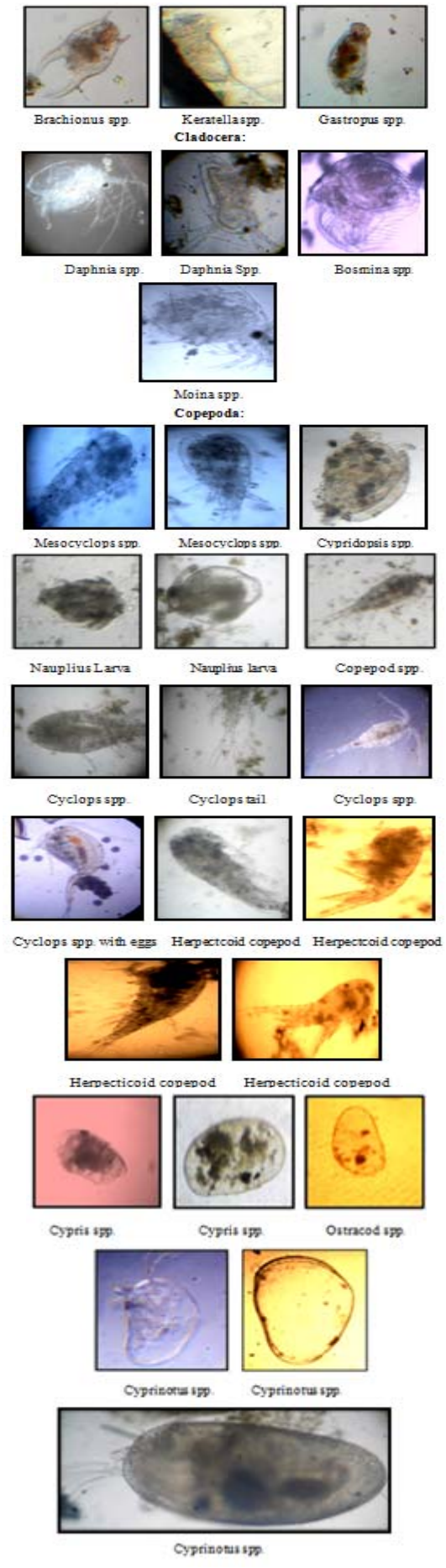


Figure 1: Zooplankton found in the lakes.

Seasonal fluctuation of total zooplankton in all the three lakes was recorded in (Table No. 1 & 2and Fig 2 and 3 a, b & c)

In Vishrale lake

Pre – monsoon: Season value is 1472± 83.71 n/L with variations in zooplankton group during the season were recorded asRotifer (398 ± 45.64) 37% >Copepoda (388 ± 66.94) 26% >Cladocera (294 ± 37) 20% >Ostracoda (214 ± 21.62) 15% >Protozoa (178 ± 7.72) 12%

Monsoon: Seasonal value is 1218 ±63 n/L with variations in zooplankton group during the season were recorded as Rotifer (402 ± 37.39) 33% >Copepoda (334 ± 48.80) 27% >Cladocera (178 ±30.34) 15% >Ostracoda (176 ± 10.58) 14% >Protozoa (128 ± 24.22) 11%

Post –monsoon: Seasonal value 1703 ± 141.98 n/L with variations in zooplankton group during the season were recorded asRotifer (588 ± 44.97) 34% >Copepoda (505 ± 26.68) 30% >Ostracoda (234 ± 24.07) 14% >Cladocera (208 ±12.43) 12% > Protozoa (168 ± 36.14) 10%

In Krishnale

Pre – monsoon: Seasonal value is 628 ± 22.31 n/L with variations in zooplankton group during the season were recorded asCopepoda (196 ± 17.70) 31% >Cladocera (136 ± 8.48) 22% > Rotifer (128 ± 11.51) 20% >Ostracoda (98 ± 5.50) 16% >Protozoa (70 ± 5.25) 11%

Monsoon: Seasonal value 460± 27.65 n/L with variations in zooplankton group during the season recorded as Copepoda (165 ± 6.39) 36% > Rotifer (125 ± 6.44) 27% >Cladocera (72 ± 1.41) 16% > Protozoa (58 ± 5.74) 12% >Ostracoda (40 ± 14.14) 9%

