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Yap, Wilfredo

Aquaculture Department, Southeast Asian Fisheries Development Center

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## Transport of sugpo, *Penaeus monodon* juveniles

**Wilfredo Yap, Hideo Mochizuki and Flor Apud**

Prawn juveniles at $P_{22}$ with an average size of 22 mg were transported by air in styrofoam-packed plastic bags with 8 L of filtered seawater with salinity of 30 ppt chilled to 20°C and oxygenated with 16 L of oxygen. Ice bags were provided to maintain the low temperature. Two experiments were performed: optimum packing density and ice quantity determination. Five packing densities from 1,000 to 5,000 juveniles per bag with increments of 1,000 were tested. Density in the ice size experiment was set at 2,000 per bag. Five different ice quantities from 0 to 1,200 g at increments of 300 g were tested. The juveniles were packed between 0500 to 0630 hrs at the SEAFDEC Leganes pond site, arrived at the SEAFDEC Freshwater Aquaculture Station in Binangonan, Rizal at 1430 hrs and were unpacked between 1500-1800 hrs, for a total packing time of 10 to 12 hrs.

The experiment shows that prawns of 40 mg size can be packed to as much as 3,000 per bag. The prawns in the regular (non-experimental) bags packed at 2,000 per bag with 600 g of ice were all alive and active upon arrival in the FAS laboratory. The mortality rate in the optimum density experiment increased with increase in packing density as shown in Table 1. Although mortality was higher at the density of 3,000 prawns per bag, the surviving prawns were observed to be healthy and active. At 4,000 prawns per bag, the survivors were sluggish and at 5,000 prawns per bag were very weak.

Packing densities above 3,000 per bag containing 8 L seawater and 16 L oxygen can be used only for short transport periods. The fry in the high density bags were observed to be all alive upon arrival at the Manila airport.

In the ice-quantity experiment, mortality rate was less than 1% in all the bags. The end temperature in the control (no ice) was higher by only 1.6°C from the original 20°C in the bags with the highest ice level of 1,200 g (Table 2). With the internal air temperature of 20°C in the styrofoam box, it took 12 hrs for 600 g of ice to melt completely. This means that to maintain the packing temperature of 20°C, 50 g of ice per hour should be allowed per box, counting from the moment the box is sealed to the time it is estimated to be opened.

For mass transport of juveniles, it appears that the live tank system is still an economically viable alternative. However, there is a need to design a transport tank with built-in life support facilities capable of aerating the water, lowering the ammonia build-up and maintaining a low temperature of 20°C. When equipped with its own power source, such a tank could be used both for overland and inter-island transport. This set-up can be handled in the same manner as container vans which are now increasingly in use.

Table 1. Survival rates of prawn juveniles ($P_{22}$) at different packing densities after 12 hours of transport and handling

| Density level (Prawn/bag) | Mortality No. | % | Final water temp. (°C) | Fry condition |
|---|---|---|---|---|
| 1,000 | 4 | 0.40 | 22.5 | Active |
| | 0 | 0.00 | 22.5 | |
| 2,000 | 78 | 3.90 | 22.2 | Active |
| | 66 | 3.30 | 22.0 | |
| 3,000 | 351 | 11.70 | 21.70 | Active |
| | 100 | 3.33 | 22.1 | |
| 4,000 | 5000 | 12.50 | 22.7 | Weak |
| | 1000 | 25.00 | 22.7 | |
| 5,000 | 1500 | 30.00 | 23.5 | Very Weak |
| | 2500 | 23.0 | | |

Table 2. Ice condition after 12 hours in a styrofoam box

| Initial ice quantity (g) | Final water temp. (°C) | Amount of ice left |
|---|---|---|
| 0 | 24.5 | None |
| | 24.5 | |
| 300 | 24.1 | None |
| 300 | 24.2 | |
| 600 | 23.1 | None |
| | 23.4 | |
| 900 | 22.5 | None |
| | 22.5 | |
| 1200 | 21.6 | Very little |
| | 21.6 | left |