1.1 Introduction

The industrial and agricultural progress of the country largely depends on its water resources, particularly rivers and reservoirs (Desai and Shrivastava, 2004). Reservoirs are of high ecological, economic and recreational importance. A large number of reservoirs have been constructed in India during the last five decades, with the primary objective of storing river water for irrigation and power generation. All man-made impoundments created by obstructing the surface flow, by erecting a dam of any description, on a river, stream or any water course, have been reckoned as reservoirs (Sugunan, 1995). Fish Seed Committee of the Government of India (1996) termed all water bodies of more than 200 ha in area as reservoirs (Desai and Shrivastava, 2004). It has also been agreed to classify uniformly reservoirs of the country into small (<1000 ha), medium (1000 to 5000 ha) and large (>5000 ha) based on their hectarage. In India, medium and large reservoirs are fewer in number but small reservoirs are numerous. By the end of year 1995, the country had 19,370 reservoirs covering more than 3 million ha of reservoirs which included 19,134 small
reservoirs with an area of 1,485,557 ha, 180 medium reservoirs covering 507,298 ha and 56 large reservoirs with a water surface area of 160,511 ha (Sugunan, 2011).

The steep gradient and heavy discharge of water from the mountain slopes of the Western Ghats, the North East and the Himalayas offer opportunities for hydroelectric power generation. Thus reservoirs have become a common feature in the Indian landscape dotting all river basins, minor drainages and seasonal streams. The ecology of reservoirs is radically different from that of the parent rivers. Dams alter river hydrology both up and down stream of the river. The amount of rainfall determines the role of inflow into the reservoir, and hence plays a crucial role in bringing in the water replenishment and nutrient enrichment. Rainfall in the catchment of the river situated hundreds of km away from the reservoir affects the inflow rate. During the months of heavy inflow and outflow, the whole reservoir mimics a lotic (running water) environment where as in summer, when the inflow into and outflow from the reservoir dwindle, a more or less lentic (standing water) condition prevails in most part of it. The water renewal pattern marked by swift changes in levels, inflow and out flow makes them different from their natural counterparts. In India, most of the precipitation takes place during the monsoon months which contribute substantially to the surface flow. In the reservoirs, the nutrient input from the allochthonous source often determines the water quality, nutrient regime and the basic production potential. This is because of the fact that the catchment of parent rivers is very often situated far away from the reservoir, under totally different geo-climatic conditions. Deep drawdown, wind-mediated turbulence, locking up of nutrients in the deep basins, etc. are some of the factors that impart the uniqueness to the reservoir ecosystem. Besides, the varying purpose and design of the dams make the
reservoirs different in their hydrographic and morphoedaphic characteristics, with implications on the production potential (Sugunan, 1995). The assessment of water quality in reservoirs is essential because they are often one of the main sources of water for human consumption and irrigation.

There are 30 reservoirs in Kerala, spread over 29635 ha, in the districts of Palakkad, Trissur, Thiruvananthapuram, Pathanamthitta, Kollam, Kannur and Idukki. 21 of them are below 1000 ha in area and among the rest only the Idukki reservoir is over 5000 ha. The total waterspread areas under 21 small, 8 medium and 1 large reservoirs are 7975, 15500 and 6160 ha respectively (Sugunan, 2011). Only limited investigation has been carried out so far on the hydrology, flora and fauna of these reservoirs and lakes. No serious research work has been undertaken for assessing the hydrobiology of Idukki reservoir also. Detailed investigations on water quality, flora and fauna of these water bodies are very essential which can help the conservation of aquatic systems, much needed for the sustainable development of this area.

**1.2 Objectives of the Study**

The present study was undertaken with the following objectives

1. Determination of physico-chemical parameters of the reservoir in three seasons.

2. Qualitative and quantitative estimation of phytoplankton in three seasons.

3. Qualitative and quantitative estimation of zooplankton in three seasons.

4. Study of fish fauna, their abundance and biomass in the reservoir during three seasons.
1.3 Review of Literature

Water is a prime natural resource, a basic human need and a precious national asset and hence its use needs appropriate planning, development and management. Due to tremendous development of industry and agriculture, the water ecosystem has become perceptibly altered in several respects in recent years and as such they are exposed to all local disturbances regardless of where they occur (Venkatesan, 2007). The health of reservoirs and their biological diversity are directly related to health of almost every component of the ecosystem (Ramesh et al., 2007). In freshwater bodies, nutrients play a major role as their excesses lead to eutrophication. Monitoring and assessment provide the basic information on the condition of water bodies and which is the first step that can lead to management and conservation of aquatic ecosystems. It is also true that the management of any aquatic ecosystem is aimed to the conservation of its habitat by suitably maintaining the physico-chemical quality of water within acceptable levels. Water quality of the water bodies are determined by studying the physico-chemical characteristics in them.

