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Notes on ovarian rematuration of ablated sugpo (prawn) *Penaeus monodon* Fabricius

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To what extent spent *Penaeus monodon* females can remature and spawn successive broods is an important question in terms of recycling spawners in a commercially viable operation. Corollary to this is the quantity and quality of fry from rematured females in comparison to those from first spawnings. Aquacop (1977) reports 18 spawnings from 6 ablated *P. monodon* females over 3 months or an average of 1 spawning per female per month. A bimodal pattern of carapace length measurements at 56 mm and 61 mm from 107 gravid *P. monodon* females caught from the wild suggests that they spawn more than once in their lifetime (H. Motoh, pers. comm., 1977).

Data from Arabian Gulf research studies suggest 5 spawnings in a lifetime for *P. semisulcatus* and *Trachypenaeus granulosus* (Badawi, 1975). Employing the gonad index method, Pillay and Nair (1971) concluded that the breeding season of the prawn *M. affinis* extends over several months of the year and indicate production of successive broods of eggs by 1 female during a single breeding season.

Spent *P. monodon* females from wild (unablated) and broodstock (ablated) sources are routinely tagged around one eyestalk with numbered brass tags (Rodriguez, 1977) for rematuration studies. Some are not ablated to serve as controls. All females are stocked in a 4.85 x 4.85 x 2.80 m concrete tank with males. Feeding is once to twice daily with salted or fresh brown mussel *(Modiolus metcalfei)* at 10% body weight. Water depth is at least 1 m. Sampling for rematuration of females is every 5 days during which the tank is cleaned and the water is completely changed. Rematuring females are taken to the Wet Laboratory for spawning and rearing of larvae.

Of 347 experimental females, only 10.1% had a second spawning and 1.4% a third spawning (Table 1). To a large degree, the low rate of rematuration is due to high spawner mortality – average survival period after spawning was only 6 days for a sample of 176 spawners. Moreover, sampling was undertaken only every 5 days to minimize stress on the prawns and because of the large size of the tank. It is highly probable that some females matured and spawned in the tank itself during this interim period – such rematurations are not accounted for in the data.

It took an average of 23 days after ablation for a prawn with undeveloped ovaries to mature and spawn (Table 2). However, at Aquacop (1977) a minimum of 12 days was observed. For previously ablated females the average time between a first and second spawning was 11 days; between a second and third spawning, 10.4 days. In comparison, wild females ablated after the first spawning took 15 days between the first and second spawning. An ablated female may have another spawning in as short as 5 days after the previous one (Table 2), in agreement with findings at Aquacop (1977).

Average fecundity was 180,000 eggs per second spawning and 140,000 eggs per third spawning (Tables 3 and 4). The average number of eggs from first spawning of ablated females was 110,000 to 120,000. Aquacop (1977) reported an average of 180,000 eggs for first and successive spawnings.

Table 1. Number of first, second and third spawnings of ablated and unblated *P. monodon* females from different sources.

Source	Spawning			Remarks
	First	Second	Third	
Tigbauan broodstock	75	6	1	Ablated before first spawning
Batan broodstock	215	18	2	Ablated before first spawning
Igang broodstock	12	2	0	Ablated before first spawning
Himamaylan broodstock	3	2	1	Ablated before first spawning
Questionable	11	5	1	Ablated before first spawning
Tigbauan wild	9	0	0	Ablated after first spawning
Batan wild	24	2	0	Ablated after first spawning
Tigbauan wild	3	0	0	Unablated (controls)
Batan wild	69	0	0	Unablated (controls)
Himamaylan wild	2	0	0	
T o t a l	423	35	5	

Table 2. Number of days between ablation and spawning and between successive spawnings of *P. monodon* females.

	No of days			No. of Spawners
	Ave.	Min.	Max.	
Ablation to first spawning	22.6	12	44	70
First spawning to second spawning				
a. ablated before first spawning	11.0	5	23	33
b. ablated after first spawning	15.0	8	22	2
Second spawning to third spawning	10.4	5	18	5

However, hatching rate was lower for rematuration: 44% for second spawnings and 35% for third spawnings (Tables 3 and 4) in contrast to 64% for first maturation.

