Summary
reported an excellent Protein Efficiency Ratio (PER) value for rainbow trout fed with *Daphnia* and *Moina*.

The present experiments on the growth of larvae of gourami with pelletized feed as control and the three different cladoceran species as live food have given some interesting results. *M. micrura*, *C. cornuta* and *D. excisum* were well known as suitable as food for rearing juveniles of the fish gourami. It was observed that all the three species of live food were accepted by the postlarvae and their increased length was appreciable when compared with the animals fed on pelletized food. The result of these experiments indicated preference to cladocerans by the larvae in the following order.

*Ceriodaphnia cornuta* > *Moina micrura* > *Diaphanosoma excisum* > Pellet feed.

These differences may be due to the nutritional values of the cladocerans. The growth and survival of fish larvae in this study may be due to the macronutrients found in *M. micrura*, *C. cornuta* and *D. excisum* (Webb and Chu, 1983; Landau and Riehm, 1985; Frolov et al., 1991; Tamaru et al., 1993).

High mortalities of finfish and shellfish larvae are encountered in hatcheries due to the nutritional inadequacy of compounded feeds. Diets deficient in essential nutrients, especially lipids are thought to be the main reason for the high mortality rate of young fish (D'Abramo and Lovell, 1999a). Cladocerans should be sufficient as a first source of nutrients required by fish for growth (Kanazawa et al., 1989). In the present experiments also no mortality of fish larvae was observed.

In conclusion, it has been established that the potential for the cultivation of cladoceran is high. The growth performance and survival of the fish larvae studied were best when fed with cladocerans. Due to the high cost of *Artemia* cyst and the possible hazards associated with the use of an artificial dry diet and mixed zooplankton as first feed sources, the use of cultured cladoceran is suggested as a convenient alternative for the larval rearing of fishes in this study. If we practice modern production techniques, live feed culture can be made a profitable venture.
SUMMARY

Our knowledge on the cladocerans of Kanyakumari District is rather nil although they form conspicuous elements in the zooplankton. During certain seasons they make a predominant portion of the zooplankton and in such cases this group is playing an important role in the food cycle of the marine and freshwater animals. Further, the high reproductive potential of the cladocerans owing to their parthenogenetic habit is a remarkable biological feature by which the cladocerans are distinguished from all other planktonic crustaceans. Considering the importance of cladocerans in the food chain and their use in aquaculture as live-feed, investigations on the taxonomical, distributional, biological and ecological aspects of cladoceran was made.

1. The systematic account of the cladocerans of Kanyakumari District, Tamil Nadu, was carried out. Samples were collected for this study from twenty five temple tanks, five rivers and five estuaries of the study area during 1999-2000. The history of the systematic accounts of the Order Cladocera is traced through the literature from Linne (1767) to the present day. A comprehensive account of Indian cladocerans is provided. Full redescription of eighteen species of cladocerans is furnished. Out of the eighteen species presently recorded, two species belonged to the family Sididae, three to Daphniidae, two each to Bosminidae and Macrothricidae, one each to Moinidae and Podonidae and seven species belonged to the family Chydoridae. Illustrations of the different characters of taxonomic value are also provided. It is also significant to note that the following cladocerans are recorded for the first time from Tamil Nadu.

2. The present study on the cladocerans has revealed that Kanyakumari District has the topography and physico-chemistry conducive to a reasonably rich cladoceran fauna. Out of the eighteen species recorded, two species, Evadne tergestina and Penilia avirostris, were marine and the others were all limnetic in nature. A unique feature of this group here is lesser species diversity. In most of the study sites there are not more than five species found at a time. The percentage of
cooccurrence values indicates that *C. cornuta* and *B. verrucosa* have maximum value of 61.90% (Table 6). Next to it are *M. micrura* and *D. excisum* with 53.57%. *M. micrura* and *C. cornuta* occupy the next position with 40.00% of cooccurrence.