Post –monsoon: Seasonal value is 645 ± 17.23 n/L with variations in zooplankton group during the season were recorded asCopepoda (215 ± 15.62) 33% > Rotifer (146 ± 11.73) 23% >Cladocera (120 ± 15.25) 19% >Ostracoda (96 ± 8.48) 15% > Protozoa (68 ± 13.90) 10%

In Dewale lake

Pre – monsoon: Seasonal value is 607 ±57.74 n/L with variations in total zooplankton group during the season recorded asRotifer (177± 46.22) 29% = Copepoda (177 ± 7.45) 29% >Cladocera (134 ± 17.33) 22% >Ostracoda (62 ± 3.41) 10% > Protozoa (58 ± 1.91) 10%

Monsoon: Seasonal value were 619 ± 4.11 n/L with variations in zooplankton group during the season recorded asRotifer (202 ± 14.20) 33% >Copepoda (164 ± 15.64) 26% >Cladocera (143 ± 12.57) 23% >Protozoa (62 ± 13.98) 10% >Ostracoda (48 ± 2.82) 8%

Post –monsoon: Seasonal value were 857 ± 22.06 n/L with variations in zooplankton group during the season were recorded as;Rotifer (220 ± 17.45) 26% >Copepoda (218 ±10.66) 25% > Protozoa (148 ± 11.60) 17% >Cladocera (138 ± 9.21) 16% >Ostracoda (133 ± 9.53) 16%

In all the three lakes, maximum zooplankton is recorded during post – monsoon season.

Table 1: Seasonal Variation of Zooplankton in the three lakes during 2010-2011

Lakes	Pre-Monsoon	Monsoon	Post-Monsoon
Vishrale Lake	1472 ± 83.71	1218 ± 63	1703 ± 141.98
Krishnale Lake	628 ± 22.31	460 ± 27.65	645 ± 17.23
Dewale Lake	607 ± 57.74	619 ± 4.11	857 ± 22.06

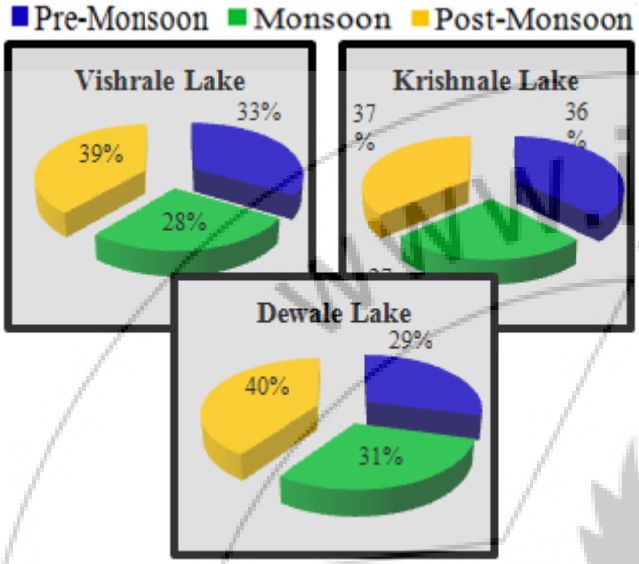
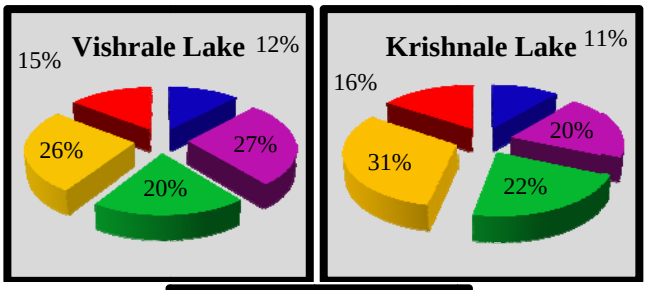


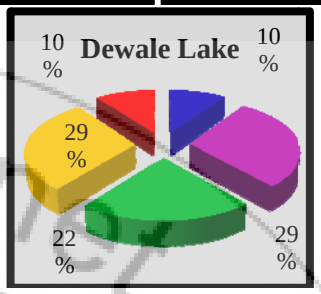
Figure 2: Seasonal Variation of Zooplankton in the three lakes during 2010-2011