Many studies were conducted on physico-chemical characteristics of different water bodies particularly in lakes, dams and reservoirs. Variations in the physico-chemical parameters due to seasonal changes were mainly attended in these studies. Talling (1987) studied the physico-chemical characteristics of Lake Victoria (East Africa) and according to him, in tropical and sub tropical lakes, fluctuations in total radiation and water temperature are not as high as those observed in temperate regions. Hart et al. (1987) in a detailed study in the Magela creek wetland System in Australia reported that the rain water had a great influence in the quality of water in freshwater bodies. Similar findings were reported by Sondergaard and Jensen (1979) from Kalgaard lake, Denmark. Khan and Chowdhury (1994) studied the limnology
of Lake Kaptai, Bangladesh and they revealed that higher transparency occurred during winter and summer was due to the absence of rain, runoff and flood water as well as gradual settling of suspended particles. Sifa and Senlin (1995) studied the Chinese reservoirs and reported that the transparency was closely related to the amount of sandy clay, detritus and organic matter suspended in water and quantity of dissolved elements in water. Ibrahim et al. (2009) assessed the physico-chemical parameters of Kontagora reservoir, Nigeria and some marked variations in the physical and chemical parameters were observed between sampling stations and seasons. The mean dry season values of transparency, conductivity, hardness, alkalinity, phosphate-phosphorus and total dissolved solids were found higher than those of rainy seasons in this study. Demas (1985) studied the limnology of Lake Bruin, Louisiana and found concentrations of DO vary considerably with depth, location and season. Alkaline pH was noted by Bhatt et al. (1999) in Taudaha lake, Katmandu. Comin et al. (1983) investigated the limnology of Gallocenta lake in Spain and stated that high nitrate concentrations in lake is related to inputs from agricultural lands. Kennedy and Hain (2002) reported that the nitrate-nitrogen increases with surface run-off and at deeper depths when they carried out investigations in Verkhne Viiskii reservoir, Russia. Kolo and Oladimeji (2004) investigated the water quality and some nutrient levels in Shiroro lake, Nigeria and recorded higher water hardness during the dry season than the rainy season. While assessing the physico-chemical properties of Moro lake, Nigeria, Mustapha and Omotosho (2006) stated that the interactions of both the physical and chemical properties of water play a significant role in composition, distribution and abundance of aquatic organisms. Akin et al. (2008) examined the physico-chemical, toxicological and ecological parameters of Gökçekaya dam lake’s water, Turkey where it was seen that while the quality had no certain differences, the level of the
nutrients in the water was low. The different characteristics of the coming water enriched the varieties of algae in this reservoir. Devi et al. (2008) investigated the siltation and nutrient enrichment level of the Gilgel Gibe hydroelectric power dam in Ethiopia and it was found that siltation and nutrient enrichment were the major problems in this reservoir. Janjua et al. (2009) studied the limnology and trophic status of Shahpur dam reservoir, Pakistan and recorded highest water turbidity during the monsoon months.

Variations in the water quality of fresh water bodies due to human intervention were also been examined by several workers. Palma et al. (2010) assessed the ecotoxicological characterization of the surface water of Alqueva reservoir, Portugal and evaluated the influence of anthropogenic sources of pollution and their seasonal variation in its toxicity. The physicochemical parameters and the pesticide concentrations in the reservoir indicated that the water quality was worse in the north part of the reservoir system. Akomeah et al. (2010) studied the physico-chemical characteristics of Ibiekuma dam, Ethiopia and recorded slightly acidic mean pH values due to the high carbon dioxide concentration occurring from organic decomposition. Edward and Ugwumba (2010) examined the physico-chemical parameters of Egbe reservoir, Nigeria where nutrient levels observed was generally higher during dry season than wet seasons. Shah et al. (2011) investigated the environmental variables of eight lakes and one reservoir in Nepal and found that the DO was negatively correlated and conductivity was positively correlated with the increasing pollution level of water bodies. DO was found reduced due to sewage discharged into dam in the study conducted by Ural and Ozdemir (2011) in Keban dam lake, Turkey.

