FRESHWATER ZOOPLANKTON BIODIVERSITY AND PHYSICO-CHEMICAL PARAMETERS OF MAYANUR DAM, TAMIL NADU, INDIA

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ABSTRACT

The distribution and diversity of zooplankton in aquatic ecosystem depends mainly on the physico-chemical properties of water. Zooplankton have been considered as ecological importance organisms. The present system contained a total of 22 species of zooplankton belonging to Protozoa, Rotifera, Cladocera, Copepoda, Ostracoda and Anostraca. A percentage comparison among the various zooplankton species reveals that the rotifers were the dominant group forming 50% of the zooplankton followed by cladocerans and copepods representing 13.7% each. This was followed by Ostracoda and Protozoa representing 9% each followed by Anostraca forming 4.6% of the total zooplankton. Thus, each group of zooplankters preferred to reach their peak in different months of the year.

Keywords: Zooplankton, biodiversity, Mayanur Dam, Tamil Nadu.

INTRODUCTION

The zooplankton community is composed of both primary consumers (which eat phytoplankton) and secondary consumers (which feed on the other zooplankton). They provide a direct link between primary producers and higher tropic levels such as fish. Nearly all fish depend on zooplankton for food during their larval phases, and some fish continue to eat zooplankton for their entire lives (Madin *et al.*, 2001). Zooplankton forms a major link in the energy transfer at secondary level in aquatic food webs between autotrophs and heterotrophs (Deivanai *et al.*, 2004). The distribution and diversity of zooplankton in aquatic ecosystem depends mainly on the physico-chemical properties of water (Harikrishnan and Abdul Azis, 1989).

Moreover, zooplankton communities are sensitive to anthropogenic impacts and their study may be useful in the prediction of long-term changes in lake ecosystems, as these communities are highly sensitive to environment fluctuations (Ferrara *et al.*, 2002; Jeppesen *et al.*, 2011; Kehayias *et al.*, 2014; Preston and Rusak, 2010). Changes in zooplankton abundance, species diversity and community composition can indicate the change or disturbance of the environment; it has been reported by several studies that zooplankton can serve as an indicator of changes in trophic dynamics and the ecological state of lakes related to changes in nutrient loading and climate (Caroni and Irvine, 2010; Kehayias *et al*., 2014). The filtering capacity of zooplankton has significant implications for the eutrophic state of a lake. Zooplankton community structure (species density and species composition) is potentially affected by both "natural" lake water chemistry and lake morphology, and anthropogenic changes in lakes and watersheds (Allen *et al.*, 1999a; Allen *et al.*, 1999b; An *et al.*, 2012; Dodson *et al.*, 2000). A change in the physico-chemical conditions in aquatic systems brings a corresponding change in the relative composition and abundance of organisms thriving in the water; therefore, they can be used as a tool in monitoring aquatic ecosystems; zooplankton have been considered as ecological importance organisms (Jose *et al.*, 2015; Smitha *et al.*, 2013). and hence the present study.

MATERIALS AND METHODS

Study Area

The Mayanur Dam is located in Karur District, Tamil Nadu, India.

Collection and preservation of samples

The plankton and water sample were collected from selected habitats for twelve months (one year). Samples were collected periodically during the first week of every month during morning hours (6:00 a.m. to 8:00 a.m.). For quantitative analysis, 100 litres of water was filtered through plankton net made up of bolden silk (150 μm) to collect zooplankton. The collected plankton samples were transferred to polyethylene bottles (90 ml) and preserved with 5% of neutral buffer (10 ml) formalin (aqueous solution of formaldehyde). The plankton samples varied both qualitative (by-towing) as well as quantitative (by-filtering) analysis throughout the study period.