Table 2: Seasonal variation of zooplankton groups in three lakes during 2010-2011

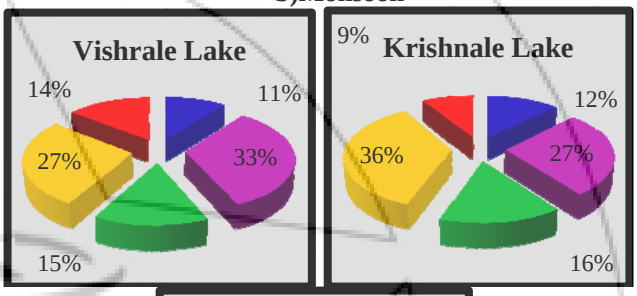
Seasons	Zooplankton	Vishrale Lake	Krishnale Lake	Dewale Lake
Pre-Monsoon	Protozoa	178±7.72	70±5.25	58±1.91
	Rotifera	398±45.64	128±11.51	177±46.22
	Cladocera	294±37	136±8.48	134±17.33
	Copepoda	388±66.94	196±17.70	177±7.45
	Ostracoda	214±21.62	98±5.50	62±3.41
Monsoon	Protozoa	128±24.22	58±5.74	62±13.98
	Rotifera	402±37.39	125±6.44	202±14.20
	Cladocera	178±30.34	72±1.41	143±12.57
	Copepoda	334±48.80	165±6.39	164±15.64
	Ostracoda	176±10.58	40±14.14	48±2.82
Post – Monsoon	Protozoa	168±36.14	68±13.90	148±11.60
	Rotifera	588±44.97	146±11.73	220±17.45
	Cladocera	208±12.43	120±15.25	138±9.53
	Copepoda	505±26.68	215±15.62	218±10.66
	Ostracoda	234±24.07	96±8.48	133±9.21

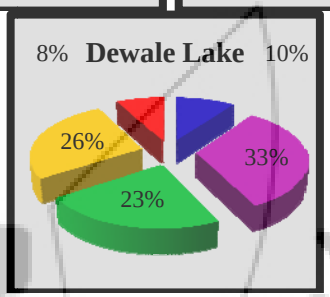
a) Pre – Monsoon



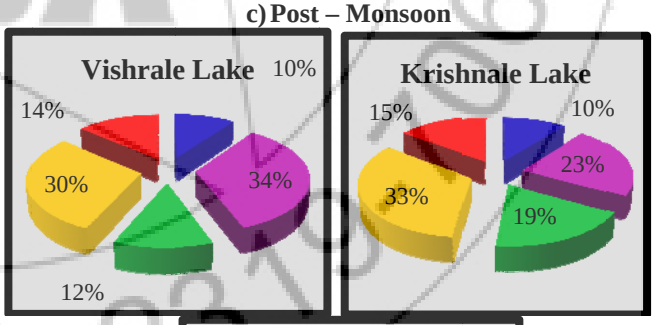


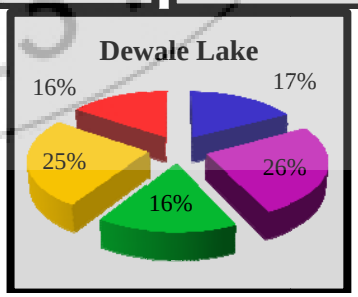
b) Monsoon





c) Post – Monsoon





4. Discussion

Abundance of zooplankton varies from season to season and such variations are mostly related to abiotic factors according

to limnological features and the trophic state (Jeppesenet al., 2002). Therefore, composition and diversity of zooplankton provide information on the characteristics and quality of the water body (Adeyemi et al., 2009; Okayiet al., 2001). Kedar et al., 2008; Dhanapati, 2000 reported that rotifers are chiefly freshwater forms and abundance of these organisms in water body can be related to favourable temperature and availability of abundant food in the form of bacteria, nanoplankton and suspended detritus which is suitable conditions for their survival. The presence of Brachionus spp., Keratella spp., Bosmina spp., Mesocyclops spp. and Daphnia spp. in all the three lakes indicate the higher trophic status of these lakes as these species are indicator of eutrophication (Kumar et al., 2011;Sharma, 1983; Chaurasia and Adoni, 1985; Agarkaret al., 1994; Wanganeo and Wanganeo, 2006; Kumar et al., 2010). Presence of eutrophication indicators, indicates that these lakes have to be protected from waste disposal so, that they are saved from disappearance in future.