Fresh water bodies in India were also been studied by several workers. Ayyappa and Gupta (1991) studied the limnology of Ramasamudra tank,
Introduction

Karnataka and they recorded the minimum water temperature during June and maximum in the month of May. Khan et al. (1986) studied the limnochemistry and water quality aspects of Upper lake Bhopal during the winter season and showed that the physico-chemical characteristics varied from reservoir to reservoir due to their geological setting. Jain et al. (1996) observed the diurnal variations in temperature in the Halai reservoir (Madhya Pradesh) and which influence the aquatic life and concentration of dissolved gases like CO₂, O₂ and chemical solutes. Swarnalatha and Rao (1998) conducted a study on Banjara lake (Andra Pradesh) with reference to water pollution and observed that the temperature was high during summer season due to clear atmosphere, greater solar radiation, and low water level.

Higher values of phosphate in monsoon period were reported by Murugavel and Pandian (2000) in Kodayar reservoir, Tamil Nadu. Shastri and Pendse (2001) studied the hydrobiology of Dahikhura reservoir of Rajasthan and observed high temperature in summer season due to high solar radiation. Fokmare and Musaddiq (2002) investigated the physico-chemical characteristics of Kapsi lake of Maharashtra and observed higher values of COD during summer season. Reduction in dissolved oxygen due to high temperature was reported by Shanthi et al. (2002) in the study conducted in Singanallur lake, Tamil Nadu. The physico-chemical parameters in surface waters of Shahpura lake, Madhya Pradesh were studied by Tiwari et al. (2004) and declared the variation in the water temperature during the present investigation was due to the difference in sampling time and the effect of season.

Moundiotiya et al. (2004) studied the Jamwa Ramgarh lake with special reference to physico-chemical properties of water and water temperature was found to be lower than atmospheric temperature. Sultana and
Sharief (2004) conducted the water pollution studies in the double lake (Erretal eri) and according to them, the low oxygen values coincided with high temperature during the summer months. The hydrobiological study conducted by Surve et al. (2005) in Kandhar dam, Maharashtra revealed that the water temperature increased during warmer months and decreased during colder months. Devaraju et al. (2005) studied the physico-chemical parameters of Muddur lake, Andra Pradesh where they observed low transparency and BOD values during monsoon season whereas high BOD was recorded during summer months. Similarly, Garg et al. (2006) in their study conducted in Harsi reservoir, Madhya Pradesh reported low transparency during monsoon season. Rawat and Sharma (2005) investigated the Himalayan Lake Deoria Tal (Uttaranchal) and the nutrients such as sulphate, nitrate and phosphate were observed in greater concentration during the summer season due to evaporation. However, Kar et al. (2006) could not record much fluctuations in the study conducted on the limnology of the Lake Sone in Assam.

Kamble et al. (2009) studied the physico-chemical parameters of Ruti dam, Maharashtra and observed low oxygen values coincided with high temperature during the summer months. Murthuzasab et al. (2010) studied the seasonal variation in physico-chemical parameters of Hiráhalla reservoir, Karnataka and recorded higher values of electrical conductivity in north east monsoon season due to agricultural run-off. Manjare et al. (2010) recorded maximum pH values during summer in a study conducted in Tamdalge tank in Maharashtra. According to them, the factors like air temperature bring about changes in the pH of water. Garg et al. (2010) studied the seasonal variations in water quality and major threats to Ramsagar reservoir and observed the lower concentration of magnesium and sodium and higher value of turbidity in monsoon season. Patil et al. (2011) studied the abiotic factors of Lotus lake...
(Maharashtra) and their correlation with reference to seasonal changes and altitude. The air temperature in Lotus lake showed significant variations over the seasons with maximum air temperature in summer. Thirumala et al. (2011) studied the physico-chemical characteristics of Bhadra reservoir of Karnataka and observed high EC and low BOD during rainy season.

