CHAPTER - IV

RESULT

1. *Research Questionnaire on Diplai Beel* for synopsis writings:

A good questionnaire is always an important tool for any research in the scientific field. Before the commencement of this research work, a questionnaire of twenty questions is made for the villagers living around Diplai Beel to get their views regarding ecological and environmental changes they witnessed the area in the last 20 years. The questionnaire (see *appendix-1*) is prepared with the help of the supervisor very carefully in a scientific way so that the synopsis of this research can be shaped well on the basis of the responds of the interviewed people.

The villagers were asked to put 'Tick marks 'Yes' or 'No' as directed for each question of the questionnaire. There are 20 questions included in the questionnaire set. A total of 150 questionnaire sets are distributed among different categories of people of Diplai Beel area in December of 2014 just after the completion of my Ph.D. course work examination and result.

Some of the villagers responded well on the spot and others submitted the forms later. I interviewed the villagers both male and female who were under matriculate /matriculate/ Higher Secondary passed / Graduate/ Post Graduate of any discipline. NGO members of the area become associated to respond my questionnaire too. Every people become interested and responsible to show their cooperation in my task.

In the 1st question of the questionnaire it is asked to the villagers about the changes taken place in the field of ecology of Diplai Beel. Their responds were 'YES' by around 85.32%. In the 2nd question it is asked about the reducing nature of Diplai Beel area; whether it is by natural or manmade process. Almost all respondents agreed the decreasing nature of Diplai Beel area by manmade processes; though a long term natural erosion in the surrounding hills are occurring due to deforestation, which is working silently more in the process of siltation. In the 3rd question it is asked about the decreasing nature of flora and fauna in Diplai Beel water. Almost 75.34 % people put their positive views in favour of this question because they have seen the differences of availability of flora and fauna in Diplai Beel water at present and in comparison to the past. In question number 4 where I ask about fishing by different mesh sized nets which specially affect micro water flora more. The fishing in this beel is yet to be restricted by the government or local authorities because not only the

fauna but also the floras which are mostly affected in the process of large scale net fishing as because floras cannot multiply their off springs. They give their responds to this by giving 86% 'Yes' for both type of mesh sizes. Question nos.5 and 6 were about fishing in Diplai Beel is a regular or an occasional practice? It shows mixed type of responds with 45.34 % in favour of regular type. To respond Qn.no.6 people supported it and gave their views for the cause of micro water plants extinction. We know that the free floating micro floras are very sensitive to physical disturbances such as wolffia sp, lemna sp, spirodela sp, some algae sp etc. The villagers responded Qn. no. 7 by giving positive remarks on the odour of Diplai beel water in different seasons. It is a vital sign of water quality in a water body. It occurs due to heavy organic deposition by the process of eutrophication. The water of Diplai Beel is not odour free whole the year. This is an unhealthy condition of water in a natural reservoir for flora and fauna. Regarding the Qn. no.8 the underground water level of Diplai Beel has gone down by about 1-2 feet in the last decades due to elevation of reservoir bed due to deforestation, siltation and encroachment. This is also responded by 67 % in favour of the question. In Qn. no. 9 the people put their opinions cent percent against 'yes' i.e. its water is totally not potable due colour and odour. It is observed dead fish floating in the beel water in post monsoon and winter during the years of this research works. To respond this, the villagers put their opinion 'Yes' for the Q. no.10. Dead small and big fish may be due to the critical DO level of water and fluctuation in pH and the collective effects of other water parameters during the seasons.

Diplai Beel is declared as an *Echo Tourism* spot by BTC for which many picnic parties and families with their friends get together here every now and then for relaxation and refreshment of mind. It is observed that pollutants in the form of undegradable solids such as plastic bottles, torn chips packets, polythene containers etc. are seen increasing in water day by day. So the villagers put their positive views to my Qn no. 11 in favour of the Qn by 'Yes' as the villagers are good observers of these sites of Diplai Beel banks. By Qn. no. 12, I ask in the questionnaire that do the NGOs, local Government and other Environmental Organizations come forward to hold awareness programmes on "Save Wetlands and save Diplai Beel and its Biodiversity" now and then? The villagers give positive responds as 'Yes' in case of birds and animals only but by 'No' not at all for saving plants diversity of Diplai Beel.

There are some governmental working groups for the protection of wildlife and forest of the area but not up to the mark. There are no any strong NGOs to protect the environment for flora and fauna in Diplai Beel. So in this case Qn. no.13 is marked as 'No' by the respondents. A large portion of catchment area of Diplai Beel is cultivated by the bank dwellers in different seasons of the year. As a result many flora and fauna are going to be extinct day by day. In this case the micro floras are heavily affected more due to invasion on their habitats by cultivators. It has been a competition for encroachment of the catchment area among the villagers. In question no.17, I ask about the depth of Diplai Beel whether it is decreased or increased in last 20 years. The villagers give a clear verdict 'Yes' about its decreasing nature of depth. This has happen due to eutrophication and heavy siltation. I make them understood how they are responsible in elimination the floras of this large beautiful natural wetland. They put 'Yes' against the Qn. no.18 because they were unknowingly responsible for direct or indirect ways. During community fishing in different festivals in a year, the mass people come to the wetland and catch fish by throwing different sized mesh nets and with different types of fishing tools in Assam. This culture has affected a lot in present ecological research scenario as it destroys ecological balance of a water environment affecting biodiversity of a natural wetland. It is happening in case of Dipai Beel too. Dwellers of Dipai Beel area also observe cultural festivals every year by different names. The Qn. no. 20 is a vital one because common people generally do not know how a wetland can help them i.e. preserve water in surface and underground soil. Wetlands are the health of green vegetation. It keeps water available in balanced form for living organisms of the surroundings. Wetland itself is a complex system where biotic and abiotic factors are entangled with each other in specific cyclic forms. The villagers were in puzzle to answer this question but after clearance its meaning; they put their consensus by 'Yes'.

After collection of 150 questionnaire sets from the villagers one month later I, with my supervisor analysed the questionnaire responses given by the villagers and found a common cause that due to impact of environmental and anthropogenic factors on Diplai Beel, some changes have been taken place and it is struggling to preserve its water qualities and biodiversity in recent times. Basing on these problems I prepare my synopsis and name of the research title is given as mentioned above and work is started from November, 2014.

2. Atmospheric Temperature:

Durnal Atmospheric Temperature both minimum and maximum was recorded during the study period. The monthly average of this temperature is calculated and tabled the data.

Table no.6

Atmospheric Temperature of Diplai Beel area in 2014, 2015, 2016 and 2017

Months	2014		2015		2016		2017	
	Mean		Mean		Mean		Mean	
	Max ˚C	*Min* ˚C	*Max* ˚C	*Min* ˚C	*Max* ˚C	*Min* ˚C	*Max* ˚C	*Min* ˚C
January	21.06	14.14	21.29	15.16	20.90	13.58	21.15	13.45
February	21.64	15.17	22.24	16.34	24.81	17.25	23.98	26.58
March	27.72	20.27	28.91	21.29	29.69	21.40	29.25	21.54
April	33.50	24.70	29.53	22.66	30.83	23.76	30.42	23.74
May	31.22	25.70	31.32	24.45	30.64	24.77	31.53	24.98
June	32.23	27.80	30.65	25.58	32.73	27.66	32.56	27.54
July	33.83	28.77	33.67	27.74	31.29	27.54	31.58	28.16
August	31.62	27.87	31.90	27.25	34.67	29.54	33.84	28.65
September	31.53	27.40	32.21	26.56	31.46	27.16	32.53	28.46
October	30.56	25.04	31.46	24.49	30.51	24.87	31.57	24.68
November	27.96	21.41	26.11	20.31	27.31	20.83	27.38	21.65
December	22.03	15.93	21.76	14.90	23.41	17.16	23.79	18.16

During the period of my research from 2014-15 Nov. to 2016-17 Nov. the monthly atmospheric temperatures are recorded as they play a vital role in the growth of macrophytes in water. It is observed that maximum mean temperature in August 2014 is 33.83°C and minimum is 14.14°C. It is followed by maximum 33.67°C in August and minimum 14.90°C in December of 2015. In 2016 it is observed that the maximum temperature 34.67°C is in August and minimum 13.58°C. But in 2017 it shows that the maximum temperature becomes 33.84 °C and minimum is 13.45 °C in August and January respectively. The changing nature of air temperature during the study years is observed that it affects in the physiological processes of water plants.

3. Rainfall in Diplai Beel:

Table no.7

Rainfall in Diplai Beel area in 2014, 2015, 2016 and 2017

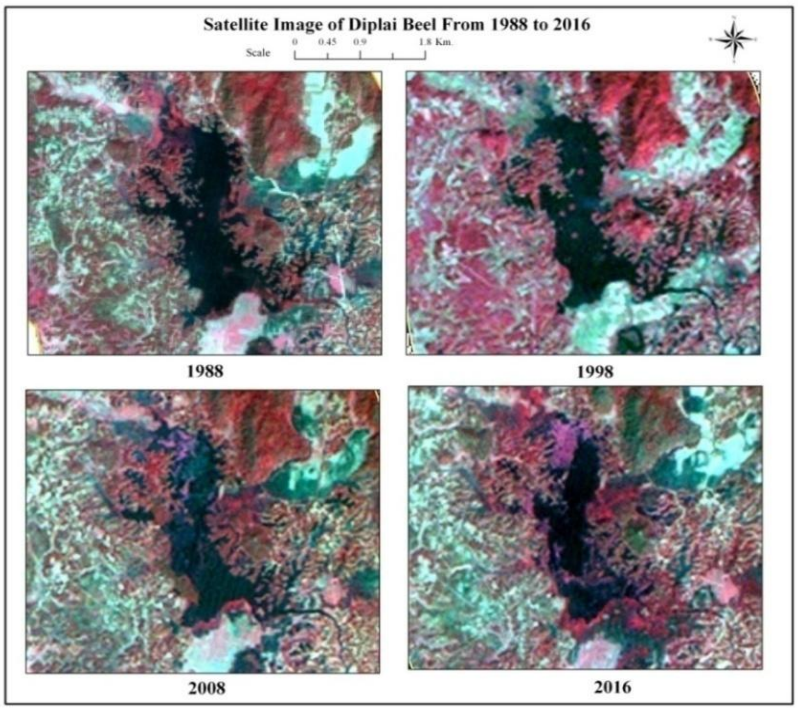
Months	2014		2015		2016		2017	
	Mean Rainfall	No. of rainy days	Mean Rainfall	No. of rainy days	Mean Rainfall	No. of rainy days	Mean Rainfall	No. of rainy days
January	nil	nil	98.0 mm	2	1.5 mm	3	nil	nil
February	53.8 mm	3	1.20 mm	2	nil	nil	0.40mm	1
March	21.4 mm	3	46.2 mm	5	3.3 mm	4	10.03mm	8
April	27.2 mm	6	188.8mm	19	23.24mm	15	32.63mm	19
May	509.4mm	23	430mm	5	26.3 mm	17	48.38mm	23
June	826.8mm	24	1146.mm	25	32.9 mm	20	72.04mm	23
July	446.0mm	19	532mm	16	22.4 mm	26	104.38mm	21
August	879.0mm	25	1155mm	24	6.36 mm	18	136.11mm	23
Sept	527.0mm	16	310.0mm	15	15.16mm	21	189.11mm	20
October	122.0mm	2	125.0mm	5	23.92mm	8	314.12mm	13
Nov	nil	nil	1.6 mm	2	nil	nil	nil	nil
Dec	0.8 mm	2	0.4 mm	1	nil	nil	nil	nil

(source- self observation)

The yearly rainfalls in Diplai Beel area during 2014 to 2017 are recorded. In 2014 the monthly mean rainfall is seen maximum in August (879.00 mm) and minimum in January (0.00 mm) with 25 rainy days in August, 2014. In 2015 the rainfall becomes maximum in June (1146.2 mm) and minimum in December (0.40 mm) having highest 24 rainy days in August. In 2016 it shows that the maximum rainfall is 32.90 mm in June and minimum is 0.00 mm in February, November and December but highest number of rainy days found is 26 in July. In 2017 maximum rainfall is seen in October (314.12 mm) and minimum is seen (0.40 mm) in February. Highest number of rainy days is observed in May, June and August. If we analysis the pattern of rainfall during these years it is seen that much fluctuation of rainfall can be observed. These fluctuating natures of rainfall play an important part in the growth and development of the aquatic macrophytes of Diplai Beel.

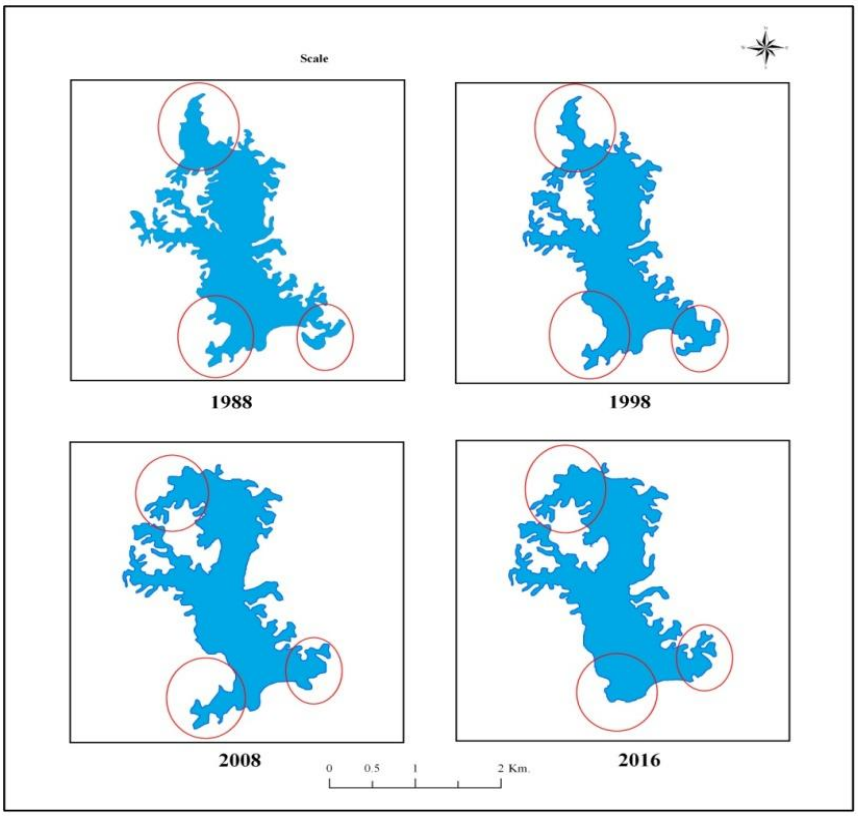
4. i. Satellite Images of Diplai Beel Physiomorphology in 30 yrs:

Fig-2.i



Sattelite images of Diplai Beel from 1988,1998, 2008 and 2016

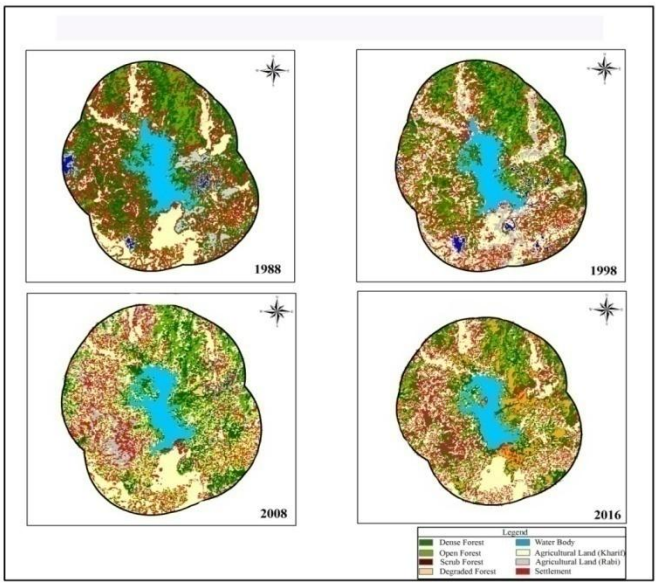
Fig. No.2.ii



Changeing Morphology of Diplai Beel (Circular rings) area in 3 decades

The satellite images, taken in every ten years in 1988, 1998, 2008 and 2016 are collected from Survey of India Topographical Sheet through remote sensing method. The scales is given in the bottom of the figure and direction in the upper right corner of the the figure. The blue coloured figures represent the water area of Diplai Beel where each figure indicates its water area covered by land (White part). The figures show the changing pattern of their shape and size in every 10 years of interval. Periodical physio-morphological changes of Diplai Beel area are shown by small circles in the images of the figures. The land parts are encircled and are the representation of partial extinction and distinction in last thirty years. The reasons behind the changing pattern of Diplai Beel will be discussed in the chapter of discussion latter.

Fig. No. 3



Land use/Land cover change of 2 km buffer area of Diplai Beel

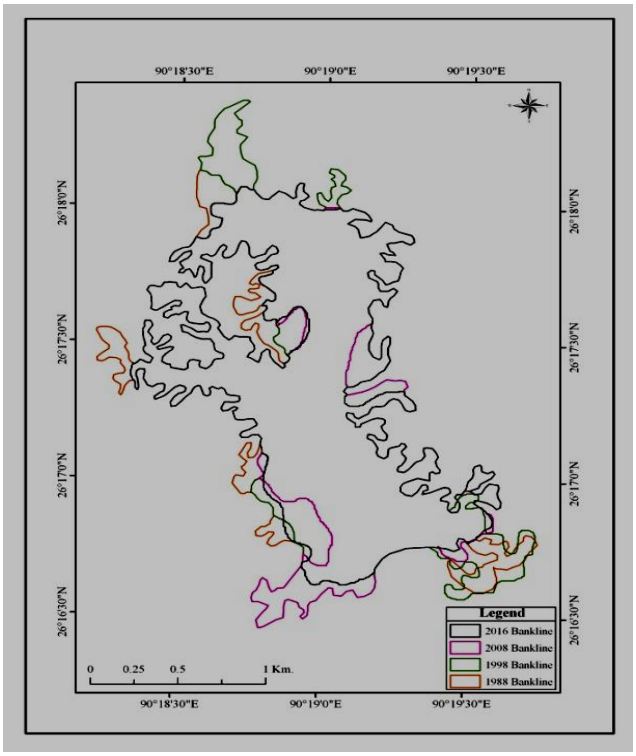
4. ii. Land cover and Land use:

These Remote sensing photographs show vegetation and land use pattern in Diplai Beel perifery area. The green patches are green vegetations while the white patches are cultivating lands and the small bluish parts are rivers or streams. We can observe the density of the green vegetation growth patterns nearby the Diplai Beel. Deep green colour area is the dance forests and light green area is open forests. Pale yellow colour represents degraded forest area but red area is human settlement area but cultivating lands are with blue patches having water of rivers and streams. The images are taken within 2 km of radius from Diplai Beel.

Data types used are Landsat T M, path 137/42 in Pre Monsoon with date of acquisition, 1988 on 16th November. Data types used are Land sat T M, path 137/42 in Pre Monsoon with date of acquisition 1998 on 16th November. Again Data types used are IRS LISS III, path 109/52 in Pre Monsoon with date of acquisition 2008 on 14th November. Lastly Data types used are IRS LISS III, path 109/42 in Pre Monsoon with date of acquisition 2016 on 16th November. Survey of India Topographical sheets used in scale 1:50,000 in 1977.

4. iii. Diplai Beel Bank line Change:

Fig. No.4



Bank line changes of Diplai Beel in 1988, 1998, 2008 and 2016

This satellite image of Diplai Beel indicates how the marginal bank line is changing with every gap of 10 years of time in 1988, 1998, 2008 and 2016 respectively. The bank lines are shown by different colours of lines which differentiate exclusion and inclusion of land patches in marginal land of Diplai Beel. The images are taken during the month November in the years mentioned. The latitude and longitude of Diplai Beel are distinctly given in the graph. The distance scale is also shown with the graph.

4. iv. Database and Methodology:

This study was conducted by examining the patterns of land use / land cover changes and changes in water spread areas by using Remote Sensing (coupled with ground survey) and GIS to distinguish among different land use states (Reeves et al. 2001; Jakubauskas et al. 1998; Lucas et al. 1993; Jensen et al. 1995; Jensen, 2000) and also to identify the factors, affecting the land cover changes in and around the Diplai Beel of Kokrajhar district, BTC, Assam.

4.v. Data Source & Methodology for Land Cover Change Analysis:

4.v. i. Data Source:

Landscape is the function of structure, process and stage (Davis, 1909, Thorbury, 1990). Landscapes are not static, there are numerous exogenesic and endogenetic forces continuously operating over the landscapes and because of this landscapes are dynamic in nature.

4.v. ii. Data sets used

Table no.8

Data/Sensor Type	Path/ Row	Date of acquisition
		Pre-Monsoon
Landsat TM	137/42	1988 (16th November)
Landsat TM	137/42	1998 (19th November)
IRS LISS III	109/52	2008 (14th November)
IRS LISS III	109/52	2016 (06th November)
Survey of India Topographical Sheets	Scale 1:50,000	1977

To analyze the changes in water spread area and land use change dynamics in Diplai beel wetland of Kokrajhar district of BTC, Assam multiyear satellite imageries are used. Besides this, the Survey of India topographical sheet at 1: 50,000 scales are used for delineation the wetland boundary and to generate baseline information for the study area. The details of the datasets used in this study are shown in above table.

5. Flora Types of Diplai Beel:

Table no.9

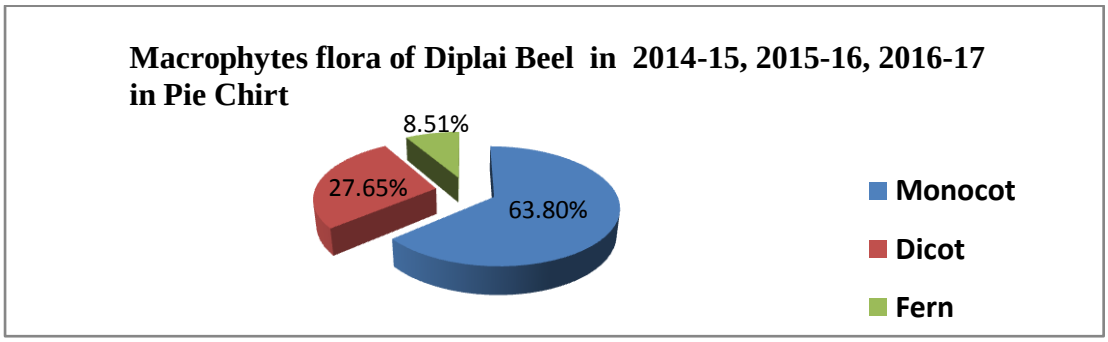
Types of Macrophyte flora of Diplai Beel collected in 2014-15, 2015-16 and 2016-17 (*Spp* no and *Spp* %)

Sl. no	Types of Macrophyte Flora	Total no. of species	% of species
1	Floating	08	17.02 %
2	Submerged (anchored)	04	08,51 %
3	Submerged (suspended)	02	04.25 %
4	Rooted Floating Shoot	02	04.25 %
5	Rooted Floating Leaves	03	06.38 %
6	Emergents	28	59.58 %

Total = 47

All aquatic macrophytes of Diplai Beel collected during the study periods are categorized according to Weaver and Clement (1929) and Daubenmire (1947). The flora of Diplai Beel water collected during the study period of 2014-15, 2015-16 and 2016-17 are categorized into six types such as **1. Floating, 2. Submerged (anchored), 3. Submerged (suspended), 4. Rooted Floating Shoot, 5. Rooted Floating Leaves and 6. Emergent.** There are all together 47 species of aquatic macrophytes collected from Diplai Beel in different seasons of a year but quantities of species are found to be with slight fluctuations . The number of species under each type of group are Floating-8 (17.02%), Submerged (anchored)-4 (08.51%), Submerged (suspended)-2 (4.25%), Rooted Floating Shoot-2 (4.25%), Rooted Floating Leaves- 3 (6.38%) and Emergent- 28 (59.58%)

Fig no. 5



6. Macrophyte families of Diplai Beel:

Table no.10

Families(family with %) and Species nos of macrophytes collected from Diplai Beel in 2014-15, 2015-16 and 2016-17

ANGIOSPERMS (DICOT)	No. of Species	ANGIOSPERMS (MONOCOT)	No. of Species	PTERIDOPHYTES (Fern)	No. of Species
Ceratophyllaceae	1	Pontederiaceae	3	Azollaceae	1
Lentibulariaceae	1	Araceae	3	Salviniaceae	2
Convolvulaceae	2	Lamnaceae	3	Marseliaceae	1

Polygonaceae	3	Hydrocharitaceae	3		
Nymphaeaceae	2	Potamogetonaceae	1		
Trapaceae	1	Poaceae	9		
Amaranthaceae	1	Cyperaceae	5		
Ceratophyllaceae	1	*Alismataceae*	2		
Portulacaceae	1	Commelinaceae	1		
Total	**13**	**Total**	**30**	**Total**	**4**
Per cent	**27.65 %**		**63.8%**		**8.51 %**

There are three groups of aquatic macrophytes collected from Dilpai Beel water during the study period of 2014-15, 2015-16 and 2016-17. The plants collected are more prevalent than other macrophytes present in Diplai Beel. I consider these aquatic macrophytes as basic plant species for research and so more emphasis is given on collecting these species.

The groups are divided into angiosperms and ferns (Pteridophyte). Angiosperms are again divided into two sections- Dicot and Monocot. The dicotyledonous macrophytes show nine families and thirteen species in the table such as Ceratophyllaceae-2, Lentibulariaceae-1, Convolvulaceae-2, Polygonaceae-3, Nymphaeaceae-2, Trapaceae-1, Amaranthaceae-1, Ceratophyllaceae-1, and Portulacaceae-1.

The monocotyledon macrophytes are of nine families and thirty species. They are Pontederiaceae-3, Araceae-3, Lamnaceae-3, Hydrocharitaceae-3, Potamogetonaceae-1, Poaceae-9, Cyperaceae-5, *Alismataceae-2,* and Commelinaceae-1.

The ferns are represented by three families and four species like Azollaceae-1, Salviniaceae-2 and Marseliaceae-1. The percentage of dicot, monocot and fern species found in Diplai Beel during study periods are 27.65%, 63.82% and 8.51% respectively. It is observed that families of ferns are more in number than dicotyledonous and monocotyledon families.

7. Macrophyte species of Diplai Beel:

Table no.11

Macrophyte flora of Diplai Beel collected in 2014-15, 2015-16 and 2016-17

***Species* no.**	**Macrophyte type**	**Name of macrophyte species**	**Family**	**Nature of plants Herb/ Shrub**	**Life span**	**Flowering & fruiting**

1	**Floating**	*Eichhornia crassipes* (Mart.) Solms.	Pontederiaceae (Monocot)	H	P	Whole year
2		*Pistia stratiotes* L.	Araceae (Monocot)	H	A	June-Oct
3		*Lemna perpusilla* Torry	Lemnaceae (Monocot)	H	A	Aug-Oct
4		*Azolla pinnata* R.Br.	Azollaceae (Fern)	H	A	flowerless
5		*Salvinia natans* (L) All.	Salviniaceae (Fern)	H	A	flowerless
6		*Salvinia cucullata*	Salviniaceae (Fern)	H	A	flowerless
7		*Spirodela polyrrhiza* (L.) Schl.	Lemnaceae (Monocot)	H	A	Sep-Oct
8		*Wolffia globasa*	Lemnaceae (Monocot)	H	A	Sep-Oct
9	**Submerged (anchored)**	*Hydrilla verticillata* (L.f.) Royle.	Hydrocharitaceae (Monocot)	H H	P	Oct-Feb
10		*Potamogeton crispus* L.	Potamogetonaceae (Monocot)	H	A	Whole yr
11		*Valisneria spiralis* Linn.	Hydrocharitaceae (Monocot)	H	P	Nov-Aug
12		*Valisneria natans* (Lour) H.Hara.	Hydrocharitaceae (Monocot)	H	P	Nov-Aug
13	**Submerged (Suspended)**	*Ceratophyllum demersum* L.	Ceratophyllaceae (Dicot)	H	A	Jan-June
14		*Utricularia exoleta* R.Br**.**	Lentibulariaceae (Dicot)	H	A	June-Nov
15	**Rooted Floating Shoot**	*Ipomoea aquatica* Forssk.	Convolvulaceae (Dicot)	H	A	Oct-Apr
16		*Hygroryza aristata (*Retz.) Nees.	Poaceae (Monocot)	H	P	Jul-Dec
17	**Rooted Floating Leaves**	*Nymphaea lotus* Linn.	Nymphaeaceae (Dicot)	H	P	Whole yr
18		*Nymphaea rubra* Roxb. Ex Salibs	Nymphaeaceae (Dicot)	H	A	Whole yr
19		*Trapa natans* L.	Trapaceae (Dicot)	H	P	All the year
20	**Emergents**	*Alternanthera philoxeroides* (Mart.) Grisep.	Amaranthaceae (Dicot)	H	P	Apr-May

21		*Vetiveria zizanoides (*L.) Nass.	Poaceae (Monocot)	H	P	Whole yr
22		*Cyperus bravifolius* (Rottb.) Hassk.	Cyperaceae (Monocot)	H	P	July-Oct
23		*Cyperus iria*	Cyperaceae(Monocot)	H	P	July-Oct
24		*Cyperus compressus* L.	Cyperaceae(Monocot)	H	A	May-Dec
25		*Cyperus corymbosus* Rottb.	Cyperaceae(Monocot)	H	P	June-Dec
26		*Hymenachne assamica* Hitch	Poaceae (Monocot)	H	P	June-Dec
27		*Echinodorus angustifolius*	*Alismataceae (*Monocot)	H	P	Jun-Dec
28		*Ipomoea fistulosa* Mart.ex.Choisy.	Convolvulaceae (Dicot)	H	P	May-Dec
29		*Scirpus eriophorum* L.	Cyperaceae (Monocot)	H	P	May-Dec
30		*Marselia quadrifolia* L.	Marseliaceae (Fern)	H	A	Whole yr
31		*Monochoria hastate* (L.) Solm.	Pontederiaceae (Monocot)	H	P	Whole yr
32		*Monochoria* C. Presl.	Pontederiaceae (Monocot)	H	A	May-Dec
33		*Polygonum barbatum* Linn.	Polygonaceae (Dicot)	H	A	May-Dec
34		*Polygonum hydropiper* Linn.	Polygonaceae (Dicot)	H	A	June-Dec
35		*Polygonum glabrum* Willd.	Polygonaceae (Dicot)	H	A	June-Dec
36		*Sagittaria trifolia* L.	Alismaceae (Monocot)	H	P	Whole yr
37		*Cynodon dactylon (*L.) Pers.	Poaceae (Monocot)	H	P	Whole yr
38		*Digitaria ciliaris* (Retzius) Koeler.	Poaceae (Monocot)	H	P	July - Aug
39		*Portulaca quadrifida* L.	Portulacaceae (Dicot)	H	P	April-Oct
40		*Brachiaria mutica* (Forssk.) Stapf.	Poaceae (Monocot)	H	P	June-Dec
41		*Eragrostis unioloides*(Retzius) Nees.	Poaceae (Monocot)	H	P	July – Nov
42		*Hemarthria*	Poaceae	H	P	Jan-Dec

		compressa L.	(Monocot)			
43		*Pogonatherum crinitum* (T.) Kunth.	Poaceae (Monocot)	H	P	June-Nov
44		*Centella asiatica* L.	Apiaceae (Dicot)	H	P	Whole year
45		*Hydrocotyl sibthorpioides* Lmmk.	Apiaceae (Dicot)	H	A	April-May
46		*Colocasia esculenta* (L.) Schott	Araceae (Monocot)	H	P	June-Dec
47		*Commelina benghalensis* L.	Commelinaceae (Monocot)	H	A	May-Oct

The table represents the species, families, habits, annual and perennials nature along with time of flowering of the aquatic macrophytes distributed in different periods of the study years. These macrophytes are almost common during different seasons of the study period of 2014-15 November to 2016-17 November and considered as type species for the study.

I. Floating- *1.Eichhornia crassipes* (Mart.) Solms., 2. *Pistia stratiotes* L., 3. *Lemna perpusilla* Torry**,** 4. *Azolla pinnata* R.Br., 5. *Salvinia natans* (L) All., 6. *Salvinia cucullata*, 7. *Spirodela polyrrhiza* (L.) Schl. , 8. *Wolffia globasa*

II. Submerged (anchored) –

9. *Hydrilla verticillata* (L.f.) Royle., *10. Potamogeton crispus*. L., *11. Valisneria spiralis* Linn., *12. Valisneria natans* (Lour) H.Hara

III. Submerged (Suspended) –

13. *Ceratophyllum demersum* L. 14. *Utricularia exoleta* R.Br**.**

IV. Rooted Floating Shoot –

15. *Ipomoea aquatica* Forssk. 16. *Hygroryza aristata (*Retz.) Nees

V. Rooted Floating Leaves –

17. *Nymphaea lotus* Linn. , 18. *Nymphaea rubra* Roxb. Ex Salibs, 19. *Trapa natans* L.

VI. Emergents –

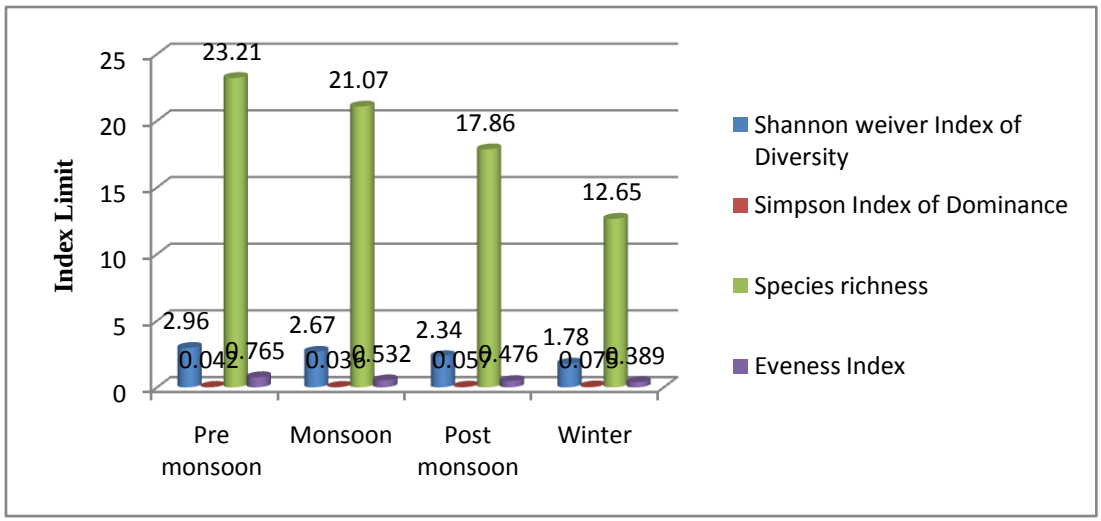
20.Alternanthera philoxeroides (Mart.) Grisep., 21. *Vetiveria zizanoides (* L.) Nass. *22. Cyperus bravifolius* (Rottb.) Hassk. , 23. *Cyperus iria, 24. Cyperus compressus* L. 25. *Cyperus corymbosus* Rottb., 26. *Hymenachne assamica*

Hitch, 27. *Echinodorus angustifolius*, 28. *Ipomoea fistulosa* Mart.ex.Choisy., 29. *Scirpus eriophorum* L. *30. Marselia quadrifolia* L., 31. *Monochoria hastate* (L.) Solm., 32. *Monochoria* C. Presl., 33. *Polygonum barbatum* Linn., 34. *Polygonum hydropiper* Linn., 35. *Polygonum glabrum* Willd., 36. *Sagittaria trifolia* L., 37. *Cynodon dactylon (*L.) Pers.,38. *Digitaria ciliaris* (Retzius) Koeler. 39. *Portulaca quadrifida* L., 40. *Brachiaria mutica* (Forssk.) Stapf., 41. *Eragrostis unioloides*(Retzius) Nees., 42. *Hemarthria compressa* L., 43. *Pogonatherum crinitum* (T.) Kunth., 44. *Centella asiatica* L 45. *Hydrocotyl sibthorpioides* Lmmk., 46. *Colocasia esculenta* (L.) Schott, 47. *Commelina benghalensis* L.

8. MACROPHYTE DIVERSITY IN DIPLAI BEEL DURING 2014-51, 2015-16 and 2016-17

8. i. Graphical presentation of Diversity Indices in 2014-15:

Fig no.-6



Diversity Indices representation of 2014-15

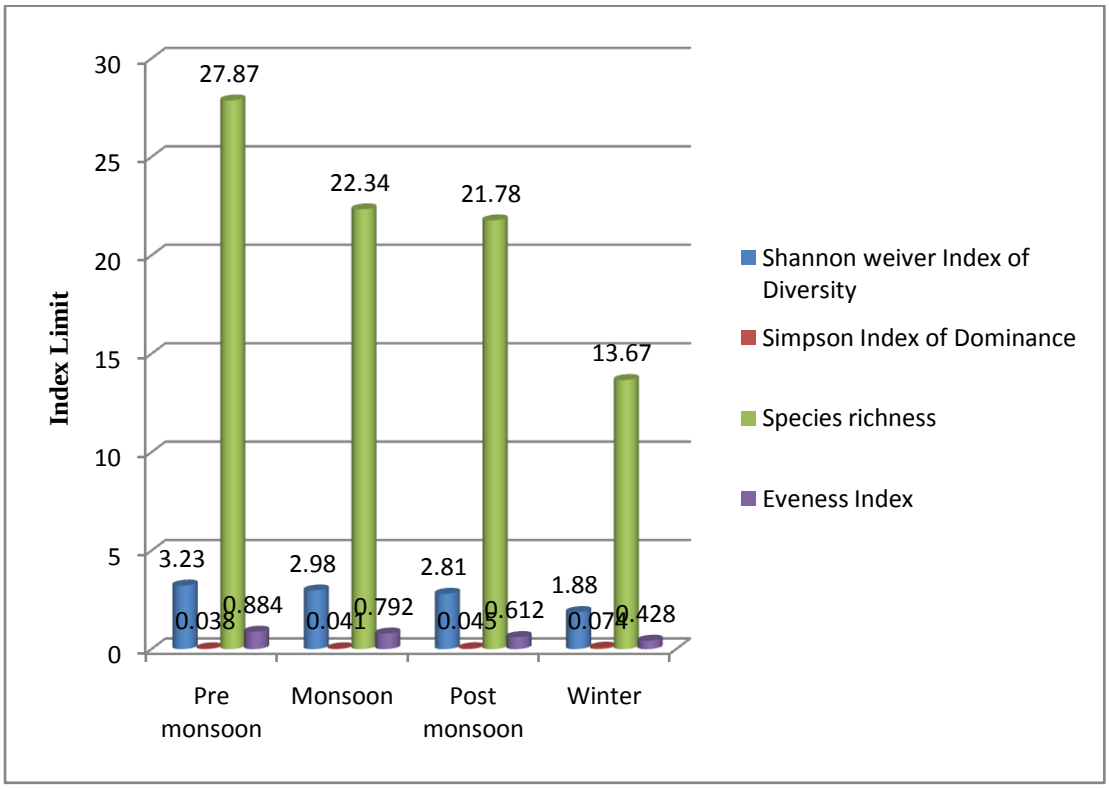
The graph represents different indices for aquatic macrophytes distribution found in Diplai Beel water during Pre monsoon, Monsoon, Post monsoon and Winter periods of the year 2014-15.

The colours indicate respective indices such as Shannon-Weaver index of diversity as blue, Simpson index of dominance as red, Species richness as green and Evenness index as violet. The Shannon-Weaver index of diversity is in Pre monsoon 2.96, in Monsoon 2.67, in Post monsoon 2.34 and in Winter 1.78 respectively. The

Simpson index of dominance is also indicated by 0.04, 0.035, 0.057 and 0.075 respectively which are below the 1 in different seasons. It looks Species richness having very high value than others such as 23.21 in Pre monsoon, 21.07 in Monsoon, 17.86 in Post monsoon and 12.65 in Winter. The Evenness index shows its value below unity but more than Species richness. These are 0.765, 0.532, 0.476, and 0.389 in the seasons of the respective years respectively.