Analysis of physico-chemical and biological parameters

Physico-chemical parameters like, air and water temperature, pH, salinity, dissolved oxygen, electrical conductivity and total dissolved solids were estimated by using µP Based Water & Soil Analysis Kit Model 1160. The freshwater zooplankton species were studied under microscope and identification made using standard manuals (Edmondson, 1959; Battish, 1992; Murugan *et al*., 1998; Altaff, 2004). Plankton counting was made by drop method. Quantitative analysis was made using a plankton-counting chamber (Sedgwick Rafter's) under Inverted Biological Microscope (INVERSO 3000 TC-100). One ml of sample was taken with a wide mouthed pipette and poured into the counting cell of the Sedgwick Rafter. At least 5 such counting was made for each sample of the plankton and the average values were taken. Total number of plankton present in 1 liter of water sample was calculated (Santhanam *et al.*, 1989) using the following formula:

$$N = \frac{(n \times v)}{V}$$

where, N = Total number of plankton perliter of water filtered;
n = Average number of plankton in 1 ml of plankton sample;
v = Volume of plankton concentrated (ml);
V = Volume of total water filtered (liter).

DISCUSSION

The present system contained a total of 22 species of zooplankton belonging to Protozoa, Rotifera, Cladocera, Copepoda, Ostracoda and Anostraca. Protozoa was represented by two species of which only one was perennial (*P. candatum*) recording its highest count in August. However, as a group, minimal level was noticed in December and the maiximum in April for both the years of study. Literature reveals that *P. caudatum* is one of the most commonly found dominant species in aquatic systems especially in Tamil Nadu as it has been noticed by many workers (Kastooribai, 1991; Jayanthi, 1994; Sivakamai, 1996).

A percentage comparison among the various zooplankton reveals that protozoa represented 9% of the zooplankton. A perusal of literature reveals that protozoans are recorded in low diversity. Thus, Sivakami (1996), Srivastava (2013) and Sirujunisa (2014) were able to record only one protozoan in their study while Pathak and Mudgal (2004) and Kiran *et al*. (2007) were able to observe two protozoans. However, Ezhili *et al*. (2013) were able to record the presence of five species of protozoans in an aquatic system in Tamil Nadu. Thus, the low diversity of protozoans recorded in the present study is in line with those of the earlier workers.

In addition, the protozoans when present, were always recorded in low densities. According to Chourasia and Adoni (1985) protozoans usually occur in low densities because of intense competition and higher predation. Further, literature suggests that ciliate protozoans usually range from nil to 250 i/l depending on ecosystem, trophic state, season and depth (Beaver *et al*., 1988; Muller, 1989; Gilbert and Jack, 1993). This appears to be true in the present study also.

Rotifera was represented by 11 species of which five species were perennial (*B. angularis, A. sieboldi, F. longiseta, K. quadrata* and *E. senata*). Further, eventhough rotifers were recorded throughout the period of study, each species appeared to prefer a certain period of the year to occur in high numbers. Nevertheless, as a group, minimal rotifer level was noticed in the month of September and the maximum in April for both the years of study.

A perusal of literature reveals that Michael (1969), Laal (1984), Chourasia and Adoni (1985), Basawarajeshwari Indur *et al*. (2015) and Ezhili *et al.* (2013) reported the preference of rotifers during the summer season while Kastooribai (1991) and Sivakami (1996) observed their preference period from June-August and Jayanthi (1994) their preference during October-November and Sirajunisa (2014) reported their preference during the September to March period. Thus, the present study is in line with the observations recorded by Michael (1969), Laal (1984), Ezhili *et al*. (2013) and Basawarajeshwari Indur *et al*. (2015).

As to the seasonal changes noticed in the present study, Zutshi *et al.* (1972) attributed this to the changes in the physics and chemistry of water while Yousuf and Qadri (1981) suggested that temperature is an important factor determining the abundance of rotifers. This appears to be true as in the present study as a positive correlation was obtained between rotifers and temperature (0.74). However, Pennak (1978) reported that pH influences the distribution of rotifers while Schmid-Araya (1993) observed that Ca, Mg and Cl_2 have an effect on rotifer population. These suggestions also appear to be true in the present study as there was a positive correlation to pH (0.46), Ca (0.71) and Mg (0.54).

Literature also reveals that rotifer abundance may also be affected by invertebrate predation by cladocerans, copepods and predatory rotifers (Neil, 1984). However, Wetzel (1983) reported that changes in the seasonal distribution of planktonic rotifer populations are quite complex and generalizations are difficult to make.