Khan and Khan (1985) studied the physical and chemical conditions of Seikha Jheelat, Uttar Pradesh and according to them the higher range of pH indicates higher productivity of water. Pandey and Soni (1993) had observed high values of free carbon dioxide, alkalinity and pH along with low dissolved oxygen in a highly polluted Lake Naukuchiyatal situated in Himalayas. Srivastava et al. (2009) while examining the physico-chemical properties of various water bodies in and around Jaipur, Rajasthan reported that the water of Jalmahal lake was most polluted due to high pH, hardness, alkalinity, free carbon dioxide, zinc content, and a low level of dissolved oxygen. Senthilkumar and Sivakumar (2008) examined the abiotic factors in Veeranam lake of Tamil Nadu and according to them, the highest average value of total dissolved solids in the lake may be due to the accumulation of anthropogenic activity which hampered the quality of water. Sangpal et al. (2011) assessed the physico-chemical properties of Ujjani reservoir, Maharashtra to study the pollution potential and their findings highlighted the deterioration of water quality in the dam due to industrialization and urbanization.

Phytoplankton, being the primary producer, forms the lowest trophic level in the food chain of fresh water ecosystem, moreover, number and species of phytoplankton serves to determine the quality of a water body (Bahura, 2001). Phytoplankton study provides a relevant and convenient point of focus research on the mechanism of eutrophication and its adverse impact on an aquatic eco-system (Meshram and Dhande, 2000). To benefit from the
algae of lakes, ponds, dam reservoirs and rivers, it is necessary to study the
investigated the plankton of Lake Washington and opined that the continuous
replacement of species is one of the most remarkable characteristics of the
plankton communities. Campos et al. (1987) conducted a limnological study
in Lake Caburgua, Chile and observed an irregular distribution of
phytoplankton with maximum growth during the summer months. In the
floodplain lakes of Argentina, Garcia de Emiliani (1993) observed highest
diversity and abundance of phytoplankton in summer. Lewis (1996) suggested
a progressive decline in phytoplankton diversity towards the tropics. In
contrast, extremely high diversity of phytoplankton was shown from
floodplain lakes in Papua New Guinea (Vyvermann, 1996). Silva and
Schiemer (2001) investigated 29 irrigation reservoirs, 3 hydropower reservoirs
and one man-made lake (Kandy lake) in Sri Lanka and stated that the
abundance and species dominance of planktonic algae varied from reservoir to
reservoir. The species composition and diversity of phytoplankton were not
similar even between two adjoining reservoirs in the Mahaweli river basin
(Silva and Wijeyaratne, 1999), indicating that although these reservoirs
showed similarity in basic limnological characteristics in the case of either
irrigation or hydropower reservoirs, their microhabitat structure and micro-
environment gradients may be different. Changes in density and species
composition also occur in tropical lakes and reservoirs with long-term
enrichment (Hecky, 1993). Komárková et al. (2003) detected strong
relationship of temperature with phytoplankton composition in reservoirs and
riverine systems. Avila et al. (2004) conducted a study in a shallow lake in
Brazil and showed transparency and water temperature as the important
environmental variables in the variation of phytoplankton composition.
Wojciechowska et al. (2007) studied the diversity and dynamics of
phytoplankton in floodplain lakes of Bug river, eastern Poland and observed that both diversity and abundance of phytoplankton were highest in summer season. The limnology and trophic status of Shahpur dam reservoir in Pakistan were investigated by Janjua et al. (2009) in which they observed low abundance of phytoplankton during rainy season and high during dry season with a noticeable sequential change in species composition. Kolo et al. (2010) studied the plankton communities of Tagwai dam, Nigeria and opined that plankton abundance in the reservoir was greatly influenced by season although not influenced by site. The species composition, diversity and abundance of plankton in Oyun reservoir, Nigeria were investigated by Mustapha (2010) and a total of 25 genera were found in four classes of phytoplankton namely, Bacillariophyceae, Chlorophyceae, Cyanobacteria and Desmidiaceae. According to him, the abundance of phytoplankton was due to the presence of large amount of nutrients especially nitrate, phosphate, silica and sulphate as well as the shallow nature of the reservoir which greatly exposes the surface to light for algal productivity. Achionye-Nzeh and Isimaikaiye (2010) studied the fauna and flora composition and water quality of Ilorin reservoir, Nigeria, where among the phytoplankton, the order of dominance in the reservoir was Bacillariophyceae, Chlorophyceae, Cyanophyceae and Desmidiaceae.

