

PRAWN BROODSTOCK DEVELOPMENT
AND REPRODUCTION

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I. Reproductive Biology

A. Size at first maturity and first mating

Table 1. Minimum size at first maturity and mating of P. monodon

	Pond	Wild
1. First maturity		
a. male (+ sperm in spermatophores)	40 g	40 g
b. female (stages III and IV)	- (only up to stage II)	87 g
2. First mating		
a. female (+ sperm in thelycum)	40 g	63 g

B. Courtship and mating behavior (PCB and CB)

1. one-half to three hours
2. involves 3 distinct phases

C. Ovarian maturation stages

1. 5 maturation stages (I, II, III, IV and V)
2. criteria for classification - external examination, dissection, histology

*Mainly for sugpo, Penaeus monodon, although the biology and technology apply to a certain extent to other local species, e.g. P. merguensis and P. indicus.

D. Spawning

1. between 8:00 p.m. and 6:00 a.m.
2. female swims upward in circles
3. lasts 2-7 minutes
4. may be partial or complete
5. minimum of 1 week and average of 3 weeks after ablation

E. Rematuration

1. rematuration rates - 14% 2nd spawning; 4% 3rd spawning; 0.4% 4th spawning (ablated only)
2. minimum of 3-5 days for a subsequent spawning after the preceding one

F. Fecundity

1. ablated: 20,000-500,000 eggs/spawner
2. wild (unablated): 50,000-1,000,000 eggs/spawner

G. Egg quality

1. 5 types (A₁, A₂, B, C and D)

H. Hatching rate

1. 40-50% average

II. Broodstock Technology

A. Sources

1. wild - females at 90 g; males at 50 g
2. pond - at least one-year-old of same sizes as above

B. Transport

1. in one-ton PVC/canvas tanks provided with aeration
2. up to 400 prawns/ton for 1 hr or shorter; 100-200 prawns for 4 hrs or longer
3. early morning or late afternoon for low temperatures

C. Acclimation

1. in water with same salinity and temperature as transport container/pond source
2. up to 100 prawns/ton without feeding if period is 1 day or shorter
3. decrease density and provide feeding if period is longer than 1 day

D. Ablation

1. stock has recovered from transport stress
2. hard-shelled
3. only for females P. monodon; female P. merguensis and P. indicus mature in captivity without ablation as with male penaeids
4. either left or right eye
5. methods include incision-pinching, cauterization, cutting, and ligation or tying

III. Maturation tanks vs. pens

Table 2. Comparison of tank and pen systems for prawn broodstock

	Land-based tank	Offshore pen
1. Dimensions & shape	4m ϕ x 1m; circular	16m x 16m x 6m; rectangular
2. Volume	12 cu m	500-1,500 cu m
3. Total stock	50-80 at 1 male; 1 female	300 at 1 male; 1 female
4. Stocking density	4-7/sq m	1/sq m
5. % mortality/month: female (ablated) male (unablated)	40-50% 20%	
6. % actual spawners/mo	30%	
7. Ave. no. eggs (Ablated): pond wild	180,000 (n = 86) 246,000 (n = 53)	191,000 (n = 19)
8. Ave. no. nauplii: pond wild	32,000 (n = 86) 94,000 (n = 53)	108,000 (n = 19)
9. Ave. % hatch. rate: pond wild	18% 38%	56%

Table 2 con't

	Land-based tank	Offshore pen
10. Site requirements	power for 24-hr flowthrough	protected cove
11. Unit cost (materials)	¥5,000 (ferrocement)	¥10,000 (bamboo & monofilament nylon)
12. Longevity	minimal depreciation	2 yrs; repairs costing after 1 yr
13. Sampling	at night w/ underwater light; 2x/wk	lifting net during day; 1x/wk
14. Manpower requirements:		
maintenance	1	1
sampling	1	2-4 divers + 2 samplers

IV. Gaps

A. Technology

1. substrate (tanks only); sex ratio; stocking density; age of pond stock
2. alternatives to ablation - hormones; pressure; light quality; etc.
3. increasing rematuration rates (by decreasing spawner mortality)
4. developing pen systems with reduced mortality due to lifting stress and fouling of substrate
5. maturation of ablated females in ponds
6. broodstock of other penaeids

B. Biology

1. molting stages
2. histology of ovarian maturation stages
3. biochemistry of eyestalk and other maturation hormones