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Viability of *Penaeus monodon* eggs after simulated transport conditons

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Penaeus monodon spawners, transported from the maturation pens (Batan, Aklan) to the hatchery (Tigbauan, Iloilo), suffer from stress which in turn may lead to lowered spawning rate or fecundity. Spawning the females in the maturation site and transporting the eggs to the hatchery site is being considered as an alternative.

Stage IV wild and ablated *P. monodon* females were isolated in 300-L fiberglass tanks for spawning. Each spent spawner was removed the morning after and the eggs were washed and strained through a series of 3 nylon meshes. The eggs were counted and placed in 1-L beakers filled with clean seawater according to the following treatments, with 2 replicates per treatment.

Treatment	Density	Aeration	Spawner Source
1	1.3 eggs/mL	+	wild
2	–do–	+	ablated
3	–do–	–	wild
4	–do–	–	ablated
5	7.1 eggs/mL	+	wild
6	–do–	+	ablated
7	–do–	–	wild
8	–do–	–	ablated

The beakers were then placed in a rotary shaker adjusted at 82 rpm. Aeration (treatments 1, 2, 5, and 6) was provided by individual portable, battery-operated (1.5 v) aerators.

After 5 hours (simulating the average transport time overland from Batan to Tigbauan), the flasks were removed from the shaker. Water was added to treatments 5, 6, and 7 to lower the density to approximately 1.3 eggs/mL; aeration was maintained in treatments 1, 2, 5, and 6 and added to treatments 3, 4, 7 and 8. All treatments were, therefore, kept under the same density and aeration conditions for the remaining incubation time until the eggs hatched. After hatching, nauplii from each flask were counted and the hatching rate was recorded.

Table 1 shows the results of the 8 treatments with replicates. Applying ANOVA using 1 3-factor factorial, there is no significant difference in hatching rate using the different combinations of the 3 factors (Table 2).

The results suggest that it is possible to reduce egg transport costs to a minimum by using eggs from ablated spawners, transported at high density with no aeration. Experiments on higher egg densities as well as on transport of nauplii should, however, be undertaken.

Table 1. Hatching rate of *P. monodon* eggs after simulated transport in a shaker.

Density	Method of transport	Replicate	Type of Spawner			
			Wild		Ablated	
			No. of Nauplii	Hatching Rate (%)	No. of Nauplii	Hatching Rate (%)
1.3 eggs per mL H_2O	with aeration	a	359	39.9	68	6.9
		b	104	11.6	259	28.8
		average	232	25.8	160	17.8
	without aeration	a	319	35.4	189	21.0
		b	290	32.2	540	60.0
		average	304	33.8	364	40.5
7.1 eggs per mL H_2O	with aeration	a	455	9.1	1,834	36.7
		b	2,735	54.7	3,084	61.7
		average	1,595	31.9	2,458	49.2
	without aeration	a	2,250	45.0	1,692	33.8
		b	865	17.3	3,373	67.5
		average	1,558	31.2	2,532	50.6

Table 2. Analysis of hatching rate data under various treatments in Table 1.

Sources	Degrees of freedom	Sum of squares	Mean squares	Test	
Treatment	7	1,764.58	252.08		
A — Transport	1	246.49	246.49		
B — Density	1	506.25	506.25	1.09	No significant
C — Spawner Source	1	316.84	316.84		differences
AB	1	225.00	225.00		between the
AC	1	70.56	70.56		transport methods,
BC	1	361.00	361.00		the density and
ABC	1	38.44	38.44		the type of spawner
Error	8	3,709.54	463.69		
Total	15	5,474.12			