1

I. INTRODUCTION

Feeding more than seven billion people on earth through agriculture alone in an environmentally sustainable manner with nutritionally balanced diet is indeed a major challenge. Hence, people all over the world have started looking at aquatic resources as a major source for food production. The apprehension that Indian population may touch 1.75 billion by the middle of the 21st century (Anon., 1994) calls for intensification of efforts to step up food production both from the land and water resources. With the constant encroachment of fertile agricultural land by the increased urbanization and industrialization, the extent of cultivable land is being diminished. Therefore, the terrestrial ecosystem alone may not provide the necessary food security for the countries like India. Terrestrial ecosystem, compared to its aquatic counterpart, offers certain advantages from the productivity point of view. For instance, about 96% of the harvest from terrestrial system is derived from primary producers whereas, the output from aquatic ecosystem consisting of secondary, tertiary and quaternary consumers amounts to 80% (Whittaker and Likens, 1975; Odum, 1980). Organisms belonging to the second, third and higher trophic levels are known to be rich in protein content especially in certain essential amino acids of importance in human nutrition (Burton, 1965). Therefore, it is apparent that aquatic system has the potential to produce large quantities of high quality food.

Capture fishery based fish industries all over the world including India are faced with increasing costs of operation and declining catches of fish. (Richardson, 1972; Devaraj and Vivekanandan, 1999). It is therefore desirable to utilize the available aquatic resources in the best possible manner. Inshore marine fishery has reached a level of stagnation (Sakthivel, 1999) and the exploitation of deep sea resources are proving uneconomical in many cases because of the inadequate information on these resources. Thus, there is considerable scope for farmed fish if a techno – economically feasible project could be developed and implemented systematically.

Poikilothermic animals, especially fishes, have relatively lower dietary energy requirement because, they do not have to maintain a constant body temperature; they spend relatively less energy for buoyancy and to move in water than mammals and birds do on land. Fish usually lose less energy in protein catabolism and excretion of nitrogenous wastes than land animals because they excrete most of their nitrogenous wastes as ammonia through gills (Lovell, 1989). These advantages result in higher body weight gain and protein efficiency ratio (PER) as
per the report of Hastings and Dickie (1972). It is known that the PER values of fish are either equal to or higher than those for poultry, and higher than those of swine, sheep and beef cattle (De Silva and Anderson, 1995; Sinha, 1993).

Diversification of fishing activities has been given priority in recent years in order to augment the marine fish production in our country. The shrimp oriented export industry along with a high concentration of effort has adversely affected the exploitation pattern of inshore fishery resources, necessitating further increase in marine fish catch, only through the extension of fishing activities to deeper waters and also by exploiting the non-conventional demersal resources.

The fishes of the family Nemipteridae (Order: Perciformes) which are commonly called as “threadfin breams” are distributed in the tropical and sub tropical seas. The principal region supporting Nemipterid fishery are the Mediterranean region, Red sea, east and west coast of India, Sri Lanka, Andaman, West coast of Malaya, peninsular Singapore, Indonesia, south China sea and southern Japan. The Nemipterus fishes constitute an important marine demersal fisheries of India exploited mainly from 40 – 100 m depth.

The annual catch of the thread fin breams is about 0.4 % of the total marine landings in India (CMFRI 2006). The Nemipterus species form an important demersal fishery contributing 13,156 t along the Karnataka coast accounting about 7.6 % of the total marine landings of state during the year 2004-05 (Anon., 2006). Trawl net is the major gear used for the exploitation of Nemipterid resources. They are landed exclusively by multi-day fleets of trawlers (MDF), which operate beyond 30 m depth forming over 15% of the landings. Weber and Beaufort (1936) studied the systematics of 20 species belonging to Nemipterus from Indo-Australian Archipelago. Fisher and Bianchi (1984) reported 16 valid species from the Western Indian Ocean. Russell (1986) recorded 5 species of genus Nemipterus swainson; from the Western Indian Ocean including Persian Gulf and Red sea.

The important species forming Nemipterid fishery along the Mangalore coast are: Nemipterus japonicus (Bloch), Nemipterus mesoprion (Bleeker) and Nemipterus delageoae (Smith).

The threadfin-bream Nemipterus japonicus was the dominant species of Karnataka till 1996 and its place was taken over by Nemipterus mesoprion constituting 64 % of thread fin bream
fishery (Zacharia and Nataraj, 2003). It is locally called as “Madumagalu meenu” in kannada and “Madmal meenu” in Tulu. Nemipterids are mostly consumed in fresh condition. And often used as raw material for fish sausage, surimi and other fishery by-products.

Information on biology of various species of Nemipterids is available from different regions of India. Krishnamurthy (1971 and 1974), Dan (1977) from Vishakhapatnam, Murthy (1982, 1984, and 1987) from Kakinada, Vivekanandan and James (1984, 1986) from Madras, Rao and Rao (1986) from Vishakahapatnam and Rao and Rao (1989) from Waltair have reported the biology of Nemipterids from east coast. On the other hand, information from west coast is limited. Though some reports on Nemipterus mesoprion, are available from Mangalore (Kuthalingam, 1965), Bombay (Acharya and Dwivedi, 1980-81) and Kerala (Vinci and Nair, 1974; Vinci, 1982) coast, being the dominant species among Nemipterids in commercial catches of Mangalore, except the reports of Kuthalingam (1965) and Zacharia (1998), detailed investigation on the biology and fishery of this species is not available from Mangalore region.

Fisheries are based on stocks of wild populations inhabiting sea in their natural environments. The success of capture fisheries depends on the state of these stocks. The purpose of the study of fish population dynamics of exploited stock is to offer scientific advice on possible range of options for rational exploitation. By increasing fishing effort, the yield can be increased to a certain level, but further increase in exploitation levels leads to reduction in yield and if the efforts is still further increased then, the stock under exploitation may collapse and the fishing industry may face the problem of rehabilitation. Such situation could be avoided if proper scientific advice on the maximum possible effort and safe gear and mesh levels are available. Hence, exploitation of stocks need to be maintained carefully and scientific advice rendered to the Government and industry on the type of measures required to ensure maximum economic and sustainable yield.

Though Nemipterus mesoprion is one of the most important species among the commercial catches of Mangalore, there is scarcity of information on the biology and population dynamics of this species. On this background, the present study was undertaken with the following objectives.

1. To study the length-weight relationship and relative condition factor
2. To investigate the food and feeding habits,
3. To study the Reproductive biology and population characteristics such as age and
growth, recruitment, maximum sustainable yield and mortality parameters
It is hoped that this information would help in rational exploitation and management of
Nemipterus mesoprion along this part of the coast.