8. ii. Graphical presentation of Diversity Indices in 2015-16

Fig no-7

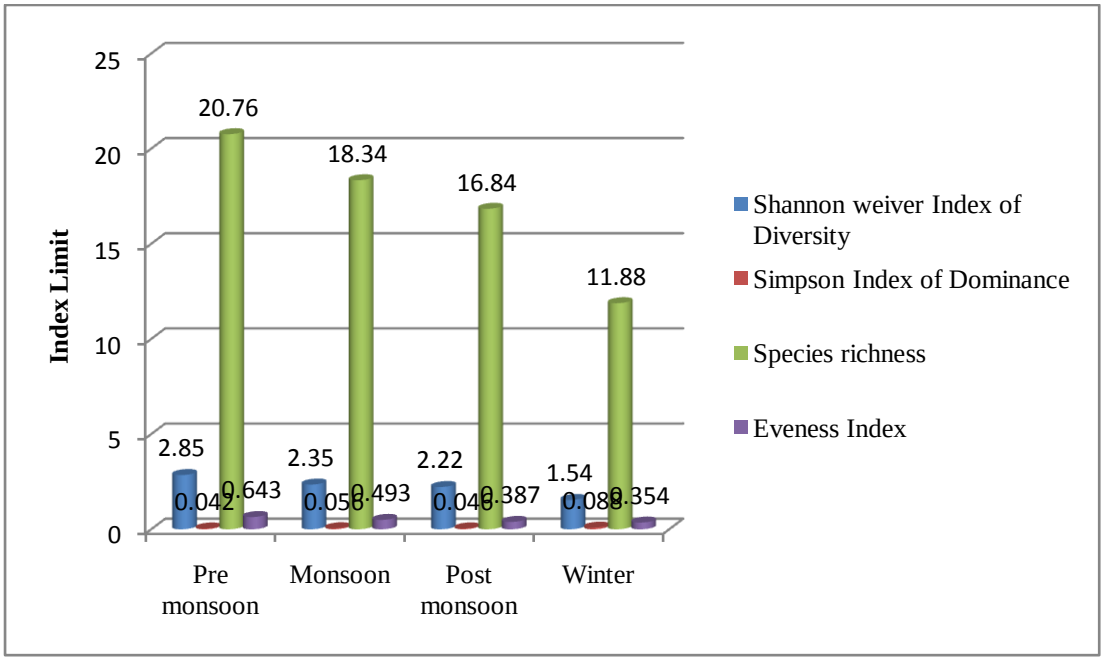


Diversity Indices representation of 2015-16

In 2015-16 the indices colours are same as the year of 2014-15. The Shannon-Weaver index of diversity represents by 3.23, 2.98, 2.81, and 1.88 in the seasons respectfully. Simpson index is represented by 0.038, 0.041, 0.045, and 0.074 in Pre monsoon, Monsoon, Post monsoon and Winter accordingly. Species richness shows very high but fluctuation with the year 2014-15 in some seasons. The values of Species richness are 27.87, 22.34, 21.78 and 13.67. The Evenness index is also less than unity. In this year its values are 0.884, 0.792, 0.612 and 0.428 in the seasons respectively.

8. iii. Graphical presentation of Diversity Indices in 2016-17

Fig no-8



Diversity Indices representation of 2016-17

In the year 2016-17 Shannon-Weaver index of diversity of macrophytes are not above 3.They are 2.85 in Pre monsoon, 2.35 in Monsoon, 2.22 in Post monsoon and 1.54 in Winter. Almost no specific differentiation in Simpson index of dominance in Pre monsoon, Monsoon, Post monsoon and Winter of 2016-17. They bear the values under unity as observed in the graph. Their values are as 0.04, 0.056, 0.046 and 0.088. The Species richness is very high than other index values such as 20.75, 18.34, 16.84 and 11.88.

Table no. 12

Diversity Indices at a glance:

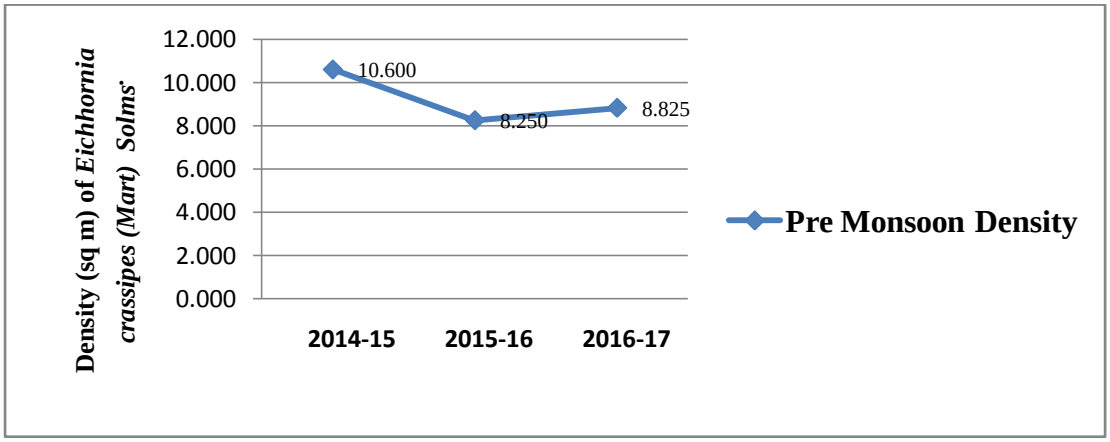
Sl no	Diversity Indices	Study Years	Pre monsoon	Monsoon	Post monsoon	Winter
1	**Shannon - Weiner Index of Diversity**	2014-15	2.96	02.67	2.34	1.78
		2015-16	3.23	02.98	2.81	1.88
		2016-17	2.85	02.35	2.22	1.54
2	**Simpson Index of Dominance**	2014-15	0.042	0.036	0.057	0.075
		2015-16	0.038	0.041	0.045	0.074
		2016-17	0.042	0.056	0.046	0.088
3	**Species richness index**	2014-15	23.21	21.07	17.86	12.65
		2015-16	27.87	22.34	21.78	13.67
		2016-17	20.76	18.34	16.84	11.88
4	**Evenness Index**	2014-15	0.765	0.532	0.476	0.389
		2015-16	0.884	0.792	0.612	0.428
		2016-17	0.643	0.493	0.387	0.354

A. ***MACROPHYTE DENSITY in DIPLAI BEEL during 2014-51, 2015-16 and 2016-17:***

9. Seasonal Density of *Eichhornia crassipes* (Mart.) Solms.in Diplai Beel during 2014-15, 2015-16 and 2016-17:

9.i. Pre Monsoon Density of *Eichhornia crassipes* (Mart.) Solms. during 2014-15, 2015-16 and 2016-17

. Fig no-9



Pre Monsoon Density of *Eichhornia crassipes* (Mart.) Solms.

Table no.26 (continuous 3 parts table)

Macrophyte flora of Diplai Beel	2014-2015 *Density and Abundance* in Pre Monsoon (March, April & May) Quadrat number in each site = 10 Total Quadrat= 10 x 4 side = 40 Quadrat size = 2 sq m									
	Site-I, (North)	**Site-II, (South)**	**Site-III, (East)**	**Site-IV, (West)**	**Total no of species (S)**	**Total no of quadrats studied (Q)**	**No of quadrates of species occurrence. (P)**	**Frequency = P/40×100%**	**Abundance A = S/P**	**Density D = S/Q**
Floating										
Eichhornia crassipes (Mart) Solms.	144	50	110	120	**424**	40	35	87.50%	12.11	10.60
Pistia stratiotes L.	2	0	0	0	**2**	40	2	5.00%	1.00	0.05
Lemna perpusilla Torry	0	2	0	2	**4**	40	3	7.50%	1.33	0.10
Azolla pinnata R.Br.	0	10	8	0	**18**	40	16	40.00%	1.13	0.45
Salvinia natans (L) All.	4	12	9	3	**28**	40	16	40.00%	1.75	0.70
Salvinia cucullata	0	16	9	1	**26**	40	13	32.50%	2.00	0.65
Spirodela polyrrhiza (L) Schleiden	2	0	1	0	**3**	40	2	5.00%	1.50	0.08
Wolffia globasa	3	0	0	0	**3**	40	2	5.00%	1.50	0.08
Submerged (anchored)										
Hydrilla verticillata (L.f.) Royle	7	10	19	12	**48**	40	17	42.50%	2.82	1.20
Potamogeton crispus	2	4	20	21	**47**	40	30	75.00%	1.57	1.18
Vallisneria spiralis	4	12	15	10	**41**	40	25	62.50%	1.64	1.03

Vallisneria natans (Lour) H.Hara	8	11	5	10	**34**	40	26	65.00%	1.31	0.85
Submerged (suspended)										
Cerratophyllum demersum Linn.	3	12	21	15	**51**	40	34	85.00%	1.50	1.28
Utricularia exoleta R.Br	5	15	10	10	**40**	40	24	60.00%	1.67	1.00
Rooted Floating Shoot								0.00%		
Ipomoea aquatic Forsk	5	5	12	6	**28**	40	20	50.00%	1.40	0.70
Hygroryza aristata (Retzius) Nees	2	2	0	0	**4**	40	3	7.50%	1.33	0.10
Rooted Floating Leaves										
Nymphaea lotus Linn.	20	15	12	13	**60**	40	20	50.00%	3.00	1.50
Nymphaea rubra Roxb. Ex Salibs	16	21	15	12	**64**	40	35	87.50%	1.83	1.60
Trapa natans L.	15	20	12	10	**57**	40	34	85.00%	1.68	1.43
Emargents										
Alternanthera philoxeroides (Mart.) Griseb.	10	12	6	2	**30**	40	20	50.00%	1.50	0.75
Vetiveria zizanoides	1	0	4	3	**8**	40	5	12.50%	1.60	0.20
Cyperus bravifolius (Rottb.)Hassk.	2	0	3	3	**8**	40	5	12.50%	1.60	0.20
Cyperus iria	0	0	0	3	**3**	40	2	5.00%	1.50	0.08
Cyperus compressus Linn.	0	12	3	1	**16**	40	10	25.00%	1.60	0.40
Cyperus corymbosus Rottb.	0	0	2	3	**5**	40	4	10.00%	1.25	0.13
Hymenachne assamica Hitch	2	12	3	0	**17**	40	7	17.50%	2.43	0.43
Echinodorus angustifolius	5	11	2	3	**21**	40	10	25.00%	2.10	0.53
Ipomoea fistulosa Mart.ex. Choisy	11	2	5	3	**21**	40	14	35.00%	1.50	0.53

Scirpus eriophorum	7	3	0	0	**10**	40	4	10.00%	2.50	0.25
Marselia quadrifolia L.	15	17	17	14	**63**	40	35	87.50%	1.80	1.58
Monochoria hastata (L) Solm.	5	3	0	0	**8**	40	4	10.00%	2.00	0.20
Monochoria (Barm.f) Presl.	12	0	0	0	**12**	40	6	15.00%	2.00	0.30
Polygonum barbatum Linn.	12	8	5	13	**38**	40	25	62.50%	1.52	0.95
Polygonum hydropiper Linn.	13	0	2	0	**15**	40	13	32.50%	1.15	0.38
Polygonum blabrum Willd.	20	7	0	0	**27**	40	12	30.00%	2.25	0.68
Sagittaria trifolia L.	5	5	0	0	**10**	40	6	15.00%	1.67	0.25
Cynodon dactylon L.	14	7	0	0	**21**	40	14	35.00%	1.50	0.53
Digitaria ciliaris	0	1	8	0	**9**	40	4	10.00%	2.25	0.23
Portulaca oleracea L.	1	0	0	0	**1**	40	2	5.00%	0.50	0.03
Brachiaria mutica (Forssk.) Stapf	17	10	9	0	**36**	40	12	30.00%	3.00	0.90
Eragrostis unioloides	17	15	5	0	**37**	40	14	35.00%	2.64	0.93
Hemarthria compressa L	12	0	0	0	**12**	40	6	15.00%	2.00	0.30
Pogonatherum crinitum	11	21	6	10	**48**	40	23	57.50%	2.09	1.20
Centella asiatica	17	10	2	15	**44**	40	34	85.00%	1.29	1.10
Hydrocotyle sibthorpioides	10	15	7	0	**32**	40	16	40.00%	2.00	0.80
Colocasia esculenta (L.) Schott	13	3	3	10	**29**	40	12	30.00%	2.42	0.73
Commelina benghalensis L.	21	10	0	0	**31**	40	14	35.00%	2.21	0.78
	495	**401**	**370**	**328**	**1594**	**1880**	**690**	**1725.00%**	**93.94**	**39.85**

Table no.27 (continuous 3 parts table)

Macrophyte flora of Diplai Beel	**2014-2015** ***Density and Abundance* in Monsoon** **(June, July & August)** **Quadrat number in each site = 10** **Total Quadrat= 10 x 4 sides = 40** **Quadrat size = 2 sq m**									
	Site-I, (North)	**Site-II, (South)**	**Site-III, (East)**	**Site-IV, (West)**	**Total no of species (S)**	**Total no of quadrats studied (Q)**	**No of quadrates of species occurrence. (P)**	**Frequency = P/40×100%**	**Abundance A = S/P**	**Density D = S/Q**
Floating										
Eichhornia crassipes (Mart) Solms.	200	141	112	120	**573**	40	40	100.00%	14.33	14.33
Pistia stratiotes L.	10	5	0	2	**17**	40	12	30.00%	1.42	0.43
Lemna perpusilla Torry	5	3	0	0	**8**	40	6	15.00%	1.33	0.20
Azolla pinnata R.Br.	13	8	3	2	**26**	40	20	50.00%	1.30	0.65
Salvinia natans (L) All.	9	6	3	2	**20**	40	15	37.50%	1.33	0.50
Salvinia cucullata	12	6	2	1	**21**	40	16	40.00%	1.31	0.53
Spirodela polyrrhiza (L) Schleiden	5	7	1	0	**13**	40	10	25.00%	1.30	0.33
Wolffia globasa	2	4	0	0	**6**	40	4	10.00%	1.50	0.15
Submerged (anchored)										
Hydrilla verticillata (L.f.) Royle	10	7	4	3	**24**	40	17	42.50%	1.41	0.60
Potamogeton crispus	9	3	5	4	**21**	40	12	30.00%	1.75	0.53
Vallisneria spiralis	10	5	4	4	**23**	40	19	47.50%	1.21	0.58

Vallisneria natans (Lour) H.Hara	2	4	3	2	**11**	40	6	15.00%	1.83	0.28
Submerged (suspended)										
Cerratophyllum demersum Linn.	10	6	4	3	**23**	40	14	35.00%	1.64	0.58
Utricularia exoleta R.Br	10	1	2	2	**15**	40	12	30.00%	1.25	0.38
Rooted Floating Shoot										
Ipomoea aquatic Forsk	9	6	3	2	**20**	40	14	35.00%	1.43	0.50
Hygroryza aristata (Retzius) Nees	11	7	5	4	**27**	40	14	35.00%	1.93	0.68
Rooted Floating Leaves										
Nymphaea lotus Linn.	8	6	3	2	**19**	40	9	22.50%	2.11	0.48
Nymphaea rubra Roxb. Ex Salibs	7	6	4	3	**20**	40	7	17.50%	2.86	0.50
Trapa natans L.	6	7	6	5	**24**	40	12	30.00%	2.00	0.60
Emargents										
Alternanthera philoxeroides (Mart.) Griseb.	4	3	6	4	**17**	40	14	35.00%	1.21	0.43
Vetiveria zizanoides	3	1	0	0	**4**	40	3	7.50%	1.33	0.10
*Cyperus bravifolius (*Rottb.*)*Hassk.	7	1	0	1	**9**	40	5	12.50%	1.80	0.23
Cyperus iria	0	3	0	1	**4**	40	2	5.00%	2.00	0.10
Cyperus compressus Linn.	0	1	1	2	**4**	40	3	7.50%	1.33	0.10
Cyperus corymbosus Rottb.	0	2	0	0	**2**	40	2	5.00%	1.00	0.05
Hymenachne assamica Hitch	6	7	3	0	**16**	40	8	20.00%	2.00	0.40
Echinodorus angustifolius	0	3	0	1	**4**	40	3	7.50%	1.33	0.10
Ipomoea fistulosa Mart.ex. Choisy	12	14	5	2	**33**	40	15	37.50%	2.20	0.83
Scirpus eriophorum	0	1	0	2	**3**	40	2	5.00%	1.50	0.08

Marselia quadrifolia L.	9	10	5	3	**27**	40	10	25.00%	2.70	0.68
Monochoria hastata (L) Solm.	4	2	0	1	**7**	40	4	10.00%	1.75	0.18
Monochoria (Barm.f) Presl.	4	4	4	3	**15**	40	12	30.00%	1.25	0.38
Polygonum barbatum Linn.	2	2	1	0	**5**	40	3	7.50%	1.67	0.13
Polygonum hydropiper Linn.	3	2	2	1	**8**	40	4	10.00%	2.00	0.20
Polygonum blabrum Willd.	4	2	1	0	**7**	40	3	7.50%	2.33	0.18
Sagittaria trifolia L.	1	0	0	2	**3**	40	3	7.50%	1.00	0.08
Cynodon dactylon L.	0	2	0	0	**2**	40	2	5.00%	1.00	0.05
Digitaria ciliaris	1	1	0	0	**2**	40	2	5.00%	1.00	0.05
Portulaca oleracea L.	1	0	0	0	**1**	40	1	2.50%	1.00	0.03
Brachiaria mutica (Forssk.) Stapf	1	7	4	3	**15**	40	5	12.50%	3.00	0.38
Eragrostis unioloides	12	6	3	2	**23**	40	17	42.50%	1.35	0.58
Hemarthria compressa L	11	5	0	1	**17**	40	12	30.00%	1.42	0.43
Pogonatherum crinitum	2	10	1	0	**13**	40	10	25.00%	1.30	0.33
Centella asiatica	12	1	2	0	**15**	40	12	30.00%	1.25	0.38
Hydrocotyle sibthorpioides	0	2	1	1	**4**	40	3	7.50%	1.33	0.10
Colocasia esculenta (L.) Schott	13	4	6	0	**23**	40	15	37.50%	1.53	0.58
Commelina benghalensis L.	2	2	2	1	**7**	40	4	10.00%	1.75	0.18
	462	**336**	**211**	**192**	**1201**	**1880**	**438**	**1095.00%**	**87.60**	**30.03**

Table no. 28 (continuous 3 parts table)

Macrophyte flora of Diplai Beel	**2014-2015** ***Density and Abundance* in Post Monsoon** **(September, October & November)** **Quadrat number in each site = 10** **Total Quadrats = 10 x 4 sides = 40** **Quadrat size = 2 sq m**									
	Site-I, (North)	**Site-II, (South)**	**Site-III, (East)**	**Site-IV, (West)**	**Total no of species (S)**	**Total no of quadrats studied (Q)**	**No of quadrates of species occurrence. (P)**	**Frequency = P/40×100%**	**Abundance A = S/P**	**Density D = S/Q**
Floating										
Eichhornia crassipes (Mart) Solms.	95	78	98	87	**358**	40	32	80.00%	11.19	8.95
Pistia stratiotes L.	2	1	0	1	**4**	40	3	7.50%	1.33	0.10
Lemna perpusilla Torry	1	1	0	0	**2**	40	2	5.00%	1.00	0.05
Azolla pinnata R.Br.	1	3	0	1	**5**	40	3	7.50%	1.67	0.13
Salvinia natans (L) All.	7	4	2	1	**14**	40	8	20.00%	1.75	0.35
Salvinia cucullata	3	3	2	1	**9**	40	6	15.00%	1.50	0.23
Spirodela polyrrhiza (L) Schleiden	1	2	0	0	**3**	40	2	5.00%	1.50	0.08
Wolffia globasa	1	0	0	0	**1**	40	1	2.50%	1.00	0.03
Submerged (anchored)										
Hydrilla verticillata (L.f.) Royle	11	8	5	4	**28**	40	20	50.00%	1.40	0.70
Potamogeton crispus	7	9	6	4	**26**	40	20	50.00%	1.30	0.65

Vallisneria spiralis	8	7	4	4	**23**	40	17	42.50%	1.35	0.58
Vallisneria natans (Lour) H.Hara	3	5	1	3	**12**	40	8	20.00%	1.50	0.30
Submerged (suspended)										
Cerratophyllum demersum Linn.	11	7	3	5	**26**	40	17	42.50%	1.53	0.65
Utricularia exoleta R.Br	2	2	2	3	**9**	40	6	15.00%	1.50	0.23
Rooted Floating Shoot										
Ipomoea aquatic Forsk	6	5	2	2	**15**	40	8	20.00%	1.88	0.38
Hygroryza aristata (Retzius) Nees	7	7	1	3	**18**	40	9	22.50%	2.00	0.45
Rooted Floating Leaves										
Nymphaea lotus Linn.	10	7	4	4	**25**	40	14	35.00%	1.79	0.63
Nymphaea rubra Roxb. Ex Salibs	6	8	3	5	**22**	40	17	42.50%	1.29	0.55
Trapa natans L.	9	7	5	5	**26**	40	16	40.00%	1.63	0.65
Emargents										
Alternanthera philoxeroides (Mart.) Griseb.	3	2	3	3	**11**	40	5	12.50%	2.20	0.28
Vetiveria zizanoides	1	1	0	1	**3**	40	2	5.00%	1.50	0.08
*Cyperus bravifolius (*Rottb.)Hassk.	6	1	0	2	**9**	40	8	20.00%	1.13	0.23
Cyperus iria	1	1	0	2	**4**	40	2	5.00%	2.00	0.10
Cyperus compressus Linn.	1	0	2	2	**5**	40	3	7.50%	1.67	0.13
Cyperus corymbosus Rottb.	1	0	0	2	**3**	40	2	5.00%	1.50	0.08
Hymenachne assamica Hitch	8	1	1	0	**10**	40	6	15.00%	1.67	0.25
Echinodorus angustifolius	4	2	2	1	**9**	40	4	10.00%	2.25	0.23

Ipomoea fistulosa Mart.ex. Choisy	7	1	2	2	**12**	40	8	20.00%	1.50	0.30
Scirpus eriophorum	4	0	0	1	**5**	40	3	7.50%	1.67	0.13
Marselia quadrifolia L.	10	0	0	4	**14**	40	7	17.50%	2.00	0.35
Monochoria hastata (L) Solm.	2	0	2	2	**6**	40	5	12.50%	1.20	0.15
Monochoria (Barm.f) Presl.	7	0	2	4	**13**	40	8	20.00%	1.63	0.33
Polygonum barbatum Linn.	6	0	2	3	**11**	40	9	22.50%	1.22	0.28
Polygonum hydropiper Linn.	5	1	2	3	**11**	40	8	20.00%	1.38	0.28
Polygonum blabrum Willd.	6	1	3	2	**12**	40	9	22.50%	1.33	0.30
Sagittaria trifolia L.	4	2	1	1	**8**	40	5	12.50%	1.60	0.20
Cynodon dactylon L.	2	2	0	2	**6**	40	4	10.00%	1.50	0.15
Digitaria ciliaris	1	1	0	3	**5**	40	3	7.50%	1.67	0.13
Portulaca oleracea L.	1	0	0	2	**3**	40	2	5.00%	1.50	0.08
Brachiaria mutica (Forssk.) Stapf	9	0	2	1	**12**	40	6	15.00%	2.00	0.30
Eragrostis unioloides	9	2	1	2	**14**	40	9	22.50%	1.56	0.35
Hemarthria compressa L	2	2	1	1	**6**	40	3	7.50%	2.00	0.15
Pogonatherum crinitum	4	2	0	0	**6**	40	4	10.00%	1.50	0.15
Centella asiatica	4	2	2	0	**8**	40	5	12.50%	1.60	0.20
Hydrocotyle sibthorpioides	0	2	1	1	**4**	40	2	5.00%	2.00	0.10
Colocasia esculenta (L.) Schott	3	3	2	5	**13**	40	6	15.00%	2.17	0.33
Commelina benghalensis L.	2	2	3	2	**9**	40	8	20.00%	1.13	0.23
	304	**195**	**172**	**187**	**858**	**1880**	**355**	**347.50%**	**84.14**	**21.45**

Table no. 29 (continuous 3 part tables)

	2014-2015 ***Density and Abundance* in Winter** **(December, January & February)** **Quadrat number in each site = 10** **Total Quadrats = 10 x 4 sides = 40** **Quadrat size = 2 sq m**									
	Site-I, (North)	**Site-II, (South)**	**Site-III, (East)**	**Site-IV, (West)**	**Total no of species (S)**	**Total no of quadrats studied (Q)**	**No of quadrates of species occurrence. (P)**	**Frequency = P/40×100%**	**Abundance A = S/P**	**Density D = S/Q**
Floating										
Eichhornia crassipes (Mart) Solms.	100	97	71	45	**313**	40	36	90.00%	8.69	7.83
Pistia stratiotes L.	0	3	2	0	**5**	40	3	7.50%	1.67	0.13
Lemna perpusilla Torry	0	0	0	1	**1**	40	1	2.50%	1.00	0.03
Azolla pinnata R.Br.	5	0	1	2	**8**	40	5	12.50%	1.60	0.20
Salvinia natans (L) All.	4	2	2	1	**9**	40	6	15.00%	1.50	0.23
Salvinia cucullata	2	4	3	0	**9**	40	7	17.50%	1.29	0.23
Spirodela polyrrhiza (L) Schleiden	1	0	0	0	**1**	40	1	2.50%	1.00	0.03
Wolffia globasa	0	0	2	0	**2**	40	1	2.50%	2.00	0.05
Submerged (anchored)										
Hydrilla verticillata (L.f.) Royle	9	7	5	4	**25**	40	21	52.50%	1.19	0.63

Potamogeton crispus	4	5	4	4	**17**	40	13	32.50%	1.31	0.43
Vallisneria spiralis	4	4	6	4	**18**	40	13	32.50%	1.38	0.45
Vallisneria natans (Lour) H.Hara	1	2	7	8	**18**	40	7	17.50%	2.57	0.45
Submerged (suspended)										
Cerratophyllum demersum Linn.	7	5	10	4	**26**	40	9	22.50%	2.89	0.65
Utricularia exoleta R.Br	3	2	7	3	**15**	40	12	30.00%	1.25	0.38
Rooted Floating Shoot										
Ipomoea aquatic Forsk	1	2	2	3	**8**	40	5	12.50%	1.60	0.20
Hygroryza aristata (Retzius) Nees	0	10	9	8	**27**	40	16	40.00%	1.69	0.68
Rooted Floating Leaves										
Nymphaea lotus Linn.	10	7	2	5	**24**	40	13	32.50%	1.85	0.60
Nymphaea rubra Roxb. Ex Salibs	10	2	5	6	**23**	40	18	45.00%	1.28	0.58
Trapa natans L.	6	4	3	5	**18**	40	15	37.50%	1.20	0.45
Emargents										
Alternanthera philoxeroides (Mart.) Griseb.	3	1	0	0	**4**	40	2	5.00%	2.00	0.10
Vetiveria zizanoides	1	1	0	2	**4**	40	2	5.00%	2.00	0.10
*Cyperus bravifolius (*Rottb.*)*Hassk.	5	1	0	1	**7**	40	4	10.00%	1.75	0.18
Cyperus iria	2	2	0	3	**7**	40	5	12.50%	1.40	0.18
Cyperus compressus Linn.	2	4	2	1	**9**	40	6	15.00%	1.50	0.23
Cyperus corymbosus Rottb.	3	5	3	1	**12**	40	9	22.50%	1.33	0.30
Hymenachne assamica Hitch	3	0	0	2	**5**	40	3	7.50%	1.67	0.13
Echinodorus angustifolius	4	2	0	4	**10**	40	9	22.50%	1.11	0.25
Ipomoea fistulosa Mart.ex. Choisy	3	4	0	0	**7**	40	5	12.50%	1.40	0.18
Scirpus eriophorum	2	0	2	1	**5**	40	3	7.50%	1.67	0.13

Marselia quadrifolia L.	3	10	10	7	**30**	40	23	57.50%	1.30	0.75
Monochoria hastata (L) Solm.	0	10	4	0	**14**	40	12	30.00%	1.17	0.35
Monochoria (Barm.f) Presl.	0	2	2	4	**8**	40	5	12.50%	1.60	0.20
Polygonum barbatum Linn.	5	5	4	4	**18**	40	14	35.00%	1.29	0.45
Polygonum hydropiper Linn.	3	2	3	2	**10**	40	6	15.00%	1.67	0.25
Polygonum blabrum Willd.	6	4	2	3	**15**	40	12	30.00%	1.25	0.38
Sagittaria trifolia L.	0	0	1	1	**2**	40	2	5.00%	1.00	0.05
Cynodon dactylon L.	1	0	0	0	**1**	40	1	2.50%	1.00	0.03
Digitaria ciliaris	0	0	2	0	**2**	40	2	5.00%	1.00	0.05
Portulaca oleracea L.	0	2	0	0	**2**	40	2	5.00%	1.00	0.05
Brachiaria mutica (Forssk.) Stapf	2	0	4	4	**10**	40	5	12.50%	2.00	0.25
Eragrostis unioloides	0	0	3	4	**7**	40	5	12.50%	1.40	0.18
Hemarthria compressa L	0	1	0	2	**3**	40	2	5.00%	1.50	0.08
Pogonatherum crinitum	0	0	6	3	**9**	40	5	12.50%	1.80	0.23
Centella asiatica	2	1	4	5	**12**	40	8	20.00%	1.50	0.30
Hydrocotyle sibthorpioides	0	0	4	6	**10**	40	6	15.00%	1.67	0.25
Colocasia esculenta (L.) Schott	3	2	0	0	**5**	40	3	7.50%	1.67	0.13
Commelina benghalensis L.	2	1	0	0	**3**	40	2	5.00%	1.50	0.08
	222	**216**	**197**	**163**	**798**	**1880**	**365**	**912.50%**	**78.09**	**19.95**

Table no. 30 (continuous 3 parts table)

Sl no.	Macrophyte flora of Diplai Beel	**2015-2016** Density and Abundance **in Pre Monsoon (March, April & May) Quadrat number in each site = 10 Total Quadrat= 10 x 4 side = 40 Quadrat size = 2 sq m**									
		Site-I, (North)	**Site-II, (South)**	**Site-III, (East)**	**Site-IV, (West)**	**Total no of species (S)**	**Total no of quadrats studied (Q)**	**No of quadrates of plants occurrence. (P)**	**Frequency = P/40×100%**	**Abundance A = S/P**	**Density D = S/Q**
	Floating										
1	*Eichhornia crassipes* (Mart) Solms.	120	38	94	78	**330**	40	32	80.00%	10.31	8.25
2	*Pistia stratiotes* L.	0	1	1	2	**4**	40	3	7.50%	1.33	0.10
3	*Lemna perpusilla* Torry	0	1	1	0	**2**	40	2	5.00%	1.00	0.05
4	*Azolla pinnata* R.Br.	2	2	0	3	**7**	40	3	7.50%	2.33	0.18
5	*Salvinia natans* (L) All.	3	2	0	2	**7**	40	4	10.00%	1.75	0.18
6	*Salvinia cucullata*	1	2	0	0	**3**	40	3	7.50%	1.00	0.08
7	*Spirodela polyrrhiza* (L) Schleiden	2	1	2	2	**7**	40	5	12.50%	1.40	0.18
8	*Wolffia globasa*	1	2	2	1	**6**	40	3	7.50%	2.00	0.15
	Submerged (anchored)								0.00%		
9	*Hydrilla verticillata* (L.f.) Royle	3	12	12	15	**42**	40	34	85.00%	1.24	1.05
10	*Potamogeton crispus*	4	3	16	10	**33**	40	24	60.00%	1.38	0.83
11	*Vallisneria spiralis*	2	10	15	8	**35**	40	13	32.50%	2.69	0.88

12	*Vallisneria natans* (Lour) H.Hara		9	4	9	**22**	40	17	42.50%	1.29	0.55
	Submerged (suspended)								0.00%		
13	*Cerratophyllum demersum* Linn.	10	10	14	10	**44**	40	9	22.50%	4.89	1.10
14	*Utricularia exoleta* R.Br	4	14	4	7	**29**	40	16	40.00%	1.81	0.73
	Rooted Floating Shoot								0.00%		
15	*Ipomoea aquatic* Forsk	5	0	1	5	**11**	40	6	15.00%	1.83	0.28
16	*Hygroryza aristata* (Retzius) Nees	5	0	1	0	**6**	40	3	7.50%	2.00	0.15
	Rooted Floating Leaves								0.00%		
17	*Nymphaea lotus* Linn.	18	7	10	12	**47**	40	25	62.50%	1.88	1.18
18	*Nymphaea rubra* Roxb. Ex Salibs	16	12	10	10	**48**	40	36	90.00%	1.33	1.20
19	*Trapa natans* L.	14	13	10	10	**47**	40	25	62.50%	1.88	1.18
	Emargents								0.00%		
20	*Alternanthera philoxeroides* (Mart.) Griseb.	10	10	6	0	**26**	40	13	32.50%	2.00	0.65
21	*Vetiveria zizanoides*	0	2	2	4	**8**	40	4	10.00%	2.00	0.20
22	*Cyperus bravifolius (*Rottb.*)*Hassk.	2	3	1	1	**7**	40	3	7.50%	2.33	0.18
23	*Cyperus iria*	1	0	0	1	**2**	40	2	5.00%	1.00	0.05
24	*Cyperus compressus* Linn.	0	10	0	1	**11**	40	7	17.50%	1.57	0.28
25	*Cyperus corymbosus* Rottb.	0	0	0	1	**1**	40	1	2.50%	1.00	0.03
26	*Hymenachne assamica* Hitch	1	10	1	0	**12**	40	7	17.50%	1.71	0.30
27	*Echinodorus angustifolius*	2	11	2	2	**17**	40	12	30.00%	1.42	0.43
28	*Ipomoea fistulosa* Mart.ex. Choisy	4	0	3	2	**9**	40	7	17.50%	1.29	0.23
29	*Scirpus eriophorum*	5	0	1	1	**7**	40	4	10.00%	1.75	0.18

30	*Marselia quadrifolia* L.	18	11	20	10	**59**	40	32	80.00%	1.84	1.48
31	*Monochoria hastata* (L) Solm.	5	0	10	0	**15**	40	12	30.00%	1.25	0.38
32	*Monochoria* (Barm.f) Presl.	10	0	12	0	**22**	40	15	37.50%	1.47	0.55
33	*Polygonum barbatum* Linn.	10	15	10	0	**35**	40	23	57.50%	1.52	0.88
34	*Polygonum hydropiper Linn.*	11	0	2	0	**13**	40	8	20.00%	1.63	0.33
35	*Polygonum blabrum* Willd.	19	3	3	1	**26**	40	13	32.50%	2.00	0.65
36	*Sagittaria trifolia* L.	2	4	0	0	**6**	40	4	10.00%	1.50	0.15
37	*Cynodon dactylon* L.	1	0	0	1	**2**	40	2	5.00%	1.00	0.05
38	*Digitaria ciliaris*	10	12	0	1	**23**	40	13	32.50%	1.77	0.58
39	*Portulaca oleracea L.*	17	1	0	0	**18**	40	13	32.50%	1.38	0.45
40	*Brachiaria mutica* (Forssk.) Stapf	12	10	10	0	**32**	40	25	62.50%	1.28	0.80
41	*Eragrostis unioloides*	10	0	3	0	**13**	40	8	20.00%	1.63	0.33
42	*Hemarthria compressa* L	1	19	0	0	**20**	40	12	30.00%	1.67	0.50
43	*Pogonatherum crinitum*	2	12	5	2	**21**	40	14	35.00%	1.50	0.53
44	*Centella asiatica*	12	12	2	15	**41**	40	34	85.00%	1.21	1.03
45	*Hydrocotyle sibthorpioides*	8	2	6	0	**16**	40	12	30.00%	1.33	0.40
46	*Colocasia esculenta* (L.) Schott	9	3	1	1	**14**	40	8	20.00%	1.75	0.35
47	*Commelina benghalensis* L.	6	7	1	1	**15**	40	9	22.50%	1.67	0.38
		398	**296**	**298**	**229**	**1221**	**1880**	**580**	**1450.00%**	**86.81**	**30.53**

Table no. 31 (continuous 3 parts table)

Sl no.	Macrophyte flora of Diplai Beel	**2015-2016** Density and Abundance **in Monsoon (June, July & August) Quadrat number in each site = 10 Total Quadrat = 10 x 4 side = 40 Quadrat size = 2 sq m**									
		Site-I, (North)	**Site-II, (South)**	**Site-III, (East)**	**Site-IV, (West)**	**Total no of species (S)**	**Total no of quadrats studied (Q)**	**No of quadrates of plants occurrence. (P)**	**Frequency = P/40×100%**	**Abundance A = S/P**	**Density D = S/Q**
	Floating										
1	*Eichhornia crassipes* (Mart) Solms.	130	130	101	110	**471**	40	40	100.00%	11.78	11.78
2	*Pistia stratiotes* L.	9	7	3	10	**29**	40	21	52.50%	1.38	0.73
3	*Lemna perpusilla* Torry	3	3	5	9	**20**	40	14	35.00%	1.43	0.50
4	*Azolla pinnata* R.Br.	10	3	10	13	**36**	40	23	57.50%	1.57	0.90
5	*Salvinia natans* (L) All.	3	10	2	3	**18**	40	25	62.50%	0.72	0.45
6	*Salvinia cucullata*	9	13	10	9	**41**	40	23	57.50%	1.78	1.03
7	*Spirodela polyrrhiza* (L) Schleiden	3	4	3	3	**13**	40	12	30.00%	1.08	0.33
8	*Wolffia globasa*	2	1	2	1	**6**	40	4	10.00%	1.50	0.15
	Submerged (anchored)										
9	*Hydrilla verticillata* (L.f.) Royle	12	9	9	10	**40**	40	23	57.50%	1.74	1.00
10	*Potamogeton crispus*	13	13	15	10	**51**	40	24	60.00%	2.13	1.28
11	*Vallisneria spiralis*	7	7	3	2	**19**	40	9	22.50%	2.11	0.48

12	*Vallisneria natans* (Lour) H.Hara	10	0	0	1	**11**	40	9	22.50%	1.22	0.28
	Submerged (suspended)										
13	*Cerratophyllum demersum* Linn.	12	4	10	18	**44**	40	34	85.00%	1.29	1.10
14	*Utricularia exoleta* R.Br	1	0	0	0	**1**	40	1	2.50%	1.00	0.03
	Rooted Floating Shoot								0.00%		
15	*Ipomoea aquatic* Forsk	1	12	13	11	**37**	40	12	30.00%	3.08	0.93
16	*Hygroryza aristata* (Retzius) Nees	10	12	13	10	**45**	40	37	92.50%	1.22	1.13
	Rooted Floating Leaves										
17	*Nymphaea lotus* Linn.	11	10	2	3	**26**	40	18	45.00%	1.44	0.65
18	*Nymphaea rubra* Roxb. Ex Salibs	5	3	2	6	**16**	40	12	30.00%	1.33	0.40
19	*Trapa natans* L.	2	0	0	2	**4**	40	3	7.50%	1.33	0.10
	Emargents										
20	*Alternanthera philoxeroides* (Mart.) Griseb.	2	4	3	0	**9**	40	7	17.50%	1.29	0.23
21	*Vetiveria zizanoides*	2	5	3	2	**12**	40	9	22.50%	1.33	0.30
22	*Cyperus bravifolius (*Rottb.*)*Hassk.	1	3	2	1	**7**	40	4	10.00%	1.75	0.18
23	*Cyperus iria*	1	4	2	5	**12**	40	8	20.00%	1.50	0.30
24	*Cyperus compressus* Linn.	3	9	2	5	**19**	40	12	30.00%	1.58	0.48
25	*Cyperus corymbosus* Rottb.	2	3	2	1	**8**	40	5	12.50%	1.60	0.20
26	*Hymenachne assamica* Hitch	10	3	3	2	**18**	40	9	22.50%	2.00	0.45
27	*Echinodorus angustifolius*	0	0	0	1	**1**	40	1	2.50%	1.00	0.03
28	*Ipomoea fistulosa* Mart.ex. Choisy	3	8	4	1	**16**	40	12	30.00%	1.33	0.40