Alfred-Ockiya and Otobo (1990) conducted a study on plankton in Lake Ofoniturobo, Nigeria and reported the dominance of diatoms in this lake. Fabricus et al. (2003) stated that the combination of physical, chemical and biological factors determines the distribution of the diatom communities in water bodies. Verch and Blinn (1971) investigated the algae of Devils lake, north Dakota and the Chlorophyta were reported to be widespread in this lake. Sommerfeld (1975) studied the phytoplankton of Canyon lake, Arizona where the abundance of Chlorophyceae were observed. Atici (2002) recorded 19 new
freshwater algae in Sarýyar dam reservoir, Turkey and 14 species were recorded from the division Chlorophyta. Ariyadej et al. (2004) studied the diversity of phytoplankton and its relationships to the physico-chemical environment in Banglang reservoir, Thailand and 135 species of phytoplankton were identified. They recorded Chlorophyceae as the dominant group in the reservoir. Mariani et al. (2006) studied the biota and water quality of the Riacho Grande reservoir, Brazil and found Chlorophyceae as the best represented group with greatest number of taxa. Janjua et al. (2009) determined the seasonal phytoplankton composition and productivity of Shahpur Dam in Pakistan. A total of 35 genera were identified during the study and class Chlorophyceae and Cyanobacteria were found to be most diverse and dominant. The phytoplankton composition in Ibiekuma dam, Ethiopia was investigated by Akomeah et al. (2010) where a total of 20 phytoplankton taxa were observed with the division Chlorophyta as the highest percentage composition followed by Bacillariophyta. Kadiri (2002) recorded the desmids in Nigerian water bodies and according to him, high diversity of desmids is an indication of unpolluted water bodies. Steinhart et al. (2002) studied the physiological indicators of nutrient deficiency in phytoplankton in southern Chilean lakes and found that desmids are indicators of good quality of water.

The study on the seasonality of Indian freshwater plankton initiated by Sewell (1934) that was followed by a long series on hydro biological studies mostly from the central and northern parts of our country, many of which were aimed at attaining only a baseline information on plankton and water chemistry for use in fishery practices (Michael, 1969). Srinivasan (1964) studied the hydrology of Bhavanisagar reservoir of Tamil Nadu and observed that the population of the phytoplankton was much higher in the summer than
in other seasons. According to him, excessive flooding is the causative factor for low population of phytoplankton in rainy seasons. Nataraj (1976) reported a direct relationship between monsoon flow and plankton density in Richard reservoir. Mohan et al. (2009) evaluated the influence of spatial and temporal variations on phytoplankton community structure in Pechiparai Reservoir, Tamil Nadu and found that the prolonged day length and high intensity of light during premonsoon period increased the phytoplankton density in the reservoir. Laskar and Gupta (2009) carried out a study in Chatla floodplain lake, Assam on phytoplankton diversity, density and distribution in different seasons and their correlations with physico-chemical properties of water. A total of 34 phytoplankton taxa with highest species diversity in premonsoon and lowest in winter were recorded in their study. Ingole et al. (2010) investigated the phytoplankton of Majalgaon dam, a freshwater reservoir on Sindphana river, Maharashtra and observed high density of Cyanophyceae, Chlorophyceae and Bacillariophyceae in summer season and low density in monsoon. Mahor and Beena (2010) investigated the phytoplanktonic community of Tighra reservoir, Madhya Pradesh and observed all the dominant group of phytoplankton throughout the year. Jayabhaye (2010) studied the phytoplankton diversity of Sawana dam, Maharashtra and found the lowest phytoplankton population during rainy season. Tiwari et al. (2001) recorded Chlorophyceae as the dominant group in Kitham lake. Verma and Singh (2010) conducted a study on the distribution of phytoplankton in relation to physico-chemical parameters in Laddia dam, Rajasthan and found Chlorophyceae as the most dominated algal group represented by 11 genera. They observed the lowest abundance of phytoplankton during rainy season in Laddia dam due to dilution of water.
The study of zooplankton has been a fascinating subject for a long time. In the last two decades much attention has been paid in tropical countries towards the study of biology, ecology and toxicology of zooplankton due to their important role in the rapidly emerging concepts in environmental management like Environmental Impact Assessment (EIA), bio indication of pollution and biological monitoring (Salve and Hiware, 2010). Zooplankton is good indicators of the changes in water quality because they are strongly affected by environmental conditions and respond quickly to changes in water quality. Zooplankton is the intermediate link between phytoplankton and fish. Hence qualitative and quantitative studies of zooplankton are of great importance.

