DOMESTICATION AND BROODSTOCK DEVELOPMENT OF THE INDIAN TIGER SHRIMP *PENAEUS MONODON*

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The Indian tiger shrimp *P. monodon* is the most suitable species for culture along the Indian coast because of its fast growth, hardiness and high price demand. With the establishment of a number of hatcheries all along the Indian coast and consequent large-scale production of seed, culture practice has been extended to vast area on extensive and semi-intensive scale. Culture was vigorous up to 1994-'95 and the production from the culture sector has reached 82, 850 tonne earning Rs. 1866.23 crores foreign exchange. Unfortunately culture industry has been facing setback since 1995-'96 due to out break of dreaded white spot disease. Of late, all the commercial hatcheries are depending on wild gravid females due to failure of broodstock management system in captivity as well as due to non response of wild females to eyestalk ablation technique. Inconsistent availability of gravid females from wild is the main reason to inadequate production of seed at appropriate time. Availability of few gravid females from wild also compelling the culture sector to stock the infected seed due to involvement of high cost of production. Hence domestication of the tiger shrimp is indispensable to produce specific pathogen free brood stock in captivity to revive the industry to its previous position in the early nineties. CMFRI, at its Regional Centre, Mandapam has developed rematuration system to obtain repetitive spawning from the same brood stock for a prolonged period of 100 days. The technique of artificial insemination was also developed and perfected to carryout research programmes on selective breeding and hybridisation on this species. Before endeavoring on this species the research team of scientists on marine shrimps conducted various programmes including sea ranching of *P. indicus* and *P. semiculcatus.* These two species were comprehensively studied for perfecting viable brood stock management system to obtain repetitive spawning for a prolonged period. With the experience on *P. indicus* and *P. semiculcatus* a research programme was taken up on development of captive broodstock of tiger shrimp *P. monodon* in 1998 at the Regional Centre of CMFRI, Mandapam.

Two females were collected from Gulf of Mannar and seed was produced separately from these two spawners at the backyard shrimp hatchery, Mandapam. The seed produced was stocked in two growout ponds at marine fish farm and reared under similar conditions. Of these, one population has shown faster growth and a total number of 280 shrimp, genetically improved in growth were selected from the fast growing population and reared in 100 t capacity cement tank up to an age of one year. In January 2000 seed of F_2 generation was produced from F_1 generation broodstock and stocked in growout pond at marine fish farm of the Regional Centre of CMFRI, Mandapam. After rearing for

a period of 30 days, F_2 generation population was infected by white- spot virus. Immediately after noticing infection, the pond water was treated with 2-ppm Potassium permanganate and 50% water was exchanged after 24-hrs treatment. Oxytetracycline was added to the shrimp feed for one week at a rate of 2 g/ kg. Despite all these efforts, the crop was lost. Then the pond was left without any further water management. After 88 days of stocking a few survived animals were found in the same pond and these were collected and transferred to 100 t capacity cement tank. After rearing for a period of 5 months some of this F_2 generation brood stock was shifted to VRC of CMFRI, Visakhapatnam in October 2000 and developmental activities were continued.

In January 2001, F_2 generation females were segregated into two groups. Of these one group was subjected to outcrossing with wild males that were collected off Visakhapatnam and the other group was subjected to *inter se* mating. F_3 generation populations were produced from these two groups and are being maintained in the mariculture laboratory at VRC of CMFRI, Visakhapatnam. Part of seed that produced from outcross breeding experiment was supplied to a progressive shrimp farmer at Avanigadda, Krishna District, Andhra Pradesh in March 2001. These seed, numbering 33,000, were stocked in 0.8 ha growout ponds. Commercially produced seed was also stocked in the same farm in other growout ponds. After 50 days, the commercially produced seed was found to be infected with white spot virus. But F_3 generation population resisted up to 65 days with 50% survival and attained average size of 134 mm TL/ 18 g.

From the above experiments it was observed that the number of eggs per spawning and the related hatching rate improved with the progression of generation. *P. monodon* that was produced in captivity from F_1 to F_2 generation responded well to the technique of eye-stalk ablation and are most amenable to the selective breeding technique like artificial insemination. *P. monodon*, developed in captivity matured without eye stalk ablation also.

A comprehensive selective breeding programme has been planned now by restricting to two traits namely, high reproductive performance and fast growth to develop dependable broodstock in captivity. At every stage broodstock will be subjected to diagnostic tests to ascertain the existence of white spot virus and only pathogen free animals will be used in the programme. Seed that produced from broodstock at each generation will be tested in the field conditions to evaluate the viability of broodstock for commercial application. Successful results may be obtained by advancing generations up to F_6 - F_7. If the programme is able to establish this technology as envisaged, it will really be a boon to shrimp farming industry in India since broodstock can be produced at very low price compared to that of the present price of wild gravid females. Let us hope for a fruitful result.