29	*Scirpus eriophorum*	0	0	2	3	**5**	40	3	7.50%	1.67	0.13
30	*Marselia quadrifolia* L.	9	3	7	3	**22**	40	12	30.00%	1.83	0.55
31	*Monochoria hastata* (L) Solm.	5	3	3	5	**16**	40	14	35.00%	1.14	0.40
32	*Monochoria* (Barm.f) Presl.	9	2	3	2	**16**	40	12	30.00%	1.33	0.40
33	*Polygonum barbatum* Linn.	5	5	3	5	**18**	40	9	22.50%	2.00	0.45
34	*Polygonum hydropiper Linn.*	2	3	5	3	**13**	40	7	17.50%	1.86	0.33
35	*Polygonum blabrum* Willd.	0	0	2	0	**2**	40	2	5.00%	1.00	0.05
36	*Sagittaria trifolia* L.	10	3	5	3	**21**	40	14	35.00%	1.50	0.53
37	*Cynodon dactylon* L.	0	0	2	2	**4**	40	2	5.00%	2.00	0.10
38	*Digitaria ciliaris*	0	0	0	1	**1**	40	1	2.50%	1.00	0.03
39	*Portulaca oleracea L.*	1	1	1	1	**4**	40	3	7.50%	1.33	0.10
40	*Brachiaria mutica* (Forssk.) Stapf	10	3	12	13	**38**	40	26	65.00%	1.46	0.95
41	*Eragrostis unioloides*	3	3	4	4	**14**	40	14	35.00%	1.00	0.35
42	*Hemarthria compressa* L	2	2	3	3	**10**	40	7	17.50%	1.43	0.25
43	*Pogonatherum crinitum*	0	10	9	3	**22**	40	12	30.00%	1.83	0.55
44	*Centella asiatica*	3	4	5	3	**15**	40	12	30.00%	1.25	0.38
45	*Hydrocotyle sibthorpioides*	2	1	1	1	**5**	40	3	7.50%	1.67	0.13
46	*Colocasia esculenta* (L.) Schott	2	3	5	3	**13**	40	7	17.50%	1.86	0.33
47	*Commelina benghalensis* L.	4	3	4	0	**11**	40	6	15.00%	1.83	0.28
		344	**329**	**300**	**307**	**1280**	**1880**	**577**	**1442.50%**	**81.52**	**32.00**

Table no. 32 (continuous 3 parts table)

Sl. No.	Macrophyte flora of Diplai Beel	2015-2016 Density and Abundance **in Post Monsoon (September, October & November) Quadrat number in each site = 10 Total Quadrat= 10 x 4 side = 40 Quadrat size = 2 sq m**									
		Site-I, (North)	**Site-II, (South)**	**Site-III, (East)**	**Site-IV, (West)**	**Total no of species (S)**	**Total no of quadrats studied (Q)**	**No of quadrates of plants occurrence. (P)**	**Frequency = P/40×100%**	**Abundance A = S/P**	**Density D = S/Q**
	Floating										
1	*Eichhornia crassipes* (Mart) Solms.	80	80	110	70	**340**	40	36	90.00%	9.44	8.50
2	*Pistia stratiotes* L.	0	1	2	3	**6**	40	4	10.00%	1.50	0.15
3	*Lemna perpusilla* Torry	1	2	3	0	**6**	40	4	10.00%	1.50	0.15
4	*Azolla pinnata* R.Br.	2	3	4	2	**11**	40	7	17.50%	1.57	0.28
5	*Salvinia natans* (L) All.	0	2	5	4	**11**	40	9	22.50%	1.22	0.28
6	*Salvinia cucullata*	6	0	2	1	**9**	40	2	5.00%	4.50	0.23
7	*Spirodela polyrrhiza* (L) Schleiden	1	1	2	2	**6**	40	3	7.50%	2.00	0.15
8	*Wolffia globasa*	0	0	0	2	**2**	40	2	5.00%	1.00	0.05
	Submerged (anchored)										
9	*Hydrilla verticillata* (L.f.) Royle	13	10	7	10	**40**	40	23	57.50%	1.74	1.00
10	*Potamogeton crispus*	8	8	8	5	**29**	40	21	52.50%	1.38	0.73

11	*Vallisneria spiralis*	5	6	6	12	**29**	40	21	52.50%	1.38	0.73
12	*Vallisneria natans* (Lour) H.Hara	8	5	1	2	**16**	40	7	17.50%	2.29	0.40
	Submerged (suspended)										
13	*Cerratophyllum demersum* Linn.	9	7	2	5	**23**	40	13	32.50%	1.77	0.58
14	*Utricularia exoleta* R.Br	3	5	3	2	**13**	40	10	25.00%	1.30	0.33
	Rooted Floating Shoot										
15	*Ipomoea aquatic* Forsk	2	0	2	1	**5**	40	3	7.50%	1.67	0.13
16	*Hygroryza aristata* (Retzius) Nees	6	6	1	2	**15**	40	8	20.00%	1.88	0.38
	Rooted Floating Leaves										
17	*Nymphaea lotus* Linn.	11	10	3	3	**27**	40	21	52.50%	1.29	0.68
18	*Nymphaea rubra* Roxb. Ex Salibs	7	10	4	2	**23**	40	21	52.50%	1.10	0.58
19	*Trapa natans* L.	10	7	3	3	**23**	40	12	30.00%	1.92	0.58
	Emargents										
20	*Alternanthera philoxeroides* (Mart.) Griseb.	8	4	3	3	**18**	40	14	35.00%	1.29	0.45
21	*Vetiveria zizanoides*	2	2	2	1	**7**	40	3	7.50%	2.33	0.18
22	*Cyperus bravifolius (*Rottb.*)*Hassk.	3	5	2	0	**10**	40	7	17.50%	1.43	0.25
23	*Cyperus iria*	1	3	1	0	**5**	40	3	7.50%	1.67	0.13
24	*Cyperus compressus* Linn.	2	0	2	0	**4**	40	2	5.00%	2.00	0.10
25	*Cyperus corymbosus* Rottb.	1	0	1	0	**2**	40	2	5.00%	1.00	0.05
26	*Hymenachne assamica* Hitch	8	0	3	0	**11**	40	9	22.50%	1.22	0.28
27	*Echinodorus angustifolius*	10	0	2	4	**16**	40	21	52.50%	0.76	0.40
28	*Ipomoea fistulosa* Mart.ex. Choisy	3	2	0	0	**5**	40	3	7.50%	1.67	0.13

29	*Scirpus eriophorum*	4	2	1	0	**7**	40	4	10.00%	1.75	0.18
30	*Marselia quadrifolia* L.	10	1	0	4	**15**	40	12	30.00%	1.25	0.38
31	*Monochoria hastata* (L) Solm.	2	5	4	4	**15**	40	13	32.50%	1.15	0.38
32	*Monochoria* (Barm.f) Presl.	8	2	1	4	**15**	40	8	20.00%	1.88	0.38
33	*Polygonum barbatum* Linn.	0	1	3	0	**4**	40	2	5.00%	2.00	0.10
34	*Polygonum hydropiper Linn.*	0	1	2	1	**4**	40	2	5.00%	2.00	0.10
35	*Polygonum blabrum* Willd.	0	1	5	1	**7**	40	4	10.00%	1.75	0.18
36	*Sagittaria trifolia* L.	4	2	3	1	**10**	40	6	15.00%	1.67	0.25
37	*Cynodon dactylon* L.	0	2	2	0	**4**	40	2	5.00%	2.00	0.10
38	*Digitaria ciliaris*	1	1	0	1	**3**	40	3	7.50%	1.00	0.08
39	*Portulaca oleracea L.*	0	5	0	1	**6**	40	3	7.50%	2.00	0.15
40	*Brachiaria mutica (Forssk.) Stapf*	9	3	0	1	**13**	40	12	30.00%	1.08	0.33
41	*Eragrostis unioloides*	8	0	1	0	**9**	40	6	15.00%	1.50	0.23
42	*Hemarthria compressa* L	2	0	2	1	**5**	40	4	10.00%	1.25	0.13
43	*Pogonatherum crinitum*	5	0	1	0	**6**	40	3	7.50%	2.00	0.15
44	*Centella asiatica*	5	0	0	0	**5**	40	3	7.50%	1.67	0.13
45	*Hydrocotyle sibthorpioides*	2	2	0	1	**5**	40	2	5.00%	2.50	0.13
46	*Colocasia esculenta* (L.) Schott	3	4	2	2	**11**	40	7	17.50%	1.57	0.28
47	*Commelina benghalensis* L.	2	2	3	1	**8**	40	6	15.00%	1.33	0.20
		275	**213**	**214**	**162**	**864**	**1880**	**393**	**982.50%**	**85.15**	**21.60**

Table no. 33 (continuous 3 parts table)

Sl. no.	Macrophyte flora of Diplai Beel	**2015-2016** Density and Abundance **in Winter (December, January & February) Quadrat number in each site = 10 Total Quadrat= 10 x 4 side = 40 Quadrat size = 2 sq m**									
		Site-I, (North)	**Site-II, (South)**	**Site-III, (East)**	**Site-IV, (West)**	**Total no of species (S)**	**Total no of quadrats studied (Q)**	**No of quadrates of plants occurrence. (P)**	**Frequency = P/40×100%**	**Abundance A = S/P**	**Density D = S/Q**
	Floating										
1	*Eichhornia crassipes* (Mart) Solms.	85	70	38	41	**234**	40	34	85.00%	6.88	5.85
2	*Pistia stratiotes* L.	1	0	1	7	**9**	40	5	12.50%	1.80	0.23
3	*Lemna perpusilla* Torry	2	0	1	2	**5**	40	3	7.50%	1.67	0.13
4	*Azolla pinnata* R.Br.	0	4	4	3	**11**	40	7	17.50%	1.57	0.28
5	*Salvinia natans* (L) All.	4	2	2	4	**12**	40	9	22.50%	1.33	0.30
6	*Salvinia cucullata*	5	4	0	3	**12**	40	9	22.50%	1.33	0.30
7	*Spirodela polyrrhiza* (L) Schleiden	2	0	3	2	**7**	40	4	10.00%	1.75	0.18
8	*Wolffia globasa*	0	0	1	1	**2**	40	2	5.00%	1.00	0.05
	Submerged (anchored)										
9	*Hydrilla verticillata* (L.f.) Royle	10	6	7	5	**28**	40	13	32.50%	2.15	0.70
10	*Potamogeton crispus*	4	3	8	4	**19**	40	16	40.00%	1.19	0.48
11	*Vallisneria spiralis*	5	4	3	5	**17**	40	14	35.00%	1.21	0.43

12	*Vallisneria natans* (Lour) H.Hara	2	3	6	8	**19**	40	14	35.00%	1.36	0.48
	Submerged (suspended)										
13	*Cerratophyllum demersum* Linn.	6	4	12	4	**26**	40	16	40.00%	1.63	0.65
14	*Utricularia exoleta* R.Br	4	2	10	3	**19**	40	14	35.00%	1.36	0.48
	Rooted Floating Shoot										
15	*Ipomoea aquatic* Forsk	2	3	2	0	**7**	40	3	7.50%	2.33	0.18
16	*Hygroryza aristata* (Retzius) Nees	0	10	3	4	**17**	40	12	30.00%	1.42	0.43
	Rooted Floating Leaves										
17	*Nymphaea lotus* Linn.	21	6	6	4	**37**	40	18	45.00%	2.06	0.93
18	*Nymphaea rubra* Roxb. Ex Salibs	15	2	6	3	**26**	40	16	40.00%	1.63	0.65
19	*Trapa natans* L.	10	4	2	4	**20**	40	17	42.50%	1.18	0.50
	Emargents										
20	*Alternanthera philoxeroides* (Mart.) Griseb.	8	0	0	1	**9**	40	7	17.50%	1.29	0.23
21	*Vetiveria zizanoides*	2	0	0	1	**3**	40	2	5.00%	1.50	0.08
22	*Cyperus bravifolius (*Rottb.*)*Hassk.	6	0	1	1	**8**	40	6	15.00%	1.33	0.20
23	*Cyperus iria*	4	2	0	1	**7**	40	3	7.50%	2.33	0.18
24	*Cyperus compressus* Linn.	4	3	0	1	**8**	40	5	12.50%	1.60	0.20
25	*Cyperus corymbosus* Rottb.	3	4	0	1	**8**	40	5	12.50%	1.60	0.20
26	*Hymenachne assamica* Hitch	2	1	0	0	**3**	40	2	5.00%	1.50	0.08
27	*Echinodorus angustifolius*	4	0	0	2	**6**	40	4	10.00%	1.50	0.15
28	*Ipomoea fistulosa* Mart.ex. Choisy	0	3	0	2	**5**	40	4	10.00%	1.25	0.13
29	*Scirpus eriophorum*	0	1	0	1	**2**	40	2	5.00%	1.00	0.05

30	*Marselia quadrifolia* L.	1	9	10	10	**30**	40	25	62.50%	1.20	0.75
31	*Monochoria hastata* (L) Solm.	8	18	7	0	**33**	40	13	32.50%	2.54	0.83
32	*Monochoria* (Barm.f) Presl.	5	9	2	10	**26**	40	18	45.00%	1.44	0.65
33	*Polygonum barbatum* Linn.	3	3	3	0	**9**	40	4	10.00%	2.25	0.23
34	*Polygonum hydropiper Linn.*	1	2	0	0	**3**	40	2	5.00%	1.50	0.08
35	*Polygonum blabrum* Willd.	4	1	0	1	**6**	40	4	10.00%	1.50	0.15
36	*Sagittaria trifolia* L.	6	4	2	0	**12**	40	6	15.00%	2.00	0.30
37	*Cynodon dactylon* L.	0	1	0	0	**1**	40	1	2.50%	1.00	0.03
38	*Digitaria ciliaris*	4	1	0	1	**6**	40	3	7.50%	2.00	0.15
39	*Portulaca oleracea L.*	4	1	2	0	**7**	40	4	10.00%	1.75	0.18
40	*Brachiaria mutica* (Forssk.) Stapf	4	2	0	1	**7**	40	3	7.50%	2.33	0.18
41	*Eragrostis unioloides*	0	0	0	2	**2**	40	2	5.00%	1.00	0.05
42	*Hemarthria compressa* L	0	1	1	0	**2**	40	2	5.00%	1.00	0.05
43	*Pogonatherum crinitum*	1	2	2	2	**7**	40	4	10.00%	1.75	0.18
44	*Centella asiatica*	5	0	1	13	**19**	40	9	22.50%	2.11	0.48
45	*Hydrocotyle sibthorpioides*	2	0	1	2	**5**	40	2	5.00%	2.50	0.13
46	*Colocasia esculenta* (L.) Schott	2	3	1	3	**9**	40	4	10.00%	2.25	0.23
47	*Commelina benghalensis* L.	4	2	1	4	**11**	40	7	17.50%	1.57	0.28
		265	**200**	**149**	**167**	**781**	**1880**	**379**	**947.50%**	**81.44**	**19.53**

Table no. 34 (continuous 3 parts table)

spp No.	Macrophyte flora of Diplai Beel	2016-2017 Density and Abundance **in Pre Monsoon** **(March, April & May)** **Quadrat number in each site = 10** **Total Quadrat= 10 x 4 side = 40** **Quadrat size = 2 sq m**									
		Site-I, (North)	**Site-II, (South)**	**Site-III, (East)**	**Site-IV, (West)**	**Total no of species (S)**	**Total no of quadrats studied (Q)**	**No of quadrates of plants occurrence. (P)**	**Frequency = P/40×100%**	**Abundance A = S/P**	**Density D = S/Q**
	Floating										
1	*Eichhornia crassipes* (Mart) Solms.	100	30	102	121	**353**	40	26	65.00%	13.58	8.83
2	*Pistia stratiotes* L.	1	0	4	3	**8**	40	4	10.00%	2.00	0.20
3	*Lemna perpusilla* Torry	2	0	4	3	**9**	40	6	15.00%	1.50	0.23
4	*Azolla pinnata* R.Br.	1	1	1	2	**5**	40	3	7.50%	1.67	0.13
5	*Salvinia natans* (L) All.	2	6	2	0	**10**	40	7	17.50%	1.43	0.25
6	*Salvinia cucullata*	0	8	12	10	**30**	40	12	30.00%	2.50	0.75
7	*Spirodela polyrrhiza* (L) Schleiden	0	3	2	3	**8**	40	4	10.00%	2.00	0.20
8	*Wolffia globasa*	0	3	4	3	**10**	40	7	17.50%	1.43	0.25
	Submerged (anchored)										
9	*Hydrilla verticillata* (L.f.) Royle	4	6	3	5	**18**	40	12	30.00%	1.50	0.45
10	*Potamogeton crispus*	5	2	3	4	**14**	40	2	5.00%	7.00	0.35

11	*Vallisneria spiralis*	4	2	1	1	**8**	40	5	12.50%	1.60	0.20
12	*Vallisneria natans* (Lour) H.Hara	4	8	5	5	**22**	40	12	30.00%	1.83	0.55
	Submerged (suspended)										
13	*Cerratophyllum demersum* Linn.	9	4	7	2	**22**	40	16	40.00%	1.38	0.55
14	*Utricularia exoleta* R.Br	0	4	0	8	**12**	40	12	30.00%	1.00	0.30
	Rooted Floating Shoot					**0**			0.00%		
15	*Ipomoea aquatic* Forsk	0	2	2	1	**5**	40	3	7.50%	1.67	0.13
16	*Hygroryza aristata* (Retzius) Nees	9	1	5	3	**18**	40	14	35.00%	1.29	0.45
	Rooted Floating Leaves										
17	*Nymphaea lotus* Linn.	10	8	10	13	**41**	40	12	30.00%	3.42	1.03
18	*Nymphaea rubra* Roxb. Ex Salibs	15	4	12	12	**43**	40	24	60.00%	1.79	1.08
19	*Trapa natans* L.	12	9	9	12	**42**	40	25	62.50%	1.68	1.05
	Emargents										
20	*Alternanthera philoxeroides* (Mart.) Griseb.	4	8	1	3	**16**	40	10	25.00%	1.60	0.40
21	*Vetiveria zizanoides*	1	2	1	2	**6**	40	3	7.50%	2.00	0.15
22	*Cyperus bravifolius (*Rottb.*)*Hassk.	3	1	5	2	**11**	40	6	15.00%	1.83	0.28
23	*Cyperus iria*	0	2	7	3	**12**	40	8	20.00%	1.50	0.30
24	*Cyperus compressus* Linn.	0	8	4	9	**21**	40	13	32.50%	1.62	0.53
25	*Cyperus corymbosus* Rottb.	0	1	0	4	**5**	40	4	10.00%	1.25	0.13
26	*Hymenachne assamica* Hitch	0	5	1	1	**7**	40	3	7.50%	2.33	0.18
27	*Echinodorus angustifolius*	4	0	0	1	**5**	40	2	5.00%	2.50	0.13
28	*Ipomoea fistulosa* Mart.ex.	3	4	0	0	**7**	40	3	7.50%	2.33	0.18

	Choisy										
29	*Scirpus eriophorum*	4	0	0	2	**6**	40	3	7.50%	2.00	0.15
30	*Marselia quadrifolia* L.	15	4	5	4	**28**	40	15	37.50%	1.87	0.70
31	*Monochoria hastata* (L) Solm.	4	2	0	5	**11**	40	7	17.50%	1.57	0.28
32	*Monochoria* (Barm.f) Presl.	12	5	2	2	**21**	40	12	30.00%	1.75	0.53
33	*Polygonum barbatum* Linn.	10	2	5	8	**25**	40	13	32.50%	1.92	0.63
34	*Polygonum hydropiper Linn.*	9	0	4	5	**18**	40	15	37.50%	1.20	0.45
35	*Polygonum blabrum* Willd.	18	0	3	1	**22**	40	13	32.50%	1.69	0.55
36	*Sagittaria trifolia* L.	4	0	0	5	**9**	40	6	15.00%	1.50	0.23
37	*Cynodon dactylon* L.	2	0	0	0	**2**	40	2	5.00%	1.00	0.05
38	*Digitaria ciliaris*	0	1	0	0	**1**	40	1	2.50%	1.00	0.03
39	*Portulaca oleracea* L.	0	0	2	1	**3**	40	2	5.00%	1.50	0.08
40	*Brachiaria mutica* (Forssk.) Stapf	0	1	1	10	**12**	40	6	15.00%	2.00	0.30
41	*Eragrostis unioloides*	0	2	1	3	**6**	40	4	10.00%	1.50	0.15
42	*Hemarthria compressa* L	1	0	2	0	**3**	40	2	5.00%	1.50	0.08
43	*Pogonatherum crinitum*	1	2	0	1	**4**	40	3	7.50%	1.33	0.10
44	*Centella asiatica*	7	0	3	1	**11**	40	6	15.00%	1.83	0.28
45	*Hydrocotyle sibthorpioides*	0	1	0	0	**1**	40	1	2.50%	1.00	0.03
46	*Colocasia esculenta* (L.) Schott	4	4	2	5	**15**	40	7	17.50%	2.14	0.38
47	*Commelina benghalensis* L.	8	5	3	3	**19**	40	12	30.00%	1.58	0.48
		292	**161**	**240**	**292**	**985**	**1880**	**388**	**970.00%**	**97.11**	**24.63**

Table no. 35 (continuous 3 parts table)

spp No.	Macrophyte flora of Diplai Beel	2016-2017 Density and Abundance **in Monsoon** **(June, July & August)** **Quadrat number in each site = 10** **Total Quadrat= 10 x 4 side = 40** **Quadrat size = 2 sq m**									
		Site-I, (North)	**Site-II, (South)**	**Site-III, (East)**	**Site-IV, (West)**	**Total no of species (S)**	**Total no of quadrats studied (Q)**	**No of quadrates of plants occurrence. (P)**	**Frequency = P/40×100%**	**Abundance A = S/P**	**Density D = S/Q**
	Floating										
1	*Eichhornia crassipes* (Mart) Solms.	151	130	101	102	**484**	40	35	87.50%	13.83	12.10
2	*Pistia stratiotes* L.	10	3	13	5	**31**	40	14	35.00%	2.21	0.78
3	*Lemna perpusilla* Torry	8	5	10	5	**28**	40	12	30.00%	2.33	0.70
4	*Azolla pinnata* R.Br.	15	9	3	0	**27**	40	13	32.50%	2.08	0.68
5	*Salvinia natans* (L) All.	9	10	2	5	**26**	40	13	32.50%	2.00	0.65
6	*Salvinia cucullata*	10	9	7	3	**29**	40	18	45.00%	1.61	0.73
7	*Spirodela polyrrhiza* (L) Schleiden	3	2	2	3	**10**	40	6	15.00%	1.67	0.25
8	*Wolffia globasa*	0	0	1	0	**1**	40	1	2.50%	1.00	0.03
	Submerged (anchored)										
9	*Hydrilla verticillata* (L.f.) Royle	9	12	9	6	**36**	40	23	57.50%	1.57	0.90
10	*Potamogeton crispus*	7	13	10	2	**32**	40	23	57.50%	1.39	0.80

11	*Vallisneria spiralis*	13	10	11	1	**35**	40	14	35.00%	2.50	0.88
12	*Vallisneria natans* (Lour) H.Hara	8	6	6	3	**23**	40	13	32.50%	1.77	0.58
	Submerged (suspended)										
13	*Cerratophyllum demersum* Linn.	10	12	13	0	**35**	40	25	62.50%	1.40	0.88
14	*Utricularia exoleta* R.Br	2	3	12	1	**18**	40	15	37.50%	1.20	0.45
	Rooted Floating Shoot								0.00%		
15	*Ipomoea aquatic* Forsk	12	9	9	1	**31**	40	16	40.00%	1.94	0.78
16	*Hygroryza aristata* (Retzius) Nees	1	3	5	3	**12**	40	12	30.00%	1.00	0.30
	Rooted Floating Leaves										
17	*Nymphaea lotus* Linn.	10	10	10	4	**34**	40	25	62.50%	1.36	0.85
18	*Nymphaea rubra* Roxb. Ex Salibs	4	13	10	11	**38**	40	25	62.50%	1.52	0.95
19	*Trapa natans* L.	0	10	13	12	**35**	40	21	52.50%	1.67	0.88
	Emargents										
20	*Alternanthera philoxeroides* (Mart.) Griseb.	0	4	8	1	**13**	40	6	15.00%	2.17	0.33
21	*Vetiveria zizanoides*	0	9	6	0	**15**	40	12	30.00%	1.25	0.38
22	*Cyperus bravifolius (*Rottb.*)*Hassk.	1	5	12	3	**21**	40	13	32.50%	1.62	0.53
23	*Cyperus iria*	2	5	0	5	**12**	40	6	15.00%	2.00	0.30
24	*Cyperus compressus* Linn.	2	10	3	4	**19**	40	12	30.00%	1.58	0.48
25	*Cyperus corymbosus* Rottb.	1	5	2	4	**12**	40	7	17.50%	1.71	0.30
26	*Hymenachne assamica* Hitch	5	13	1	2	**21**	40	12	30.00%	1.75	0.53
27	*Echinodorus angustifolius*	0	0	0	1	**1**	40	1	2.50%	1.00	0.03
28	*Ipomoea fistulosa* Mart.ex.	0	4	0	4	**8**	40	5	12.50%	1.60	0.20

	Choisy										
29	*Scirpus eriophorum*	0	0	2	3	**5**	40	3	7.50%	1.67	0.13
30	*Marselia quadrifolia* L.	14	3	3	3	**23**	40	12	30.00%	1.92	0.58
31	*Monochoria hastata* (L) Solm.	13	3	1	7	**24**	40	13	32.50%	1.85	0.60
32	*Monochoria* (Barm.f) Presl.	6	12	1	3	**22**	40	14	35.00%	1.57	0.55
33	*Polygonum barbatum* Linn.	2	3	1	3	**9**	40	6	15.00%	1.50	0.23
34	*Polygonum hydropiper Linn.*	6	2	0	7	**15**	40	8	20.00%	1.88	0.38
35	*Polygonum blabrum* Willd.	2	0	0	3	**5**	40	3	7.50%	1.67	0.13
36	*Sagittaria trifolia* L.	2	3	0	4	**9**	40	5	12.50%	1.80	0.23
37	*Cynodon dactylon* L.	0	1	2	1	**4**	40	2	5.00%	2.00	0.10
38	*Digitaria ciliaris*	0	0	0	3	**3**	40	2	5.00%	1.50	0.08
39	*Portulaca oleracea L.*	0	2	1	7	**10**	40	8	20.00%	1.25	0.25
40	*Brachiaria mutica (Forssk.) Stapf*	1	4	0	7	**12**	40	5	12.50%	2.40	0.30
41	*Eragrostis unioloides*	0	3		3	**6**	40	3	7.50%	2.00	0.15
42	*Hemarthria compressa* L	2	2	4	1	**9**	40	7	17.50%	1.29	0.23
43	*Pogonatherum crinitum*	1	5	5	1	**12**	40	6	15.00%	2.00	0.30
44	*Centella asiatica*	0	2	9	3	**14**	40	12	30.00%	1.17	0.35
45	*Hydrocotyle sibthorpioides*	2	1	2	15	**20**	40	12	30.00%	1.67	0.50
46	*Colocasia esculenta* (L.) Schott	4	3	5	3	**15**	40	7	17.50%	2.14	0.38
47	*Commelina benghalensis* L.	3	4	3	3	**13**	40	9	22.50%	1.44	0.33
		351	**377**	**318**	**271**	**1317**	**1880**	**535**	**1337.50%**	**91.42**	**32.93**

Table no. 36 (continuous 3 parts table)

spp No.	Macrophyte flora of Diplai Beel	**2016-2017** Density and Abundance **in Post Monsoon (September, October & November) Quadrat number in each site = 10 Total Quadrat= 10 x 4 side = 40 Quadrat size = 2 sq m**									
		Site-I, (North)	**Site-II, (South)**	**Site-III, (East)**	**Site-IV, (West)**	**Total no of species (S)**	**Total no of quadrats studied (Q)**	**No of quadrates of plants occurrence. (P)**	**Frequency = P/40×100%**	**Abundance A = S/P**	**Density D = S/Q**
	Floating										
1	*Eichhornia crassipes* (Mart) Solms.	70	30	90	112	**302**	40	32	80.00%	9.44	7.55
2	*Pistia stratiotes* L.	1	0	1	8	**10**	40	7	17.50%	1.43	0.25
3	*Lemna perpusilla* Torry	1	0	2	14	**17**	40	12	30.00%	1.42	0.43
4	*Azolla pinnata* R.Br.	4	1	1	6	**12**	40	7	17.50%	1.71	0.30
5	*Salvinia natans* (L) All.	4	1	4	7	**16**	40	9	22.50%	1.78	0.40
6	*Salvinia cucullata*	4	0	2	3	**9**	40	4	10.00%	2.25	0.23
7	*Spirodela polyrrhiza* (L) Schleiden	2	0	0	3	**5**	40	2	5.00%	2.50	0.13
8	*Wolffia globasa*	0	0	0	1	**1**	40	1	2.50%	1.00	0.03
	Submerged (anchored)										
9	*Hydrilla verticillata* (L.f.) Royle	15	6	13	13	**47**	40	35	87.50%	1.34	1.18
10	*Potamogeton crispus*	7	2	8	10	**27**	40	14	35.00%	1.93	0.68
11	*Vallisneria spiralis*	5	2	7	2	**16**	40	9	22.50%	1.78	0.40

12	*Vallisneria natans* (Lour) H.Hara	7	8	2	5	**22**	40	12	30.00%	1.83	0.55
	Submerged (suspended)										
13	*Cerratophyllum demersum* Linn.	10	4	5	9	**28**	40	13	32.50%	2.15	0.70
14	*Utricularia exoleta* R.Br	4	4	9	6	**23**	40	24	60.00%	0.96	0.58
	Rooted Floating Shoot										
15	*Ipomoea aquatic* Forsk	0	1	2	7	**10**	40	5	12.50%	2.00	0.25
16	*Hygroryza aristata* (Retzius) Nees	3	1	1	9	**14**	40	5	12.50%	2.80	0.35
	Rooted Floating Leaves								0.00%		
17	*Nymphaea lotus* Linn.	10	8	9	12	**39**	40	24	60.00%	1.63	0.98
18	*Nymphaea rubra* Roxb. Ex Salibs	10	4	6	14	**34**	40	27	67.50%	1.26	0.85
19	*Trapa natans* L.	11	9	8	15	**43**	40	31	77.50%	1.39	1.08
	Emargents										
20	*Alternanthera philoxeroides* (Mart.) Griseb.	2	9	2	7	**20**	40	12	30.00%	1.67	0.50
21	*Vetiveria zizanoides*	0	2	3	3	**8**	40	3	7.50%	2.67	0.20
22	*Cyperus bravifolius (*Rottb.*)*Hassk.	6	1	1	7	**15**	40	13	32.50%	1.15	0.38
23	*Cyperus iria*	1	2	3	3	**9**	40	5	12.50%	1.80	0.23
24	*Cyperus compressus* Linn.	0	9	1	9	**19**	40	9	22.50%	2.11	0.48
25	*Cyperus corymbosus* Rottb.	0	1	2	2	**5**	40	3	7.50%	1.67	0.13
26	*Hymenachne assamica* Hitch	0	5	0	3	**8**	40	6	15.00%	1.33	0.20
27	*Echinodorus angustifolius*	12	7	5	2	**26**	40	20	50.00%	1.30	0.65
28	*Ipomoea fistulosa* Mart.ex. Choisy	3	0	2	10	**15**	40	12	30.00%	1.25	0.38

29	*Scirpus eriophorum*	2	2	1	1	**6**	40	3	7.50%	2.00	0.15
30	*Marselia quadrifolia* L.	10	9	1	6	**26**	40	12	30.00%	2.17	0.65
31	*Monochoria hastata* (L) Solm.	12	2	3	2	**19**	40	12	30.00%	1.58	0.48
32	*Monochoria* (Barm.f) Presl.	7	5	4	2	**18**	40	8	20.00%	2.25	0.45
33	*Polygonum barbatum* Linn.	2	0	2	3	**7**	40	4	10.00%	1.75	0.18
34	*Polygonum hydropiper Linn.*	3	2	5	4	**14**	40	6	15.00%	2.33	0.35
35	*Polygonum blabrum* Willd.	0	0	8	7	**15**	40	8	20.00%	1.88	0.38
36	*Sagittaria trifolia* L.	3	0	2	0	**5**	40	3	7.50%	1.67	0.13
37	*Cynodon dactylon* L.	1	2	0	0	**3**	40	2	5.00%	1.50	0.08
38	*Digitaria ciliaris*	0	1	0	0	**1**	40	1	2.50%	1.00	0.03
39	*Portulaca oleracea L.*	0	3	0	2	**5**	40	2	5.00%	2.50	0.13
40	*Brachiaria mutica (Forssk.) Stapf*	0	2	0	0	**2**	40	2	5.00%	1.00	0.05
41	*Eragrostis unioloides*	3	2	1	1	**7**	40	2	5.00%	3.50	0.18
42	*Hemarthria compressa* L	4	4	1	3	**12**	40	8	20.00%	1.50	0.30
43	*Pogonatherum crinitum*	2	0	2	2	**6**	40	4	10.00%	1.50	0.15
44	*Centella asiatica*	3	5	9	4	**21**	40	12	30.00%	1.75	0.53
45	*Hydrocotyle sibthorpioides*	2	0	1	5	**8**	40	5	12.50%	1.60	0.20
46	*Colocasia esculenta* (L.) Schott	2	2	4	0	**8**	40	4	10.00%	2.00	0.20
47	*Commelina benghalensis* L.	4	3	3	2	**12**	40	8	20.00%	1.50	0.30
		252	**161**	**236**	**346**	**995**	**1880**	**462**	**1155.00%**	**90.51**	**24.88**

Table no. 37 (continuous 3 parts table)

spp No.	Macrophyte flora of Diplai Beel	2016-2017 Density and Abundance **in Winter (December, January & February) Quadrat number in each site = 10 Total Quadrat= 10 x 4 side = 40 Quadrat size = 2 sq m**									
		Site-I, (North)	**Site-II, (South)**	**Site-III, (East)**	**Site-IV, (West)**	**Total no of species (S)**	**Total no of quadrats studied (Q)**	**No of quadrates of plants occurrence. (P)**	**Frequency = P/40×100%**	**Abundance A = S/P**	**Density D = S/Q**
	Floating										
1	*Eichhornia crassipes* (Mart) Solms.	80	140	85	30	**335**	40	23	57.50%	14.57	8.38
2	*Pistia stratiotes* L.	1	3	0	3	**7**	40	3	7.50%	2.33	0.18
3	*Lemna perpusilla* Torry	1	6	0	0	**7**	40	3	7.50%	2.33	0.18
4	*Azolla pinnata* R.Br.	0	8	0	2	**10**	40	6	15.00%	1.67	0.25
5	*Salvinia natans* (L) All.	3	6	2	2	**13**	40	7	17.50%	1.86	0.33
6	*Salvinia cucullata*	2	11	2	3	**18**	40	9	22.50%	2.00	0.45
7	*Spirodela polyrrhiza* (L) Schleiden	0	2	1	2	**5**	40	3	7.50%	1.67	0.13
8	*Wolffia globasa*	2	0	1	2	**5**	40	2	5.00%	2.50	0.13
	Submerged (anchored)								0.00%		
9	*Hydrilla verticillata* (L.f.) Royle	12	12	9	6	**39**	40	16	40.00%	2.44	0.98
10	*Potamogeton crispus*	10	13	7	8	**38**	40	23	57.50%	1.65	0.95
11	*Vallisneria spiralis*	4	5	5	9	**23**	40	21	52.50%	1.10	0.58

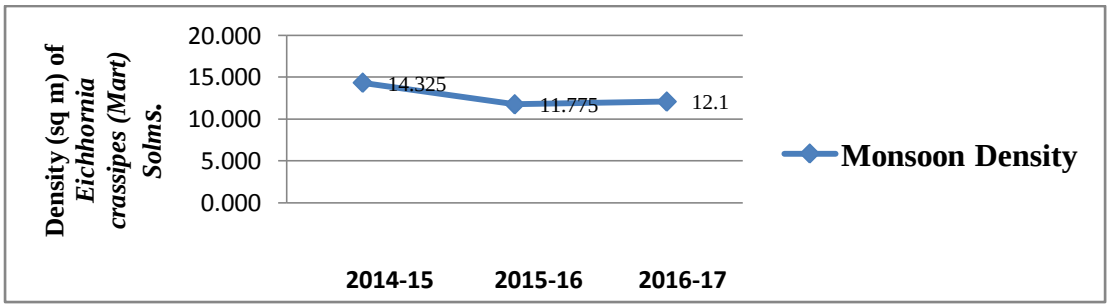
12	*Vallisneria natans* (Lour) H.Hara	4	5	3	8	**20**	40	12	30.00%	1.67	0.50
	Submerged (suspended)								0.00%		
13	*Cerratophyllum demersum* Linn.	7	6	5	10	**28**	40	13	32.50%	2.15	0.70
14	*Utricularia exoleta* R.Br	4	14	1	3	**22**	40	15	37.50%	1.47	0.55
	Rooted Floating Shoot								0.00%		
15	*Ipomoea aquatic* Forsk	0	3	10	4	**17**	40	13	32.50%	1.31	0.43
16	*Hygroryza aristata* (Retzius) Nees	0	9	0	1	**10**	40	4	10.00%	2.50	0.25
	Rooted Floating Leaves								0.00%		
17	*Nymphaea lotus* Linn.	4	10	9	5	**28**	40	24	60.00%	1.17	0.70
18	*Nymphaea rubra* Roxb. Ex Salibs	9	9	7	4	**29**	40	18	45.00%	1.61	0.73
19	*Trapa natans* L.	8	10	5	9	**32**	40	19	47.50%	1.68	0.80
	Emargents								0.00%		
20	*Alternanthera philoxeroides* (Mart.) Griseb.	5	4	2	8	**19**	40	10	25.00%	1.90	0.48
21	*Vetiveria zizanoides*	3	9	1	4	**17**	40	13	32.50%	1.31	0.43
22	*Cyperus bravifolius (*Rottb.*)*Hassk.	4	5	2	4	**15**	40	12	30.00%	1.25	0.38
23	*Cyperus iria*	4	5	2	2	**13**	40	8	20.00%	1.63	0.33
24	*Cyperus compressus* Linn.	3	10	2	2	**17**	40	8	20.00%	2.13	0.43
25	*Cyperus corymbosus* Rottb.	2	5	1	1	**9**	40	4	10.00%	2.25	0.23
26	*Hymenachne assamica* Hitch	2	11	0	0	**13**	40	7	17.50%	1.86	0.33
27	*Echinodorus angustifolius*	0	0	0	5	**5**	40	2	5.00%	2.50	0.13
28	*Ipomoea fistulosa* Mart.ex. Choisy	0	4	0	0	**4**	40	2	5.00%	2.00	0.10
29	*Scirpus eriophorum*	0	0	0	2	**2**	40	2	5.00%	1.00	0.05

30	*Marselia quadrifolia* L.	11	3	9	13	**36**	40	26	65.00%	1.38	0.90
31	*Monochoria hastata* (L) Solm.	17	3	5	4	**29**	40	16	40.00%	1.81	0.73
32	*Monochoria* (Barm.f) Presl.	4	3	3	8	**18**	40	13	32.50%	1.38	0.45
33	*Polygonum barbatum* Linn.	2	15	0	0	**17**	40	14	35.00%	1.21	0.43
34	*Polygonum hydropiper Linn.*	0	3	0	0	**3**	40	2	5.00%	1.50	0.08
35	*Polygonum blabrum* Willd.	0	0	0	5	**5**	40	3	7.50%	1.67	0.13
36	*Sagittaria trifolia* L.	1	3	1	2	**7**	40	5	12.50%	1.40	0.18
37	*Cynodon dactylon* L.	2	5	2	7	**16**	40	4	10.00%	4.00	0.40
38	*Digitaria ciliaris*	0	0	1	2	**3**	40	2	5.00%	1.50	0.08
39	*Portulaca oleracea L.*	0	2	0	3	**5**	40	3	7.50%	1.67	0.13
40	*Brachiaria mutica (Forssk.) Stapf*	1	5	0	1	**7**	40	4	10.00%	1.75	0.18
41	*Eragrostis unioloides*	2	13	0	1	**16**	40	12	30.00%	1.33	0.40
42	*Hemarthria compressa* L	0	2	0	1	**3**	40	3	7.50%	1.00	0.08
43	*Pogonatherum crinitum*	1	5	0	3	**9**	40	5	12.50%	1.80	0.23
44	*Centella asiatica*	2	0	1	0	**3**	40	2	5.00%	1.50	0.08
45	*Hydrocotyle sibthorpioides*	5	0	2	2	**9**	40	4	10.00%	2.25	0.23
46	*Colocasia esculenta* (L.) Schott	2	0	4	3	**9**	40	5	12.50%	1.80	0.23
47	*Commelina benghalensis* L.	4	3	0	2	**9**	40	8	20.00%	1.13	0.23
		228	**390**	**190**	**196**	**1004**	**1880**	**433**	**1082.50%**	**95.57**	**25.10**

In the graph (Fig no . 9. & See pages -126–161) the Pre Monsoon density of the floating macrophyte (Serial no.1 in species list) *Eichhornia crassipes* (Mart.) Solms is shown. The range of values of density of this plant are 10.600 in 2014-15, 8.250 in 2015-16 and 8.825 in 2016-17. The value is highest in Pre monsoon of 2014-15 and lowest in 2016-17.

