most cases. *Artemia* cysts may be harvested from natural or inoculated populations occurring in adjacent salt works while decapsulation of the cysts can be done in the hatchery. Enrichment of *Artemia* nauplii can be done routinely using enriched formulated diets during hatching of the cysts or after separation of the nauplii. Pre-adult and adult *Artemia* can be produced either extensively in nearby salt ponds or intensively in flowthrough raceway systems using nutrient-rich effluent water from the hatchery.

In this regard, an integrated use of *Artemia* in shrimp farming will not only increase postlarval production but will decrease costs as well by production on the spot of the most expensive and valuable live food: *Artemia.*

Heterotrophic Bacteria Associated with Eggs and Larvae of *Penaeus indicus* in a Hatchery System

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Total viable aerobic heterotrophic bacteria (THB) associated with egg, nauplius, zoea, mysis and postlarva of *Penaeus indicus* and seawater in a hatchery system were estimated for three years from 1981 to 1984. The bacterial population varied from 1.3×10^4 to 8.72×10^7/g in egg, 1.5×10^4 to 6.17×10^7/g in nauplius, 4×10^3 to 3.14×10^7/g in zoea, 1.35×10^6 to 1.25×10^8/g in mysis, 1.6×10^5 to 8.44×10^6/g in postlarva. Water contained a THB population of 1.2×10^5 to 2.8×10^8/100 ml.

Species of *Vibrio, Pseudomonas, Aeromonas, Acinetobacter, Moraxella,* members of the family Enterobacteriaceae, *Micrococcus, Bacillus*, and Coryneform group were encountered. Gram-negative bacteria were found to be dominant in all stages and showed an increase from egg (81.3%) to postlarva (92.7%). However such an increase was not recorded in the respective water samples even though gram-negative bacteria were found to be dominant. *Vibrio* spp. were found in high numbers in postlarvae and it was to be increasing from egg (10.4%) to postlarva (80%). The number of larvae in culture pools gradually declined as the nauplii metamorphosed to postlarvae through zoea and mysis. In general, coincidence of higher percentage of *Vibrio* spp. and larval mortality was recorded. Physico-chemical factors such as salinity, temperature, pH, oxygen, inorganic phosphorus, organic phosphorus, inorganic nitrogen and organic nitrogen of water did not show much variation in the same set of pools. Relationship between the physico-chemical parameters, bacterial population and the number of larvae is discussed.

A New Approach in Intensive Nursery Rearing of Penaeids

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The need for a nursery phase between the hatchery and the growing pond to avoid mortalities of young postlarvae, and provide a better assessment of stocked animals is general in crustacean aquaculture.

The Centre Oceanologique du Pacifique recently developed a new culture technique using strong aeration, no water exchange and no external filter or artificial substrates. The technique relies on the development of a phytoplankton and bacterial medium with both nutritive and purifying qualities. Early postlarvae (PL_3) are grown for a month or less up to 0.1 g mean weight, in 10 to 100 m^3 tanks, at densities of 1 to 10 individuals/ℓ. The mean daily growth rates are around 20% for *Penaeus indicus, P. stylirostris* and *P. vannamei* and only 12-15% for *P. monodon.* For all species tested, density has little or no influence on growth. The final survival rates are generally high.

Floating Cage Nursery Culture System for *Penaeus monodon*

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The use of floating cages as nursery for *Penaeus monodon* postlarvae was tried at the Batan, Aklan Substation of the SEAFDEC Aquaculture Department. The cages were made of bamboo and measured $2 \times 5 \times 1.5$ m (effective volume 10 m^3) with cement-coated styrofoam sheets as floats. Two nets were installed inside a cage. The outer net (3 mm mesh size) protects the inner net (0.5 mm mesh size) from floating debris in the bay. The cages were installed offshore where water depth was at least 2 m during the lowest tide, and were attached to bamboo posts by metal rings. Postlarvae were stocked at ages ranging from PL_5 to PL_{16}. Feed consisted of raw ground fish paste applied to a feeding net which also served as substrate. Average survival based on 25 production runs was 40.98% after 2 to 3 weeks of culture. Stocking density ranged from 4,000 to 16,895 PL/m^3.

Unlike nursery tanks, this system is easier to manage and needs no aeration and pumping, thus reducing operational costs. Floating nursery cages should be located in protected areas; they can also be installed inside fishponds.