3. Cladoceran fauna in relation to hydrography pertaining to Kumaracoil temple tank and Suchindrum temple tank were studied during the period from June 1999 to May 2000. Correlation coefficient was adopted to assess the influence of the environmental parameters on the abundance of cladocerans. It was seen that water temperature, pH, dissolved oxygen, silicate, nitrate, nitrite and phosphate turned out to be significantly important in the case of *Moina micrura*, *Ceriodaphnia cornuta*, *Diaphanosoma excisum* and *Bosminopsis deitersi*. In the case of *Chydorus sphaericus*, except nitrate and silicate, all the other environmental parameters were found to be not significant. Correlation coefficient of temperature, pH, dissolved oxygen and nutrients were found not significant in the case of *Bosmina longirostris*.

4. The diurnal periodicity on the parthenogenetic reproduction of *Moina micrura*, *Ceriodaphnia cornuta*, *Diaphanosoma excisum*, *Chydorus sphaericus* and *Bosmina longirostris* were studied in both the temple tanks. In addition, the hydrographical parameters influencing the vertical migration of different stages of cladocerans were studied for the first time from this region. The water temperature in the two stations measured least during the early morning hours and it gradually increased from 08.00hr to 15.00hr after which there was again a decline in temperature. Higher dissolved oxygen content was recorded during the day in both the surface and deeper waters. The concentration of phosphate, nitrate and nitrite were lower in deeper waters than in the surface waters. But silicate concentration was higher in deeper waters than in the surface waters. Broods of the cladocerans in both the stations tended to mature at dusk and night and the release of broods was maximum just before dawn. With the onset of the release of the young females at dawn, they begin to increase rapidly until they constituted the major portion of the population during morning hours in each the
tanks. Thereafter embryonic development seemed to proceed fast; neonates began to decrease. The statistical analysis of the data correlated from both the tanks showed that the variation between phosphate, nitrate, nitrite and silicate at both the surface and deeper waters were statistically significant at 5% level.

5. Life history of *Moina micrura*, *Ceriodaphnia cornuta* and *Diaphanosoma excisum* are described in detail. The unicellular algae, *Chlorella ellipsoidea*, *Ankistrodesmus convolutus* and *Scenedesmus acuminatus* were used as food. Instar numbers, mean length, number of eggs per brood and duration of each instar are given. Two series of experiments were conducted. First series were assumed to be Non-Adapted (NA) and the second series Adapted (AA). Instar numbers, mean length and number of eggs per brood were higher in AA when compared with NA. The present study reveals that the three cladocerans had two preadult instars and different adult instars at a temperature range of 28°C-30°C under the laboratory conditions. During the life span of 13 days, *M. micrura* produced 67 eggs, within a record time of 15 days, *C. cornuta* produced 61 eggs and *D. excisum* produced 72 eggs in 17 days. The duration of preadult and adult instars were constant (24hr) in each instar of the three cladocerans. Smaller size, minimal egg production and low lifespan were seen while cultured in *Scenedesmus acuminatus* than *Ankistrodesmus convolutus* and *Chlorella ellipsoidea*. The growth rates of the three species were found to increasing in the last instars.

6. Study on the above three cladoceran species are aimed at finding out a most suitable medium in which a high and sustained production is possible. Cladocerans were cultured with three species of algae, *Chlorella ellipsoidea*, *Ankistrodesmus convolutus* and *Scenedesmus acuminatus*, using different culture media. High production was obtained when cultured with *Chlorella ellipsoidea*. Yeast medium was found to be the best medium for *M. micrura* culture. Cowdung seemed to be a favourable medium for *C. cornuta* population. *D. excisum* gave good result when cultured with ricebran. The experiments conducted without algae exhibited less production.
7. Feed trail on pearl gourami (*Trichogaster leeri*) feeding with three different species of cladocerans, *M. micrura*, *C. cornuta* and *D. excisum* as live feed and commercial dry food as control was conducted. The larval length and survival rates under different diets were compared. The fish larvae fed with *C. cornuta* showed good growth rate (14.02mm) than *M. micrura* and *D. excisum* with pelletized feed. The length of larvae fed on *Moina micrura* was 12.22mm and *D. excisum* was 11.40mm. Length increment per day was high, when fed with *Ceriodaphnia cornuta* (0.67mm) and it was very low (0.13mm) in control diet. Length increment per day of the fish, pearl gourami, cultured with *Moina micrura* and *Ceriodaphnia cornuta* was 0.55mm and 0.67mm respectively. It was observed that all the three species of live feed were accepted by the post larvae of pearl gourami and their growth was appreciable when compared with the larvae fed on commercial pelletized food.