

1977

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Primavera, J. H. (1977). Land-based mass production of prawn (*Penaeus monodon* Fabricius) spawners. SEAFDEC Aquaculture Department Quarterly Research Report, 1(2), 34-37.

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Land-based mass production of prawn (*Penaeus monodon* Fabricius) spawners

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The successful spawning of gravid *Penaeus monodon* (prawn, sugpo) females led to mass production of fry in early 1970 (D. K. Villaluz et al., 1972). Nevertheless, 2 major constraints remained: the high costs of procuring wild females, and the seasonal nature of stock. Costs include not only the payment for the spawners but also transport, personnel, and maintenance of distant collection posts. Some sugpo females spawn in transit, or regress upon arrival in the laboratory, resulting in additional loss.

For these reasons, SEAFDEC Aquaculture Department research was channeled toward maturation of *P. monodon* females in captivity. Although males can attain sexual maturity in ponds, there is no known record of a pond-reared spawner.

Observations of precocious maturation and molting in destalked decapods (Adiyodi and Adiyodi, 1975) have led to the eyestalk ablation method.

Eyestalk ablation of *P. monodon* using land-based tanks in the Tigbauan Station was started in the middle of 1976. Pond-reared females kept in 1.5-ton fiberglass tanks suffered total mortality with no ovarian development 2 months after ablation. Wild females of the same size ablated in November and stocked in 4-ton wooden tanks yielded spawning approximately 3 weeks after ablation. Possible reasons behind successful maturation in the latter could be the more stable temperatures in the wooden tanks and greater water volume. These encouraging results led to the attempt at mass production of spawners using land-based tanks.

196 sugpo females of different ages from various ponds in Iloilo province weighing at least 90 g were ablated and stocked with 139 males weighing a minimum of 50 g (Table 1) in a 120-ton concrete tank in the Indoor Hatchery. Most of the ablation was done within a 4-day period; no males were ablated.

Ablation consisted of making an incision in the eyeball, pressing the eye contents outward and crushing the eyestalk tissue with the prawn under water to minimize stress. Mortality after 1 week was higher for females (12.2%) than for males (7.2%), probably because of ablation stress in addition to transport handling.

Water was maintained at a depth of 1.5m and a flowthrough system was simulated by opening the outflow pipe simultaneously with the 2 inflow pipes were attached 4-m long PVC pipes 10cm in diameter and with 1-cm perforations. Water inflow comes through these perforations instead of a single spout to lessen disturbance of the prawns. Ranges of physico-chemical measurements taken at midmorning were: water temperature, 23-2-27.0°C; salinity, 30-34 ppt; pH, 7.8-8.1; and alkalinity, 123.5-144.5 ppm CaCO₃. Feed was salted mussel meat, at 15% body weight daily. A census of the total female population for maturation was undertaken 11 days after ablation and roughly every 5-6 days thereafter.

The first spawnings were obtained 12 days after ablation with 4 spawners yielding 784,000 eggs and a harvest of 250,000 P₁₀ fry (Table 2). Survival of females after 1 month was approximately 30%. (The actual figure could have been higher if all spent spawners were returned to the original tank; some were transferred to another tank for a separate experiment on rematuration.) Mortalities were mostly due to handling stress during the regular ovarian samplings as well as disease from the accumulated excess feeds on the bottom of the tank. Male survival could not be recorded because of transfers to other tanks and addition of new stocks. Development seemed to peak 3 weeks after ablation.

Table 1. Stocking data of adult *Penaeus monodon* in 120-ton concrete tank.

Date Stocked	Source	No. of Females	Ave. Body Wt. (g)	Date Ablated	No. of Males	Ave. Body Wt. (g)
3-11-77	Pond No. 1, Mandurriao, Iloilo	6	100	3-14-77	—	—
	SEAFDEC, Leganes Ponds	41	145	3-14-77	36	95
3-12-77	Pond No. 2, Mandurriao, Iloilo	81	112	3-14-77	50	55
3-16-77	SEAFDEC, Leganes Ponds	24	145	3-16-77	5	65
3-17-77	Pond No. 2, Mandurriao, Iloilo	30	100	3-17-77	45	95
3-21-77	Pond No. 2, Mandurriao, Iloilo	11	100	3-21-77	3	55
	SEAFDEC, Leganes Ponds	3	130	3-21-77	—	—
Total		196			139	

36 Table 2. Spawning data of unilaterally ablated *P. monodon* females.

Date	Location	Tag No. of Spawners		Total No. of Spawners	No. of Eggs	No. of Nauplii (N_6)	Hatch Rate (%)	Remarks
		Partial	Complete					
3-26-77	Hatchery	118/082/134	132	4	784,000	689,920	88.0	Harvested 25,000 P_2 – P_3 and 250,000 P_7 – P_8
3-28-77	Wet Lab	104/124/133/ 806/037*	119	6	513,000	–	–	Most of eggs accidentally drained; out of remaining 50,000 nauplii, 7,000 P_6 were harvested.
3-30-77	Wet Lab		124@/027*@	0	80,000	76,000	95.00	Harvested 30,000 P_3
4-7/8-77	Hatchery	136/142/097/ 181/131/116/ 148/174/137 Untagged	168/108/185/ 182/191/150 101/109/145/ 081	20	1,720,000	1,600,000	93.00	296,000 M_3P_1 discarded due to <i>Lagenidium</i> .
4-11-77	Wet Lab	153/143/093	161/110	5	539,000	492,000	91.3	Nauplii distributed to various experiments

*Spawner from other stock

@Completion of spawning started 1–2 nights before.

The average number of eggs per ablated spawner was 120,000. However, many of the partially spawned females were removed from the spawning tanks the following day so that remaining eggs released in the next 2 to 3 days could not be recorded. Estimate of the average number of eggs per ablated spawner is 120,000–150,000 in contrast to 500,000 per wild spawner. However, the low production cost more than compensates for the difference. Fry reared in the Wet Laboratory were used for experiments, mostly on feeding. Therefore, survival at harvest is not to be taken as a reflection of stock quality. Although fewer in number, larvae from ablated prawns are as healthy in terms of vigor in swimming and feeding as those from wild females. Most mortalities are due to inability to molt caused by lower water temperatures and inadequate feeding.

Literature Cited

- Adiyodi, K. G. and R. G. Adiyodi. 1975. Endocrine control of reproduction in decapod Crustacea. *Biol. Rev.* **45**:121–165.
- Forster, J. R. M. and T. W. Beard. 1974. Experiments to assess the suitability of nine species of prawns for intensive cultivation. *Aquaculture* **3**:355-368.
- Rodriguez, L. R. 1977. A simple method of tagging prawns. *Nat. and Applied Sci. Bull.* v. 29 n.1. (In press).
- Santiago, A. C. Jr., L. Rodriguez, R. Mateo and R. Obregon, 1976. Development of a broodstock of the tiger prawn (*Penaeus monodon* Fabricius). Tech. Report No. 1, Aquaculture Dept., SEAFDEC.
- Villaluz, D. K., A. Villaluz, B. Ladrera, M. Sheik and A. Gonzaga. 1972. Reproduction, larval development and cultivation of sugpo (*Penaeus monodon* Fabricius). *Phil. Jour. Sci.* **98**:205–234.