9.ii. Monsoon Density of *Eichhornia crassipes* (Mart.) Solms. during 2014-15, 2015-16 and 2016-17

Fig no-10

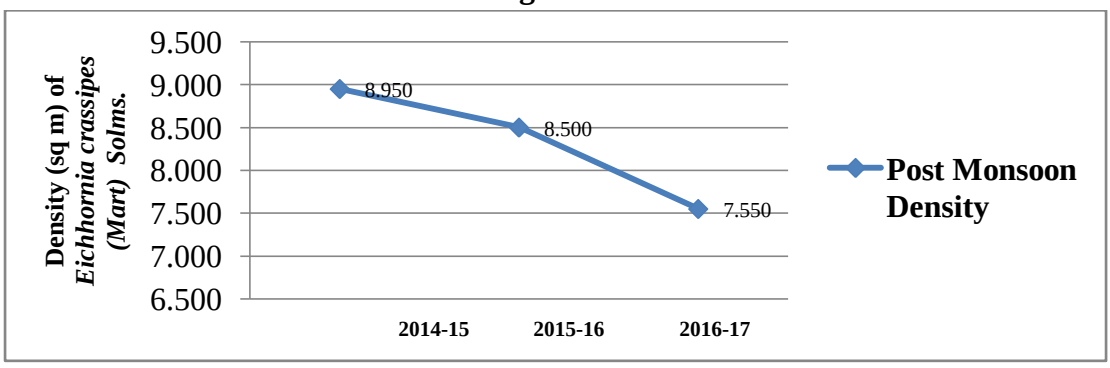


Monsoon Density of *Eichhornia crassipes* (Mart.) Solms.

Here the graph shows the Monsoon density of *Eichhornia crassipes* (Mart.) Solms.in the year 2014-15 is near to15.000 per sq m but in 2015-16 its growth is slightly above 10.000 per sq m and it rises again to12.1 sq m in 1016-17

9. iii. Post Monsoon Density of *Eichhornia crassipes* (Mart.) Solms during 2014-15, 2015-16 and 2016-17

Fig no-11

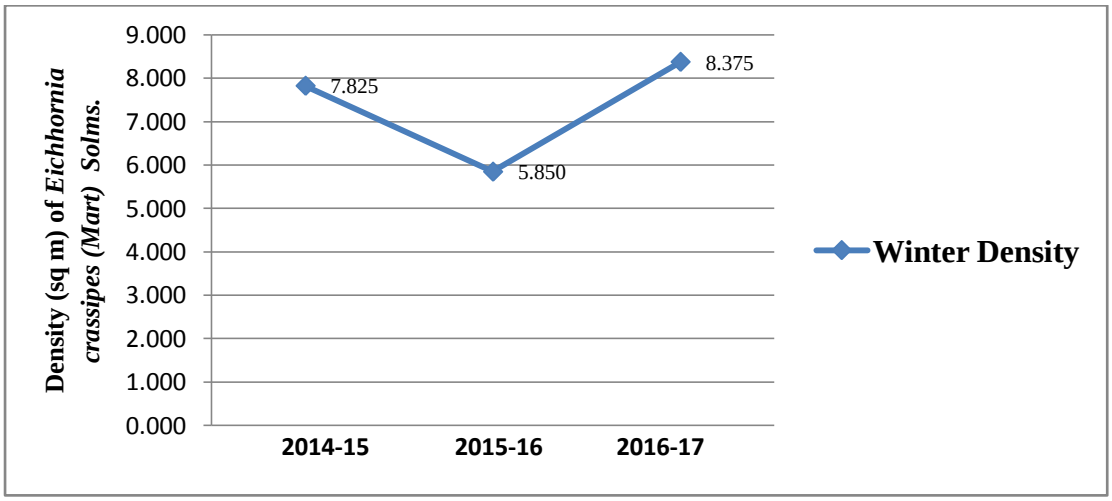


Post Monsoon Density of *Eichhornia crassipes* (Mart.) Solms.

In the graph during Post monsoon period of study years 2014-15, 2015-16 and 2016-17 *Eichhornia crassipes* (Mart.) Solms. Density falls down by 8.950, 8.500 and 7.550 per sq m. The graph shows density of *Eichhornia crassipes* (Mart.) Solms. has been decreased from 2014-15 to 2016-17 abraptly differentiating in 1.400 sq m during this period.

9. iv. Winter Density of *Eichhornia crassipes* (Mart.) Solms. during 2014-15, 2015-16 and 2016-17

Fig no-12



Winter Density of *Eichhornia crassipes* (Mart.) Solms.

The graph represnts the per sq meter density of *Eichhornia crassipes* (Mart.) Solms. in winter period of the years 2014-15, 2015-16 and 2016-17. The values represent here are 7.825, 5.850 and 8.375 respectivly. In 2015-16 the density value is lower than both years 2014-15 and 2016-17. In 2016-17 the species shows having highest density of 8.375 per sq m area during winter. As *Eichhornia crassipes* (Mart.) Solms. is the largest plant sp in number in comparision to others in Diplai beel so it is sparately shown in 4 graphs above.

9.v. At a glance Density of *Eichhornia crassipes* (Mart.) Solms. in Diplai Beel during 2014-15, 2015-16 and 2016-17:

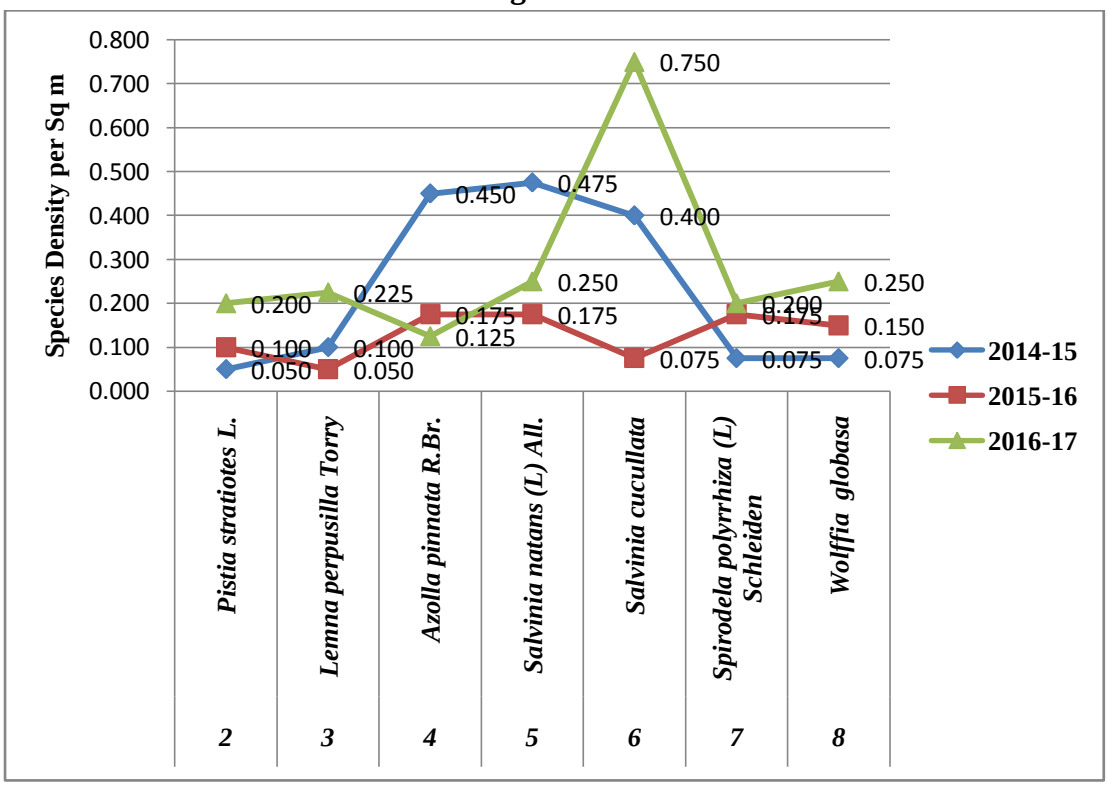
Table no.13

Study Years	Pre Monsoon	Monsoon	Post Monsoon	Winter
2014-15	10.600	14.325	8.950	7.325
2015-16	8.250	11.775	8.500	5.850
2016-17	8.825	12.100	7.550	8.375

10. Seasonal Density of ***Floating*** macrophytes in Diplai Beel (2014-15, 2015-16 and 2016-17): see at page

10.i.a Pre Monsoon Density of *Floating* Macrophytes

Fig no- 10.i. a



Pre Monsoon Density of *Floating* Macrophytes

There are 3 coloured (green, red and blue) line graphs represent the species density of the aquatic macrophytes such as *Pistia stratiotes* L. , *Lemna perpusilla* Torry, *Azolla pinnata* R.Br., *Salvinia natans* (L) All., *Salvinia cucullata* ,*Spirodela polyrrhiza* (L.) Schl. *and Wolffia globasa.* in the study years 2016-17, 2015-16 and 2014-15 respectively. In 2014-15, the macrophytes show the species density per sq m as No 2. *Pistia stratiotes* L.- 0.050, No 3. *Lemna perpusilla* Torry - 0.100, No 4. *Azolla pinnata* R.Br.- 0.450, No 5. *Salvinia natans* (L) All.- 0.475, No 6. *Salvinia cucullata- 0.400,* No 7. *Spirodela polyrrhiza* (L.) Schl.- 0.075. *and* No.8. *Wolffia globasa.- 0.075.* Likely in 2015-16 macrophyte No 2. *Pistia stratiotes* L.- 0.100, No 3. *Lemna perpusilla* Torry - 0.050, No 4. *Azolla pinnata* R.Br.- 0.175, No.5. *Salvinia natans* (L) All.- 0.175 No.6., *Salvinia cucullata- 0.075*, No7.*Spirodela polyrrhiza* (L.) Schl.- 0.175. *and* No 8. *Wolffia globasa.- 0.150.* Again in 2016-17 density of the macrophytes are seen as No 2. *Pistia stratiotes* L.- 0.200, No. 3. *Lemna perpusilla* Torry - *0.252, No 4. Azolla pinnata* R.Br.- 0.125, No. 5. *Salvinia natans* (L) All.- 0.175, No. 6. *Salvinia cucullata- 0.750,* No 7. *Spirodela polyrrhiza* (L.) Schl.- 0.200. *and* No 8. *Wolffia globasa.- 0250.* The graph represents Pre monsoon Density of plants from sl no. 2 to 8 of the plant list given above.

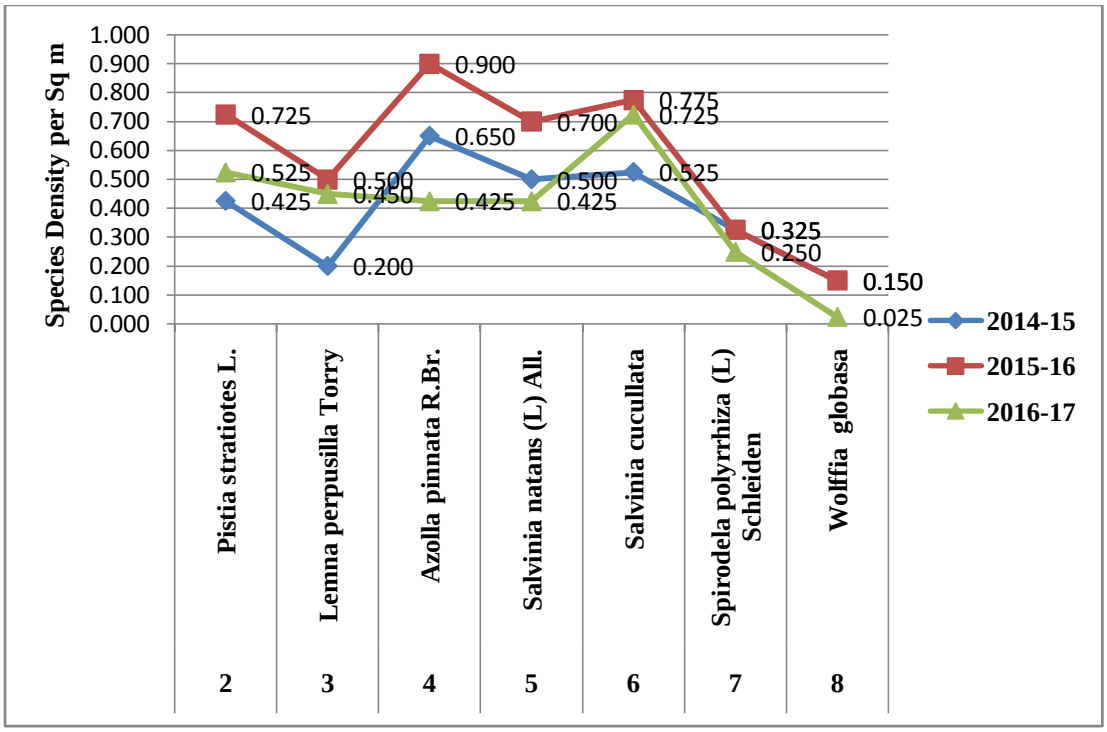
Table no 10.i. b

Years (November to November)	Decreaseing Density of No.4. *Azolla pinnata* R.Br. *(Floating)* in Pre Monsoon
2014-15	0.450
2015-16	0.175
2016-17	0.125

The density of the floating macrophyte No.4. *Azolla pinnata* R.Br. decreases consequtively the 3 study years from 0.450 to 0.125 in Pre Monsoon periods.

10. ii. Monsoon Density of *Floating* Macrophytes Sp. No. 2 to 8

Fig no-10.ii.



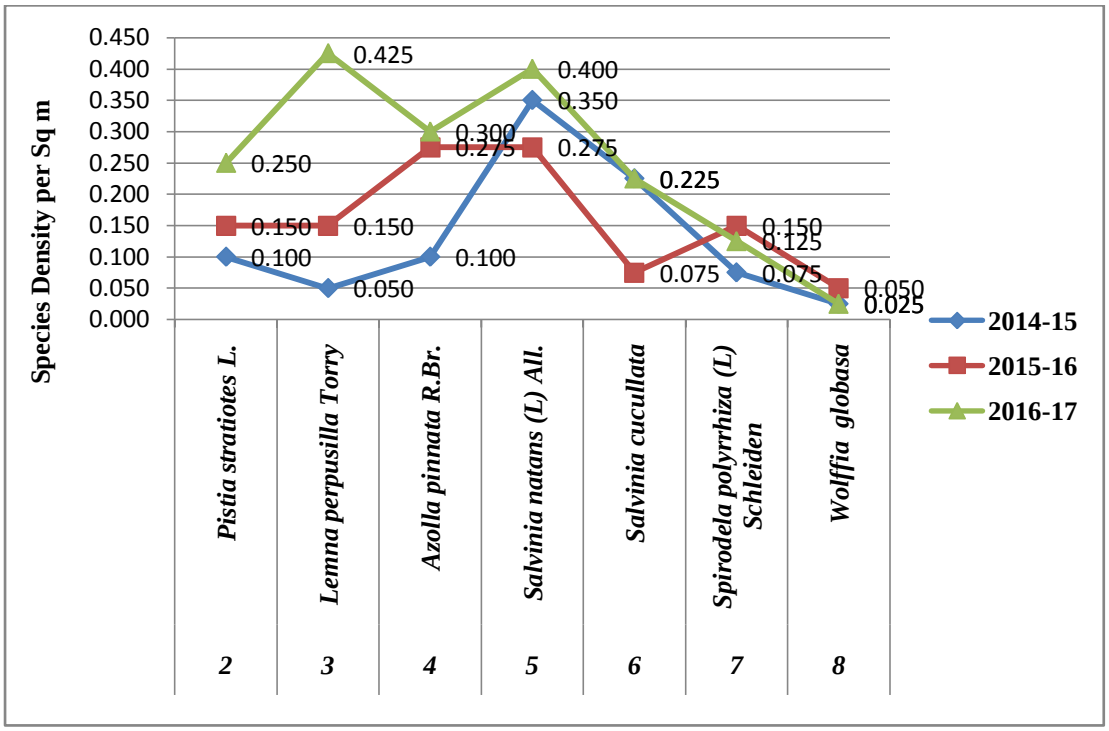
Monsoon Density of *Floating* Macrophytes Sp. No. 2 to 8

The graph reprents here is the per sq m Monsoon Density of the Diplai Beel macrphytes. The arranged serial nos are brought from plats list shown in earlier page. The plants of 2016-17 are in green line as No 2. *Pistia stratiotes* L.- 0.252, No 3. *Lemna perpusilla* Torry - 0.450, No 4. *Azolla pinnata* R.Br.- 0.425, No 5. *Salvinia natans* (L) All.- 0.025, No 6. *Salvinia cucullata*- 0.725, No 7. *Spirodela polyrrhiza* (L.) Schl.- 0.250. *and* No.8. *Wolffia globasa*.- 0.150. The red line indicates density value of 2015-16 as No 2. *Pistia stratiotes* L.- 0.725, No 3. *Lemna perpusilla* Torry - 0.500, No 4. *Azolla pinnata* R.Br.- 0.900, No 5. *Salvinia natans* (L) All.- 0.700, No 6.

Salvinia cucullata- 0.775, No 7. *Spirodela polyrrhiza* (L.) Schl.- 0325. *and* No.8. *Wolffia globasa*.- 0.028

10. iii. Post Monsoon Density of *Floating* Macrophytes Sp. No. 2 to 8

Fig no-10.iii.

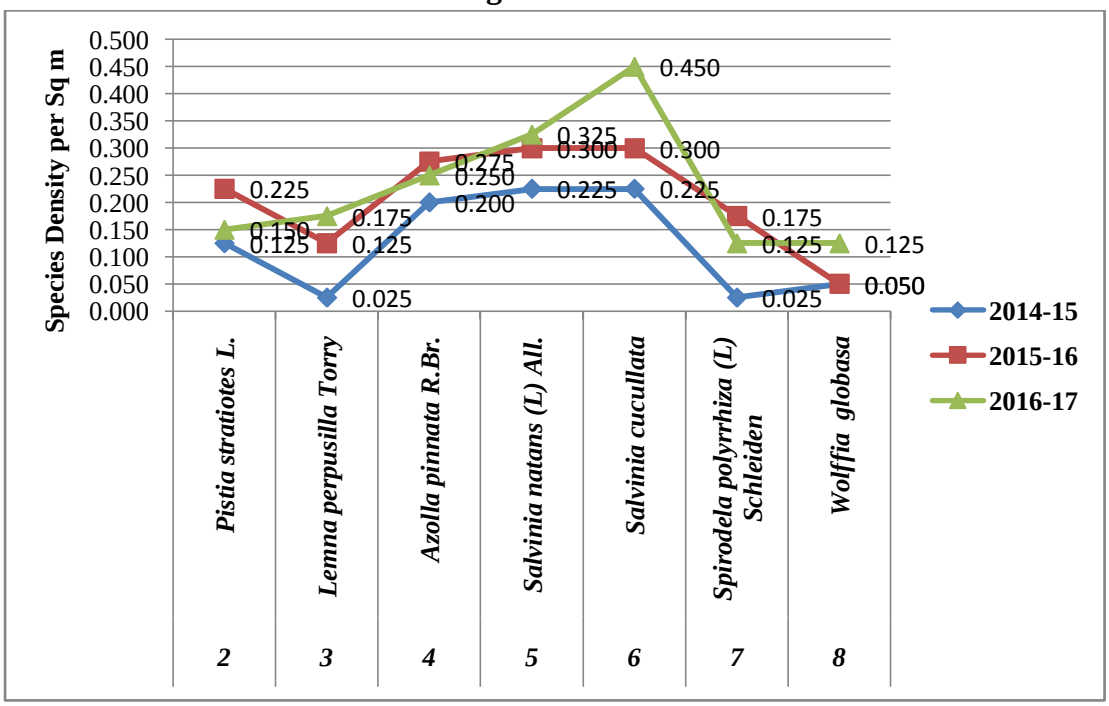


Post Monsoon Density of *Floating* Macrophytes Sp. No. 2 to 8

In the Post monsoon period the species density in the graph are represented by serial numbers such as No 2. *Pistia stratiotes* L.- 0.100, No 3. *Lemna perpusilla* Torry - 0.050, No 4. *Azolla pinnata* R.Br.- 0.100, No 5. *Salvinia natans* (L) All.- 0.350, No 6. *Salvinia cucullata*- 0.225, No 7. *Spirodela polyrrhiza* (L.) Schl.- 0.075. *and* No.8. *Wolffia globasa*.- 0.025. All the plants again represented against as red line, year 2015-16 bearing nos. No 2. *Pistia stratiotes* L.- 0.150, No 3. *Lemna perpusilla* Torry - 0.150, No 4. *Azolla pinnata* R.Br.- 0.275, No 5. *Salvinia natans* (L) All.- 0.275, No 6. *Salvinia cucullata*- 0.075, No 7. *Spirodela polyrrhiza* (L.) Schl.- 0.150. *and* No.8. *Wolffia globasa*.-0.025. The green line (2016-17) gives the density of the plants as No 2. *Pistia stratiotes* L.- 0.250, No 3. *Lemna perpusilla* Torry -0.425, No 4. *Azolla pinnata* R.Br.- 0.300, No 5. *Salvinia natans* (L) All.- 0.400, No 6. *Salvinia cucullata*- 0.225, No 7. *Spirodela polyrrhiza* (L.) Schl.- 0.125. *and* No.8. *Wolffia globasa*.- 0.050.

10. iv. Winter Density of *Floating* Macrophytes Sp. No. 2 to 8

Fig no-10.iv



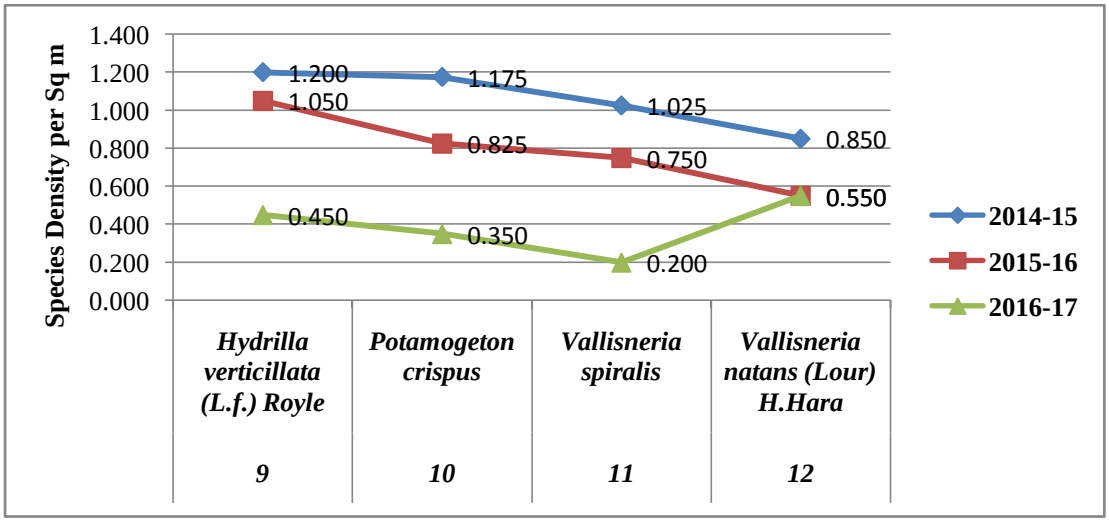
Winter Density of *Floating* Macrophytes Sp. No. 2 to 8

The floating aquatic macrophytes placed in the graph by Blue line represent the distribution of density of No 2. *Pistia stratiotes* L.- 0.125, No 3. *Lemna perpusilla* Torry -0.015, No 4. *Azolla pinnata* R.Br.- 0.200, No 5. *Salvinia natans* (L) All.- 0.300, No 6. *Salvinia cucullata*- 0.225, No 7. *Spirodela polyrrhiza* (L.) Schl.- 0.025. *and* No.8. *Wolffia globasa*.-0.050. during the period of Winterof 2014-15. Line red graph represents the year 2015-16.of plants No 2. *Pistia stratiotes* L.- 0.225, No 3. *Lemna perpusilla* Torry -0.175, No 4. *Azolla pinnata* R.Br.- 0.275, No 5. *Salvinia natans* (L) All.- 0.325, No 6. *Salvinia cucullata*- 0,300 No 7. *Spirodela polyrrhiza* (L.) Schl.- 0.175. *and* No.8. *Wolffia globasa*.-0.050. In 2016-17 density of plants are shown in green lin graph as No 2. *Pistia stratiotes* L.- 0.150, No 3. *Lemna perpusilla* Torry -0.175, No 4. *Azolla pinnata* R.Br.- 0.250, No 5. *Salvinia natans* (L) All.- 0.325, No 6. *Salvinia cucullata*- 0,450 No 7. *Spirodela polyrrhiza* (L.) Schl.- 0.125. *and* No.8. *Wolffia globasa*.-0.125. the macrophytes No 4. *Azolla pinnata* R.Br, No 5. *Salvinia natans* (L) All,, No 6. *Salvinia cucullata*- increases in all study years,

11. Seasonal Density of ***Submerged (anchored)*** Macrophytes in Diplai Beel:

11. i.a Pre Monsoon Density of *Submerged (anchored)* Macrophytes Sp.No.9 to 12

Fig no-11.i.a



Pre Monsoon Density of *Submerged (anchored)* Macrophytes Sp.No.9 to 12

This graph represents the Pre Monsoon Density of Submerged (anchored) macrophytes (Sl.No.9 to 12 in plants List). Here the blue line shows 2014-15 density of plants No 9. *Hydrilla verticillata* (L.f.) Royle.-1.200, No10. *Potamogeton crispus* L.- 1.175, No11. *Valisneria spiralis* Linn.- 1.025, No 12. *Valisneria natans* (Lour) H.Hara.-0.850. The red line graph represents density of the year 2015-16 by No 9. *Hydrilla verticillata* (L.f.) Royle.-1.050, No10. *Potamogeton crispus* L.- 0.825, No11. *Valisneria spiralis* Linn.- 0.750, No 12. *Valisneria natans* (Lour) H.Hara.-0.550. The green line shows density of the year 2016-17 by No 9. *Hydrilla verticillata* (L.f.) Royle.- 0.450, No10. *Potamogeton crispus* L.- 0.350, No11. *Valisneria spiralis* Linn.- 0.200, No 12. *Valisneria natans* (Lour) H.Hara.-0.550.

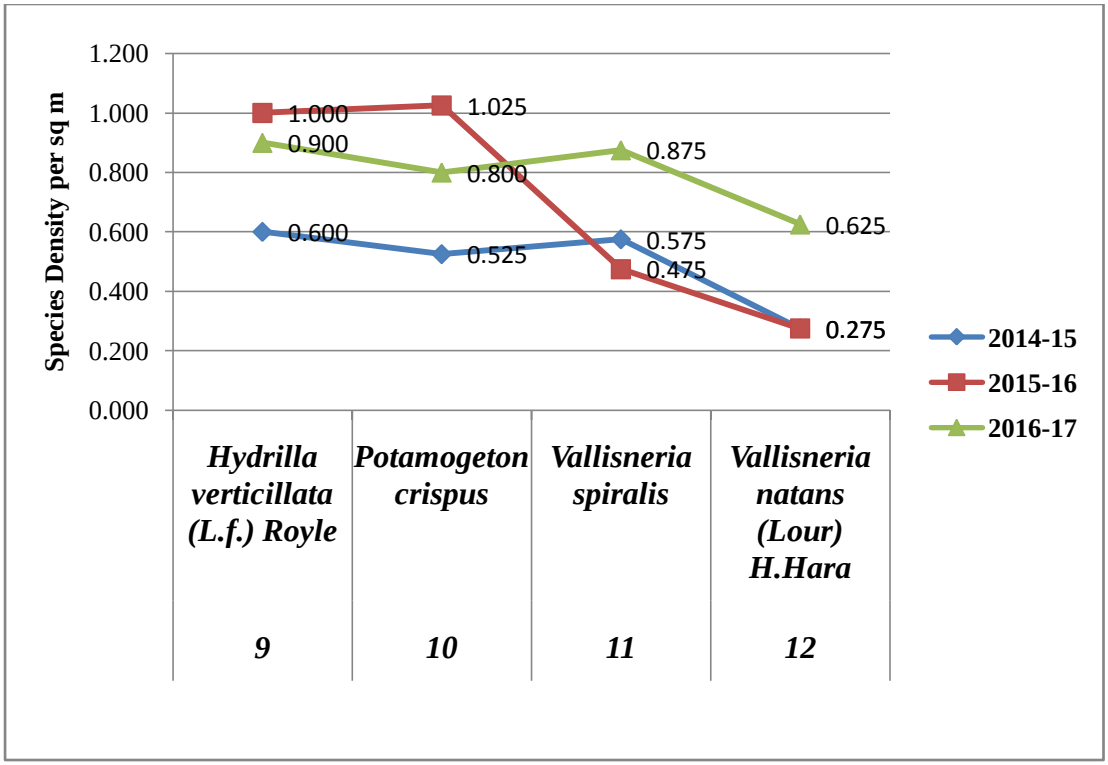
Table no. 11.i. b

Years (November to November)	**Decreasing Density in Pre Monsoon of Submerged (anchored) Macrophytes (Sp. no 9 to 11) with Density value**		
	9. Hydrilla verticillata (L.f.) Royle.	*10. Potamogeton crispus L.*	*11. Valisneria spiralis* Linn.
2014-15	1.200	1.175	1.025
2015-16	1.050	0.825	0.750
2016-17	0.450	0.350	0.200

The Submerged (anchored) macrophytes No 9. *Hydrilla verticillata* (L.f.) Royle.- 0.450, No10. *Potamogeton crispus* L.- 0.350, No11. *Valisneria spiralis* Linn. Shows their decreasing density continuously in the study years during Pre Monsoon period.

11. ii. Monsoon Density of *Submerged (anchored)* Macrophytes (Sp.no.9 to 12)

Fig no-11.ii.

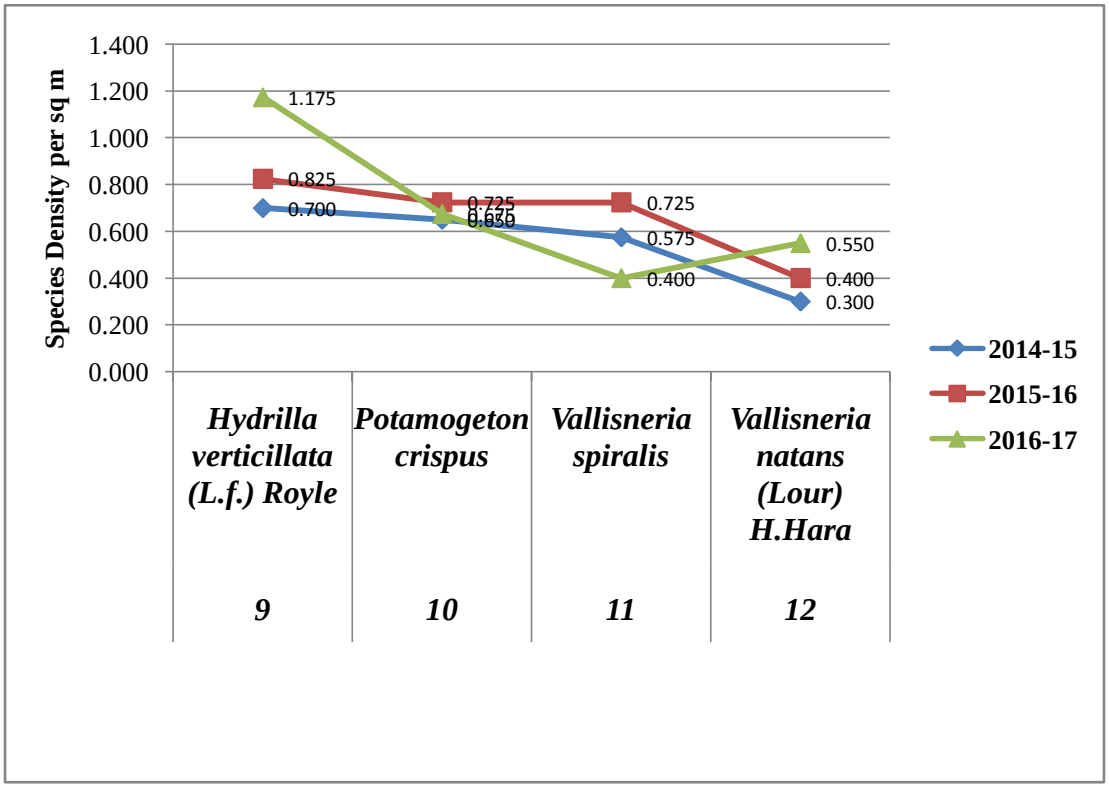


Monsoon Density of *Submerged (anchored)* Macrophytes (Sp.no.9 to 12)

The graph shows monsoon density of *submerged (anchored)* macrophytes (Sl.No.9 to 12). The blue line represents the distribution of four plants in 2014-15 such as *9. Hydrilla verticillata* (L.f.) Royle.-0.600, 10. *Potamogeton crispus* L.-0.525, 11. *Valisneria spiralis* Linn.-0.575, *12. Valisneria natans* (Lour) H.Hara.-0.275. The red line represents the value of 2015-16. They are *9. Hydrilla verticillata* (L.f.) Royle.-1.00, 10. *Potamogeton crispus* L.-1,025, 11. *Valisneria spiralis* Linn.-0.475, *12. Valisneria natans* (Lour) H.Hara.-0.275. The green line shows density of the year 2016-17 by No 9. *Hydrilla verticillata* (L.f.) Royle.- 0.900, No10. *Potamogeton crispus* L.- 0.800, No11. *Valisneria spiralis* Linn.- 0.875, No 12. *Valisneria natans* (Lour) H.Hara.- 0.625. The distribution range is in between .000 to 1.500.

11. iii. Post Monsoon Density of *Submerged (anchored)* Macrophytes (Sp.No.9 to 12)

Fig no-11.iii.

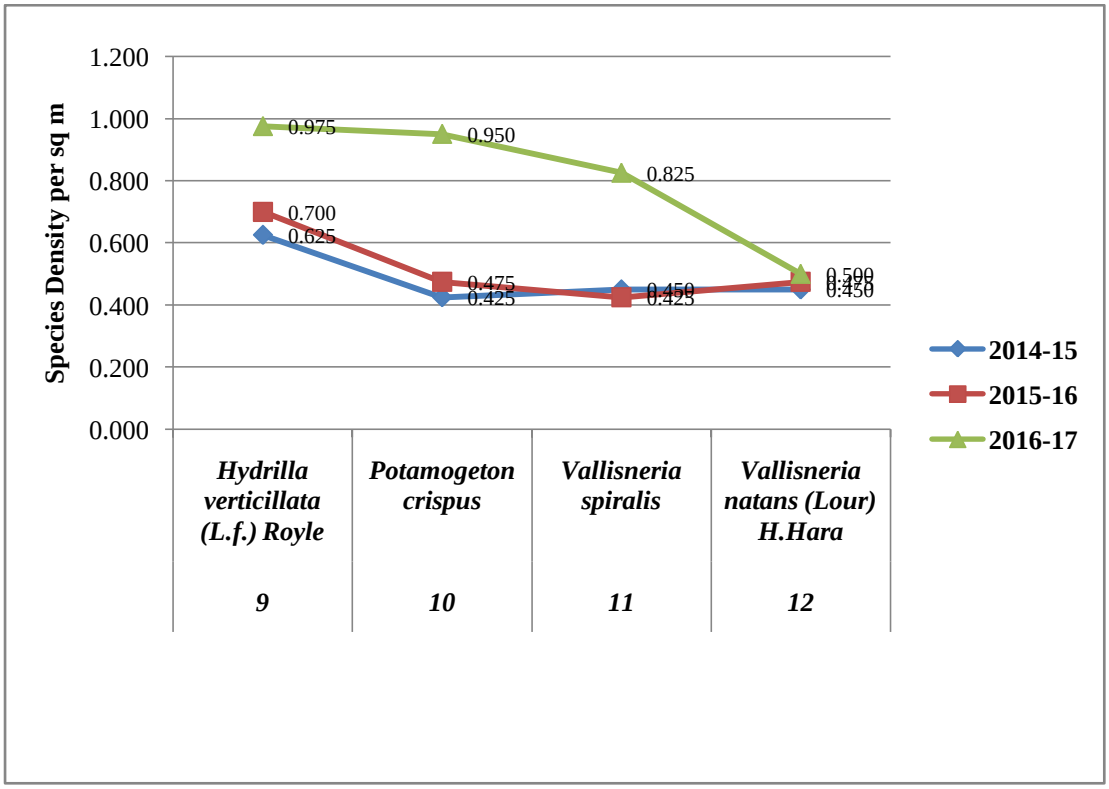


Post Monsoon Density of *Submerged (anchored)* Macrophytes (Sp.No.9 to 12)

The graph shows monsoon density of *submerged (anchored)* macrophytes (Sl.No.9 to 12). The blue line represents the distribution of four plants in 2014-15 such as *9. Hydrilla verticillata* (L.f.) Royle.-0.700, 10. *Potamogeton crispus* L.-0.650, 11. *Valisneria spiralis* Linn.-0.575, *12. Valisneria natans* (Lour) H.Hara.-0.300. The red line represents the value of 2015-16. They are *9. Hydrilla verticillata* (L.f.) Royle.-0.825, 10. *Potamogeton crispus* L.- 0,725, 11. *Valisneria spiralis* Linn.- 0.725, *12. Valisneria natans* (Lour) H.Hara.- 0.400. The green line shows density of the year 2016-17 by No 9. *Hydrilla verticillata* (L.f.) Royle.- 1.175, No10. *Potamogeton crispus* L.- 0.675, No11. *Valisneria spiralis* Linn.- 0.400, No 12. *Valisneria natans* (Lour) H.Hara.- 0.550. The distribution range is in between .000 to 1.400.

11. iv. Winter Density of *Submerged (anchored)* Macrophytes (Sp.No. 9 to 12)

Fig no-11.iv.