Silva and Davias (1986) investigated the primary productivity and released parameters in three different types of inland waters in Sri Lanka and according to them, the amount of dissolved solutes play an important role directly or indirectly to control the growth of zooplankton. Aziz and Ezz (2004) studied the temporal and spatial changes of zooplankton structure related to the ecological characteristics of Lake Maryout, Egypt which lies under stress of different types of discharged waste waters. They identified a total of 112 species, including 13 marine forms. Pociecha and Heese (2007) were examined the structure of zooplankton community and its spatial distribution in two Pomeranian reservoirs, Rosnowski and Hajka. 34 species of zooplankton were identified in Rosnowski reservoir and 32 species in Hajka. Mustapha (2010) studied the seasonal influence of limnological variables on plankton dynamics of a small, shallow, tropical African reservoir (Oyun reservoir) and 14 genera of zooplankton were identified with a total of 1709 organisms/m³ of zooplankton number. Oueda et al. (2007) studied the diversity, abundance and seasonal dynamic of zooplankton community in a
south Saharan reservoir (Loumbila reservoir) and observed that Crustaceans are more sensitive to the season impacts than Rotifers. Besides the seasonal variability, the zooplankton community of Loumbila reservoir also showed variability according to depth. Sartori et al. (2009) studied the zooplankton fluctuations in Jurumirim reservoir, Brazil and identified 32 taxa of Rotifers. Kozak and Goldyn (1995) studied the zooplankton versus phyto and bacterioplankton in the Maltański reservoir, Poland and 63 taxa of Rotifers were detected. Sampaio et al. (2002) investigated the composition and abundance of zooplankton in the limnetic zone of seven reservoirs of the Paranapanema river, Brazil and taxonomic dominance of Rotifera was reported. Zooplankton community structure of Asartpe dam lake in Turkey was examined by Buyurgan et al. (2010) and Rotifera was found to be the dominant group with 43 species, followed by Cladocera with 3 species and Copepoda with 2 taxa respectively. Edward and Ugwumba (2010) studied the physico-chemical parameters and plankton community of Egbe reservoir, Nigeria and Copepods were found to be most abundant during the dry season while Cladocera was the least abundant during dry season.

Four genera of Rotifera and Cladocera and two genera under Copepoda were observed by Agrawal (1980) when he studied some aspects of limnology of Ramaua dam, Madhya Pradesh with special reference to phytoplankton and zooplankton. Ramakrishna and Sarkar (1982) studied the plankton productivity in relation to certain hydrobiological factors in Konar reservoir, Bihar and observed that the simultaneous presence of dissolved oxygen and hard water favoured the production of zooplankton during the summer. Similar results were also reported by Bhati and Rana (1987) when they studied the zooplankton in relation to abiotic components in the Fort moat of Bharatpur. Masood (1987) noted zooplankton species with their maximum values during
summer and minimum in winter when he studied the bimodal peak of zooplankton in Kashmir lake. Bais and Agrawal (1995) conducted a comparative study of the zooplanktonic spectrum in the Sagar lake and Military Engineering lake and according to him the summer population maxima of zooplankton were co-related with higher temperature, lower transparency and a high standing crop of primary producers leading to greater availability of food. Their investigation in Sagar lake revealed that the fresh water flood from the upstream caused great depletion of zooplankton population density during rainy months. Walujkar and Hiware (2006) studied the seasonal variation in zooplankton population of Shirsatwadi reservoir, Maharashtra and observed that low zooplankton counts in the reservoir during monsoon season due to dilution. Salve and Hiware (2010) studied the zooplankton diversity of Wanprakalpa reservoir, Maharashtra and recorded 17 genera of zooplankton belonging to four major groups Rotifera, Cladocera, Copepoda and Ostracoda. Chauhan (1993) investigated the seasonal fluctuation of zooplankton in Renuka lake of Himachal Pradesh and observed maximum number of Copepods during summer and minimum during winter. Pathak and Mudgal (2004) studied the biodiversity of zooplankton in Virla reservoir of Madhya Pradesh and observed five genera in respect of Protozoans and Copepods. Jayabhaye and Jadhav (2009) studied the population dynamics of Cladocerans and Copepods in Sawana dam, Maharashtra and recorded 9 species of Cladocerans and 4 species of Copepods with maximum density of Copepods during summer. Rao and Durve (1992) studied the structure and dynamic of zooplankton in Rangasagar lake, Udaipur and observed that the Cladocerans contributed 22.31% of total zooplankton collection and were represented by 13 species. Rajashekhar et al. (2010) investigated the seasonal variations of zooplankton community in a freshwater reservoir at Gulbarga district, Karnataka and recorded 6 species of
Cladocerans in the reservoir. They observed maximum density of Cladocera in monsoon season while low density in summer season. According to Chattopadhyay and Barik (2009), the abundance of Rotifera in Krishnasayer lake was probably because of their ability to withstand and survive in varying limnological conditions prevailing at different seasons. Shashikanth and Vijaykumar (2009) studied the seasonal distribution and diversity of zooplankton in Karanja reservoir, Karnataka and according to them, Ostracoda represented very low population diversity compared to other groups. Mahor (2011) assessed the diversity and seasonal fluctuation of zooplankton in Tighra fresh water reservoir (Madhya Pradesh) and observed 38 species of zooplankton with the highest density of Ostracoda during summer season and minimum during rainy season. Sirsat and Jogadand (2012) studied the zooplankton of Domri reservoir, Maharashtra and recorded maximum density of Ostracods during summer season.