In the present study, among the various groups of zooplankton, the most dominant one was rotifers representing 50% of the zooplankton. Literature reveals that many workers have also reported rotifers to be the dominant group of zooplankton in freshwater systems (Pace and Orcutt, 1981; Gilbert and Bogdan, 1984; Jayanthi, 1994; Sivakami, 1996; Ezhili *et al*., 2013; Sivakami *et al.*, 2014; Basawarajeshwari Indur *et al*., 2015). This is attributed to the less specialised feeding, pathenogenetic reproduction and high fecundity (Sampio *et al*., 2002). Further, Gannan and Stemberger (1978) reported that rotifers respond more quickly to environmental changes while Sladecek (1983) considered rotifers as bioindicators of water quality. Sendacz (1984) observed high rotifer density to be a characteristic of eutrophic lakes. Nevertheless, Goldman and Horne (1983) reported that almost all fish, even large predators like pike and lake trout feed on rotifers during their early development. On the other hand, Sharma (1991) observed that *Brachionus* is particularly more suitable for feeding fish larvae. Thus, the present aquatic system which registered *Brachionus* in large numbers is specifically suited for aquaculture as *Brachionis* can be used as a livefeed organism decreasing the cost of aquaculture in addition to providing a healthy diet for fish larvae.

Cladocera of the system was represented by three species of which only one was perennial (*M. micrura*) and registered its peak in February. Nevertheless, total cladoceran count reveals that minimal levels were recorded either in December or January and the maximum uniformly in July for both the years of study.

A perusal of literature reveals that some scientists reported their favourable period from October to February (Das and Srivastava, 1956; Chourasia and Adoni, 1985; Khan *et al*., 1986) while some scientists reported cladoceran peaks to occur in summer (Khan *et al*., 1986; Sivakami *et al*., 2014; Basawarajeshwari Indur *et al*., 2015) as was noticed in the present study.

Literature suggests that temperature plays an important role in the development, occurrence and abundance of cladocerans (Singh, 1953; Naidu, 1962; Sumithra, 1969; Patalas, 1972; Qadri and Yousuf, 1978; Sivakami, 1996 Das and Srivastava, 1956; Singh *et al.*, 2007; Sivakami *et al.*, 1994, 2008; 2014). This appears to be in line with the present study also as there was a positive correlation between cladocerans and temperature (0.56). Prabhavathy and Sreenivasan (1977) observed that ponds rich in nutrients especially phosphates harbor an abundance of cladocerans which also appeared to be true in the present study as there was a positive correlation with phosphate (0.64). In the present study, there was a positive relationship between rotifers and cladocerans indicating that both share a common set of environmental requirements. Sivakumar and Altaff (2004) also suggested that cladoceran and rotifer abundance depends on physical parameters like temperature, pH and nutrient status. Nevertheless, Wetzel (1983) opines that the seasonal succession in cladocera is quite variable both among species and within a species living in different conditions.

In the present study, the most dominant cladoceran was *M. micrura.* Raghunathan (1985) stated that this species is one of commonest cladoceran species found even in high altitude systems of India.

According to Basawarajeshwari Indur *et al*. (2015), cladocerans are considered to be an important component of zooplankton from an ecological point of view. They also suggested that this group occupies a prime place in pisciculture because they attain a maximum population within a short period of time besides being an important food source for many of the cultured fishes both juveniles as well as adults (Verma and Shukla, 1968; Jhingran, 1982).

Copepoda was also represented by three species of which two were perennial (*H. vidvus* and *M. hyalinus*). However, both the perennial species recorded their peaks at different times. While *H. viduus* recorded its peak in July, *M. hyalinus* recorded its peak in July. Nevertheless, total copedodan count reveals that the minimal count was noticed in October and the maximum in January for both the years or study.

A perusal of literature regarding the preferable period for copepods reveals contrasting results. Thus, George (1961a, b) while studying three different systems recorded copepodan peaks at different months (June, October and February) in the three systems, Prabhavathy and Sreenivasan (1977) noticed copepodan peaks to occur between September and October while Kastooribai (1991) observed peaks between July and October and Jayanthi (1994) recorded peaks between December and February. However, Sivakami (1996) registered copepodan peaks between July and August while Ezhili *et al.* (2013) and Basawarajeshwari Indur *et al*. (2015) registered peaks in the summer season. Thus, the present study is in line with the observation made especially by Jayanthi (1994).