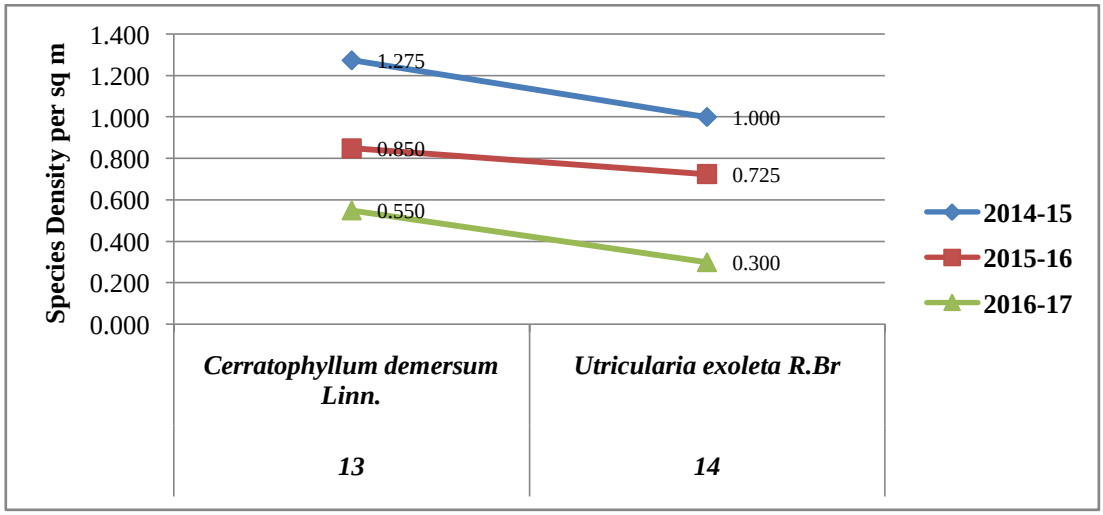
Winter Density of *Submerged (anchored)* Macrophytes (Sp. no. 9 to 12)

The graph shows monsoon density of *submerged (anchored)* macrophytes (Sl.No.9 to 12). The blue line represents the distribution of four plants in 2014-15 such as *9. Hydrilla verticillata* (L.f.) Royle.- 0.625, 10. *Potamogeton crispus* L.- 0.425, 11. *Valisneria spiralis* Linn.- 0.450, *12. Valisneria natans* (Lour) H.Hara.- 0.450. The red line represents the value of 2015-16. They are *9. Hydrilla verticillata* (L.f.) Royle.-0.700, 10. *Potamogeton crispus* L.- 0.475, 11. *Valisneria spiralis* Linn.- 0.450, *12. Valisneria natans* (Lour) H.Hara.- 0.425. The green line shows density of the year 2016-17 by No 9. *Hydrilla verticillata* (L.f.) Royle.- 0.900, No10. *Potamogeton crispus* L.- 0.800, No11. *Valisneria spiralis* Linn.- 0.875, No 12. *Valisneria natans* (Lour) H.Hara.- 0.625. The distribution range is in between .000 to 1.200.

12. Seasonal Density of ***Submerged (suspended)*** Macrophytes in Diplai Beel:

12. i.a Pre Monsoon Density of *Submerged (suspended)* Macrophytes (Sp.No.13 and 14)

Fig no-12.i.a



Pre Monsoon Density of *Submerged (suspended)* Macrophytes (Sp.No.13 and 14)

The graph lines represent here about the distribution of Pre Monsoon Density of *Submerged (suspended)* macrophytes (Sl.No.13 to 14). The blue line shows the distribution of plants species in 2014-15 and they are *13. Ceratophyllum demersum* L.- 1.275, *14. Utricularia exoleta* R.Br.- 1.000. The red line represents the distribution of the plants of 2015-16 and the species are *13. Ceratophyllum demersum* L.- 0.850, *14. Utricularia exoleta* R.Br.- 0.725. The green line is of 2016-17 and they are *13. Ceratophyllum demersum* L.- 0.550, *14. Utricularia exoleta* R.Br.- 0.500. Its value range is 0 to 1.500.

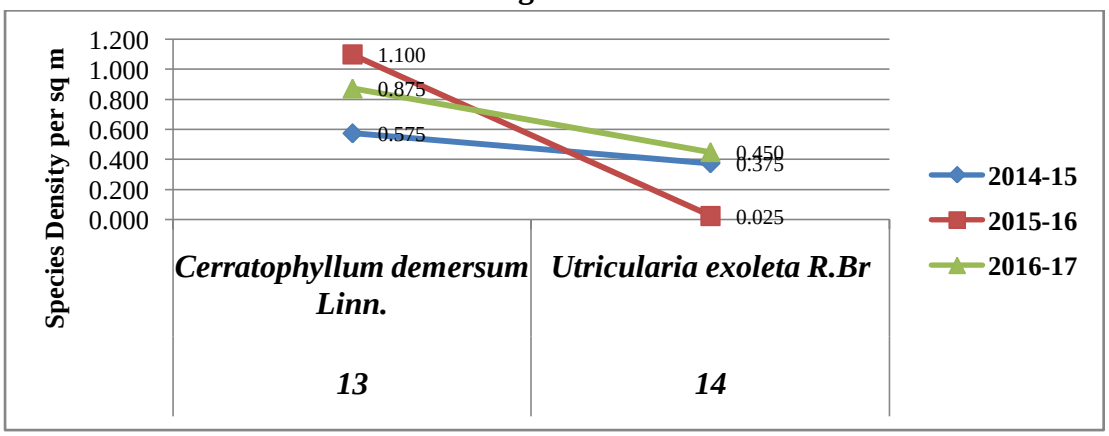
Table no. 12.i.b

Years (November to November)	**Decreasing Density in Pre monsoon Submerged (suspended) Macrophytes (Sp. no 13 to 14) with Density value**	
	13. Ceratophyllum demersum L.	*14. Utricularia exoleta* R.Br.
2014-15	1.275	1.000
2015-16	0.850	0.725
2016-17	0.550	0.300

The Submerged (suspended) macrophytes *13. Ceratophyllum demersum* L. , *14. Utricularia exoleta* R.Br. show their decreasing density continuously in the study years during Pre Monsoon period.

12. ii. Monsoon Density of *Submerged (suspended)* Macrophytes (Sp.No.13 and 14)

Fig no-12.ii.

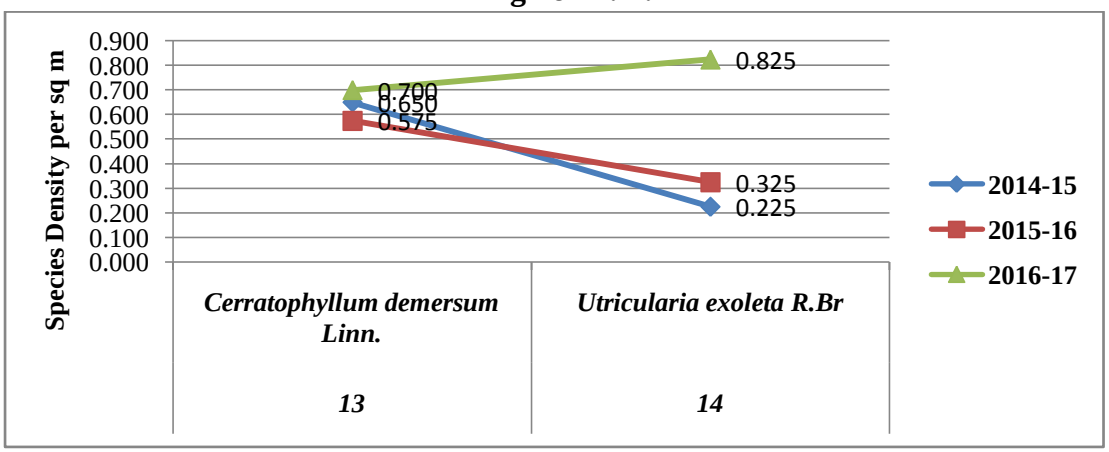


Monsoon Density of *Submerged (suspended)* Macrophytes (Sp.No.13 and 14)

The graph lines represent here about the distribution of Monsoon Density of *Submerged (suspended)* macrophytes (Sl.No.13 to 14). The blue line shows the distribution of plants species in 2014-15 and they are *13. Ceratophyllum demersum* L.- 0.575, *14. Utricularia exoleta* R.Br.- 0.375. The red line represents the distribution of the plants of 2015-16 and the species are *13. Ceratophyllum demersum* L.- 0.1.100, *14. Utricularia exoleta* R.Br.- 0.025. The green line is of 2016-17 and they are *13. Ceratophyllum demersum* L.- 0.875, *14. Utricularia exoleta* R.Br.- 0.450. Its value range is **0 to 1.500.**

12. iii. Post Monsoon Density of *Submerged (suspended)* Macrophytes (Sp.No.13 and 14)

Fig no-12.iii.



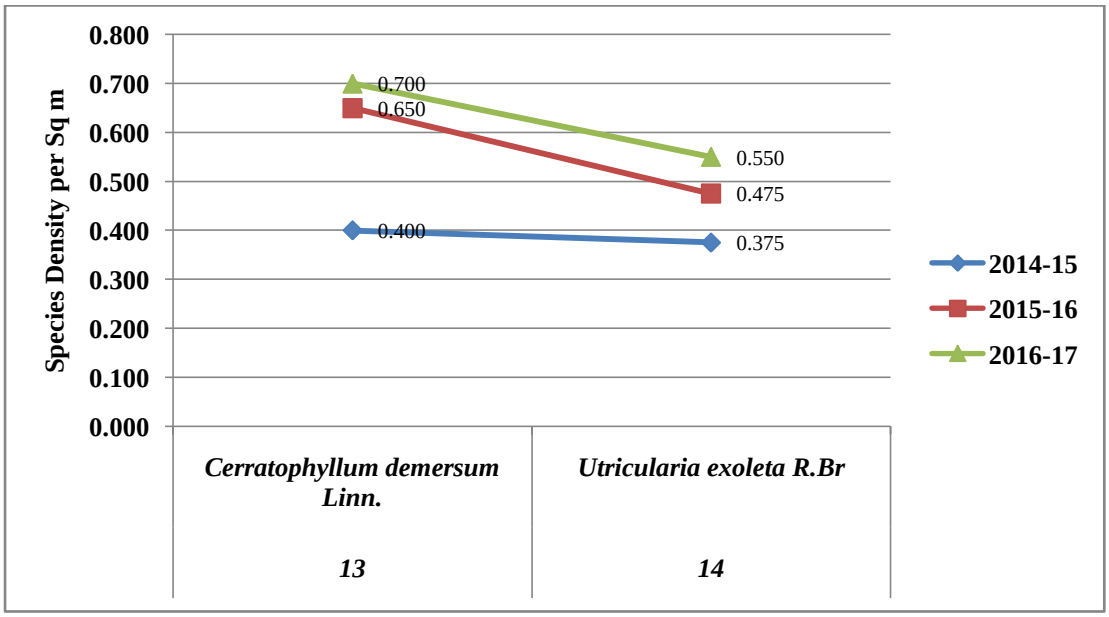
Post Monsoon Density of *Submerged (suspended)* Macrophytes (Sp.No.13 and 14)

The graph lines represent here about the distribution of Post Monsoon Density of *Submerged (suspended)* macrophytes (Sl.No.13 to 14). The blue line shows the distribution of plants species in 2014-15 and they are *13. Ceratophyllum demersum*

L.- 0.650, *14. Utricularia exoleta* R.Br.- 0.225. The red line represents the distribution of the plants of 2015-16 and the species are *13. Ceratophyllum demersum* L.- 0.575, *14. Utricularia exoleta* R.Br.- 0.325. The green line is of 2016-17 and they are *13. Ceratophyllum demersum* L.- 0.700, *14. Utricularia exoleta* R.Br.- 0.825. Its value range is **0 to 0.900.**

12. iv. Winter Density of *Submerged (suspended)* Macrophytes (Sp.No.13 and 14)

Fig no-12.iv.



Winter Density of *Submerged (suspended)* Macrophytes (Sp.No.13 and 14)

The graph lines represent about the density of Post Monsoon of *Submerged (suspended)* macrophytes (Sl.No.13 and 14). The blue line shows the plants species of 2014-15 and they are *13. Ceratophyllum demersum* L.0.400, *14. Utricularia exoleta* R.Br.- 0.375.

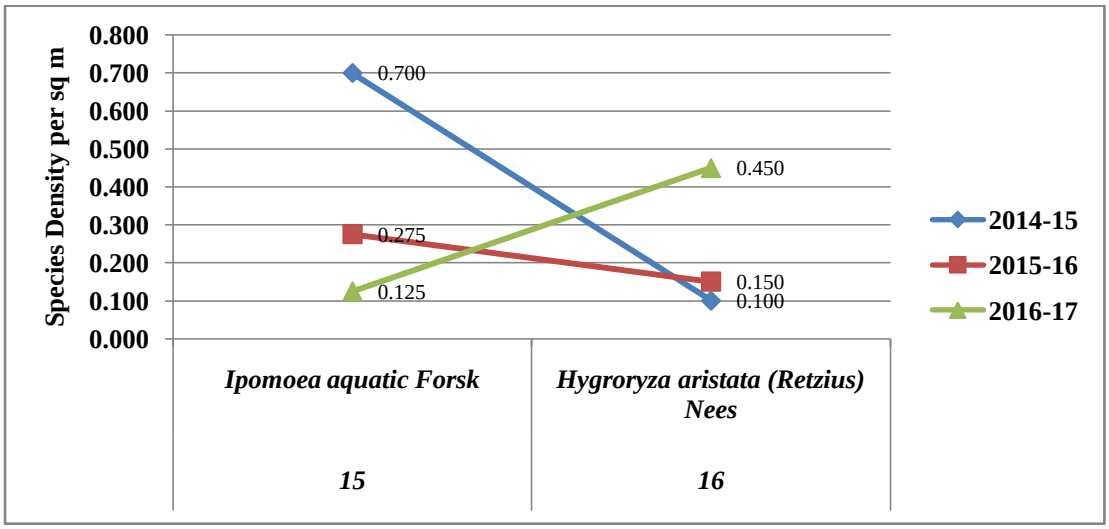
The red line graph represents the density of the plants of 2015-16 and the species are *13. Ceratophyllum demersum* L.- 0.650, *14. Utricularia exoleta* R.Br.- 0.475.

The green line represents of 2016-17 and they are *13. Ceratophyllum demersum* L.- 0.700, *14. Utricularia exoleta* R.Br.- 0.550. Its value range is **0 to 0.800**.

13. Seasonal Density of ***Rooted Floating Shoot*** Macrophyte in Diplai Beel (Sp.no.15 to 16)

13. i. a

Fig no- 13.i.a



Pre Monsoon Density of *Rooted Floating Shoot* Macrophyte

(Sp.No.15 to 16)

The graph shows Pre monsoon density of *Rooted Floating Shoot* macrophytes (Sl.No.15 and 16). The blue line represents the distribution of two plants in 2014-15 such as 15. *Ipomoea aquatica* Forssk.- 0.700, 16. *Hygroryza aristata (*Retz.) Nees.- 0.100.

The red line represents the value of 2015-16. They are 15. *Ipomoea aquatica* Forssk. – 0.775, 16. *Hygroryza aristata (*Retz.) Nees.- 0.150.

The green line shows density of the year 2016-17 by 15. *Ipomoea aquatica* Forssk.- *0.125*, *Hygroryza aristata (*Retz.) Nees.- 0.450. The distribution range is in between 0 to 0.800 per sq m.

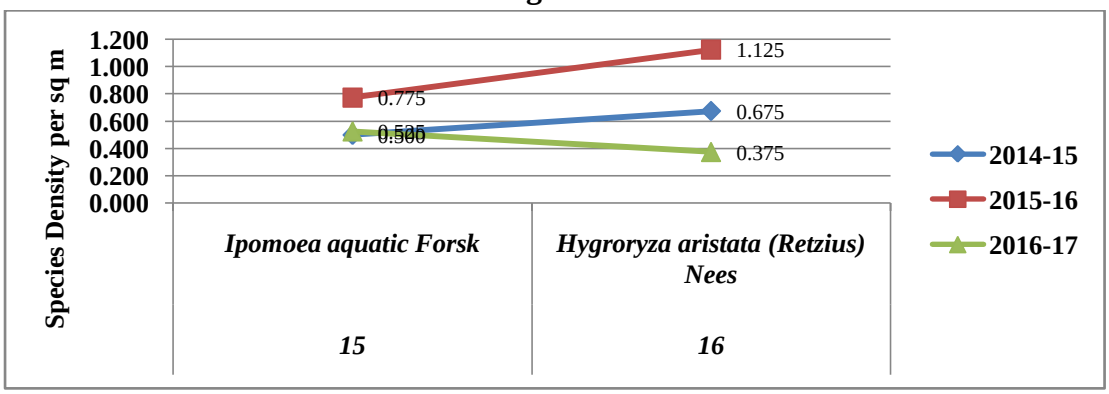
Table no. 13.i.b

Years (November to November)	**Decreasing Density in Pre Monsoon Submerged (anchored) macrophytes (Sp no. 15) with Density value**
	No.15. *Ipomoea aquatica* Forssk
2014-15	0.700
2015-16	0.275
2016-17	0.125

The submerged (anchored) macrophyte, *Ipomoea aquatica* Forssk shows the decreasing density in Pre Monsoon among the the plants during Pre Monsoon.

13. ii. Monsoon Density of *Rooted Floating Shoot* Macrophytes (Sp.No.15 to 16)

Fig no-13.ii.

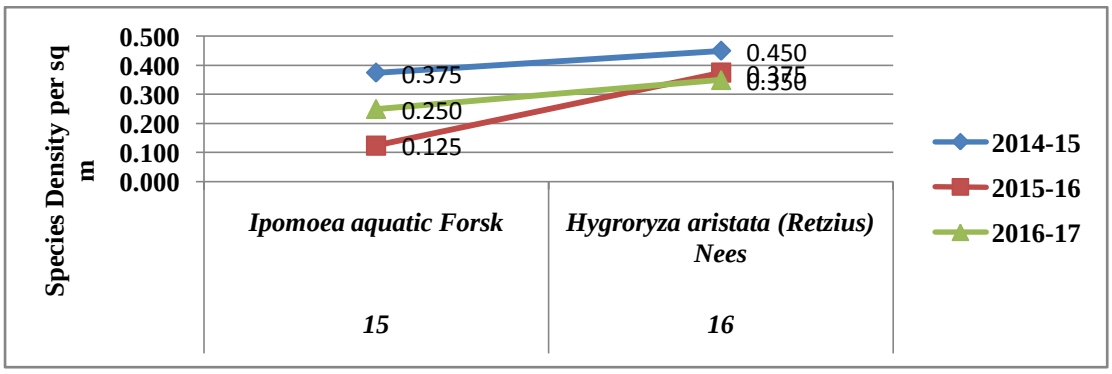


Monsoon Density of *Rooted Floating Shoot* Macrophytes (Sp.No.15 to 16)

The graph shows monsoon density of *Rooted Floating Shoot* macrophytes (Sl.No.15 and 16). The blue line represents the distribution of two plants in 2014-15 such as 15. *Ipomoea aquatica* Forssk.- 0.500, 16. *Hygroryza aristata (*Retz.) Nees.- 0.675. The red line represents the value of 2015-16. They are 15. *Ipomoea aquatica* Forssk. – 0.775, 16. *Hygroryza aristata (*Retz.) Nees.- 1.125. The green line shows density of the year 2016-17 by 15. *Ipomoea aquatica* Forssk.- *.500,* *Hygroryza aristata (*Retz.) Nees.- 0.375. The distribution range is in between 0 to 0.800 per sq m.

13. iii. Post Monsoon Density of *Rooted Floating Shoot* Macrophytes (Sp.No.15 to 16)

Fig no- 13. iii. A



Post Monsoon Density of *Rooted Floating Shoot* Macrophytes (Sp.No.15 to 16)

The graph shows Post monsoon density of *Rooted Floating Shoot* macrophytes (Sl.No.15 and 16). The blue line represents the distribution of two plants in 2014-15 such as 15. *Ipomoea aquatica* Forssk.- 0.0.375, 16. *Hygroryza aristata (*Retz.) Nees.- 0.450. The red line represents the value of 2015-16. They are 15. *Ipomoea aquatica* Forssk. – 0.125, 16. *Hygroryza aristata (*Retz.) Nees.- 0.375. The green line shows density of the year 2016-17 by 15. *Ipomoea aquatica* Forssk.- *0.250,*

*Hygroryza aristata (*Retz.) Nees.- 0.350. The distribution range is in between 0 to 0.500 per sq m.

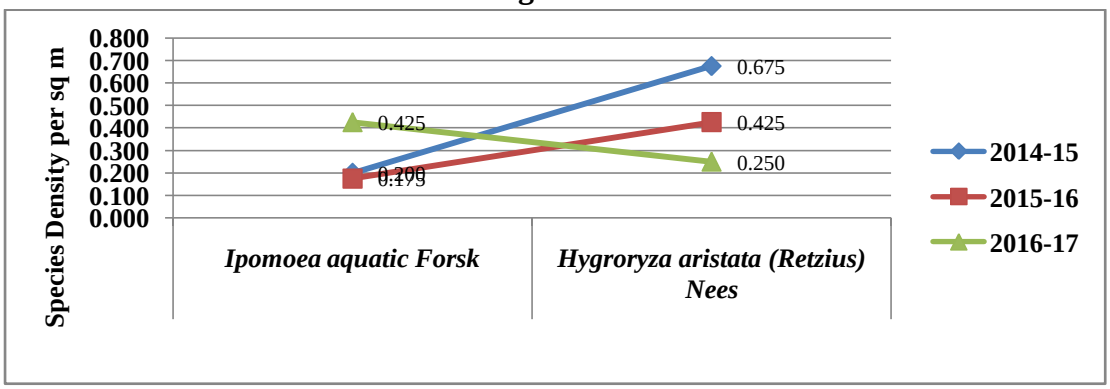
Table no. 13. iii. b

Years (November to November)	Decreasing Density in Post Monsoon of submerged (anchored) macrophytes (Sp. no.16) with Density value
	Hygroryza aristata (Retz.) Nees.
2014-15	0.450
2015-16	0.375
2016-17	0.350

No. 16. *Hygroryza aristata (*Retz.) Nees.shows the density going down ward in the study years in Post Monsoon period.

13. iv. Winter Density of *Rooted Floating Shoot* Macrophytes (Sl.No.15 to 16)

Fig no. 13. iv.a



Winter Density of *Rooted Floating Shoot* Macrophytes (Sl.No.15 to 16)

The graph shows winter density of *Rooted Floating Shoot* macrophytes (Sl.No.15 and 16). The blue line represents the distribution of two plants in 2014-15 such as 15. *Ipomoea aquatica* Forssk.- 0200., 16. *Hygroryza aristata (*Retz.) Nees.- 0.675. The red line represents the value of 2015-16. They are 15. *Ipomoea aquatica* Forssk. – 0.175, 16. *Hygroryza aristata (*Retz.) Nees.- 0.425. The green line shows density of the year 2016-17 by 15. *Ipomoea aquatica* Forssk.- *0.425, Hygroryza aristata (*Retz.) Nees.- 0.250. The distribution range is in between 0 to 0.800 per sq m.

Table no.13.iv.b

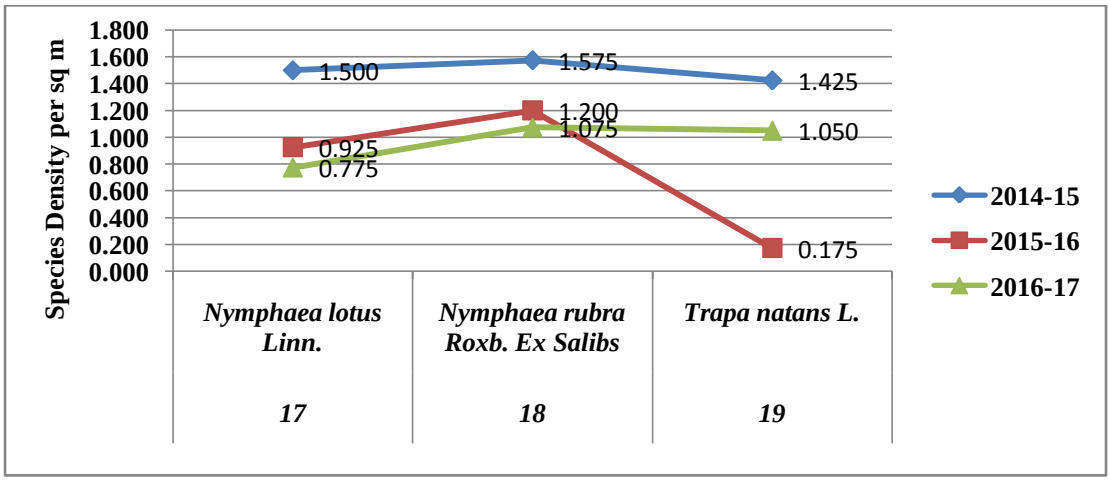
Years (November to November)	Decreasing Density in Winter Submerged (anchored) Macrophytes (Sp.no. 16) with Density value
	*Hygroryza aristata (*Retz.) Nees.
2014-15	0.675
2015-16	0.425
2016-17	0.250

*Hygroryza aristata (*Retz.) Nees. shows the density going down ward again in the study years in Winter period.

14. Seasonal Density of Rooted Floating Leaves Macrophytes in Diplai Beel (Sp. no.17 to 19)

14. i. Pre Monsoon Density of *Rooted Floating Leaves* Macrophytes (Sp.No.17 to 19)

Fig no-14.i. a



Pre Monsoon Density of *Rooted Floating Leaves* Macrophytes (Sp.No.17 to 19)

The graph shows Pre monsoon density of *Rooted Floating Leaves* macrophytes (Sl.No.17 and 19). The blue line represents the distribution of three plants in 2014-15 such as *17. Nymphaea lotus* Linn.- 1.500, *18. Nymphaea rubra* Roxb. Ex Salibs,- *1.575, 19. Trapa natans* L.- 1.425. The red line represents the value of 2015-16. They are *17. Nymphaea lotus* Linn. – 0.925, *18. Nymphaea rubra* Roxb. Ex Salibs.1.200, *19. Trapa natans* L.-0.175 .The green line shows density of the year 2016-17 by *17. Nymphaea lotus* Lin.- 0775, *18. Nymphaea rubra* Roxb. Ex Salibs,- *1.075, 19. Trapa natans* L.-1.050. Density range 0 to 1.800 sq. m.

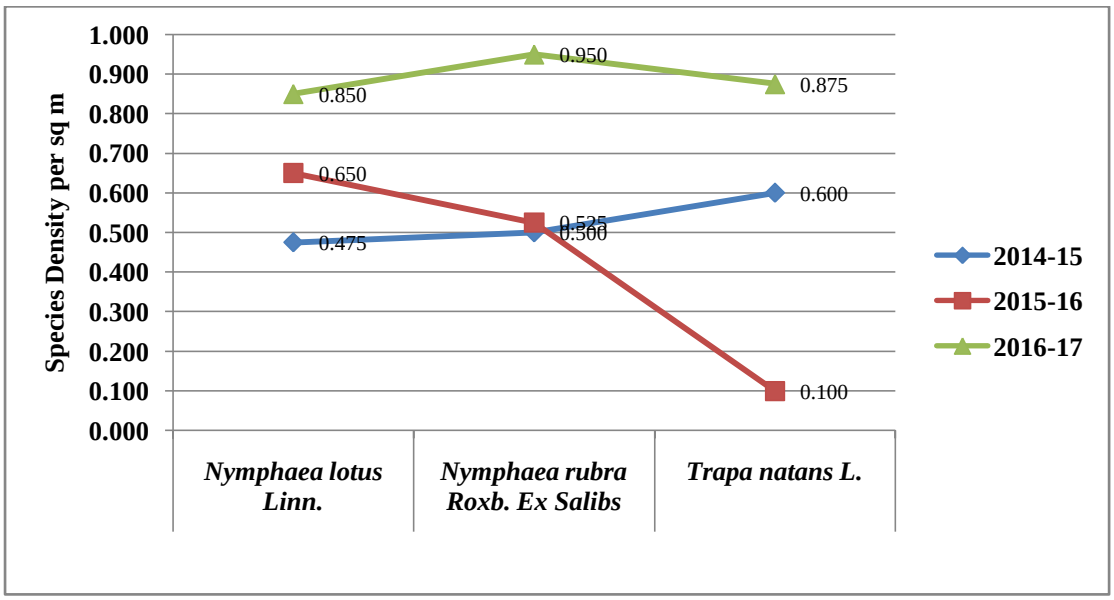
Table no. 14.i. b

Years (November to November)	Decreasn Density in Pre Monsoon of Rooted Floating Leaves Macrophytes (Sp. no 17 to 18) with Density value	
	17. Nymphaea lotus Linn.	*18. Nymphaea rubra* Roxb. Ex Salibs
2014-15	1.500	1.575
2015-16	0.925	1.200
2016-17	0.775	1.075

The plants *Nymphaea lotus* Lin,, *Nymphaea rubra* Roxb. Ex Salibs, show decreasing nature in density in the study years in Pre Monsoon period.

14. ii. Monsoon Density of *Rooted Floating Leaves* Macrophytes (Sp.No.17 to 19)

Fig no-14.ii.



Monsoon Density of *Rooted Floating Leaves* Macrophytes (Sp.No.17 to 19)

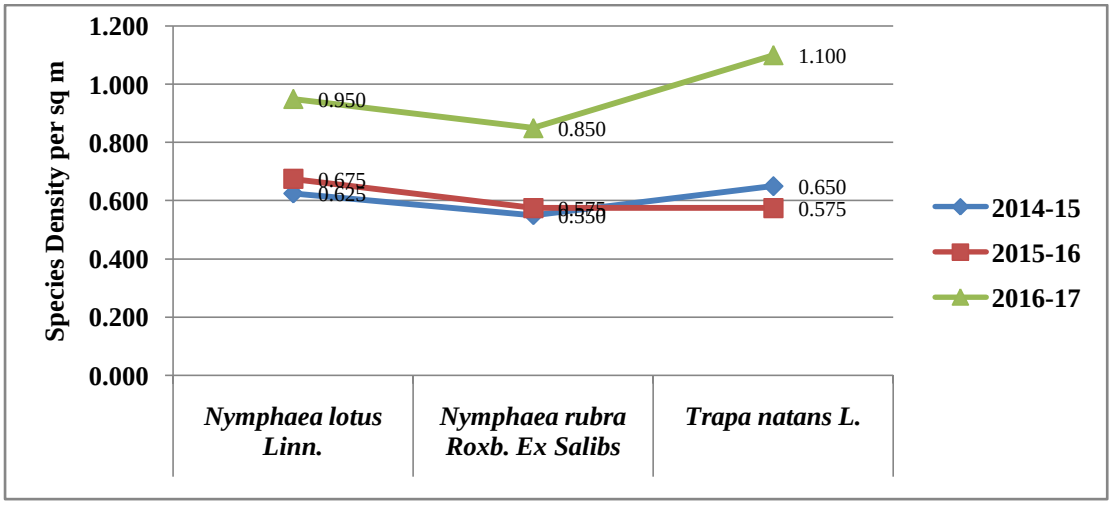
The graph shows monsoon density of *Rooted Floating Leaves* macrophytes (Sl.No.17 to 19). The blue line represents the distribution of three plants in 2014-15 such as *17. Nymphaea lotus* Linn.- 0.475, *18. Nymphaea rubra* Roxb. Ex Salibs,- *0.500, 19. Trapa natans* L.-0.600.

The red line represents the value of 2015-16. They are *17. Nymphaea lotus* Linn.- 0.650, *18. Nymphaea rubra* Roxb. Ex Salibs.0.525, *19. Trapa natans* L.-0.100 .

The green line shows density of the year 2016-17 by *17. Nymphaea lotus* Lin.- 0.850, *18. Nymphaea rubra* Roxb. Ex Salibs,-*0.875, 19. Trapa natans* L.-1.050. Density range 0 to 1.000 sq. m.

14. iii. Post Monsoon Density of *Rooted Floating Leaves* Macrophytes (Sp. no.17 to 19)

Fig no. 14.iii.



Post Monsoon Density of *Rooted Floating Leaves* Macrophytes (Sp. no.17 to 19)

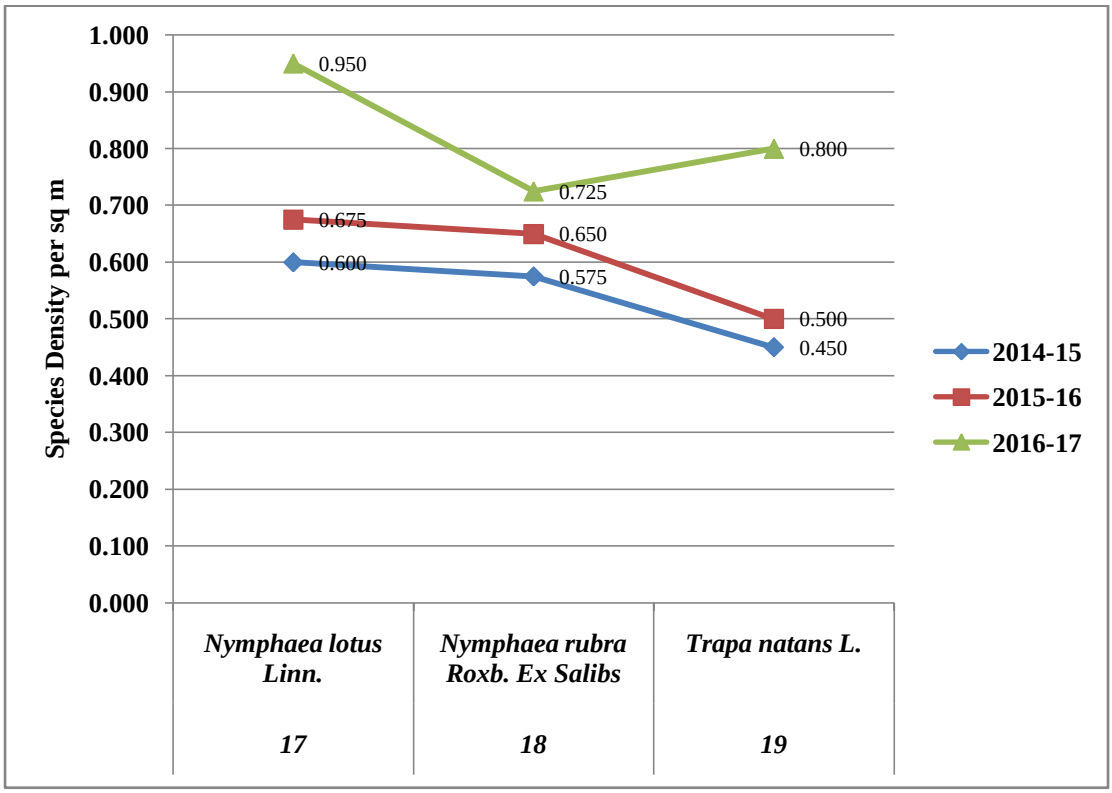
The graph shows Post monsoon density of *Rooted Floating Leaves* macrophytes Sl.No.17 and 19). The blue line represents the distribution of three plants in 2014-15 such as *17. Nymphaea lotus* Linn.- 0.625, *18. Nymphaea rubra* Roxb. Ex Salibs,- *0.575. 19. Trapa natans* L.- 0.650.

The red line represents the value of 2015-16. They are *17. Nymphaea lotus* Linn. – 0.675, *18. Nymphaea rubra* Roxb. Ex Salibs.0.575, *19. Trapa natans* L.- 0.575.

The green line shows density of the year 2016-17 by *17. Nymphaea lotus* Lin.- 0.950, *18. Nymphaea rubra* Roxb. Ex Salibs,- *0.850, 19. Trapa natans* L.-1.100. Density range 0 to 1.200 sq. m.

14. iv. Winter Density of *Rooted Floating Leaves* Macrophytes (Sp.No.17 to 19)

Fig No-14.iv.



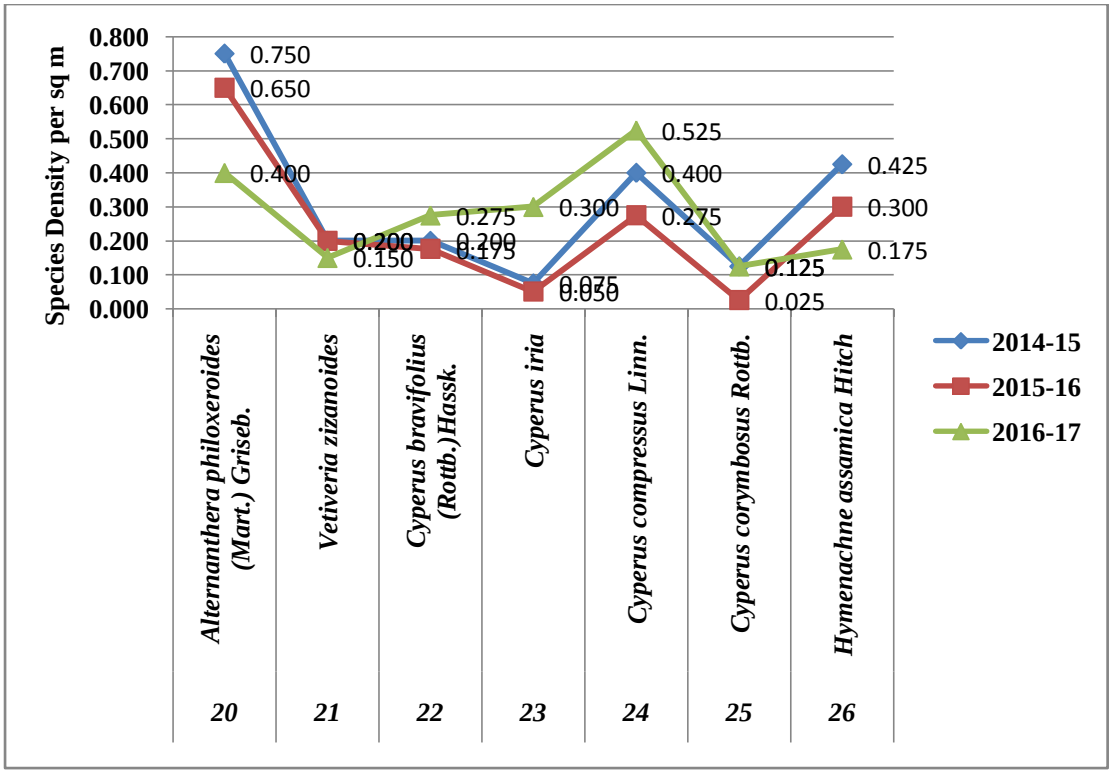
Winter Density of *Rooted Floating Leaves* Macrophytes (Sp.No.17 to 19)

The graph shows winter density of *Rooted Floating Leaves* macrophytes (Sl.No.17 to 19). The blue line represents the distribution of three plants in 2014-15 such as *17. Nymphaea lotus* Linn.- 0.600, *18. Nymphaea rubra* Roxb. Ex Salibs,- *0.575, 19. Trapa natans* L.- 0.450. The red line represents the value of 2015-16. They are *17. Nymphaea lotus* Linn.- 0.675, *18. Nymphaea rubra* Roxb. Ex Salibs.0.650, *19. Trapa natans* L.-0.500.The green line shows density of the year 2016-17 by *17. Nymphaea lotus* Lin.- 0.950, *18. Nymphaea rubra* Roxb. Ex Salibs,-*0.725, 19. Trapa natans* L.-0.800. Density range 0 to 1.000 sq. m.

15. a. Seasonal Density of ***Emargent*** Macrophytes in Diplai Deel (Sp.no.20 to 26)

15. a. i. Pre Monsoon ensity of *Emergent* Macrophytes (Sp.No.20 to 26)

Fig no-15. a. i. A



Pre Monsoon Density of *Emergent* Macrophytes (Sp.No.20 to 26)

The graph shows Pre monsoon density of *Emergent* macrophytes (Sl.No.20 and 26). The blue line represents the density of seven plants in 2014-15 such as *20. Alternanthera philoxeroides* (Mart.) Grisep.- *0.750, 21. Vetiveria zizanoides (*L.) Nass.- 0.200, *22. Cyperus bravifolius* (Rottb.) Hassk.- 0.200, *23. Cyperus iria – 0.075, 24. Cyperus compressus* L.- *0.400, 25. Cyperus corymbosus* Rottb,- 0.125, *26. Hymenachne assamica* Hitch -0.425.

The red line represents the value of 2015-16. They are *20. Alternanthera philoxeroides* (Mart.) Grisep.- *0.650, 21. Vetiveria zizanoides (*L.) Nass.- 0200, *22. Cyperus bravifolius* (Rottb.) Hassk.- 0.200, *23. Cyperus iria – 0.050, 24. Cyperus compressus* L.- *0.275, 25. Cyperus corymbosus* Rottb,- 0.025, *26. Hymenachne assamica* Hitch -0.175.

The green line shows density of the year 2016-17 by *20. Alternanthera philoxeroides* (Mart.) Grisep.- *0.400, 21. Vetiveria zizanoides (*L.) Nass.- 0.150, *22. Cyperus bravifolius* (Rottb.) Hassk.- 0.275, *23. Cyperus iria – 0.300, 24. Cyperus compressus* L.- *0.525, 25. Cyperus corymbosus* Rottb,- 0.125, *26. Hymenachne assamica* Hitch -0.500. The limit is 0 to 0.800 per sq m.

