IN THE NAME OF ALLAH,
THE COMPASSIONATE,
THE MERCIFUL.

To Ulod

To the cherished memories of
my deceased parents,
whose prays are accompaniment
in the journey of
my life. May *Allah* rest their soul in
peace for ever (Aameen)

INFLUENCE OF POND SIZE, ARTIFICIAL FEED, AND TILAPIA MIXED CULTURE ON THE GROWTH PERFORMANCE OF CHANNA MARULIUS IN FERTILIZED PONDS

By

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CHAPTER 1

INTRODUCTION

The population of the world is increasing at a fabulous rate without a corresponding increase in the food production. This situation is leading us to a risk of severe malnutrition in the developing countries including Pakistan. The problem of food shortage in the face of population explosion is becoming more and more critical both in terms of quantity as well as quality. The proteins of animal origin are mostly derived from milk, meat and eggs. Animal production is a long term project to produce adequate amount of quality protein to meet the national need. Meat production is improving in Pakistan with the establishment of poultry and fish farming. To increase the production of quality protein rationally and in large amount remains with the development of fisheries on large scale.

In Pakistan, there are many vast areas formed due to innundation, salinity and waterlogging which can be utilized for fish production. However, these resources are not being adequately exploited at present due to lack of research and technical knowledge. During the last decade, much work has been done on the culture of major carp, i.e., *Labeo rohita, Cirrhina mrigala* and *Catla catla* (herbivorous fishes) with different fertilizer treatments. However, no attention has been paid to the propagation of carnivorous

fishes in Pakistan which could be helpful in filling the gap of quality protein. Pakistan has many saline water bodies which are not suitable for the culture of herbivorous fishes but are quite suitable for the propagation of carnivorous fishes. Many species of carnivorous fishes are available in Pakistan but murrels or snakeheads belonging to Channidae family, can be cultured in pond system because they can thrive best on artificial feed and planktonic life (Mookerjee *et al.*, 1948; Alikunhi, 1953). Snakeheads are very hardy fishes and can be cultured under harsh climatic conditions. The murrels are native to freshwater system of tropical Africa and South Asia (Nelson, 1984). They have long been regarded as valuable food fish in the Far East (Willey, 1910; Aldaba, 1931) and their flesh is claimed to be rejuvenating, particularly during recuperation from serious illness and as a post-natal growth promoting diet. In Thailand, they are one of the most popular staple food fish (Smith, 1965). In recent years, the high market price for its firm, white, particularly boneless and more agreeably flavored flesh and hardness when handled have made the culture of snakeheads economically viable. The dressed out weight of *Channa* is comparable to that of carp or trout. Snakeheads are also popular as sport fish, owing to their voracity and strength at the end of the line. Its culture can be profitable because it brings a high price, comparable to that of rainbow trout (Muir and Roberts, 1982). In the polyculture it has been used as "police fish" to control the number of young tilapia (Cruz

and Laudencia, 1980).

Channa marulius is commonly available fish of Channidae family in Pakistan and can attain larger size than other species included in this family (Devaraj, 1973b). Sharma and Simlot (1971) determined the approximate chemical composition of two species of snakeheads i.e. *C. marulius* and *C. striatus* and reported that both have a considerably higher protein and lower fat contents than carp or tilapia. Snakeheads can therefore be considered more nutritive than carp or tilapia, in terms of a higher protein to fat ratio. It is a preferred food by a large segment of the Pakistani population. There is a need for exploring the conditions for maximum growth rate of *C. marulius* in Pakistan, so that quality protein could be increased. As *C. marulius* becomes piscivorous at some stage of its life and will need some other fish in the pond which could proliferate at a rapid rate to become its food, such a fish may be tilapia that can go alongwith *C. marulius* under the same polyculture system. This experiment will also become helpful in controlling the progeny/population of *T. nilotica* which can have stunted growth as a result of overpopulation.

The growth and production of fish directly depend upon the gross biological production of any water body which provides the basic natural food for the fish (Hepher and Pruginin, 1981). The growth potential of fish can be exploited to the maximum by enriching the biomass of water. The plankton plays an important role in the maintenance of

ecological status of a pond. By monitoring water quality, the productivity can be increased for maximum sustainable yield of fish (Love, 1980).

Thus, a project was planned to study the growth potential of *C. marulius* with the following objectives.

1. To study the effect of pond size and different treatments on the growth of *C. marulius*.
2. To study the effect of different treatments on the food preference of *C. marulius*.
3. To study the influence of various treatments on the proximate composition of fish meat.
4. To study the influence of fertilization and feed supplementation on the physico-chemical charecteristics and planktonic life of water.
5. To study the limnological conditions best suited for the growth performance of *C. marulius*.