IMPROVED REPRODUCTIVE PERFORMANCE OF *PENAEUS VANNAMEI* BY C0-FEEDING WITH FROZEN (ENRICHED) ADULT *ARTEMIA*

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·oduction

Lavens et al. (1986) suggested that a dietary supplement of reproductive adult *Artemia* can promote sexual maturation of penaeid shrimp. Browdy et al. (1989) stimulated the reproductive performance of *Penaeus semisulcatus* by feeding frozen adult *Artemia*. Naessens et al. (1995) demonstrated that marine polychaetes - of which the positive effect on maturation performance has been documented - can be successfully replaced by *Artemia* for *P. vannamei*. The aim of the present study is to evaluate the effect of co-feeding *P. vannamei* broodstock with adult *Artemia* and enriched adult *Artemia*.

Materials and methods

Two hundred and forty wild caught *P. vannamei* reproducers from the Ecuadorian coast were equally distributed over six 19.6m2 oval-shaped black tanks: 3 tanks with females and 3 tanks with males. 35 ppt sea water was filtered (10µ), UV treated, and exchanged at 200% daily. Water temperatures were controlled at 28.5-29°C. The pH ranged between 7.8 and 8.2. An ir ted photoperiod of 14h light: 10h dark was used.

Three dietary treatments were evaluated. They received a mixture based on frozen squid, oyster, mussel and clam and a 50% supplement of: 1) extra squid (Natural Diet); 2) frozen adult *Artemia* (*Artemia*); and 3) frozen enriched adult *Artemia* (Enriched *Artemia*). The emulsion used to enrich the *Artemia* had particularly high levels of HUFA, cholesterol, vitamin E, vitamin C and astaxanthin. These three treatments were applied in the same way for female as for male broodstock. After two weeks one eyestalk of each female was ablated. During the consecutive 77 days, females with fully developed ovaries were transferred to one of the three male tanks. If females had mated, they were placed in 300-l spawning tanks. If not, they were returned to their maturation tanks. Of each spawning, triplicate larviculture tests were run up to mysis 2. Statistical significance was determined with analysis of covariance (the covariates were: female weight, spawn order, and male tank) and Duncanís new multiple range test.

Results and Discussion

The natural diet treatment gave poor results for almost every parameter evaluated. Co-feeding with non-enriched or enriched *Artemia* resulted in better survival, improved maturation and reproduction, and increased offspring quality. For all these criteria, except for offspring quality, the best results were obtained with enriched *Artemia*. Spawn size was not affected by the dietary treatments. The total nauplii production per tank after 77 days, pressed as percentages of the production in the natural diet treatment, were 451% and 875% for the *Artemia* and enriched *Artemia* treatments respectively. No significant effect of the diet on male reproductive performance could be detected (sperm count, spermatophore weight, male tank as covariate).

These results suggest that one or more of the constituents of adult reproductive *Artemia* (hormones?) and of the enrichment product (lipids, vitamins, carotenoids) stimulate ovarian maturation and reproductive activity. Additionally, the adult *Artemia* contains a factor that improves offspring quality.

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