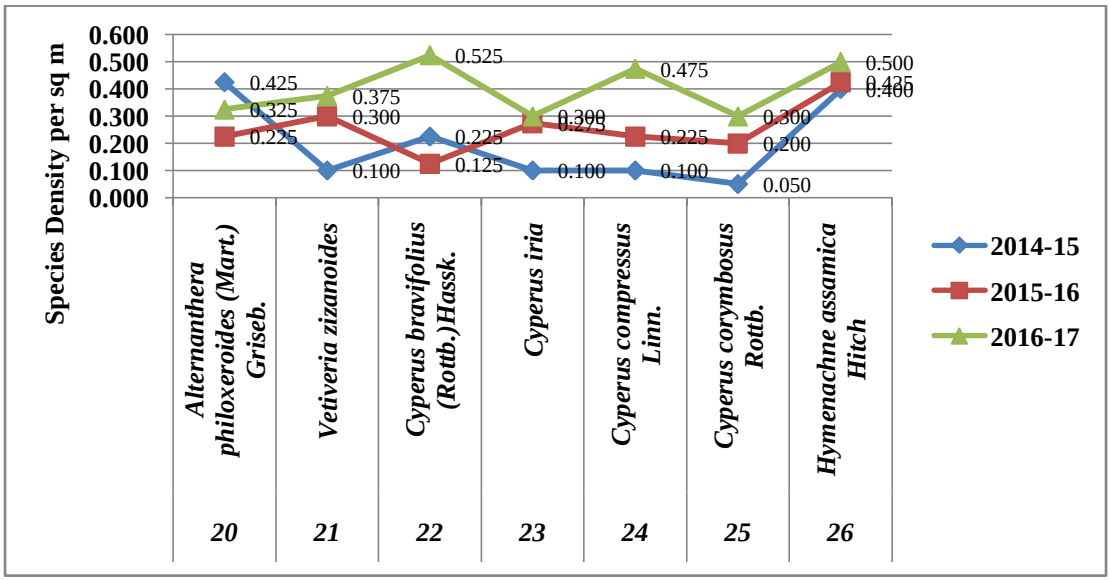
Table no. 15. a. i.B

Years (November to November)	Decreasing Density in Pre Monsoon Emergent Macrophytes (Sp. no 20 to 26) with Density value	
	20. Alternanthera philoxeroides (Mart.) Grisep	*26. Hymenachne assamica* Hitch
2014-15	0.750	0.425
2015-16	0.650	0.300
2016-17	0.400	0.175

20. Alternanthera philoxeroides (Mart.) Grisep and *26. Hymenachne assamica* Hitch are *Emergent* macrophytes showed their density decreased consequtively during Pre Monson periods in 3 study years.

15. a. ii. Monsoon Density of *Emergent* Macrophytes (Sp.No.20 to 26)

Fig no-15. a. ii.



Monsoon Density of *Emergent* Macrophytes (Sp.No.20 to 26)

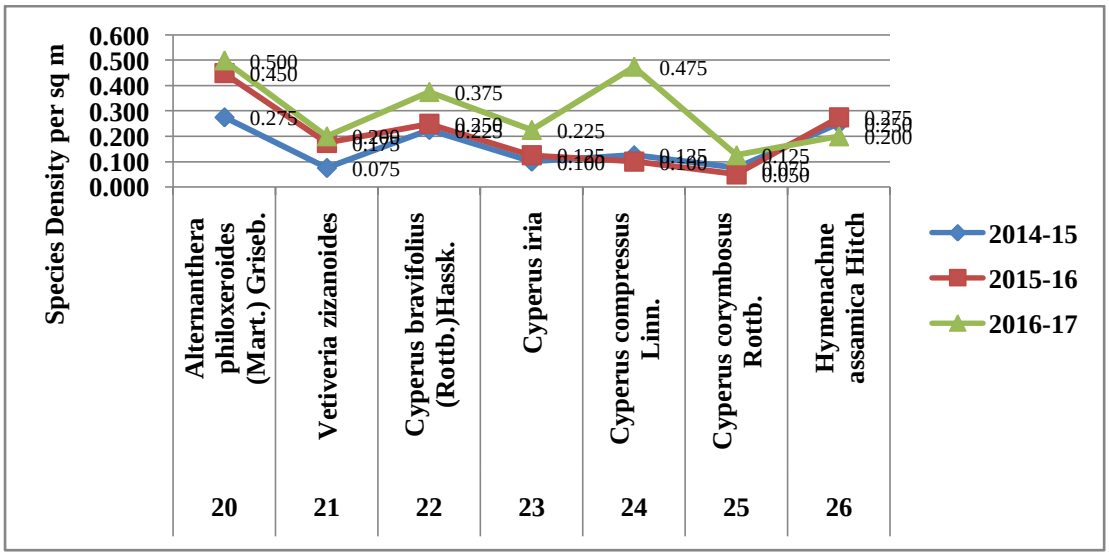
The graph shows monsoon density of *Emergent* macrophytes (Sl.No.20 and 26). The blue line represents the density of seven plants in 2014-15 such as *20. Alternanthera philoxeroides* (Mart.) Grisep.- *0.425, 21. Vetiveria zizanoides* (L.) Nass.- 0.2000.100, *22. Cyperus bravifolius* (Rottb.) Hassk.-0.225, *23. Cyperus iria – 0.100, 24. Cyperus compressus* L.- *0.100, 25. Cyperus corymbosus* Rottb,- 0.050, *26. Hymenachne assamica* Hitch -0.400.

The red line represents the value of 2015-16. They are *20. Alternanthera philoxeroides* (Mart.) Grisep.- *0.225, 21. Vetiveria zizanoides (*L.) Nass.- 0.300, *22. Cyperus bravifolius* (Rottb.) Hassk.- 0.125, *23. Cyperus iria – 0.275, 24. Cyperus compressus* L.- *0.225, 25. Cyperus corymbosus* Rottb,- 0.200, *26. Hymenachne assamica* Hitch -0.425.

The green line shows density of the year 2016-17 by *20. Alternanthera philoxeroides* (Mart.) Grisep.- *0.325, 21. Vetiveria zizanoides (*L.) Nass.- 0.375, *22. Cyperus bravifolius* (Rottb.) Hassk.- 0.525, *23. Cyperus iria – 0.300, 24. Cyperus compressus* L.- *0.475, 25. Cyperus corymbosus* Rottb,- 0.300, *26. Hymenachne assamica* Hitch -0.500. The limit is 0 to 0.600 per sq m

15. a. iii. Post Monsoon Density of *Emergent* Macrophytes (Sp.No.20 to 26)

Fig no-15.a.iii.



Post Monsoon Density of *Emergent* Macrophytes (SpNo.20 to 26)

The graph shows Pre monsoon density of *Emergent* macrophytes (Sl.No.20 and 26). The blue line represents the density of seven plants in 2014-15 such as *20. Alternanthera philoxeroides* (Mart.) Grisep.- *0.276, 21. Vetiveria zizanoides (*L.) Nass.- 0.075, *22. Cyperus bravifolius* (Rottb.) Hassk.- 0.225, *23. Cyperus iria – 0.100, 24. Cyperus compressus* L.- *0.075, 25. Cyperus corymbosus* Rottb,- 0.125, *26. Hymenachne assamica* Hitch -0.250.

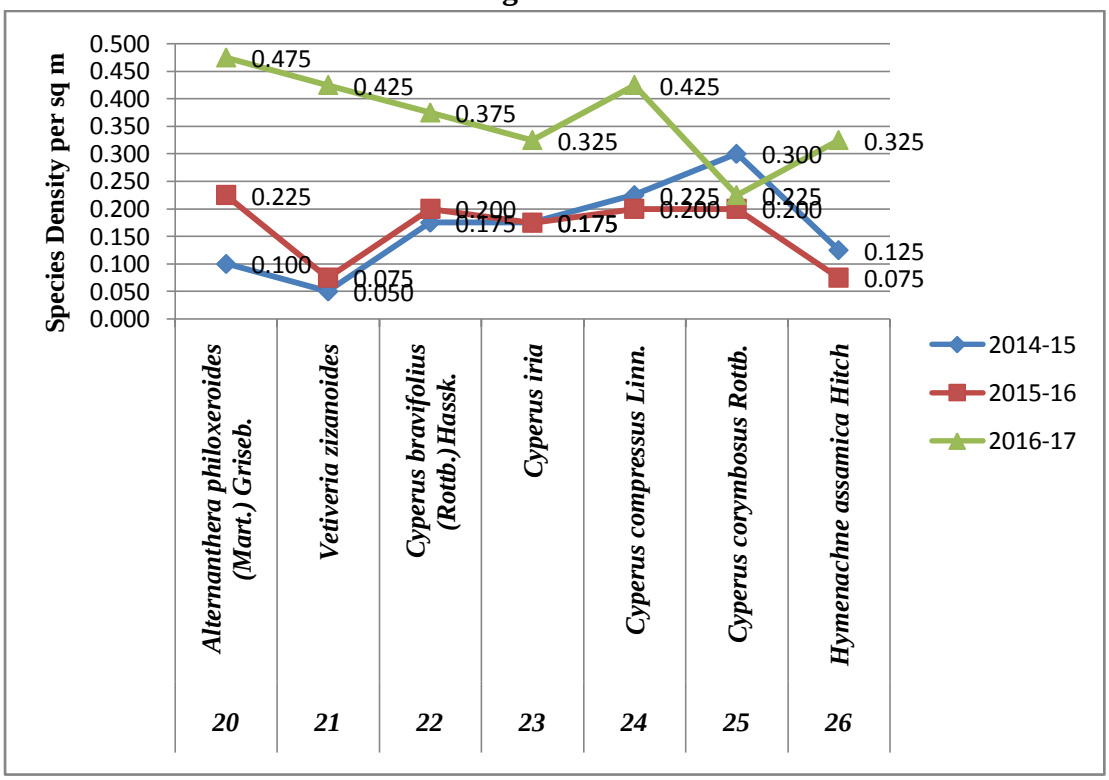
The red line represents the value of 2015-16. They are *20. Alternanthera philoxeroides* (Mart.) Grisep.- *0.450, 21. Vetiveria zizanoides (*L.) Nass.- 0.175, *22. Cyperus bravifolius* (Rottb.) Hassk.- 0.250, *23. Cyperus iria – 0.125, 24. Cyperus*

compressus L.- *0.100, 25. Cyperus corymbosus* Rottb,- 0.050, *26. Hymenachne assamica* Hitch -0.275.

The green line shows plants density of the year 2016-17 by *20. Alternanthera philoxeroides* (Mart.) Grisep.- *0.500, 21. Vetiveria zizanoides (*L.) Nass.- 0.200, *22. Cyperus bravifolius* (Rottb.) Hassk.- 0.375, *23. Cyperus iria – 0.225, 24. Cyperus compressus* L.- *0.475, 25. Cyperus corymbosus* Rottb,- 0.2125, *26. Hymenachne assamica* Hitch -0.200. The limit is 0 to 0.600 per sq m

15. a. iv. Winter Density of *Emergent* Macrophytes (Sp.No.20 to 26)

Fig no- 15.a.iv.



Winter Density of *Emergent* Macrophytes (Sp.No.20 to 26)

The graph shows winter density of *Emergent* macrophytes (Sl.No.20 and 26). The blue line represents the density of seven plants in 2014-15 such as *20. Alternanthera philoxeroides* (Mart.) Grisep.- *0.100, 21. Vetiveria zizanoides (*L.) Nass.- 0.050, *22. Cyperus bravifolius* (Rottb.) Hassk.- 0.175, *23. Cyperus iria – 0.175, 24. Cyperus compressus* L.- *0.225, 25. Cyperus corymbosus* Rottb,- 0.300, *26. Hymenachne assamica* Hitch -0.125.

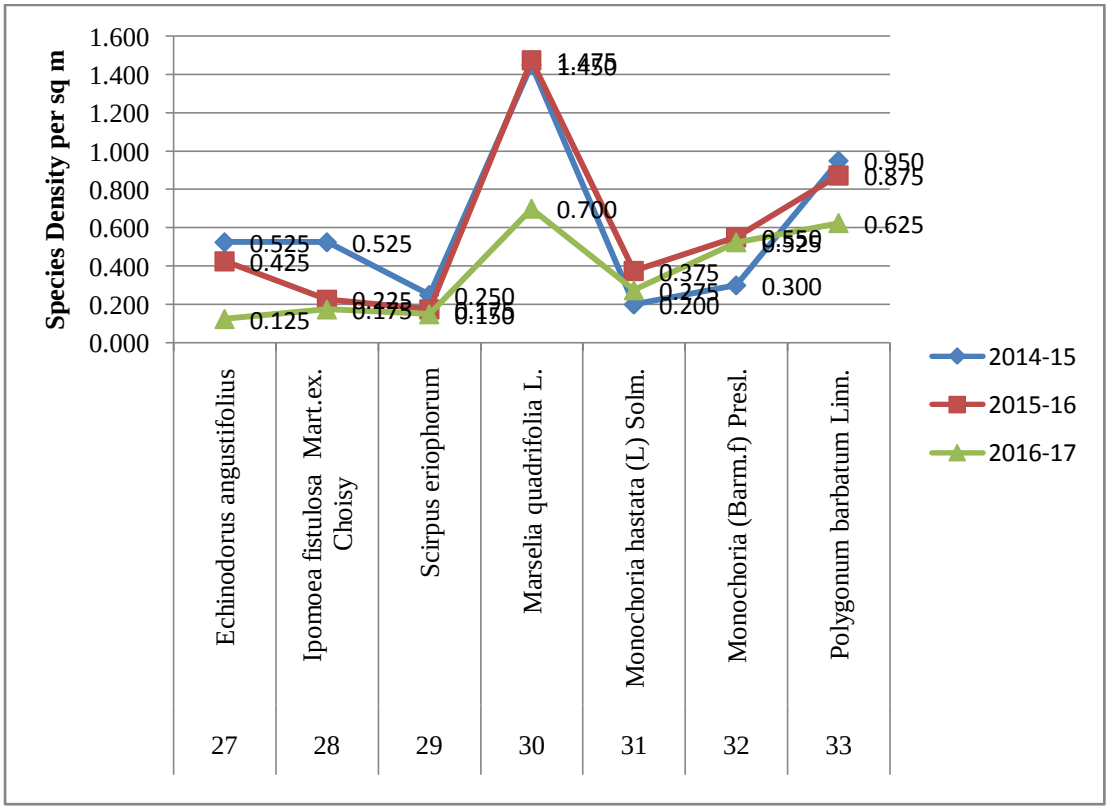
The red line represents the value of 2015-16. They are *20. Alternanthera philoxeroides* (Mart.) Grisep.- *0.225, 21. Vetiveria zizanoides (*L.) Nass.- 0.075, *22. Cyperus bravifolius* (Rottb.) Hassk.- 0.200, *23. Cyperus iria – 0.175, 24. Cyperus compressus* L.- *0.200, 25. Cyperus corymbosus* Rottb,- 0.200, *26. Hymenachne assamica* Hitch -0.075.

The green line shows plants density of the year 2016-17 by *20. Alternanthera philoxeroides* (Mart.) Grisep.- *0.475, 21. Vetiveria zizanoides (*L.) Nass.- 0.425, *22. Cyperus bravifolius* (Rottb.) Hassk.- 0.375, *23. Cyperus iria – 0.325, 24. Cyperus compressus* L.- *0.475, 25. Cyperus corymbosus* Rottb,- 0.225, *26. Hymenachne assamica* Hitch -0.325. The limit is 0 to 0.600 per sq m

15. b. Seasonal Density of *Emergent* Macrophytes (Sp.No.27 to 33)

15. b. i. Pre Monsoon Density of *Emergent* Macrophytes (Sp.No.27 to 33)

Fig no-15. b.i. A



Pre Monsoon Density of *Emergent* Macrophytes (Sp.No.27 to 33)

The graph shows Pre monsoon density of *Emergent* macrophytes (Sl.No.27 and 33). The blue line represents the density of seven plants in 2014-15 such as 27. *Echinodorus angustifolius*- 0.525, *28.Ipomoea fistulosa* Mart**.**ex.Choisy.- 0.525, *29. Scirpus eriophorum* L.-0.250, *30. Marselia quadrifolia* L.- 1.450, *31. Monochoria hastate* (L.) Solm.- 0.200, *32. Monochoria* C. Presl.- 0.300, *33. Polygonum barbatum* Linn.- 0950.

The red line represents the value of 2015-16. They are 27. *Echinodorus angustifolius*- 0.425, *28. Ipomoea fistulosa* Mart**.**ex.Choisy.- 0225, *29.Scirpus eriophorum* L. *– 0.175, 30. Marselia quadrifolia* L.- 1.475, *31. Monochoria hastate* (L.) Solm.-0.200 *32. Monochoria* C. Presl.- 0.550, *33. Polygonum barbatum* Linn.- 0.950.

The green line shows plants density of the year 2016-17 by 27. *Echinodorus angustifolius* – 0.125, *28. Ipomoea fistulosa* Mart**.**ex.Choisy.- 0.175, *29. Scirpus eriophorum* L.-0.175, *30. Marselia quadrifolia* L.- 0.700, *31. Monochoria hastate* (L.) Solm.- 0.200, *32. Monochoria* C. Presl.- 0.300, *33. Polygonum barbatum* Linn.- 0.625. limit is 0 to 1.600.

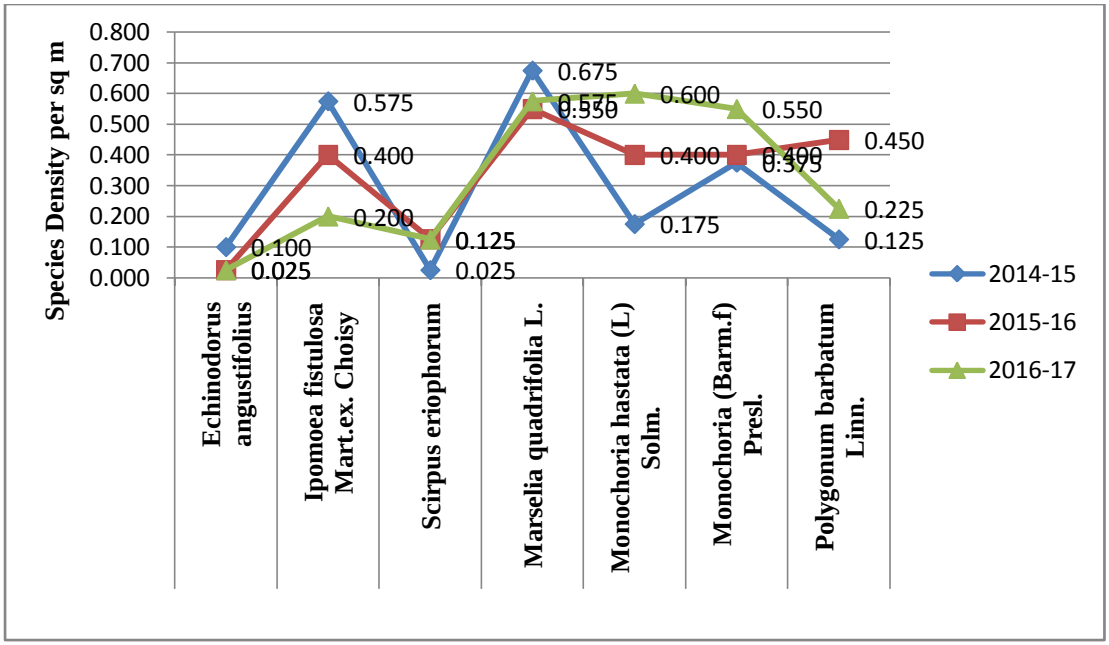
Table no. 15. b. i. B

Years (November to November)	**Decreasing Density in Pre Monsoon Emergent Macrophytes (Sp.no 27 ,28 and 33) with Density value**		
	27. *Echinodorus angustifolius*	*28.Ipomoea fistulosa* Mart**.**ex.Choisy.	*33. Polygonum barbatum* Linn.
2014-15	0.525	0.525	0.950
2015-16	0.425	0.225	0.875
2016-17	0.125	0.175	0.625

27. *Echinodorus angustifolius , 28. Ipomoea fistulosa* Mart**.** ex. Choisy and *33. Polygonum barbatum* Linn. are the decreasing emergents in Pre Monsoon.

15. b.ii. Monsoon Density of *Emergent* Macrophytes (Sl.No.27 to 33)

Fig no- 15. b. ii. A



Monsoon Density of *Emergent* Macrophytes (Sp.No.27 to 33)

The graph shows Monsoon density of *Emergent* macrophytes (Sl.No.27 and 33). The blue line represents the density of seven plants in 2014-15 such as 27. *Echinodorus angustifolius*- 0.100, *28. Ipomoea fistulosa* Mart.ex.Choisy.- 0.575, *29. Scirpus eriophorum* L.-0.025, *30. Marselia quadrifolia* L.- 0.675, *31. Monochoria hastate* (L.) Solm.- 0.175, *32. Monochoria* C. Presl.- 0.375, *33. Polygonum barbatum* Linn.- 0.125.

The red line represents the value of 2015-16. They are 27. *Echinodorus angustifolius*- 0.025, *28. Ipomoea fistulosa* Mart.ex.Choisy.-0.400, *29.Scirpus eriophorum* L. – *0.125*, *30. Marselia quadrifolia* L.-0.400, *31. Monochoria hastate* (L.) Solm.-0.200 *32. Monochoria* C. Presl.- 0.550, *33. Polygonum barbatum* Linn.- 0.950.

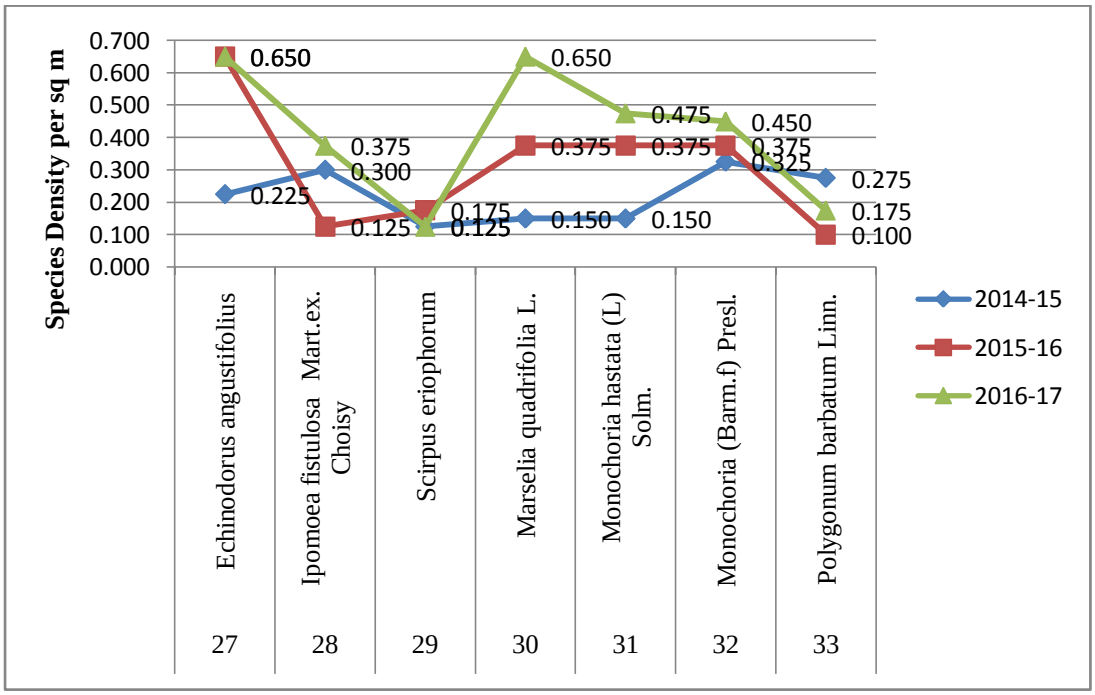
The green line shows plants density of the year 2016-17 by 27. *Echinodorus angustifolius* – 0.125, *28. Ipomoea fistulosa* Mart.ex.Choisy.- 0.175, *29. Scirpus eriophorum* L.-0.175, *30. Marselia quadrifolia* L.- 0.700, *31. Monochoria hastate* (L.) Solm.- 0.400, *32. Monochoria* C. Presl.- 0.375, *33. Polygonum barbatum* Linn.- 0.625. limit is 0 to 0.125. *Ipomoea fistulosa* Mart.ex.Choisy. is seen to be decreased continuously from 2014-15 to 2016-17 of the study period.

Table no. 15. b. ii. B

Years (November to November)	Decreasing Density in Monsoon Emergent macrophytes (Sl.no 28) with Density value
	28. *Ipomoea fistulosa* Mart.ex.Choisy.
2014-15	0.575
2015-16	0.400
2016-17	0.200

15. b. iii. Post Monsoon Density of *Emergent* Macrophytes (Sp.No.27 to 33)

Fig no-15.b.iii.



Post Monsoon Density of *Emergent* Macrophytes (Sp.No.27 to 33)

The graph shows Post monsoon density of *Emergent* macrophytes (Sl.No.27 and 33). The blue line represents the density of seven plants in 2014-15 such as 27. *Echinodorus angustifolius*- 0.225, *28. Ipomoea fistulosa* Mart**.** Choisy.- 0.300, *29. Scirpus eriophorum* L.-0.175, *30. Marselia quadrifolia* L.- 0.125, *31. Monochoria hastate* (L.) Solm.- 0.150, *32. Monochoria* C. Presl.- 0.150, *33. Polygonum barbatum* Linn.- 0.175.

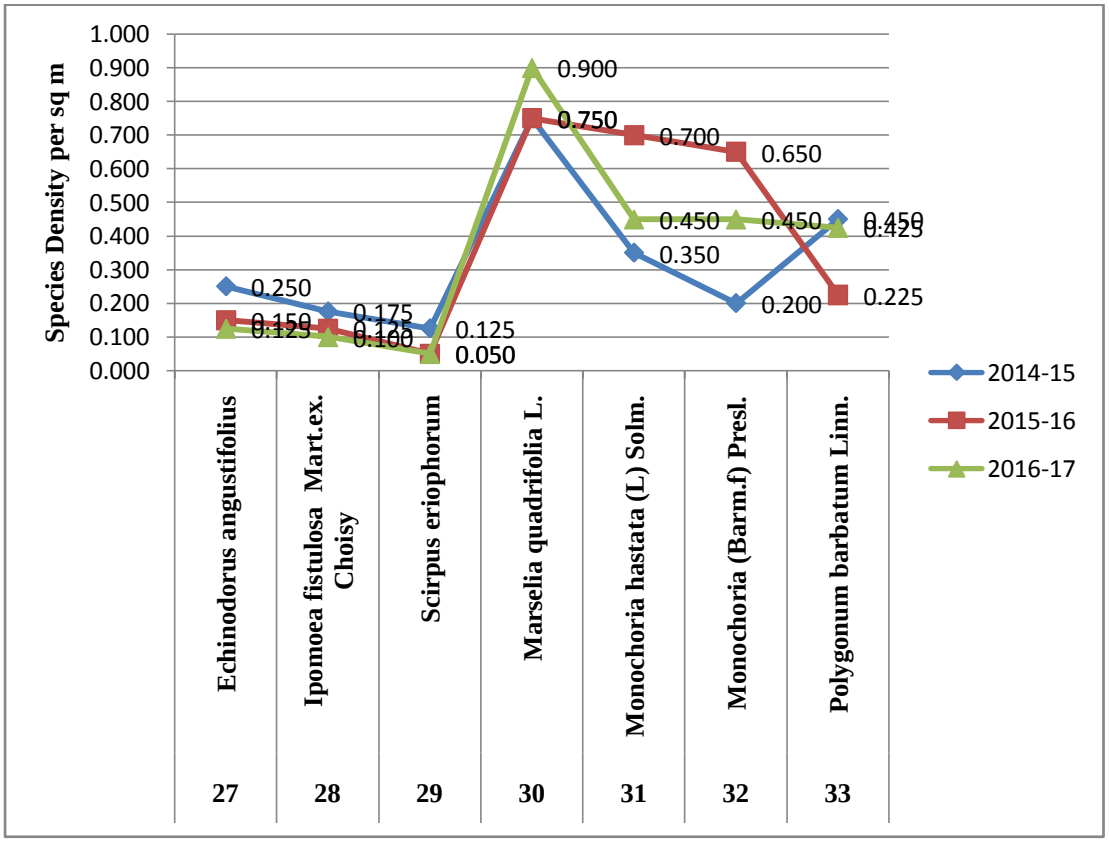
The red line represents the value of 2015-16. They are 27. *Echinodorus angustifolius*- 0.650, *28. Ipomoea fistulosa* Mart.ex.Choisy.-0.125, *29.Scirpus eriophorum* L. – *0.175*, *30. Marselia quadrifolia* L.-0.575, *31. Monochoria hastate*

(L.) Solm.-0.575 *32. Monochoria* C. Presl.- 0.375, *33. Polygonum barbatum* Linn.- 0.100.

The green line shows plants density of the year 2016-17 by 27. *Echinodorus angustifolius* –0.650, *28. Ipomoea fistulosa* Mart.ex.Choisy.- 0.375, *29. Scirpus eriophorum* L.-0.125, *30. Marselia quadrifolia* L.- 0.650, *31. Monochoria hastate* (L.) Solm.- 0.475, *32. Monochoria* C. Presl.- 0.450, *33. Polygonum barbatum* Linn.- 0.625. Limit is 0 to 0.175.

15. b. iv. Winter Density of *Emergent* Macrophytes (Sp.No.27 to 33)

Fig no- 15.b.iv. A



Winter Density of *Emergent* Macrophytes (Sp. No.27 to 33)

The graph shows winter density of *Emergent* macrophytes (Sl.No.27 and 33). The blue line represents the density of seven plants in 2014-15 such as 27. *Echinodorus angustifolius*- 0250, *28. Ipomoea fistulosa* Mart. Choisy.- 0.175, *29. Scirpus eriophorum* L.-0.125, *30. Marselia quadrifolia* L.- 0.750, *31. Monochoria hastate* (L.) Solm.- 0.350, *32. Monochoria* C. Presl.- 0.200, *33. Polygonum barbatum* Linn.- 0.450.

The red line represents the value of 2015-16. They are 27. *Echinodorus angustifolius*- 0.150, *28. Ipomoea fistulosa* Mart.ex.Choisy.-0.125, *29.Scirpus eriophorum* L. – *0.050, 30. Marselia quadrifolia* L.-0.750, *31. Monochoria hastate* (L.) Solm.-0.700 *32. Monochoria* C. Presl.- 0.650, *33. Polygonum barbatum* Linn.- 0.225.

The green line shows plants density of the year 2016-17 by 27. *Echinodorus angustifolius* –0.125, *28. Ipomoea fistulosa* Mart.ex.Choisy.- 0.100, *29. Scirpus eriophorum* L.-0.050, *30. Marselia quadrifolia* L.- 0.750, *31. Monochoria hastate* (L.) Solm.- 0.450, *32. Monochoria* C. Presl.- 0.450, *33. Polygonum barbatum* Linn.- 0.425. Limit is 0 to 0.175.

Table no. 15. b. iv. B

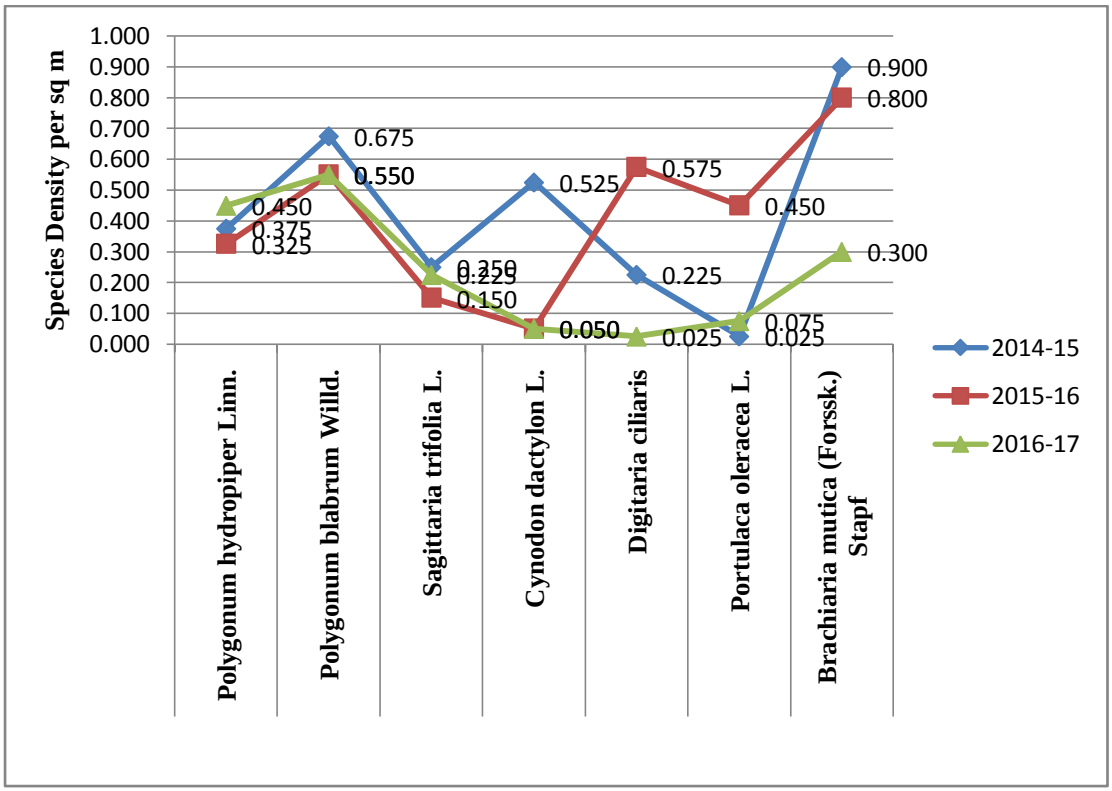
Years (November to November)	**Decreasing Density in Winter Emergent Macrophytes (Sp. no 27) with Density value**
	27. *Echinodorus angustifolius*
2014-15	0.100
2015-16	0.025
2016-17	0.025

27. *Echinodorus angustifolius* is also in decreasing form during Winter in study period.

15. c. Seasonal Density of *Emargents* Macrophytes (Sp.No.34 to 40)

15. c. i. Pre Monsoon Density of *Emergent* Macrophytes (Sp.No.34 to 40)

Fig no. 15.c.i. A



Pre Monsoon Density of *Emergent* Macrophytes (Sp.No.34 to 40

The graph shows Pre monsoon density of *Emergent* macrophytes (Sl.No.34 and 35). The blue line represents the density of seven plants in 2014-15 such as *34. Polygonum hydropiper* Linn.- 0.375, *35. Polygonum glabrum* Willd.- 0.675, *36.Sagittaria trifolia* L.- 0.250, *37. Cynodon dactylon (*L.) Pers.- 0.050, *38. Digitaria ciliaris* (Retzius) Koeler – 0.225, *.39. Portulaca quadrifida* L. 0.025, 40. Brachiaria mutica (Forssk.) Stapf.- 0.900.

The red line represents the value of 2015-16. They are *34. Polygonum hydropiper* Linn.- 0.352, *35. Polygonum glabrum* Willd.- 0.550, *36.Sagittaria trifolia* L.- 0.150, *37. Cynodon dactylon (*L.) Pers.- 0.050, *38. Digitaria ciliaris* (Retzius) Koeler.- 0.575, *39. Portulaca quadrifida* L.- 0.450, 40. Brachiaria mutica (Forssk.) Stapf. 0.800.

The green line shows plants density of the year 2016-17 by *34. Polygonum hydropiper* Linn.- 0.450, *35. Polygonum glabrum* Willd.- 0.550, *36.Sagittaria trifolia* L.- 0.450, *37. Cynodon dactylon (*L.) Pers.- 0.050, *38. Digitaria ciliaris* (Retzius) Koeler.- 0.025, *39. Portulaca quadrifida* L.- 0.075, 40. Brachiaria mutica (Forssk.)

Stapf.- 0.900. The limit is 0 to 1.00.

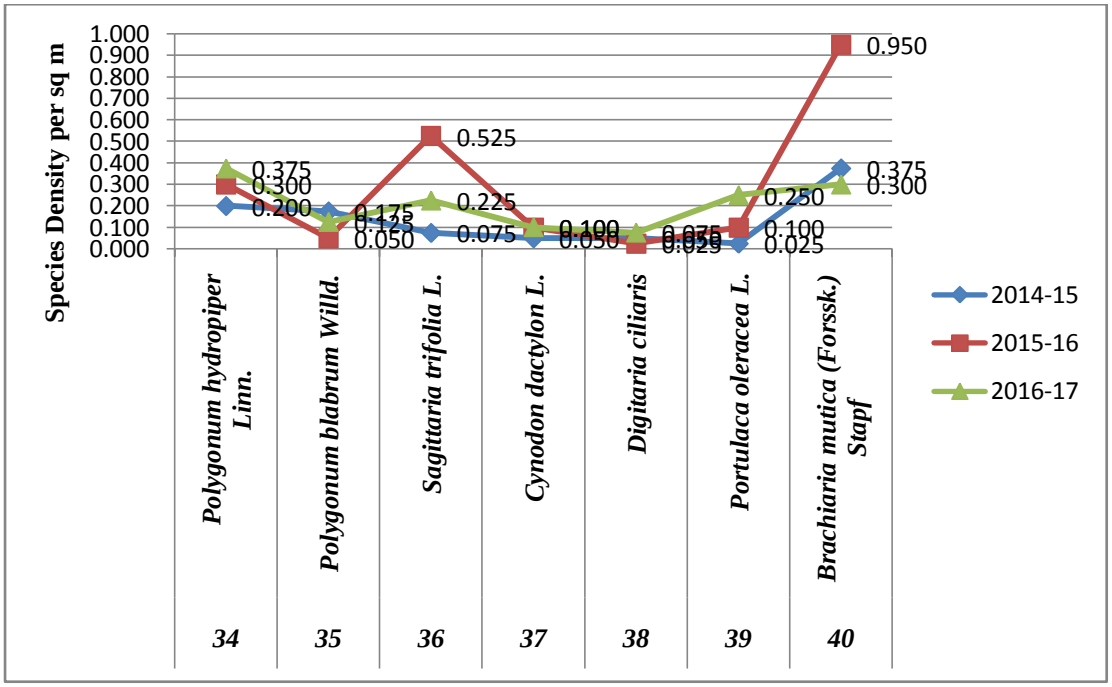
Table no. 15. c. i. B

Years (November to November)	Decreasing Density in Pre Monsoon Emergent Macrophytes (Sp. no 40) with Density value
	40. *Brachiaria mutica* (Forssk.) Stapf.
2014-15	0.900
2015-16	0.800
2016-17	0.300

40. *Brachiaria mutica* (Forssk.) Stapf. decreases its density in Pre Monsoon.

15. c. ii. Monsoon Density of *Emergent* Macrophytes (Sp.No.34 to 40)

Fig no-15.c.ii



Monsoon Density of *Emergent* Macrophytes (Sp.No.34 to 40)

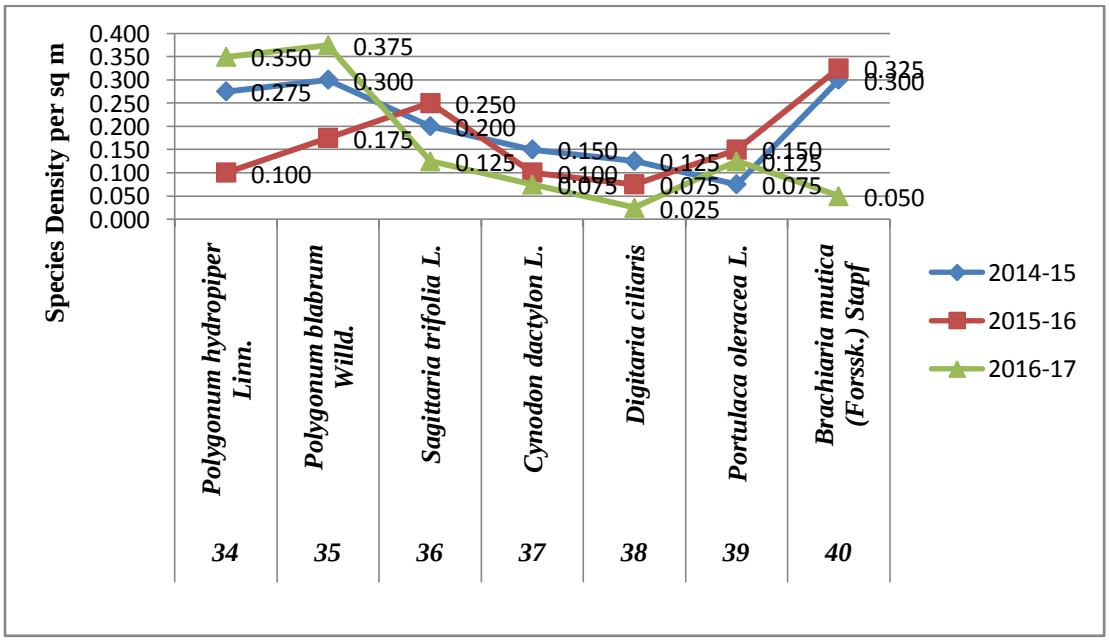
The graph shows monsoon density of *emergent* macrophytes (Sl.No.34 and 35). The blue line represents the density of seven plants species in 2014-15 such as *34. Polygonum hydropiper* Linn.- 0.200, *35. Polygonum glabrum* Willd.- 0.175, *36.Sagittaria trifolia* L.- 0.225, *37. Cynodon dactylon (*L.) Pers.-0.100, *38. Digitaria ciliaris* (Retzius) Koeler – 0.075, *.39. Portulaca quadrifida* L. 0.250, 40. *Brachiaria mutica* (Forssk.) Stapf.-0.300.