Regarding the pattern of copepodan fluctuations, Patalas (1972) reported that the physical and chemical characteristics of water are mostly responsible for the abundance of copepods while Lewis (1945) reported that cyclopoid production shows strong evidence of association with abundance of diatoms and blue green algae which appears to be true as there was a positive correlation between copepods and diatoms (0.52) and also with green algae (0.38). Jayanthi (1994) and Sivakami (1996) also reported that there was a positive relationship between copepods and pH as well as temperature. This fact also appears to be true as a positive correlation was obtained between copepods and pH as well as with temperature. However, Pennak (1978) reported that environmental conditions seemed to have little impact on the distribution or copepods.

Copepods are considered as an important food item for various kinds of fish and play a key role in the energy transformation at different trophic levels (Juday, 1907; Rajendran, 1973; Goswami and Singbal, 1977). Gannon and Stremberger (1978) also reported that calanoid copepods best adapt to oligotrophic system while cyclopoid copepods to eutrophic lakes. Further, Basawarajeshwari Indur *et al.* (2015) also suggested that low density and diversity of copepods provide evidence for the presence of high amount of organic matter.

Ostracoda was represented by two species of which only one was perennial (*C. subglobossa*) which recorded its peak in March. A perusal of total ostracodan count reveals that the lowest count was noticed in August and the peak in March during both the years of study.

A perusal of literature reveals that Kalavathi (1980) reported the preferred ostracodan period as April-June and September while Jayanthi (1987) reported their preference for March-June and Kastooribai (1991) observed June to be the peak period. On the other hand, Sivakami (1996) reported the preferable period as February and September and Basawarajeshwari Indur *et al.* (2015) recorded the rainy season as their most preferred season.

Many scientists (Malarvizhi¸ 1989; Kastooribai, 1991; Jayanthi, 1994; Sivakami, 1996) suggest that a positive correlation exists between ostracods and temperature and pH. In the present study, there appeared to be a positive correlation with pH (0.39). Kumar *et al*. (2006), however, observed a direct correlation between ostracods and protozoans and rotifers which appeared to be true in the present study also. Rajashekhar *et al*. (2010), however, attributed the low diversity and abundance of ostracods to soft nature of water. Nevertheless, Pennak (1978) reported that the nature of the substrate and the general type of environment may have little effect on the distribution of ostracods. Literature reveals that many scientists working on aquatic systems especially of Tamil Nadu have reported *C. subglobosa* as the most common ostracod. Hence it is not surprising that this species was present in the system. However, the presence of *Helerocypris* appears to be unique as this species has usually been reported only to occur in rivers (Hameed, 1992).

Anostraca was represented by a single species, *S. dichotomus* which was seasonal occurring between November and February/March and recording its peak in January. According to Palaniyappan (1989), there are two distinct forms of *S. dichotonus*. Of these, only the monsoonic form was noticed in the present study. Eventhough the species has not been reported by many workers especially in Tamil Nadu it was observed by Sivakami (1996) in a pond in Tamil Nadu. She also suggested that this species occurs in systems which are rich in nanoplanktonic detritus, fully oxygenated and always alkaline waters with pH 7-9 and usually water temperature closer to atmospheric air. These conditions in general, appear to hold good in the present system also.

In general, there was a gradually increasing trend in zooplankton count from September/October to culminate in a peak in April followed by a decline. Thus, the minimal zooplankton count was noticed either in September/October while the peak was invariably noticed in April. A closer look at class count reveals that copepods recorded their peak in January while ostracods in March and rotifers and protozoans their peak uniformly in April. However, while Cladocera recorded their peak in July, anostracans recorded their peak in August. Thus, each group of zooplankters preferred to reach their peak in different months of the year.

A percentage comparison among the various zooplankton species reveals that the rotifers were the dominant group forming 50% of the zooplankton followed by cladocerans and copepods representing 13.7% each. This was followed by Ostracoda and Protozoa representing 9% each followed by Anostraca forming 4.6% of the total zooplankton.

A perusal of literature with that of the present study indicates in general an agreement on the occurrence of these groups and representative species in this part of the country while at the same time maintaining their individuality reflecting the adaptiveness of zooplankton to their local set of hydrological conditions.

