SUMMARY

Morphometric analysis

Total Length (TL), Post Orbital Length (POL), Cephalothorax Length (CL), Total Weight (TW), Clutch Weight (CW) and Fecundity of 218 *Macrobrachium rosenbergii* collected from five different farms were measured and analysed. The minimum and maximum measurements are: body weight: 20.0g (Farm V) and 84.3g (Farm I); total length: 12.1cm (Farm V) and 20.2 cm (Farm I) and fecundity: 15,342 (Farm IV) and 73,719 (Farm I). There is a significant difference (P<0.05) in the total length and weight of brooders. A linear increase in clutch size was observed as a function of total length and weight. Subsequently ANCOVA was performed to compare differences between the slope and elevation of pooled regression lines among the five farms; there is a significant difference between elevations (P<0.001) but not among slopes (P>0.05) indicating a significant variation in clutch size in farms due to biotic and abiotic variations between the farms.

TOPOGRAPHY OF GROW-OUT PONDS

The physico-chemical parameters such as pH, electro conductivity (micro/ohms/cm), Total dissolved solids (mg/l), Alkalinity to methyl orange (mg/l), Total hardness as CaCO₃ (ppm) and Iron (ppm in Fe) of water samples from five farms showed no significant difference in these parameters among farms; the parameters are well within permissible range of farming practices.

Nursery

The physico-chemical parameters and pond management practices of the selected farms indicate that all the chosen parameters and management practices are identical since the farms are supervised and monitored by farm consultants. But the culture pond size, source of seed procurement, time of stocking and density and culture period differ from farm to farm. The major differences among these farms are 1) age of the Post Larvae (PL) stocked in the nursery, 2) the stocking density (number of PL/m²)
3) source of post larvae, 4) use of formulated feed 5) days of the culture (DOC) and 6) variations in the supplements to enrich the feeds through vitamins.

The maximum survival of PL recorded in the farm I (87%) 55±5 days of culture (DOC) and the minimum survival was recorded in farm V (72%) where the DOC was 65±5 days. Prawns stocked in low density with a minimum rearing period of 55±5 days resulted in a better yield as evident in farm I.

**Grow-out pond**

Among the grow-out ponds the variations prevail in 1) size of the pond, 2) stocking density, 3) feed and 4) male: female ratio.

There is no significant difference among the farms in pH and dissolved oxygen content. There is a considerable difference in male/female ratio among the farms at the time of harvest where the lowest male/female ratio recorded was as 43:57 in Farm III and the highest ratio 49:51 was recorded in Farm II.

In farm I where the stocking density (1.5 m²) was low prawns attained the maximum weight gain as evident from the male average weight of 85.5±7.63g and for the female it was 50.5±4.81g.

**BIOCHEMICAL ANALYSIS OF BROODER**

Biochemical analysis of protein, carbohydrate, lipid, cholesterol, glycogen and triacylglyceride of midgut gland, ovary and eggs of wild and farm reared brooders were analyzed to find out the differences between these populations. The fatty acid profile of wild and two farm reared brooders was also studied for a comparison.

Protein is the major biochemical component of midgut gland, ovary and eggs among farms followed by triacylglyceride and lipid. However, the carbohydrate, glycogen and cholesterol content among tissues of wild and farm reared prawns did not differ significantly (P>0.05).
Fatty acid profile of midgut gland, ovary and eggs of wild and farm brooders showed a significant difference in saturated, monounsaturated, polyunsaturated and highly unsaturated fatty acids. However, highly unsaturated fatty acids are more in midgut gland of farm reared brooders (farm II) than in the other organs.

**FORMULATION OF BROODSTOCK DIET**

Four isonitrogenous (45%) and isolipidic (9%) diets enriched with n-6 and n-3 series of fatty acids were formulated based on the biochemical composition of the farm brooders. The fatty acids sources of n-6 polyunsaturated and n-3 highly unsaturated fatty acids were derived from heterotrophically grown drum dried *Scizochytrium* sp and *Cryptothecodinium* algae. Marine algal mixtures were added in increasing percentage (3, 5, 7 and 9%) in the broodstock diets and their fatty acid levels were quantified.

The water stability of the formulated feeds was tested for a period of 1, 3, 5 and 7 hours. The maximum water observed was 84% for diet I in 1 hr that was reduced to 73.6% for diet III in 7 hrs.

The fatty acid composition of the four broodstock diets was well within the maternal fatty acid composition.

**EFFECT OF FORMULATED FEEDS ON BROOD STOCK SPAWNING**

Broodstock performance of the four formulated broodstock diets was studied for a period of three spawning cycles. There is no significant difference (P>0.05) in intermoult period during three moulting cycles. For instance, the intermoult period ranged from 25.9±1.35 days in (diet II) to 26.9±0.83 days (diet I). The female weight gain ranged from 40.447±0.969g to 41.116±0.508 g that differed significantly (P<0.05) among diets.

The fecundity of females ranged from 36977±897 to 40377±860 eggs/clutch which vary significantly (P<0.05) among diets at first spawning cycle. But, there is no significant difference in fecundity during second and third spawnings (P>0.05).
The number of eggs per female weight (eggs g⁻¹) ranged from 914±11.51 to 982.01±15.1 among diets, which was statistically significant at first spawning cycle (P<0.05); there was no significant difference (P>0.05) in the second and third spawning.

The broodstock performance of the females fed with four broodstock diets for three consecutive spawning cycles has resulted in improved fecundity of the females when compared to that of the wild brooder. The dietary fatty acids incorporated in the animal tissue have resulted in an increased performance of the brooders with reference to fecundity and spawning.