The red line represents the value of 2015-16. They are *34. Polygonum hydropiper* Linn.- 0.300, *35. Polygonum glabrum* Willd.- 0.050, *36.Sagittaria trifolia* L.- 0.525, *37. Cynodon dactylon (*L.) Pers.- 0.100, *38. Digitaria ciliaris* (Retzius) Koeler.- 0.025, *39. Portulaca quadrifida* L.- 0.100, 40. *Brachiaria mutica* (Forssk.) Stapf. 0.950.

The green line shows plants density of the year 2016-17 by *34. Polygonum hydropiper* Linn.- 0.375, *35. Polygonum glabrum* Willd.- 0.125, *36.Sagittaria trifolia* L.- 0.225, *37. Cynodon dactylon (*L.) Pers.- 0.100, *38. Digitaria ciliaris* (Retzius) Koeler.- 0.075, *39. Portulaca quadrifida* L.- 0.250, 40. *Brachiaria mutica* (Forssk.) Stapf.- 0.300. Limit is 0 to 1.00.

15. c. iii. Post Monsoon Density of *Emergent* Macrophytes (Sp.No.34 to 40)

Fig no- 15.c.iii.A



Post Monsoon Density of *Emergent* Macrophytes (Sp.No.34 to 40)

The graph shows Post monsoon density of *emergent* macrophytes (Sl.No.34 and 35). The blue line represents the density of seven plants species in 2014-15 such as *34. Polygonum hydropiper* Linn.- 0.275, *35. Polygonum glabrum* Willd.- 0.300, *36.Sagittaria trifolia* L.- 0.125, *37. Cynodon dactylon (*L.) Pers.-0.075, *38. Digitaria ciliaris* (Retzius) Koeler – 0.025, *.39. Portulaca quadrifida* L. 0.120, 40. *Brachiaria mutica* (Forssk.) Stapf.- 0.050.

The red line represents the value of 2015-16. They are *34. Polygonum hydropiper* Linn.- 0.100, *35. Polygonum glabrum* Willd.- 0.175, *36. Sagittaria trifolia* L.- 0.250, *37. Cynodon dactylon (*L.) Pers.- 0.100, *38. Digitaria ciliaris* (Retzius) Koeler.- 0.075, *39. Portulaca quadrifida* L.- 0.150, 40. *Brachiaria mutica* (Forssk.) Stapf. 0.325.

The green line shows plants density of the year 2016-17 by *34. Polygonum hydropiper* Linn.- 0.350, *35. Polygonum glabrum* Willd.- 0.375, *36.Sagittaria trifolia* L.- 0.125, *37. Cynodon dactylon (*L.) Pers.- 0.075, *38. Digitaria ciliaris* (Retzius) Koeler.- 0.025, *39. Portulaca quadrifida* L.- 0.125, 40. *Brachiaria mutica* (Forssk.) Stapf.- 0.050. Limit is 0 to 1.00.

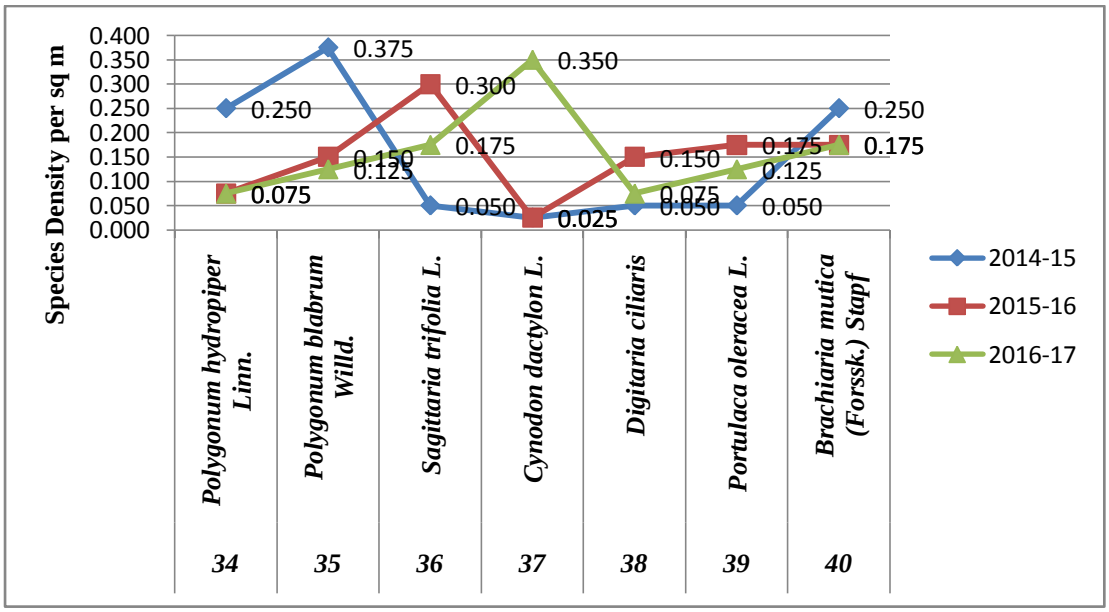
Table no. 15. c. iii. B

Years (November to November)	**Decreasing Density in Post Monsoon Emergent Macrophytes (Sp.no 37 and 38) with Density value**	
	37. Cynodon dactylon (L.) Pers.	*38. Digitaria ciliaris* (Retzius) Koeler L.
2014-15	0.150	0.125
2015-16	0.100	0.075
2016-17	0.075	0.025

*37. Cynodon dactylon (*L.) Pers.*38. Digitaria ciliaris* (Retzius) Koeler are being reduced.

15. c. iv. Winter Density of *Emergent* Macrophytes (Sp.No.34 to 40)

Fig no- 15. c.iv. A



Winter Density of *Emergent* Macrophytes (Sp.No.34 to 40)

The graph shows winter density of *emergent* macrophytes (Sl.No.34 and 35). The blue line represents the density of seven plants species in 2014-15 such as *34. Polygonum hydropiper* Linn.- 0.250, *35. Polygonum glabrum* Willd.- 0.375, *36. Sagittaria trifolia* L.- 0.050, *37. Cynodon dactylon (*L.) Pers.-0.025, *38. Digitaria ciliaris* (Retzius) Koeler – 0.050, *.39. Portulaca quadrifida* L. 0.125, 40. *Brachiaria mutica* (Forssk.) Stapf.- 0.050.

The red line represents the value of 2015-16. They are *34. Polygonum hydropiper* Linn.- 0.100, *35. Polygonum glabrum* Willd.- 0.175, *36. Sagittaria trifolia* L.- 0.250, *37. Cynodon dactylon (*L.) Pers.- 0.100, *38. Digitaria ciliaris* (Retzius) Koeler.- 0.075, *39. Portulaca quadrifida* L.- 0.150, 40. *Brachiaria mutica* (Forssk.) Stapf. 0.250.

The green line shows plants density of the year 2016-17 by *34. Polygonum hydropiper* Linn.- 0.075, *35. Polygonum glabrum* Willd.- 0.125, *36.Sagittaria trifolia* L.- 0.175, *37. Cynodon dactylon (*L.) Pers.- 0.350, *38. Digitaria ciliaris* (Retzius) Koeler.- 0.075, *39. Portulaca quadrifida* L.- 0.125, 40. *Brachiaria mutica* (Forssk.) Stapf.- 0.175. Limit is 0 to 0.400. *Polygonum glabrum* Willd. shows its density reducing in the study period from 0.375 to 0.125. *Polygonum glabrum* Willd. shows its density reducing in the study period from 0.375 to 0.12*35. Polygonum glabrum* Willd. is decreasing in no.

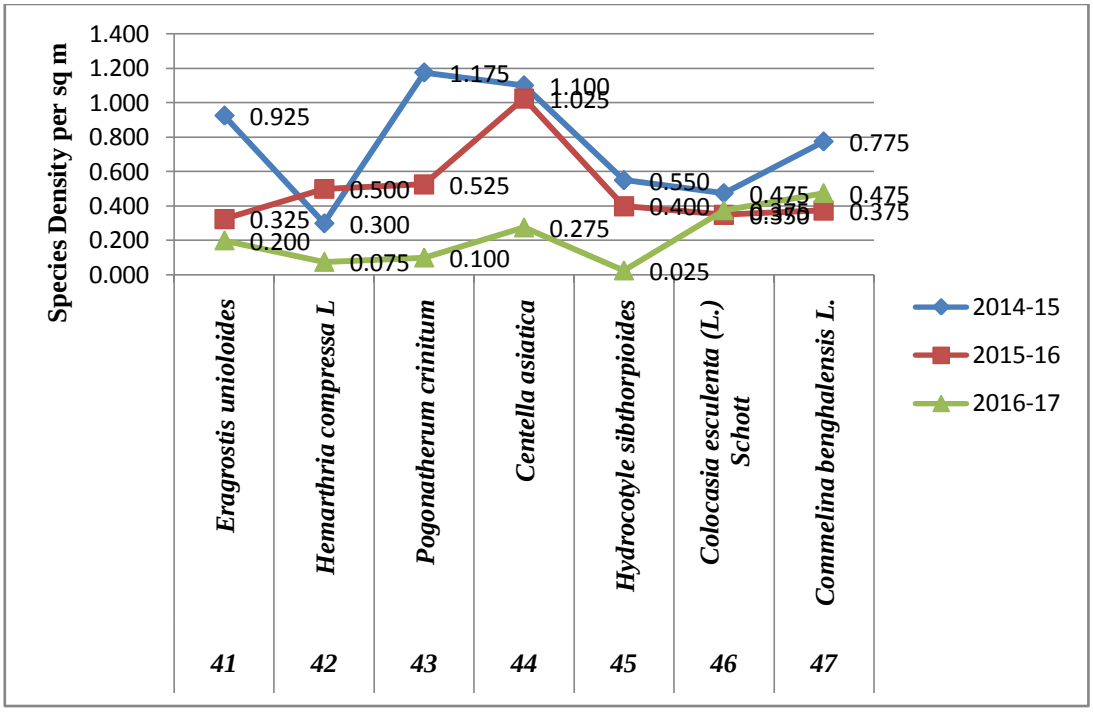
Table no. 15. c. iv. B

Years (November to November)	Decreasing Density inWinter Emergent Macrophytes (Sp. no 35) with Density value
	35. Polygonum glabrum Willd.
2014-15	0.375
2015-16	0.150
2016-17	0.125

15. d. Seasonal Density of *Emergent* Macrophytes (Sp..No.41 to 47)

15. d. i. Pre Monsoon Density of Emergent Macrophytes (Sp. no. 41 to 47)

Fig no.-15. d. i. A



Pre Monsoon Density of Emergent Macrophytes (Sp. no.41 to 47)

The graph shows Pre monsoon density of *emergent* macrophytes (Sl.No.41 and 47). The blue line represents the density of seven plants species in 2014-15 such as 41. *Eragrostis unioloides*(Retzius) Nees.-0.925, *42.Hemarthria compressa* L.-0.300, *43.Pogonatherum crinitum* (T.) Kunth. - *1.175*, 44. *Centella asiatica* L.- 1.100, 45.

Hydrocotyl sibthorpioides Lmmk.- 0.550, *46. Colocasia esculenta* (L.) 0.475, Schott*47. Commelina benghalensis* L.0.775,

The red line represents the value of 2015-16. They are 41. *Eragrostis unioloides*(Retzius) Nees.- 0.325, *42. Hemarthria compressa* L.- 0.500, *43. Pogonatherum crinitum* (T.) Kunth.-0.525, 44. *Centella asiatica* L.- 1.025, 45. *Hydrocotyl sibthorpioides* Lmmk.- 0.400, *46. Colocasia esculenta* (L.) Schott – 0.375, *47. Commelina benghalensis* L.- 0.375.

The green line shows plants density of the year 2016-17 by 41. *Eragrostis unioloides*(Retzius) Nees.0.200, *42. Hemarthria compressa* L. – 0.075, *43. Pogonatherum crinitum* (T.) Kunth.)- 0.100, 44. *Centella asiatica* L.- 0.275, 45. *Hydrocotyl sibthorpioides* Lmmk. – 0.025, *46. Colocasia esculenta* (L.) Schott- 0.350, *47. Commelina benghalensis* L.-0.75. Range 00 to 1.400

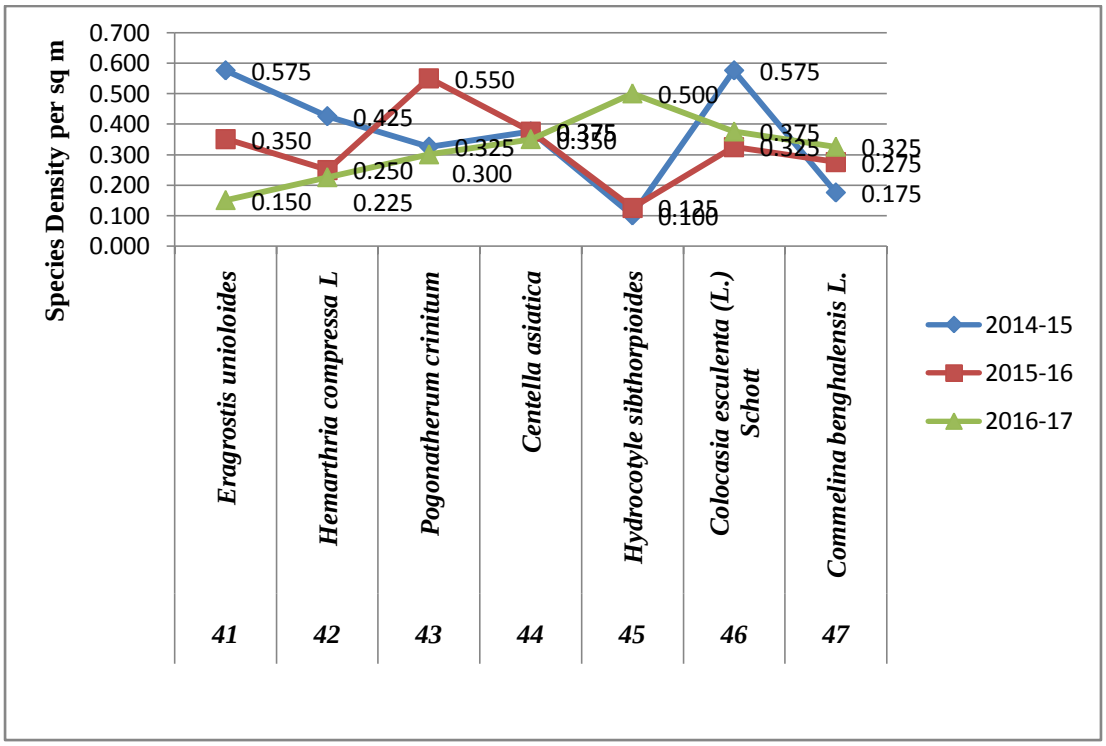
Table no. 15. d. i. B

Years (November to November)	**Decreasing Density in Pre Monsoon Emergent Macrophytes (Sp.no 41, 43 and 45) with Density value**		
	41. *Eragrostis unioloides* (Retzius) Nees.	*43. Pogonatherum crinitum* (T.) Kunth.	45. *Hydrocotyl sibthorpioides* Lmmk.
2014-15	0.925	1.175	0.550
2015-16	0.325	0.525	0.400
2016-17	0.200	0.100	0.025

41.*Eragrostis unioloides* (Retzius) Nees. *Hemarthria compressa* L. *43. Pogonatherum crinitum* (T.) Kunth.) and 45. *Hydrocotyl sibthorpioides* Lmmk. are emergents and their density in Diplai Beel found decreased in the study years

15. d. ii. Monsoon Density of *Emergent* Macrophytes (Sp.No.41 to 40)

Fig no- 15. d. ii. A



Monsoon Sp. Density of *Emergent* Macrophytes (Sp.No.41 to 40)

The graph shows Pre monsoon density of *emergent* macrophytes (Sl.No.41 and 47). The blue line represents the density of seven plants species in 2014-15 such as 41. *Eragrostis unioloides*(Retzius) Nees.-0.575, *42. Hemarthria compressa* L.- 0.425, *43. Pogonatherum crinitum* (T.) Kunth. – *0.325*, 44. *Centella asiatica* L.- 0.375, 45. *Hydrocotyl sibthorpioides* Lmmk.- 0.125, *46. Colocasia esculenta* (L.) 0.575, Schott- 0.575, *47. Commelina benghalensis* L.0.175,

The red line represents the value of 2015-16. They are 41. *Eragrostis unioloides*(Retzius) Nees.- 0.150, *42. Hemarthria compressa* L.-0.225, *43. Pogonatherum crinitum* (T.) Kunth.- 0.550, 44. *Centella asiatica* L.- 0.350, 45. *Hydrocotyl sibthorpioides* Lmmk.- 0.125, *46. Colocasia esculenta* (L.) Schott – 0.325, *47. Commelina benghalensis* L.- 0.275.

The green line shows plants density of the year 2016-17 by 41. *Eragrostis unioloides* (Retzius) Nees.0.200, *42. Hemarthria compressa* L.–0.075, *43. Pogonatherum crinitum* (T.) Kunth.)- 0.100, 44. *Centella asiatica* L.- 0.275, 45. *Hydrocotyl sibthorpioides* Lmmk. – 0.500, *46. Colocasia esculenta* (L.) Schott- 0.375, *47. Commelina benghalensis* L.- 0.325. Range 00 to .700

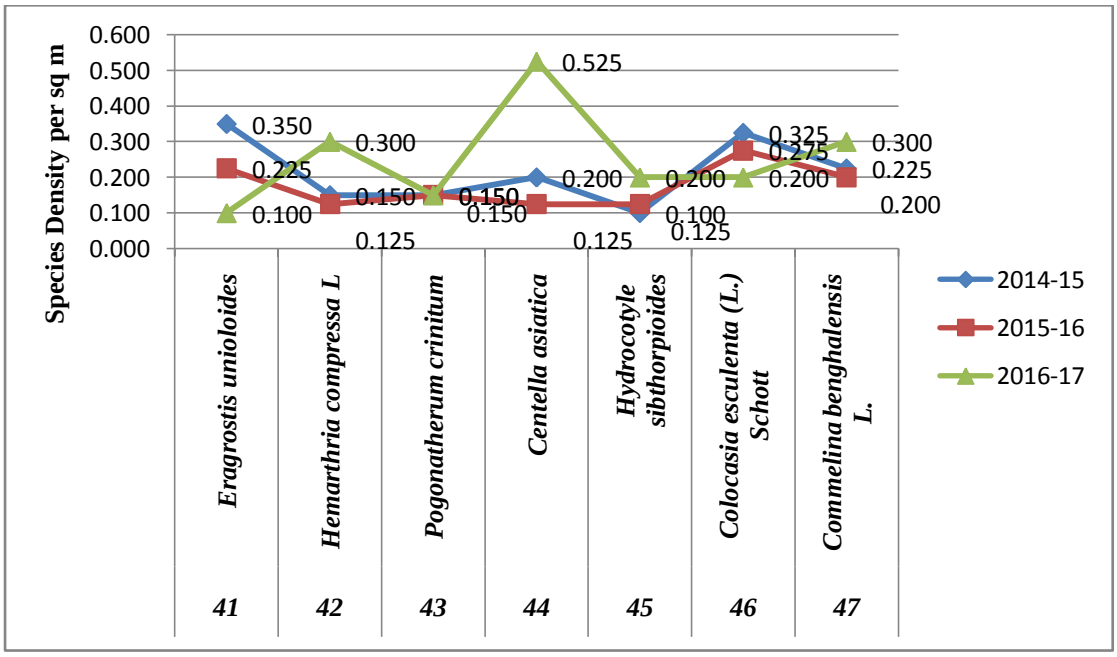
Table no. 15. d. ii. B

Years (November to November)	Decreasing Density in Monsoon Emergent Macrophytes (Sp.no 41 and 42) with Density value	
	41. *Eragrostis unioloides* (Retzius) Nees.	*42. Hemarthria compressa* L.
2014-15	0.575	0.475
2015-16	0.350	0.250
2016-17	0.150	0.225

41. *Eragrostis unioloides* (Retzius) Nees. and *42. Hemarthria compressa* L. showed decreasing form 2014-15 to 2016-17 in density among the plant community.

15. d.iii. Post Monsoon Density of *Emergent* Macrophytes (Sp.No.41 to 47)

Fig no- 15. d. iii. A



Post Monsoon Density of *Emergent* Macrophytes (Sp.No.41 to 47)

The graph shows Post monsoon density of *emergent* macrophytes (Sl.No.41 and 47). The blue line represents the density of seven plants species in 2014-15 such as 41. *Eragrostis unioloides*(Retzius) Nees.-0.035, *42. Hemarthria compressa* L.- 0.150, *43. Pogonatherum crinitum* (T.) Kunth.- *0.150,* 44. *Centella asiatica* L.- 0.200, 45. *Hydrocotyl sibthorpioides* Lmmk.- 0.100, *46. Colocasia esculenta* (L.), Schott. -0.325 *47. Commelina benghalensis* L.0.225,

The red line represents the value of 2015-16. They are 41. *Eragrostis unioloides*(Retzius) Nees.- 0.225, *42. Hemarthria compressa* L.-0.125, *43. Pogonatherum crinitum* (T.) Kunth.- 0.150, 44. *Centella asiatica* L.- 0.125, 45. *Hydrocotyl sibthorpioides* Lmmk.- 0.125, *46. Colocasia esculenta* (L.) Schott – 0.275, *47. Commelina benghalensis* L.- 0.200.

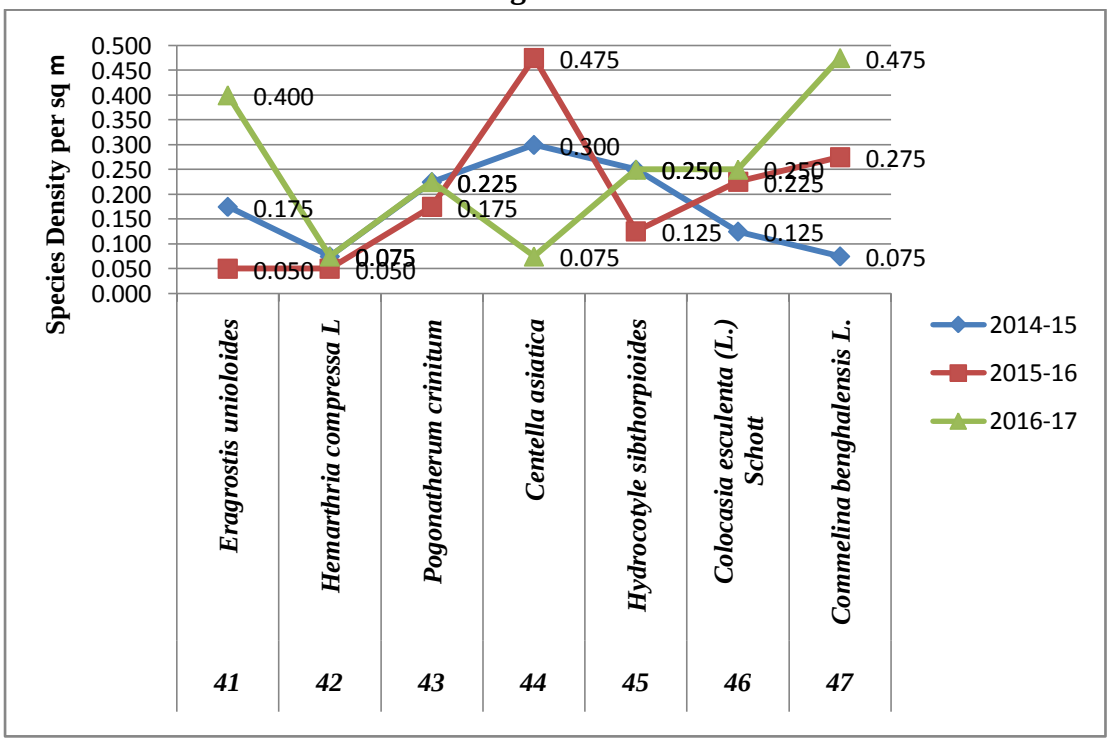
The green line shows plants density of the year 2016-17 by 41. *Eragrostis unioloides* (Retzius) Nees.0.100, *42. Hemarthria compressa* L.–0.300, *43. Pogonatherum crinitum* (T.) Kunth.)- 0.150, 44. *Centella asiatica* L.- 0.275, 45. *Hydrocotyl sibthorpioides* Lmmk. – 0.500, *46. Colocasia esculenta* (L.) Schott- 0.200, *47. Commelina benghalensis* L.- 0.300. Range 00 to 0.600

Table no. 15. d. iii. B

Years (November to November)	**Decreasing Density in Post Monsoon** **Emergent Macrophytes (Sp. no 41 to 46) with Density value**	
	41. *Eragrostis unioloides* (Retzius) Nees.	*46. Colocasia esculenta* (L.)
2014-15	0.350	0.325
2015-16	0.225	0.275
2016-17	0.100	0.200

15. d. iv. Winter Density of *Emergent* Macrophytes sp. No.41 to 47)

Fig no.-15. d. iv.



Winter Density of *Emergent* Macrophytes (Sp.No.41 to 47)

The graph shows Pre monsoon density of *emergent* macrophytes (Sl.No.41 and 47). The blue line represents the density of seven plants species in 2014-15 such as 41. *Eragrostis unioloides*(Retzius) Nees.-0.175, *42. Hemarthria compressa* L.- 0.075, *43. Pogonatherum crinitum* (T.) Kunth. – *0.225*, 44. *Centella asiatica* L.- 0.300, 45. *Hydrocotyl sibthorpioides* Lmmk.- 0.250, *46. Colocasia esculenta* (L.) 0.125, Schott, *47. Commelina benghalensis* L.0.075,

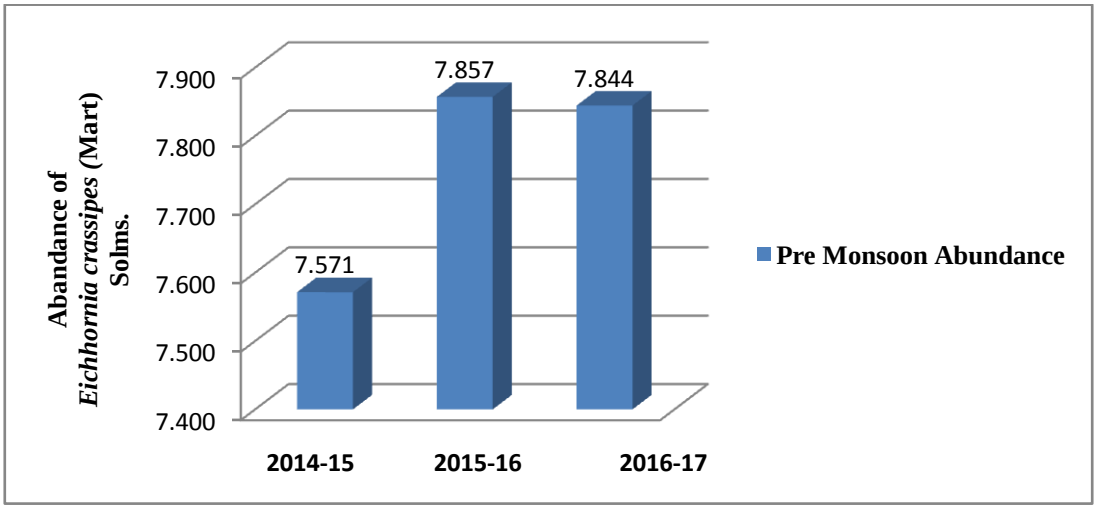
The red line represents the value of 2015-16. They are 41. *Eragrostis unioloides*(Retzius) Nees.- 0.050, *42. Hemarthria compressa* L.- 0.050, *43. Pogonatherum crinitum* (T.) Kunth.-0.175, 44. *Centella asiatica* L.- 0.475, 45. *Hydrocotyl sibthorpioides* Lmmk.- 0.125, *46. Colocasia esculenta* (L.) Schott- 0.125, *47. Commelina benghalensis* L.- 0.275.

The green line shows plants density of the year 2016-17 by 41. *Eragrostis unioloides*(Retzius) Nees.0.400, *42. Hemarthria compressa* L.- 0.075, *43. Pogonatherum crinitum* (T.) Kunth.)- 0.225, 44. *Centella asiatica* L.- 0.075, 45. *Hydrocotyl sibthorpioides* Lmmk. – 0.250, *46. Colocasia esculenta* (L.) Schott- 0.250, *47. Commelina benghalensis* L.-0.475. Range 00 to 1.500

B. MACROPHYTE ABANDANCE IN DIPLAI BEEL FOR 2014-51, 2015-16 and 2016-17:

16. Seasonal Abundance of aquatic macrophyte – *Eichhornia crassipes* (Mart.) Solms. in Diplai Beel (Sl No.1 plant list)

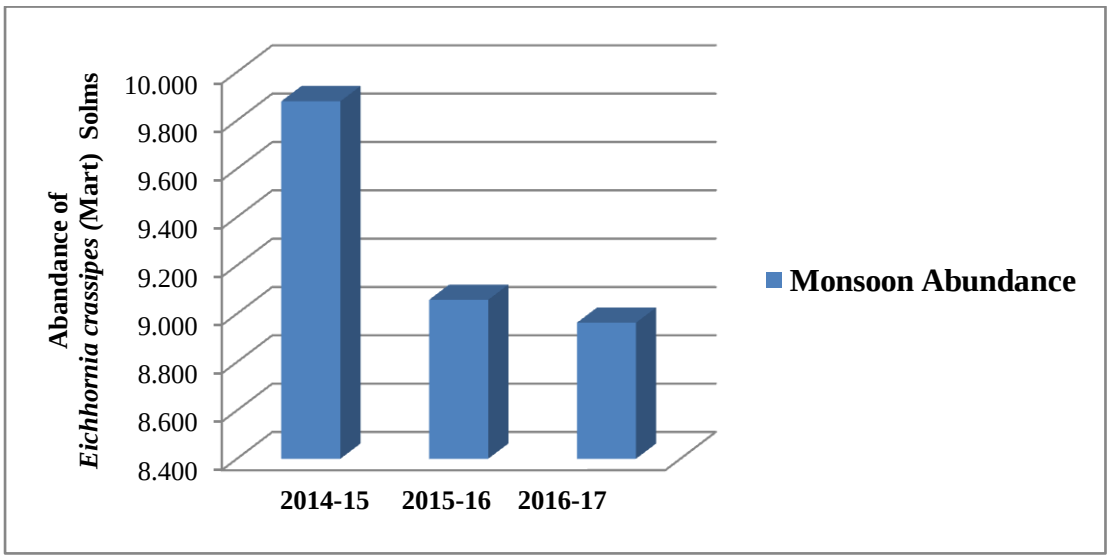
16. i. **Fig no-16.i.**



Pre monsoon Abundance of *Eichhornia crassipes* (Mart.) Solms. in Diplai Beel (Sp. No.1)

The graph represents Pre monsoon abundance of *Eichhornia crassipes* (Mart.) Solms. in the study years of 2014-15 to 2015-16. In 2014-15 Abundance value is7.571, in 2015-16 it is 7.857 but in 2016-17 it is 7.844. The graph shows very low value of abundance of *Eichhornia crassipes* (Mart.) Solms.in 2014-15

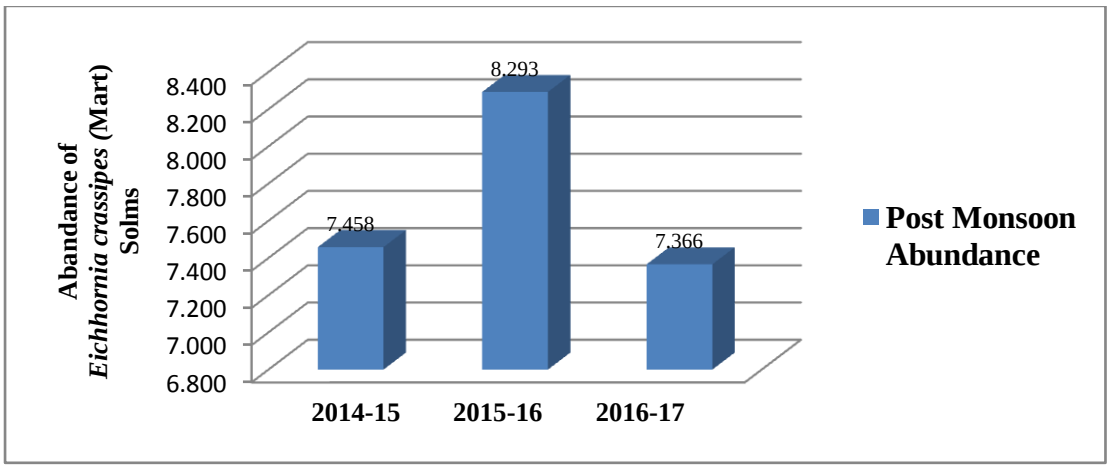
16. ii. **Fig no-16.ii.**



Monsoon Abundance of *Eichhornia crassipes* (Mart.) Solms.in Diplai Beel (Sl No.1)

Monsoon abundance of ***Eichhornia crassipes* (Mart.) Solms.** is represented in this graph for the study years 2014-15 to 2016-17. The abundance values 9.879, 9.058 and 8.963 are found for 2014-1, 2015-16 and 2016-17 respectivly.and which is seen high for 2014-15.

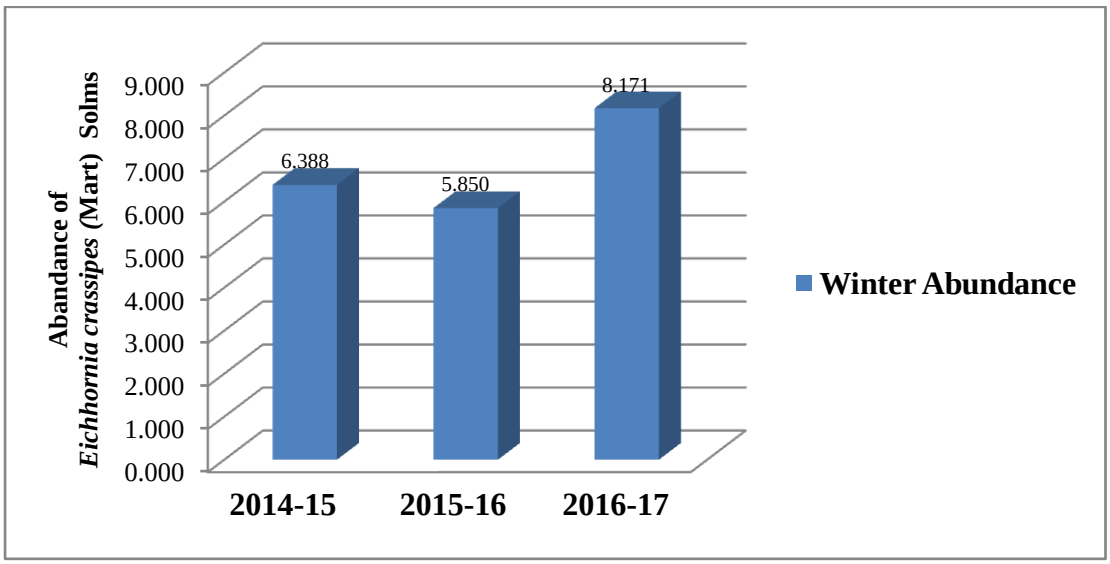
16. iii. **Fig no-16.iii.**



Post monsoon Abundance of *Eichhornia crassipes* (Mart.) Solms.in Diplai Beel (Sl No.1)

In Post monsoon Abundance of *Eichhornia crassipes* (Mart.) Solms.in Diplai Beel is indicated in this graph where the values are 7.458, 8.293 and 7.366 representing the study years 2014-1, 2015-16 and 2016-17 respectivly. It is seen that the Abundance value is very high in 2015-16.

16. iv. **Fig No- 16.iv.**



Winter Abundance of *Eichhornia crassipes* (Mart.) Solms.in Diplai Beel (Sl No.1)

The winter abundance of *Eichhornia crassipes* (Mart.) Solms.in Diplai Beel is also noticibale where in 2014-15 the abundance value is 6.388, in 2015-16 abundance value 5.850 and in 2016-17 is 8.171.

Table No- 16.iv.a

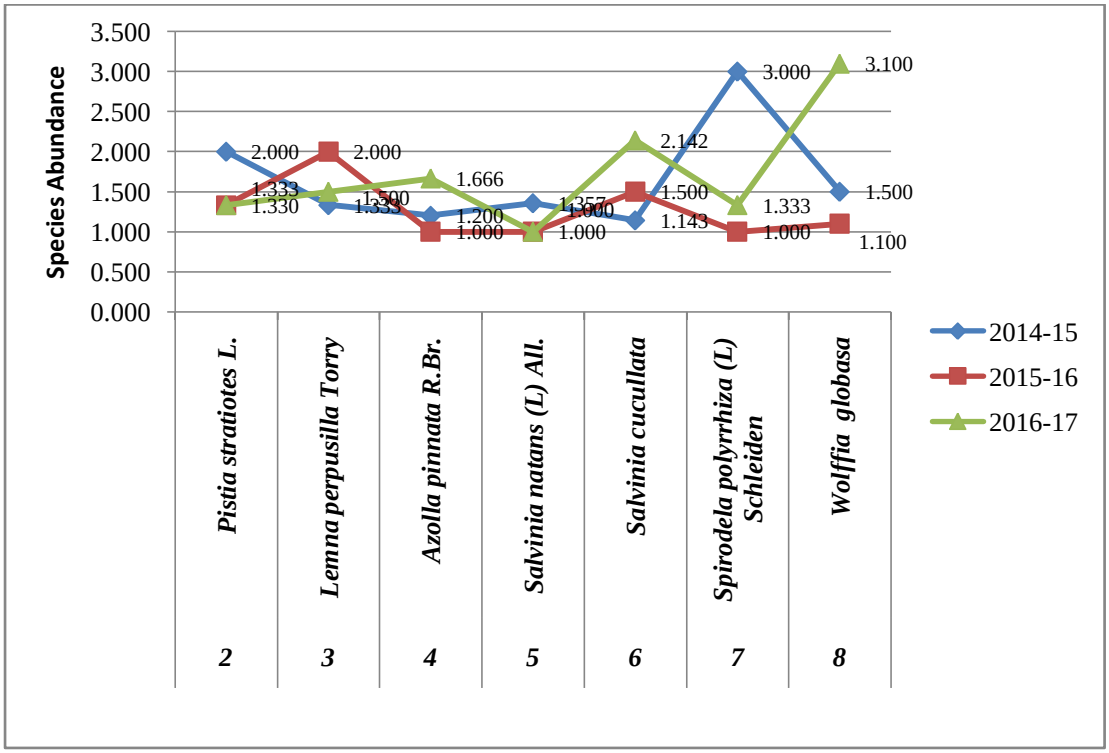
Abundance of *Eichhornia crassipes* (Mart.) Solms.in Diplai Beel during study years 2014-15 to 2016-17

Study years	Pre Monsoon	Monsoon	Post Monsoon	Winter
2014-15	7.571	9.879	7.458	6.388
2015-16	7.857	9.058	8.293	5.850
2016-17	7.844	8.963	7.366	8.171

The ecological abundance of *Eichhornia crassipes* (Mart.) Solms.in Diplai Beel is shown in the table. The nature of abundance is seen as fluctuating with no proper rule of growth as obsereved.

