CHAPTER 1
GENERAL INTRODUCTION

The present study deals with the fishery biology of fringe scale sardine, *Sardinella fimbriata* (Cuvier and Valenciennes, 1847) from Karwar waters. It is well known that the development of fishery depends upon recruitment pattern, maturation and spawning of the fish. India has made enormous strides in the research and management of fishery resources. Considerable progress has been achieved during last four decades. Modernization in the fish catching equipments, nets and gears, transportation, preservation techniques has made greater achievements in the commercial success, better understanding and utilization of fish and fishery resources. Lesser sardines contribute to the lucrative fisheries along the Indian coast and have considerable employment potential. In India fish and fisheries have particular position and functional role in the food, nutrition and livelihood of the people. Besides agriculture, fishery plays an important role in providing employment opportunities and foreign exchange too thus supports to the social and economic development of India.

Small pelagic fishes include oil sardines, lesser sardines, Indian Mackerels, Whitebaits, Flying fishes, Half-beaks, Unicorn cods, Full-beaks, Silver bellies, Anchovies etc., which are the major components and contribute to the total Indian marine landings. Since 1947, fish production has been increased more than tenfold. During the period between 1990 to 2010 fish production has shown double output (FAO, 2011). India has ranked among the top ten fish producing countries of the world (Seafood’s International by
India occupied second position by contributing 5.49% to the world fish production; fish production showed rise from 4.16 million tonnes (1991-92) to 8.67 million tonnes (2011-12); [DAHA & F, 2012-13]. India has 7517 km of coastline, 0.5 million km continental shelf and 2.02 million km EEZ. Annual marine fish catch is around 3.93 million tonnes (Handbook of fisheries and Aquaculture).

During 1956, Karnataka was recognized as a maritime state. Karnataka's coastline is around 350 km, covers a coastal stretch of North Kanara district is about 144 km, which extends from Majali (North) to Bhatkal (South), enriched with marine resources. Karwar is one of the major and important fish landing centers located in the North Kanara district. Karwar has extensive shelf and slope areas and Kali estuarine complex, which provides feeding and breeding grounds for the commercially exploited fishes and other marine organisms such as Prawns, Crabs, Bivalves, Gastropods etc. The aim of such research is to increase the production of animal protein in order to meet the needs of overgrowing population and production of quality fish and fish products for the purpose of export.

Lesser sardines are the marine pelagic fin-fishes, mostly gets caught along with oil sardines as by-catch. During present study, fresh fish collection was done from Karwar and Karwar fish market; Baithkol and Majali. During monsoon season fish were also collected from Karwar coast (shore seine catches) and Karwar fish market as per need and availability. Baithkol is the second fish collection centre lies two km away from the Karwar city, where purse seine catches gets landed. Majali is the third fish collection centre
which lies ten km away from the Karwar where fishing is done by non-
mechanized boats.

Arabian Sea coast of India shares around 70%, to the country’s total
Sea fish landings. Probably higher magnitude may be attributed to the
broader continental shelf and upwelling of Oceanic waters. The upwelling
helps to set up chain reactions which are of great biological and
oceanographical importance. Higher concentration of phosphates and
nitrates in the Oceanic waters results in the production of greater planktomic
biomass. In general the West coast fishery shows higher landings from
September to February, followed by a lean period from March to August. This
may be due to; fishing is carried out in small extent during monsoon months
(Sehara et. al., 1992).

The classification of Clupeid fishes has been controversial one, just like
other fish groups. In the past years different researchers have given different
classifications, the important among which are those by Weber and Beanfort
(1913); Regan (1917); Berg (1940); Herre (1953) and Chan (1965). According to Weber and Beaufort (1913) the order- Malacopterygii includes
eight families of which family- Clupeidae is one of those. Sardines are
included in the family- Clupeidae. The family: Clupeidae includes five sub-
families: Clupeinae; Dussummierinae; Dorosomatinae; Engraulinae and
Chirocentrinae and six genera: Corica (Hamilton, Buchanan); Clupeoides
(Bleecker); Clupea (Linn.); Pellona (Cuv. and Val.); Opisthopterus (Gill) and
Raconda, (Grey) while Cantor is included under the sub-family: Clupeinae.
The genus- Clupea (Linn.) comprises the following three sub-genera:
Amblygaster (Bleecker), Alosa (Cuv.) and Harengula (Val.). Under the family-
Clupeidae; Berg (1940) has mentioned three sub-families: Dussummierinae, Clupeinae and Dorosomatinae.

According to Herre (1953) the family Clupeidae comprises five genera: *Ilisha* (Richardson); *Sardinella* (Cuv. and Val.); *Alosa* (Cuv); *Harengula* (Cuv. and Val.) and *Clupeoides* (Bleeker). Under the genus- *Sardinella*: eleven species are identified by him. Chan (1965) during the revision of Indo-pacific Clupeid fishes of the genus- *Sardinella* treated the group conservatively as a single genus with two sub-genera: *Amblygaster* and *Sardinella*. Under the sub-genus: *Sardinella*, he has recognized fifteen species of which total nine species found in the Indian waters. Regarding the nomenclature of certain species, different authors used different names; Chan (1965) has used the names *Perforatta* and *Jussieu*. Whitehead (1965) has adopted the specific names as *S. albella* and *S. gibbosa*. In the present study widely accepted and used names are preferred to avoid the confusion.

Though necessary information is available, close monitoring of fishery is needed. Future prospectus, challenges and management strategies may be helpful for increasing the pelagic fish production and for their sustainable development. Present work will provide thorough knowledge and information about fishery biology of *Sardinella fimbriata*. This will provide guideline to the researchers in future.