Reservoirs, the most important freshwater resource, have the potential to substantially augment the inland fish production of the country. To formulate sound scientific management measures for augmenting fish production in reservoirs, information on the fish yield potential is necessary which would help in setting targets for such water bodies. Many studies were undertaken to know the role of reservoirs in the fish production in India and abroad. Gophen et al. (1983) studied the impact of fish introduction into the Lake Kinneret, the only natural freshwater lake in Israel and found that the introduced fish actually displaced local fish in this lake and that the increase in yield is attributed to improved fishing techniques and not to the introduction of a multitude of different fishes. Castro (1997) studied the fish diversity in Barra Bonita reservoir, Brazil and reported 35 species of fishes in the reservoir. Henry and Nogueira (1999) studied the fish diversity of Jurumirim
impoundments and observed 28 species of fishes. Araujo and Santos (2001) investigated the distribution of fish assemblages in Lajes reservoir, Brazil and reported 15 species of fishes belonging to 14 genera and 9 families. According to their study, the seasonal environmental variables of temperature, pH, transparency and water level did not show a clear association with fish occurrence in Lajes reservoir. Study on the fish community and the status of the fishery of Chenderoh Reservoir, Malaysia was carried out by Kah-Wai and Ali (2001) and 42 species from 13 families were observed in contrast to 63 species observed 7 years earlier. Mustapha (2002) surveyed the flora and fauna of Oyun lake in Nigeria and eight fish species representing six families were obtained. Carol et al. (2006) studied the effects of limnological features on fish assemblages of 14 Spanish reservoirs and found that the most eutrophic reservoirs were dominated by common carp (Cyprinus carpio) whereas the oligotrophic reservoirs presented other fish species in tolerant to pollution rather native. Despite clear changes in species composition, there was no significant effect of water quality on overall fish richness. Mancini et al. (2009) evaluated the specific richness and diversity of ichthyofauna in La Viña reservoir, Argentina and 7 species distributed in 5 orders and 5 families were observed. Bala et al. (2009) studied the ichtyofauna of Daberam reservoir, Nigeria and 7 genera comprising 11 species of fish were identified. A total of twelve species from eight families were reported from Ilorin reservoir, Nigeria and the Cichlids were found to be the most abundant (Achionye-Nzeh and Isimaikaiye, 2010). Wandera and Balirwa (2010) studied the fish species diversity and relative abundance in Lake Albert, Uganda and a total of 40 fish species belonging to 26 genera in 12 families were recorded. According to them, over exploitation, bad fishing methods and gears, habitat degradation and oil and gas exploration are the major threats to fish abundance and diversity in this lake. Montenegro et al. (2012) investigated the ichthyofauna
diversity of Taperoá II reservoir, Brazil and a significant negative correlation between precipitation and number of individuals was observed.