If a second spawning follows in as quick as 5 days and no molting and mating take place during this period (assuming that mating can occur only when the female is soft-shelled), a lot of unfertilized eggs will account for a low hatch rate. Fry from rematured females also seem to be weaker compared to first spawnings. This could be related to poor nutrition (a monodiet of mussel meat) of the broodstock. Aquacop (1977) does not mention hatch rate nor fry quality in its report.

Table 3. Data on second spawning ot unilaterally ablated *P. monodon* females.

Date	Tag Nos. Partial	Tag Nos. Complete	Total No. Spawners	No. of Eggs	No. of Nauplii (N_5N_6)	Hatch Rate %	Remarks
4-06-77	059	043	2	158,000	0	0.0	Eggs did not hatch.
4-13-77		181/057	2	129,000	46,000	35.7	Discarded – larvae very weak.
4-14-77		045	1	197,000	46,000	23.4	Discarded – larvae very weak.
4-20-77		108	1	104,200	75,000	72.0	Discarded – larvae very weak.
4-18-77		185	1	107,000	0	0.0	Eggs did not hatch.
4-25-77		100	1	58,000	0	0.0	Eggs did not hatch.
4-28-77		151	1	77,160	30,180	39.1	Discarded – larvae very weak.
5-07-77		195	1	307,800	262,000	85.1	Harvested 10,000 P_1 (3.8% survival from $N_5 N_6$).
5-28-77		478	1	126,000	0	0.0	Eggs did not hatch.
6-02-77		461	1	106,000	76,800	71.5	Harvested 5,000 P_2 (6.5% survival from $N_5 N_6$).
6-03-77		536	1	138,000	0	0.0	Eggs did not hatch.
6-08-77		543/421/ 503	3	773,600	278,000	35.9	Harvested 13,000 P_1 (4.7% survival from $N_5 N_6$).
				300,000	No data	No data	Given to T. Jamandre.
7-12-77	592			107,000	45,000	42.2	Discarded – larvae very weak.
7-22-77		393	1	217,000	105,600	48.7	Discarded – larvae very weak.
7-22-77		517	1	523,500	247,500	47.3	Discarded – larvae very weak.
7-22-77	378		1	208,800	159,000	76.22	Discarded – larvae very weak.
8-06-77	380		1	204,800	196,200	95.0	Harvested 11,300 P_3 (5.8% survival from $N_5 N_6$).
Average				182,993		44.2	

Table 4. Data on third spawning of unilaterally ablated *P. monodon* females.

Date	Tag Nos. Partial	Tag Nos. Complete	Total No. Spawners	No. of Eggs	No. of Nauplii ($N_5 N_6$)	Hatch Rate %	Remarks
5-02-77	100		1				No count because few hatched; larvae discarded.
5-08-77		108	1	86,000	0	0.0	Eggs did not hatch.
5-30-77		504	1	130,000	110,000	84.6	Harvested 27,000 (24.5% survival from $N_5 N_6$).
6-25-77		503	1	124,000	0	0.0	Eggs did not hatch.
7-27-77		378	1	220,000	85,000	38.6	Discarded.
Average				140,000	48,750	34.8	

Literature Cited

Aquacop, 1977. Reproduction in captivity and growth of *Penaeus monodon* Fabricius in Polynesia. Paper presented at the Eighth Annual Meeting of the World Mariculture Society, San Jose, Costa Rica, 20 pp., mimeographed.

Badawi, H. K., 1975. On maturation and spawning in some penaeid prawns of the Arabian Gulf. Mar. Biol., 32:1-6.

Pillay, K. K. and Nair, N. B., 1971. The annual reproductive cycles of *Uca annulipes, Portunus pelagicus* and *Metapenaeus affinis* (Decapoda: Crustacea) from the Southwest Coast of India. Mar. Biol., 2:152-166.

Rodriguez, L. R., 1976. A simple method of tagging prawns. U.P. Nat. Appl. Sci. Bull. 28 (4) (in press).