GENERAL INTRODUCTION

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1. GENERAL INTRODUCTION

Ornamental fish are called "living jewels" due to their beautiful colouration. Despite the many attractions and temptations of today's computer dominated society, aquarium keeping still continues to attract and enthrall millions of enthusiasts the world over.

Not only in India, all over the world there has been considerable growth and diversification in the trade of ornamental fish, which is a billion dollar industry. Freshwater tropical ornamental fish culture is the largest component of aquaculture in the State of Florida and accounts for approximately 95% of all ornamentals produced in U.S.A. Tropical fish formers in Florida collectively culture hundreds of different species and varieties of fishes from numerous families and several geographic regions. (Hill and Yanong, 2005). In recent years, much interest has been shown by the home hobbyists and public aquaria to keep ornamental fishes and so demand for colourful tropical ornamental fish is increasingly high (Jamson and Santhanam 1996).

More than 100 varieties of indigenous ornamental fish species are known in Indian freshwaters apart from marine ornamental fishes. The family cyprinidae, the largest family of fishes, consists of over 2000 species in about 200 genera. These fish are native to Africa, Asia, Europe and North America. The greatest diversity is found in Southeast Asia. Minnows of interest to India's and U.S's fish industries include barbs (*Barbus, Capoeta* and *Puntius*), danios (*Brachydanio* and *Danio*), rasboras

(*Rasbora*) and freshwater sharks (*Labeo*) from different parts of Asia (Hill and Yanong, 2005).

One among the cyprinids, *Puntius conchonius,* Rosy barb as commonly called, is a freshwater tropical ornamental fish native to India and found distributed throughout the Indian continent, especially in South Tamil Nadu riverine habitats (NBFGR, 1998).

This fish has been chosen as the experimental animal of the present research project. The Rosy barb, *P. conchonius* is an economically important/ cultivable ornamental fish of South India and NBFGR has reported it as a vulnerable (Arunachalam *et al.*, 1998) ornamental fish and recommended for captive breeding to improve its wilderness.

Undoubtedly, this fish is an attractive sexual dimorphant found its entry invariably in most public aquaria. It is a hearty fish, easily amenable to culture, and also earns good returns to aquarists. It is an omnivorous fish accepting all kinds of food. Although fish have been kept for more than three centuries as ornamentals, and the development of manufactured feed since 50 years ago has contributed to the tremendous growth of this hobby, nutrition of ornamental fish is based on extrapolation of results derived from food fishes under intensive farming conditions (Sales and Janssens, 2003). Some research on nutrient requirements of growing freshwater ornamental species in a production environment has been conducted, mainly in Singapore, with special emphasis on provision of live feed during early stages of the life cycle. Nevertheless, information on the exact optimum dietary protein requirements of various ornamental fishes are lacking. Ornamental fish in captivity need to utilize their dietary protein with the utmost efficiency, as the

breakdown products of protein metabolism (mainly ammonia) will directly pollute their living environment. (Raj and Jesily, 1996).

It is impractical to feed very specific diets to individuals in an aquarium environment. The diet must be suitable for all tank inhabitants, which may include herbivores, omnivores and carnivores. Not only will these fishes have different nutritional requirements, but also the digestibility of various components of the diet will differ depending on the nature of diet and intestinal morphology of experimental animals.

The other biotic and abiotic factors to be kept in mind while culturing the ornamental fish are size, density of animals, dissolved oxygen content, temperature and good quality water, because undesirable changes in these factors hamper the culture industry. Dissolved oxygen is an important limiting factor in intensive fish culture. Day / night diurnal fluctuations act on the metabolism of fish. As the temperature increases, the dissolved oxygen in the culture tank decreases thereby increasing the metabolic rate of fish. Therefore, decreasing stocking density and increasing oxygenation have to be executed to avoid any disaster (Via *et al.*, 1998).

A significant drop in the rate of food consumption (Malla Reddy, 1987) and metabolic disorders (Fulton and Key, 2001) have been reported to occur in fish if the aquatic environment is polluted with low levels of pesticides. These pesticides reach reverine habitats as agricultural "run-off" when applied over crops to manage pests. Hence, the water quality is also one of the limiting factors in aquaculture industry.

In recent years, cytogenetic studies on fish have received considerable attention (Galetti *et al.*, 2000). Fitness of an individual in an environment depends on its interaction with that ecosystem. Hence, knowledge on karyotype of a fish could

provide genetic plasticity of that species and might throw light on future maneuverability of this genome.

With this broad ideas and reasons in mind the present project on the rosy barb, *P. conchonius* has been executed with the following objectives:

1. To study the length-weight relationships among sexes.
2. To study the effect of isocaloric diet with different dietary protein densities on the growth and bioenergetics of different size groups of the fish.
3. To find out the optimum dietary protein level for the fish.
4. To find out the influence of ration level of a particular diet among different size groups.
5. To study the effect of partial pressure of oxygen, temperature and densities of animal on the rates of oxygen consumption.
6. To study the difference in SMR and RMR and SDA in post prandial oxygen. consumption rate of different size groups of fish fed different dietary protein densities.
7. To study the histopathological changes which might occur in fish on exposure to sublethal concentrations of pesticides, Endosulfan and Fenvalerate.
8. To explore the chromosomal number and karyotype of the fish.