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Table-1: Physio-chemical variables of fresh water, Mayanur Dam

S. No.	Parameter	Unit	Ranges
1.	Water Temperature	°C	27-34
2.	pH	°C	7-9
3.	Dissolved Oxygen	mg/l	6.8-10.4
4.	Free CO_2	mg/l	0-1.6
5.	Salinity	‰	18-28
6.	Calcium	mg/l	48-82
7.	Magnesium	mg/l	20-36
8.	Phosphate	mg/l	0.06-1.2

Table-2: Protozoan Population in the System (i/l)

S. No.	Protozoa	Year	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
1.	*Difflugia oblongata*	2016-17	-	-	-	-	-	10	20	30	10	-	-	-
		2017-18	-	-	-	-	-	10	20	40	10	10	-	-
2.	*Paramecium caudatum*	2016-17	120	130	140	120	90	70	20	40	60	100	170	100
		2017-18	140	160	160	140	100	80	40	50	60	120	200	140
Total Count		**2016-17**	**120**	**130**	**140**	**120**	**90**	**80**	**40**	**70**	**70**	**100**	**170**	**100**
		2017-18	**140**	**160**	**160**	**140**	**100**	**90**	**60**	**90**	**70**	**130**	**200**	**140**

'–' Represents nil value

Table-3: Occurrence of Rotifera Population in the System (i/l)

S. No.	Rotifera	Year	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
1.	*Brachionus angularis*	2016-17	70	60	60	40	70	30	120	140	180	130	80	80
		2017-18	80	50	50	30	100	60	130	200	260	160	120	100
2.	*Asplanchna sieboldi*	2016-17	90	70	60	60	80	100	130	190	180	140	140	100
		2017-18	80	60	40	80	100	120	130	210	160	160	150	130
3.	*Cephalodella gibba*	2016-17	-	-	-	-	-	-	-	10	30	10	-	-
		2017-18	-	-	-	-	-	-	10	20	30	10	-	-
4.	*Filinia longiseta*	2016-17	140	140	140	120	80	40	90	140	170	180	220	160
		2017-18	160	150	130	130	100	70	100	160	180	190	260	190
5.	*Keratella quadrata*	2016-17	210	160	160	110	80	130	170	200	220	270	270	260
		2017-18	230	180	170	80	40	110	140	190	180	290	290	260
6.	*Lecane luna*	2016-17	20	40	10	-	-	-	-	-	-	10	40	80
		2017-18	20	60	10	-	-	-	-	-	-	20	60	60
7.	*Notholca acuminata*	2016-17	40	10	10	-	-	-	-	-	10	20	30	60
		2017-18	80	10	10	-	-	-	-	-	20	20	20	90
8.	*Philodina roseola*	2016-17	-	-	-	10	40	60	20	-	-	-	-	-
		2017-18	-	-	-	10	20	80	20	20	-	-	-	-
9.	*Rotaria citrinis*	2016-17	90	90	-	-	-	-	-	-	10	20	30	40
		2017-18	110	70	-	-	-	-	-	-	10	20	50	60
10.	*Epiphanes senta*	2016-17	10	20	10	10	10	70	10	10	10	10	10	10
		2017-18	10	20	10	10	20	30	20	20	20	20	20	20
11.	*Trichocerca longiseta*	2016-17	-	-	-	-	-	-	10	20	40	20	20	20
		2017-18	-	-	-	-	-	-	20	40	60	30	20	20
Total Count		2016-17	**670**	**590**	**450**	**350**	**420**	**370**	**550**	**710**	**840**	**810**	**840**	**810**
		2017-18	**970**	**600**	**420**	**340**	**390**	**460**	**570**	**860**	**920**	**920**	**990**	**930**

‘–’ Represents nil value

Table-4: Copepoda Population in the System (i/l)