Ramakrishniah (1980) investigated the fishery of Nagarjunasagar reservoir and observed that the percentage of carps in total catch varied from 22% to 27% and catfishes from 64% to 73% during the study period. Sakhare (1999) investigated the fisheries of Yeldari reservoir, Maharashtra 25 fish species were recorded. Rao et al. (1999) studied the limnology and status of the fishery of Nelligudda reservoir, Karnataka and found that the reservoir harbours around 20 autochthonous fish species of which the exotic Oreochromis mossambicus contributes more than 80% to the commercial fishery. Sakhare (2001) studied the ichthyofauna of Jawalgaon reservoir in Maharashtra and reported the occurrence of 23 fish species belonging to 7 orders. The fishes belonging to order Cypriniformes were found dominant with 11 species to be followed by fishes of order Siluriformes with 4 species, while orders like Osteoglossiformes, Perciformes and Channiformes were represented by 2 species and the rest of orders by single species. Piska (2001) studied the fisheries of Shathamraj, a minor reservoir with 25 ha of water spread is located in Hyderabad and observed the total fish production of 513.13 kg/ha/yr. 24 species belonging to 18 genera were found in this reservoir. Sakhare and Joshi (2002) studied the ecology of Pallas-Nilegaon reservoir in Maharastra and observed 28 fish species including 9 species of carps, 5 of cat fishes 2 of feather base, 5 of live fishes and 7 belonging to miscellaneous fishes. Juyal and Chaudhary (2003) studied the status of fisheries of Rana Pratapsagar reservoir, Rajasthan and a total of 46 fish species were reported. Sakhare and Joshi (2003) also studied the water quality of Migni (Pangaon) reservoir, Maharashtra and its significance to fisheries and reported 34 species of fishes. Mohapatra (2003) evaluated the present status of
fisheries of Hirakund reservoir, Orissa and recorded abundance of catfishes in the reservoir; total 43 species were present in which 18 were commercially important. Salasker and Yeeggi (2004) recorded 10 main fish species from Powai lake in Maharashtra. Sakhare (2005) studied the ecology and fisheries of Manjara reservoir in Maharashtra and 28 species of fish belonging to 19 genera falling under 4 orders were identified. Of the 4 orders Cypriniformes dominated with 12 species of fish. Hiware and Pawar (2006) recorded 43 fish species from Nathasagar dam of Maharashtra. Krishna and Piska (2006) recorded 31 fish species from Lake Durgamcheruvu of Andhra Pradesh. Desai et al. (2007) studied the fishes of Ravishankar sagar reservoir (Madhya Pradesh) and recorded a total of 48 species from the reservoir. Of these 48 species, while 22 species were placed on the record for the first time, 26 species were found in common with those of earlier two reported. Vinod et al. (2007) investigated the ichthyoofaunistic diversity in Umiam reservoir of Meghalaya and in all, 29 fish species were recorded among which 21 were native fish species. Srinivas (2007) investigated the fisheries of Edulabad reservoir in Andhra Pradesh and the average fish production recorded from the reservoir was 208.83 kg/ha/yr. Thirumala et al. (2011) studied the fish diversity in relation to physico-chemical characteristics of Bhadra reservoir of Karnataka and 33 fish fauna were identified. Among them, family Cyprinidae was the most dominant in the assemblage composition with 54.55%. Rao et al. (2011) investigated the ichthyofauna of Pocharam and Wyra lakes of Andhra Pradesh and found that these lakes are dominated by Cyprinid and Cobitid species (Cypriniformes) followed by the species of Perches (Perciformes). These two lakes are meant for agriculture, fish harvesting and drinking water supply which are not influenced by urban sewage and are surrounded by semi-deciduous forest. Shaik et al. (2011) studied the ichthyofauna diversity in upper Dudhna project water reservoir in Maharashtra and confirmed the
occurrence of 27 species belonging to 7 orders, 9 family and 15 genera. The order Cypriniformes includes 15 species and this order was found to be dominant. Shinde et al. (2009) reported the ichthyofauna of Harsool-Savangi dam, Maharashtra and recorded a total of 15 fish species belonging to 3 orders, 4 families and 12 genera. In this reservoir, the order Cypriniformes found dominant with 11 species, followed by Perciformes (3 species) and Siluriformes with 1 species.