5. Conclusion

Thus, we can conclude that zooplanktons are abundant during post – monsoon. Lakes has to be maintained in good condition by cleaning them regularly as well as creating awareness among the citizens through street play, banners, posters etc.

References

[1] S.O. Adeyemi, I.A. Adikwu, P.M.Akombu, J.T. Iyela, Survey of Zooplanktons and Macroinvertebrates of Gbedikere Lake, Bassa, Kogi State, Nigeria. *International Journal of Lakes and Rivers*,**Vol. 2**, No. 1, 37-44 (2009).

[2] M.S. Agarkar, H. K. Goswami. S.Kaushik, S. N. Mishra, A.K. Bajpai, U.S.Sharma, Biology, conservation and management of Bhoj wetland 1. Upper lake Ecosystem in Bhopal.*Bionature*,**14 (2),** 1-119 (1994).

[3] A.S. Bhuiyan, M. T. Islam, R.Sharmeen, Occurrence and abundance of some copepods in a fish pond in Rajshahi, bangladesh in relation to the physico-chemical Conditions. *J. bio-sci.*, **16**, 115-119(2008).

[4] S. K.Chaurasia, A. D. Adoni, Zooplankton dynamics in a shallow eutrophic lake. *Proc. Nat. Symp. Pure and Appl. Limnology (ed) Adoni. A. D. Bull. Bot. SocSagar*, **32,** 30-39 (1985).

[5] M.V.S.S.S.Dhanapati, Taxonomic notes on the Rotifers from India – *IAAB Publication, Hyderabad*– 175 (2000).

[6] E. Jeppesen, J. P. Jensen, M.Sondergaard, Response of phytoplankton, zooplankton and fish to re-oligotrophication: An 11- year study of 23 Danish lakes. *Aquat. Ecosys. Health & Mgmt*.**, 5**, 31–43 (2002).

[7] H.Kaur, I.D. Sharma, Hydrobiological studies on river Basantar, Samba, Jammu (Jammu and Kashmir). *J. Aqua. Biol.*,**1 (16),** 41-44 (2001).

[8] G.T. Kedar, G.P.Patil, S.M. Yeole, Effect of Physico-Chemical Factors on the Seasonal Abundance of Zooplankton Population in Rishi Lake. *Proceedings of Taal 2007: the 12th World lake Conference:* 88-91 (2008).

[9] A. Kumar, B.S. Bisht, V.D. Joshi, A.K.Singh, A.Talwar, Physical, Chemical and Bacteriological study of water from Rivers of Uttarakhand. *J Hum Ecol*.**, 32(3)**, 169-173 (2010).

[10] V. B. Kumar, V. K. Pradeep, S.V. Roopa, Aquachemistry, Zooplankton and Bacterial Diversity in three Ponds of Karwar District, Karnataka. *Recent Research in Science and Technology*,**3 (4),** 39-48 (2011).

[11] R.G. Okayi, C.Y. Jeje, F.O. Fagade, Seasonal patterns in the zooplankton community of River Benue (Makurdi), Nigeria. African Journal on Environmental studies, Vol. 2, No. 1, 9-19 (2001).

[12] R. Senthilkumar, K.Sivakumar, Studies on phytoplankton diversity in response to abiotic factors in Veeranamlake in the Cuddalore district of Tamil Nadu. *Journal of Environmental Biology***, 29(5)**, 747-752 (2008).

[13] B.K.Sharma, The Indian species of the genus Brachionus (Eurotatoriamonogononta: Brachionidae). *Hydrobiologia*.**104**, 31-39 (1983).

[14] A. Wanganeo, R.Wanganeo, Variation in Zooplankton population in two morphologically dissimilar rural lakes of Kashmir Himalayas. *Proc. Nat. Acad. Sci. India*, **76 (B) III**(2006).

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