S. No.	Copepoda	Year	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
1.	*Diaptomus castor*	2016-17	-	-	-	-	10	60	20	-	-	-	-	-
		2017-18	-	-	-	-	10	70	40	10	10	-	-	-
2.	*Heliodiaptomus viduus*	2016-17	100	80	80	40	20	40	90	180	160	140	120	120
		2017-18	90	70	40	20	20	60	120	190	170	140	130	80
3.	*Mesocyclops hyalinus*	2016-17	30	80	30	10	10	10	40	40	20	20	20	20
		2017-18	40	90	40	20	10	10	30	40	50	30	30	30
Total Count		2016-17	**130**	**160**	**110**	**50**	**40**	**110**	**150**	**220**	**180**	**160**	**140**	**140**
		2017-18	**130**	**160**	**80**	**40**	**40**	**140**	**190**	**240**	**230**	**170**	**160**	**110**

'–' Represents nil value

Table-5: Ostracoda Population in the System (i/l)

S. No.	Ostracoda	Year	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
1.	*Cypris subglobosa*	2016-17	40	20	10	10	10	10	10	40	40	70	60	40
		2017-18	30	30	10	20	20	20	30	50	50	80	50	20
2.	*Heterocypris malcolmsonii*	2016-17	-	-	-	-	-	-	-	-	-	-	-	-
		2017-18	-	-	-	-	10	20	10	-	-	-	-	-
Total Count		2016-17	**40**	**20**	**10**	**10**	**10**	**10**	**10**	**40**	**40**	**70**	**60**	**40**
		2017-18	**30**	**30**	**10**	**20**	**30**	**40**	**40**	**50**	**50**	**80**	**50**	**20**

'–' Represents nil value

Table-6: Cladocera and Anostraca Population in the System (i/l)

S. No.	Species	Year	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
Cladocera														
1.	*Daphnia pulex*	2016-17	70	50	40	20	10	-	-	-	-	10	40	40
		2017-18	100	90	60	60	10	-	-	-	-	20	60	90
2.	*Moina micrura*	2016-17	20	40	20	10	20	40	60	60	70	50	40	20
		2017-18	30	60	40	20	20	20	40	40	80	70	30	30
3.	*Bosmina longirostris*	2016-17	-	-	-	-	20	40	10	-	-	-	-	-
		2017-18	-	-	-	-	40	60	40	20	-	-	-	-
Total Count		2016-17	**70**	**90**	**60**	**30**	**50**	**80**	**20**	**60**	**70**	**60**	**80**	**60**
		2017-18	**130**	**150**	**100**	**80**	**70**	**80**	**80**	**60**	**80**	**90**	**90**	**120**
Anostraca														
1.	*Streptocephalus dichotomus*	2016-17	-	10	50	20	10	-	-	-	-	-	-	-
		2017-18	-	10	60	40	20	10	-	-	-	-	-	-
Total Count		2016-17	**-**	**10**	**50**	**20**	**10**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		2017-18	**-**	**10**	**60**	**40**	**20**	**10**	**-**	**-**	**-**	**-**	**-**	**-**

'–' Represents nil value

Table-7: Classcount and Total Count of Zooplankton in the System (i/l)

S. No.	Species	Year	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
1.	Rotifera	2016-17	670	590	450	350	420	370	550	710	840	810	840	810
		2017-18	970	600	420	340	390	460	570	860	920	920	990	930
2.	Protozoa	2016-17	120	130	140	120	90	80	40	70	70	100	170	100
		2017-18	140	160	160	140	100	90	60	90	70	130	200	140
3.	Copepoda	2016-17	130	160	110	50	40	110	150	220	180	160	140	140
		2017-18	130	160	80	40	40	140	190	240	230	170	160	110
4.	Ostracoda	2016-17	40	20	10	10	10	10	10	40	40	70	60	40
		2017-18	30	30	10	20	30	40	40	50	50	80	50	20
5.	Cladocera	2016-17	70	90	60	30	50	80	20	60	70	60	80	60
		2017-18	130	150	100	80	70	80	80	60	80	90	90	120
6.	Anostraca	2016-17	-	10	50	20	10	-	-	-	-	-	-	-
		2017-18	-	10	60	40	20	10	-	-	-	-	-	-
Total Count		**2016-17**	**1030**	**950**	**820**	**580**	**620**	**640**	**750**	**1070**	**1190**	**1200**	**1240**	**1150**
		2017-18	**1400**	**1110**	**830**	**660**	**650**	**800**	**920**	**1260**	**1340**	**1380**	**1490**	**1220**

'–' Represents nil value