3 million eggs each for the mussel-pellet and all mussel diets; total number of nauplii produced was highest at 598,760 for the mussel-pellet combination and lowest at 195,200 for the all pellet treatment.

Average number of eggs produced per spawner was highest at approximately 180,000 each for the mussel-pellet and all mussel treatments followed by 140,000 for the squid-pellet diet and 136,000 for the all pellet treatment. Average hatching rate was highest at more than 20% for the mussel-pellet and all pellet combinations followed by 18% for the squid pellet diet and only 9% for the all mussel treatment.

On the basis of total number of spawnings, total number of eggs and nauplii produced, average number of eggs and average hatching rate, the frozen mussel-pellet combination gave the best results followed by the all mussel diet. Although the all pellet diet showed a high hatching rate, it had the poorest overall performance because both fecundity and total number of nauplii produced were the lowest among all treatments. The results of this study indicate that a feeding regime of frozen brown mussel meat in the morning and pellets in the afternoon was best and this has been incorporated into routine prawn broodstock operations (Primavera, 1979).

The length of time between ablation and first spawning ranged from 17 to 23 days for all treatments and between successive spawnings was as short as 3 to 4 days for the all mussel, all pellet and mussel-pellet combinations and 11 days for the squid-pellet treatment (Table 2). Survival after 41 days in the maturation tanks was generally higher for males (32-56%) than for females (8-20%) for all treatments. Highest survival was 56% for males in the all pellet diet and 20% for females in the all mussel diet; lowest survival for both males and females was in the squid-pellet treatment, 32% and 8%, respectively. Average survival of spent females after first spawning was relatively short, ranging from 8 to 14 days for all treatments (Table 2).

The generally higher mortality rates for females compared to males may be attributed to additional stress in the form of handling during the periodic examination for ovarian maturation as well as spawning stress. In fact, a female survived not more than one to two weeks after the first spawning, whether she had subsequent spawnings or died immediately afterwards.

In this study many of the eggs were not viable and did not hatch, accounting for the relatively low hatching rate of 9 to 20% in contrast to earlier rates ranging from 16 to 91% and average rates of approximately 35% for second and third spawnings. The greater number of females compared to males may partly explain why some females failed to mate and spawned unfertilized eggs although other factors may also be responsible. Nevertheless, the fact that many females first molted right after ablation before they matured their ovaries and spawned points to the need for the presence of males in the tanks.

Table 1. Data on survival, spawning, fecundity and hatching rate of ablated *P. monodon* receiving different feeding regimes.

Treatment	A	B	C	D
Feeding regime	pellet-pellet	mussel-mussel	mussel-pellet	squid-pellet
Survival (%)				
Male	56	40	52	32
Female	16	20	14	8
No. of spawnings				
First	5	11	15	11
Second	1	4*	1	1
Third	1	1	0	0
Total	7	16	16	12
Average no. of eggs/spawning	136,771	179,275	180,282	140,317
Total no. of eggs produced	957,400	2,868,400	2,884,520	1,683,800
Total no. of nauplii produced	195,200	266,200	598,760	308,440
Average hatching rate (%)	20.04	9.3	20.08	18.3
Thelyca + for sperm (%) (no. of thelyca examined)	70 (10)	80 (35)	94 (34)	98 (48)

*One rematuring spawner formerly from Treatment A.

Table 2. Average no. of days between ablation and first spawning, between successive spawnings and survival after first spawning of ablated *P. monodon* receiving different feeding regimes.*

	A	B	C	D
Ablation to 1st spawning	17.2 (5)*	22.6 (11)	19.0 (15)	19.3 (11)
1st spawning to 2nd spawning	3.0 (1)	4.0 (4)	4.0 (1)	11.3 (3)
2nd spawning to 3rd spawning	3.0 (1)	3.0 (1)	—	—
Survival after 1st spawning (1st spawning to death)**	13.8 (5)	10.6 (11)	7.9 (15)	12.5 (11)

* Figures in parentheses refer to no. of females.

** Spent females may have died after first spawning or undergone a second or even third spawning before death.

LITERATURE CITED

Aquacop, 1979. Penaeid reared broodstock: Closing the cycle of *P. monodon, P. stylirostris* and *P. vannamei.* Proc. Tenth World Mariculture Society Workshop. Honolulu, USA. 24-27 Jan. 1979.

Beard, T. W., J. F. Wickins and D. R. Arnstein. 1977. The breeding and growth of *Penaeus merguiensis* de Man in laboratory recirculation systems. Aquaculture 10:275-189.

Laubier-Bonichon, A. and L. Laubier. 1976. Controlled reproduction in the shrimp *Penaeus japonicus.* FAO Technical Conference on Aquaculture. Kyoto, Japan, 26 May-2 June 1976. 6 pp.

Primavera, J. H. 1978. Induced maturation and spawning in five-month old *Penaeus monodon* Fabricius by eyestalk ablation. Aquaculture, 13:355-359.

Primavera, J. H. 1979. Sugpo *(Penaeus monodon)* broodstock Aqua-Guide Series No. 1 Aquaculture Dept., SEAFDEC, Iloilo, Philippines, 15 p. + 12 figs.

Primavera, J. H., E. Borlongan and R. A. Posadas. Mass production in concrete tanks of sugpo *Penaeus monodon* Fabricius spawners by eyestalk ablation. Fish. Res. J. Phil., 3:1-12.