17. Seasonal Abundance of *Floating* Macrophytes in Diplai Beel (Sp.no. 2 to 8):

17. i. **Fig no-17. i. A**



Pre Monsoon Abundance of *Floating* Macrophytes (Sp.no. 2 to 8)

It is a coloured line graph of Pre monsoon Abundance of Floating Macrophytes of the study rears. The plants are floating in nature and of 2014-15 such as 2. *Pistia stratiotes* L.- 0.2.00, No 3. *Lemna perpusilla* Torry -1.333, No 4. *Azolla pinnata* R.Br.- 1.000, No 5. *Salvinia natans* (L) All.-1.000, No 6. *Salvinia cucullata*- 1.145, No 7. *Spirodela polyrrhiza* (L.) Schl.- 0.300. *and* No.8. *Wolffia globasa*.- 0.500.

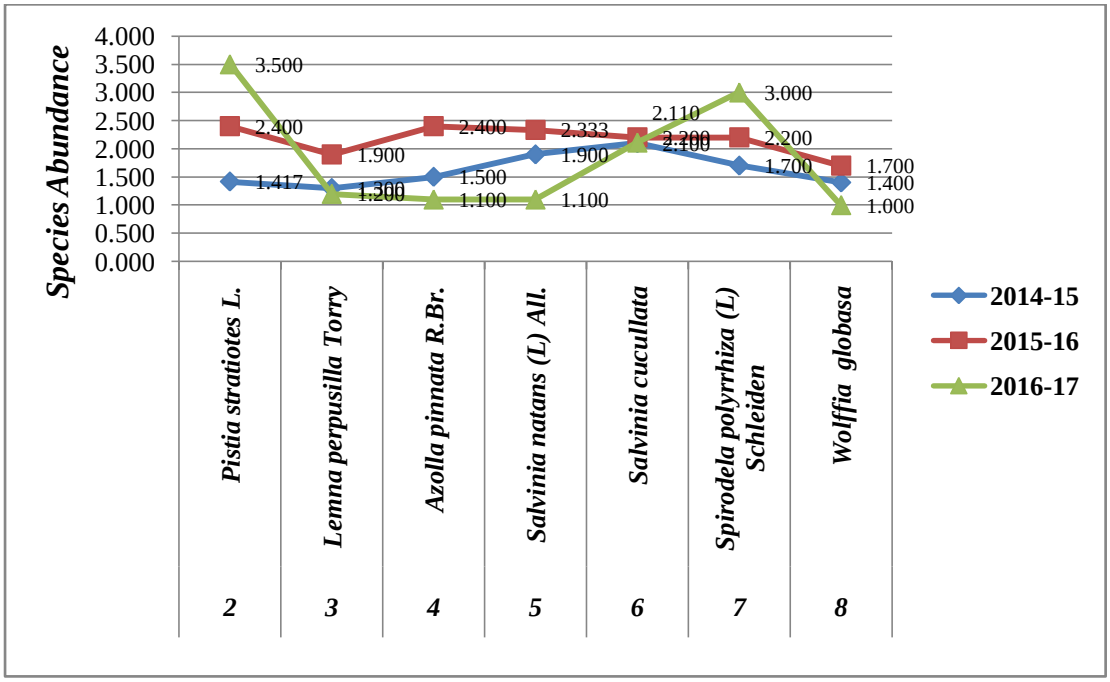
The red line in 2015-16 indicates 1.33, 2.00, 1.00, 1.00, 1.50, 1.00, 1.10 and 3.10 accordingly in 2. *Pistia stratiotes* L., No 3. *Lemna perpusilla* Torry, No 4. *Azolla pinnata* R.Br., No 5. *Salvinia natans* (L) All, No 6. *Salvinia cucullata*, No 7. *Spirodela polyrrhiza* (L.) Schl.. *and* No.8. *Wolffia globasa*.

Again the corresponding values in green line graph are 1.33, 1.50, 1.66, 1.00, 2.143, 1.33, 3.10. in respect to the species nos 2 to 8. Limit is 0 to 4.

Table no.17. i. B

Years (November to November)	Decrease in Sp. Abundance in Pre Monsoon Floating Macrophyte (Sp.no. 2) Abundance value
	2. *Pistia stratiotes* L.
2014-15	2.000
2015-16	1.333
2016-17	1.330

17. ii. **Fig no- 17. ii.**



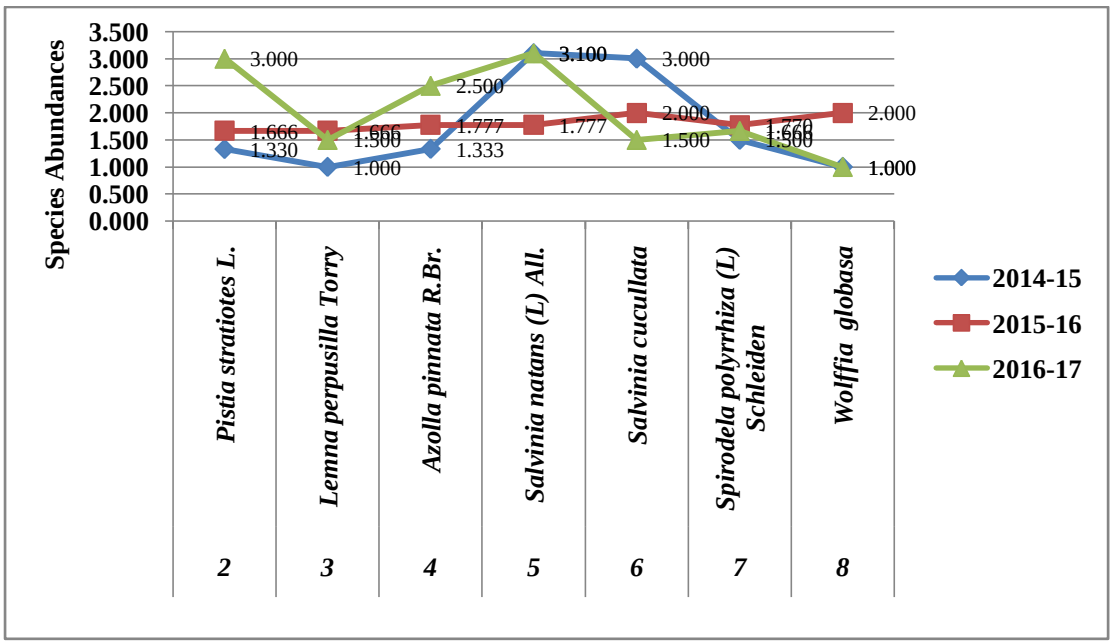
Monsoon Abundance of *Floating* Macrophytes (Sp.no. 2 to 8)

The Monsoon Abundance of Floating Macrophytes in 2014-15 is 2. *Pistia stratiotes* L.- 1.45, No 3. *Lemna perpusilla* Torry- 1.30, No 4. *Azolla pinnata* R.Br.- 1.50, No 5. *Salvinia natans* (L) All. -1.90, No 6. *Salvinia cucullata- 2.10* , No 7. *Spirodela polyrrhiza* (L.) Schl.- 1.70. *and* No.8. *Wolffia globasa*.-1.40.

In 2015-16 the red line represents the values 2.40, 1.90, 2.40, 2.33, 2.11, 3.00, 1.70 for species sl no. 2 to sl no.8 respectively.

The green line graph represents 2. *Pistia stratiotes* L.- 3.500, No 3. *Lemna perpusilla* Torry- 1.20, No 4. *Azolla pinnata* R.Br.- 1.10, No 5. *Salvinia natans* (L) All. -1.90, No 6. *Salvinia cucullata -2.10* , No 7. *Spirodela polyrrhiza* (L.) Schl.- 3.00. *and* No.8. *Wolffia globasa*.-1.60. The limit is 0 to 4.

17. iii. **Fig no- 17.iii. A**



Post Monsoon Abundance of *Floating* Macrophytes (Sp. no. 2 to 8)

The Post Monsoon Abundance of Floating Macrophytes are represented by blue line in 2014-15 as No 2. *Pistia stratiotes* L.- 1.33, No 3. *Lemna perpusilla* Torry- 1.00, No 4. *Azolla pinnata* R.Br.- 1.33, No 5. *Salvinia natans* (L) All- 3.10, No 6. *Salvinia cucullata*- 1.60, No 7. *Spirodela polyrrhiza* (L.) Schl.-1.50. *and* No.8. *Wolffia globasa*.-1.00.

The red line gives the data of 2015-16 having 1.66, 1.50, 1.77, 1.77, 2.00, 1.50, 2.00. abundance of plants 2014-15.

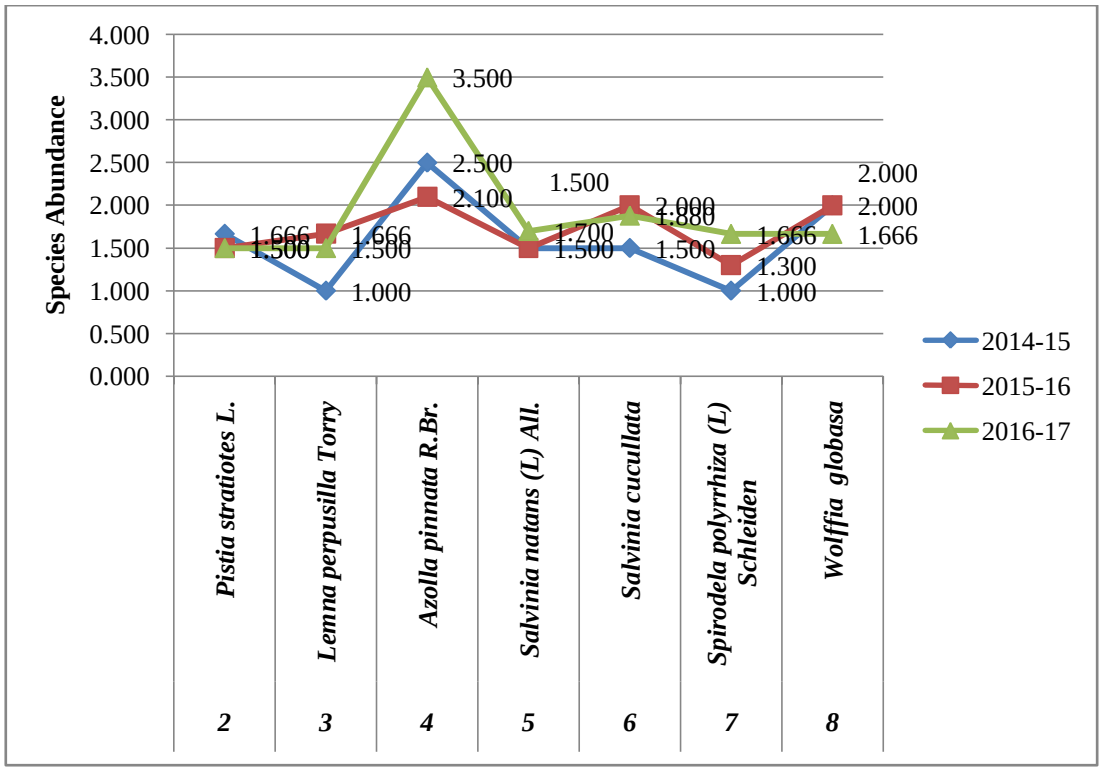
The green line gives the abundance results of 2016-17 by No 2. *Pistia stratiotes* L.- 3.00, No 3. *Lemna perpusilla* Torry- 1.50, No 4. *Azolla pinnata* R.Br.- 2.50, No 5. *Salvinia natans* (L) All- 3.103, No 6. *Salvinia cucullata*- 1.50, No 7. *Spirodela polyrrhiza* (L.) Schl.-1.66. *and* No.8. *Wolffia globasa*.-1.00.

Table no. 17. iii. B

Years (November to November)	**Decrease in Abundance in Post Monsoon** **Floating Macrophyte (Sp. no. 6) Abundance value**
	6. *Salvinia cucullata*
2014-15	3.000
2015-16	2.000

2016-17	1.500

17. iv. **Fig no-17.iv.**



Winter Abundance of *Floating* Macrophytes (Sp. no. 2 to 8)

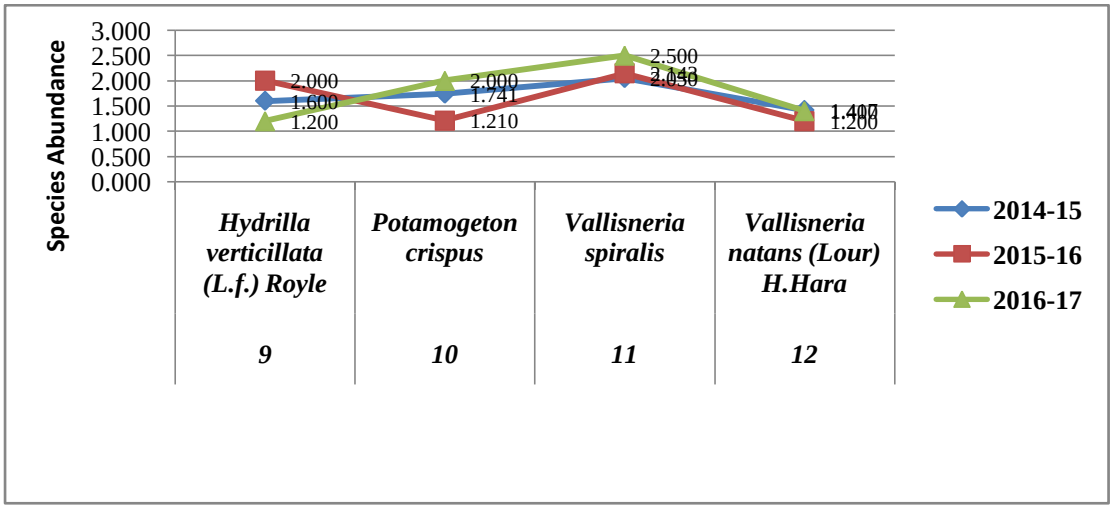
The winter abundance of Floating Macrophytes are represented by blue line in 2014-15 as No 2. *Pistia stratiotes* L.-1.66, No 3. *Lemna perpusilla* Torry- 1.00, No 4. *Azolla pinnata* R.Br. – 2.50, No 5. *Salvinia natans* (L) All – 2.50, No 6. *Salvinia cucullata* – 1.50, No 7. *Spirodela polyrrhiza* (L.) Schl. – 1.50. *and* No.8. *Wolffia globasa*.-1.00.

The red line gives the data of 2015-16 having 1.66, 1.50, 1.77, 1.77, 2.00, 1.50, 2.00. abundance of plants 2014-15.

The green line gives the abundance results of 2016-17 by No 2. *Pistia stratiotes* L.- 3.00, No 3. *Lemna perpusilla* Torry- 1.50, No 4. *Azolla pinnata* R.Br. – 2.50, No 5. *Salvinia natans* (L) All – 3.103, No 6. *Salvinia cucullata* – 1.50, No 7. *Spirodela polyrrhiza* (L.) Schl. – 1.00. *and* No.8. *Wolffia globasa*.-2.00.

18. Seasonal Abundance of ***Submerged (anchored)*** Macrophytes (Sp. No.9 to 12)

18. i. **Fig No-18.i.**



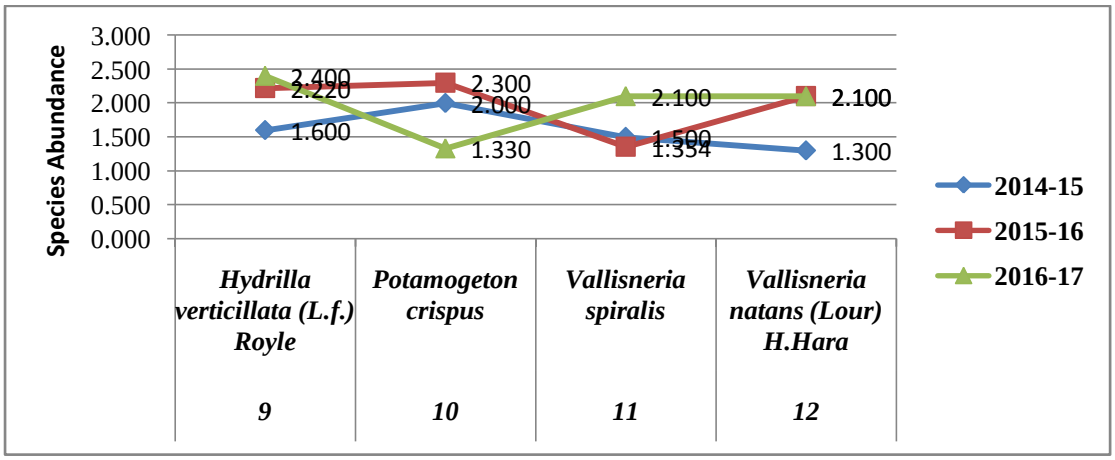
Pre Monsoon Abundance of *Submerged (anchored)* Macrophytes (Sp. No.9 to 12)

The Pre Monsoon Abundance of Submerged (anchored) Macrophytes (Sl. No.9 to 12) are represented by the colour graphs of 2014-15 to 2016-17. The blue ile represents the plants with values *Hydrilla verticillata* (L.f.) Royle.- 1.60, *Potamogeton crispus* L. -1.74 , *Valisneria spiralis* Linn.- 2.05, *Valisneria natans* (Lour) H. Hara. 1.41.

The red line values are shown of 2015-16 by *Hydrilla verticillata* (L.f.) Royle.- 2.00, *Potamogeton crispus* L. -1.210, Valisneria *spiralis* Linn.- 2.143, *Valisneria natans* (Lour) H. Hara. 1.200.

The green line represents the values of 20 16-17 of *Hydrilla verticillata* (L.f.) Royle.- 1.200, *Potamogeton crispus* L. -2.00, *Valisneria spiralis* Linn.- 2.500, *Valisneria natans* (Lour) H. Hara. 1.40.

18. ii. **Fig no-18.ii.**



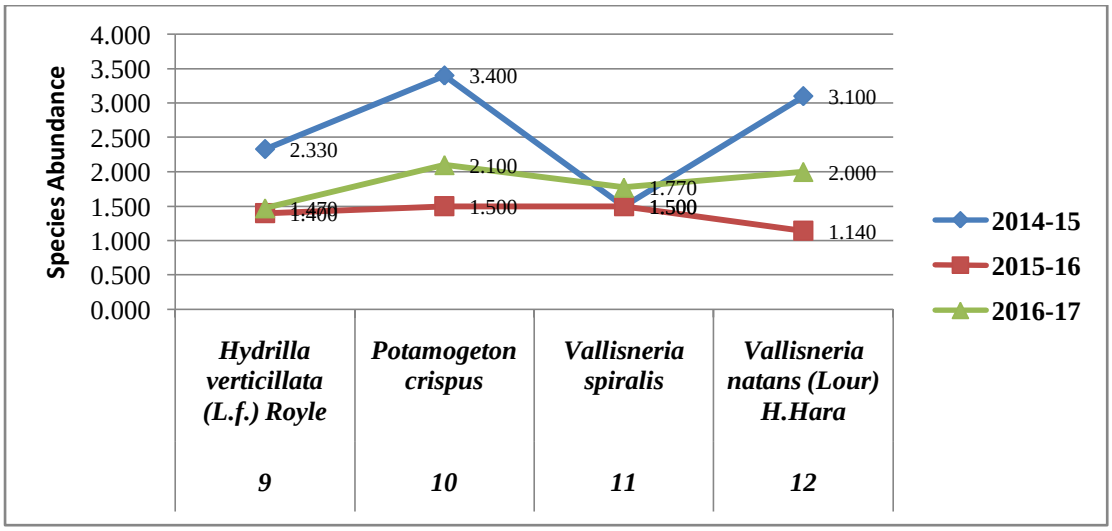
Monsoon Abundance of *Submerged (anchored)* Macrophytes (Sl. No.9 to 12)

The blue line graph represents the macrophytes with their abundances of 2014-15 e.g. *Hydrilla verticillata* (L.f.) Royle.- 1.60, *Potamogeton crispus* L. -2.00 , *Valisneria spiralis* Linn.- 1.50, *Valisneria natans* (Lour) H. Hara. 1.30.

The red line graph gives the abundances of the year 2015-16 with values *Hydrilla verticillata* (L.f.) Royle.- 2.22, *Potamogeton crispus* L. -2.30 , *Valisneria spiralis* Linn.- 1.35, *Valisneria natans* (Lour) H. Hara.-2.10.

The green line indicates the abundances of the year 2016-17 such as *Hydrilla verticillata* (L.f.) Royle.- 2.40, *Potamogeton crispus* L. *-1.33* , *Valisneria spiralis* Linn.- 2.10, *Valisneria natans* (Lour) H. Hara.-2.10.

18. iii. **Fig No. 18. iii. A**



Post Monsoon Abundance of *Submerged (anchored)* Macrophytes (Sp. No.9 to 12)

The blue line graph represents the macrophytes with their abundances of 2014-15 e.g. *Hydrilla verticillata* (L.f.) Royle.- 2.33, *Potamogeton crispus* L. -3.40 , *Valisneria spiralis* Linn.- 1.40, *Valisneria natans* (Lour) H. Hara. 2.00.

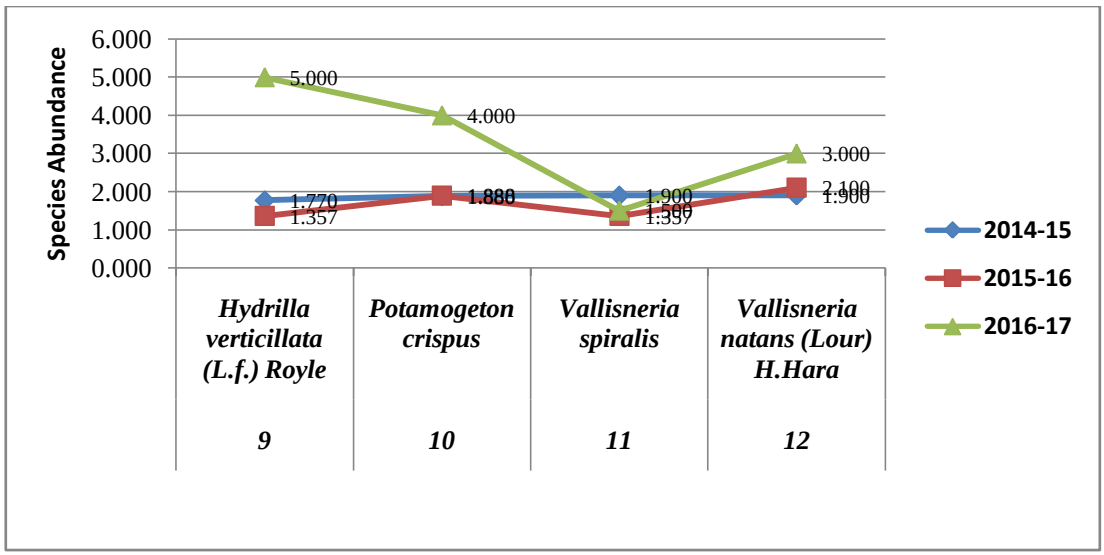
The red line graph gives the abundances of the year 2015-16 with values *Hydrilla verticillata* (L.f.) Royle.- 1.40, *Potamogeton crispus* L. -1.50 , *Valisneria spiralis* Linn.- 1.50, *Valisneria natans* (Lour) H. Hara.-1.24.

The green line indicates the abundances of the year 2016-17 such as *Hydrilla verticillata* (L.f.) Royle.- 1.47, *Potamogeton crispus* L. -2.10 , *Valisneria spiralis* Linn.- 1.77, *Valisneria natans* (Lour) H. Hara.-2.00.

Table no.18. iii. B

Years (November to November)	Decrease in Abundance in Post Monsoon Submerged (anchored) Macrophytes (Sp.No.9) Abundance value
	9. *Hydrilla verticillata* (L.f.) Royle.
2014-15	2.330
2015-16	1.470
2016-17	1.400

18. iv. **Fig No-18.iv.**



Winter Abundance of *Submerged (anchored)* Macrophytes (Sp. No.9 to 12)

The blue line graph represents the macrophytes with their abundances of 2014-15 e.g. *Hydrilla verticillata* (L.f.) Royle.-*1.770, Potamogeton crispus* L.- 1.880 , *Valisneria spiralis* Linn.- 1.900, *Valisneria natans* (Lour) H. Hara. 1.900.

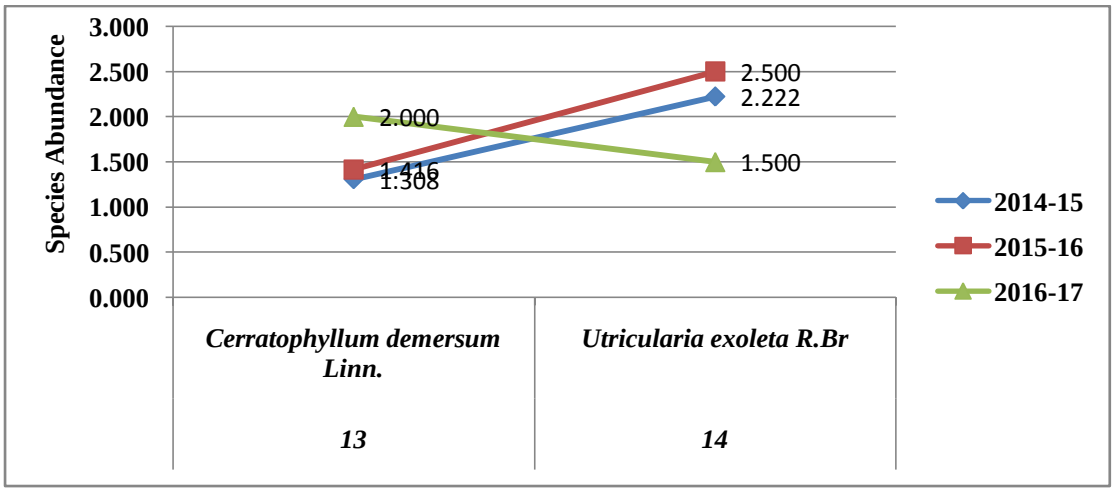
The red line graph gives the abundances of the year 2015-16 with values *Hydrilla verticillata* (L.f.) Royle.- 1.357, *Potamogeton crispus* L. -1.800 , *Valisneria spiralis* Linn.- 1.357, *Valisneria natans* (Lour) H. Hara.-2.100.

The green line indicates the abundances of the year 2016-17 such as *Hydrilla verticillata* (L.f.) Royle.- 5.00, *Potamogeton crispus* L.- 4.000 , *Valisneria spiralis* Linn.- 1.500, *Valisneria natans* (Lour) H. Hara.-3.00.

19. Macrophyte Abundance of ***Submerged (suspended)***

Macrophytes (Sp.no. 13 and 14)

19. i. **Fig No-19.i.**



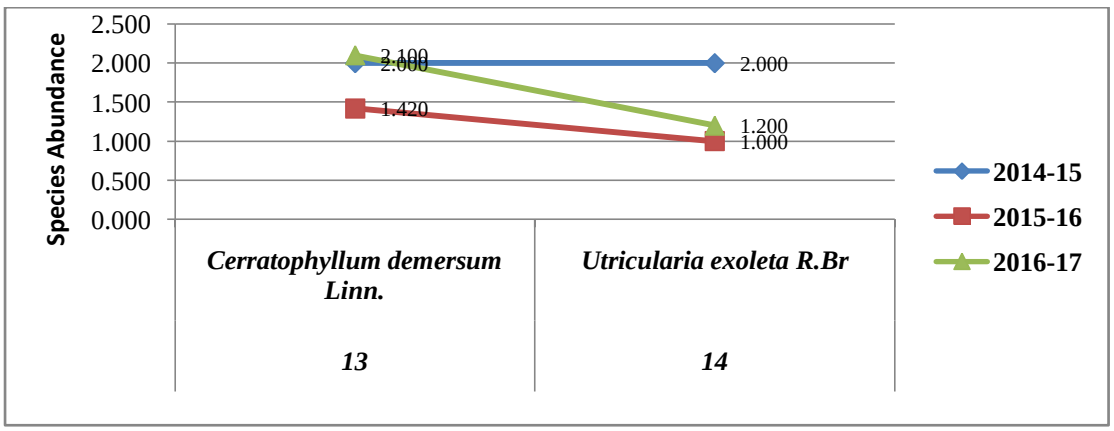
Pre Monsoon Abundance of *Submerged (suspended)* Macrophytes (Sp. no.13 and 14)

Pre Monsoon Abundance of *Submerged (suspended)* Macrophytes (Sl no.13 and 14) represents the graph. The blue line graph of abundances on the macrophytes sp in 2014-15 are *13. Ceratophyllum demersum* L.- 1.308, 14. *Utricularia exoleta* R.Br**.** 2.22

The red line graph gives the abundances of the year 2015-16 with the values of species *13. Ceratophyllum demersum* L.- 1.416 *and 14. Utricularia exoleta* R.Br**.** 2.500

The green line indicates the abundances of the year 2016-17 of the species such as 13. *Ceratophyllum demersum* L.-2.00 and *14. Utricularia exoleta* R.Br**.** 1.500**.** The Limit values are 0 to 3.

19. ii. **Fig No-19.ii.**



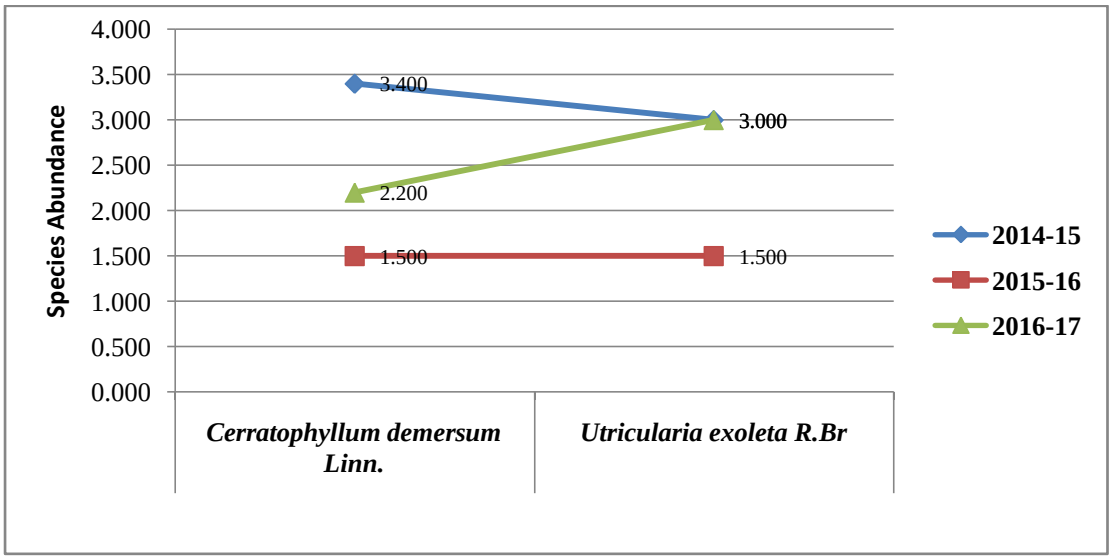
Monsoon Abundance of *Submerged (suspended)* Macrophytes (Sp. no. 13 and 14)

Monsoon Abundance of *Submerged (suspended)* Macrophytes (Sl no.13 and 14) represents this line graphs. The blue line graph of abundance of the macrophyte sp in 2014-15 represents *13. Ceratophyllum demersum* L.- 2.00, 14. *Utricularia exoleta* R.Br**.** 2.00

The red line graph gives the abundance of the year 2015-16 with the values of no *13. Ceratophyllum demersum* L.1.420 *and 14. Utricularia exoleta* R.Br**.** 1.00

The green line graph indicates the abundance of the year 2016-17 of the species such as 13. *Ceratophyllum demersum* L.-2.100 and *14. Utricularia exoleta* R.Br**.** 1.200**.** The Limit value is in between 0 and 2.50.

19. iii. **Fig No-19.iii.**



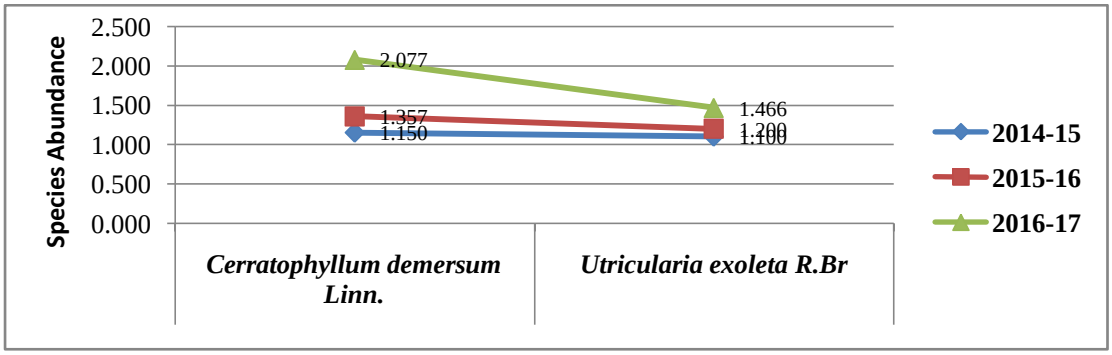
Post Monsoon Abundance of *Submerged (suspended)* Macrophytes (Sp.no. 13 and 14)

It is Post Monsoon Abundance graph of *Submerged (suspended)* Macrophytes (Sl no.13 and 14) which is represented by line graphs. The blue line graph of abundance of the macrophyte sp in 2014-15 represents *13. Ceratophyllum demersum* L.- 3.400,

The red line graph gives the abundance of the year 2015-16 with the values of no *13. Ceratophyllum demersum* L.1.500 *and 14. Utricularia exoleta* R.Br**.** 1.500

The green line graph indicates the abundance of the year 2016-17 of the species such as 13. *Ceratophyllum demersum* L.-2.200 and *14. Utricularia exoleta* R.Br**.** 3.000**.** The Limit value is in between 0 and 4.

19. iv. **Fig No- 19. iv.**



Winter Abundance of *Submerged (suspended)* Macrophytes (Sp. no. 13 and 14)

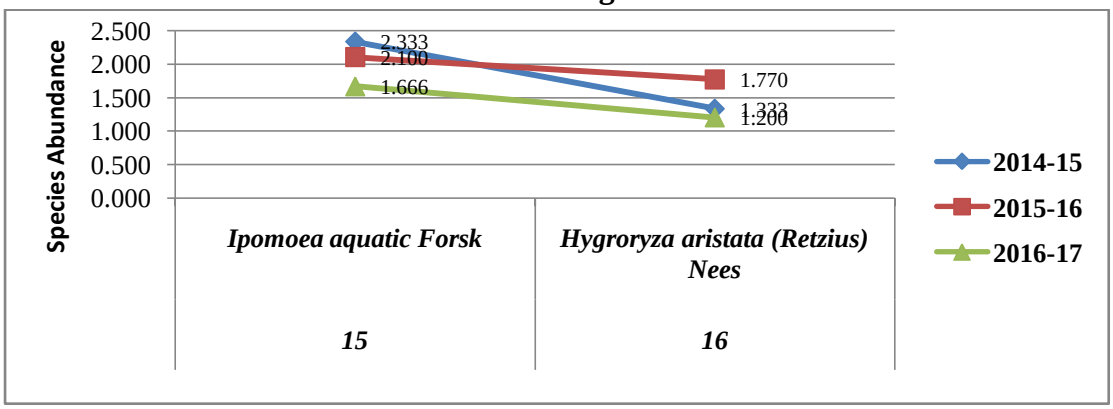
It is winter abundance graph of *Submerged (suspended)* Macrophytes (Sl no.13 and 14) which is represented by line graphs. The blue line graph of abundance of the macrophyte sp in 2014-15 represents *13. Ceratophyllum demersum* L.- 1.150, 14. *Utricularia exoleta* R.Br**.** 1.100

The red line graph gives the abundance of the year 2015-16 with the values of no *13. Ceratophyllum demersum* L.1.357 *and 14. Utricularia exoleta* R.Br**.** 1.200

The green line graph indicates the abundance of the year 2016-17 of the species such as 13. *Ceratophyllum demersum* L.-2.077 and *14. Utricularia exoleta* R.Br**.** 1.466**.** The Limit value is in between 0 and 2.500.

20. Macrophyte Abundance of ***Rooted Floating Shoot*** Macrophytes (Sp. no. 15 and 16):

20. i. **Fig No- 20.i. A**



Pre Monsoon Abundance of Rooted Floating Shoot Macrophytes (Sp. no. 15 and 16)

It is Pre monsoon abundance graph of Rooted Floating Shoot Macrophytes (Sl no.15 and 16) which is represented by line graphs. The blue line graph of abundance of the macrophyte species in 2014-15 represents *15.Ipomoea aquatica* Forssk. 2.100,

*16. Hygroryza aristata (*Retz.) Nees. 1.333

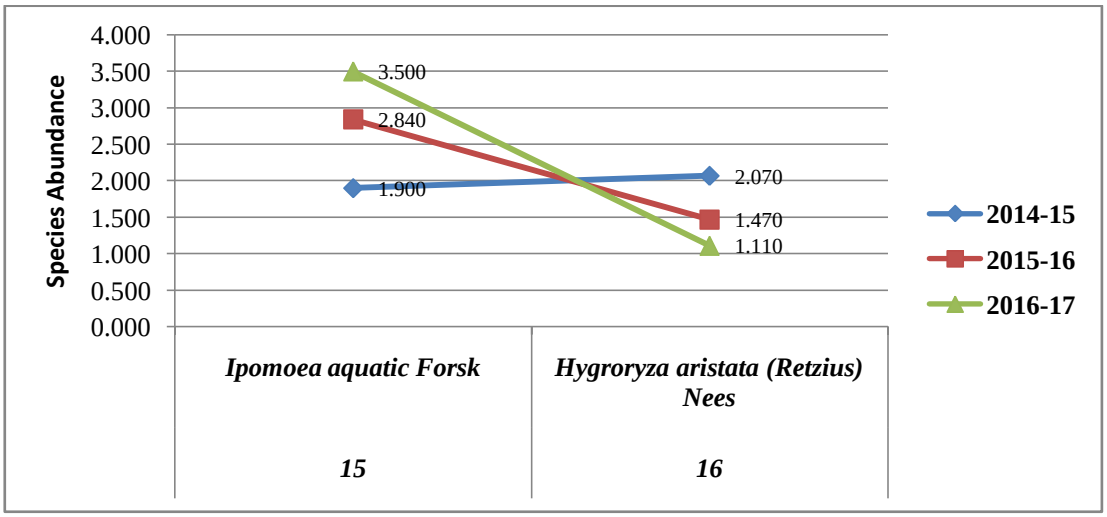
The red line graph gives the abundance of the year 2015-16 with the values of no *15 .Ipomoea aquatica* Forssk.- 2.100 , *16. Hygroryza aristata (*Retz.) Nees.- 1.770

The green line graph indicates the abundance of the year 2016-17 of the species such as *15 .Ipomoea aquatica* Forssk.- 1.666 , *16. Hygroryza aristata (*Retz.) Nees.- 1.200

Table no.20. i. B

Years (November to November)	**Decrease in Abundance in Pre Monsoon Rooted Floating Leaves Macrophytes (Sp.no.15) Abundance value**
	15. Ipomoea aquatica Forssk.
2014-15	2.333
2015-16	2.100
2016-17	1.666

20. ii. **Fig No- 20. ii. A**



Monsoon Abundance of Rooted Floating Shoot Macrophytes (Sp.no. 15 and 16)

It is Monsoon abundance graph of Rooted Floating Shoot Macrophytes (Sl no.15 and 16) which is represented by line graphs. The blue line graph of abundance of the macrophyte sp in 2014-15 represents *15. Ipomoea aquatica* Forssk.- 1.900, *16. Hygroryza aristata (*Retz.) Nees.- *2.070*

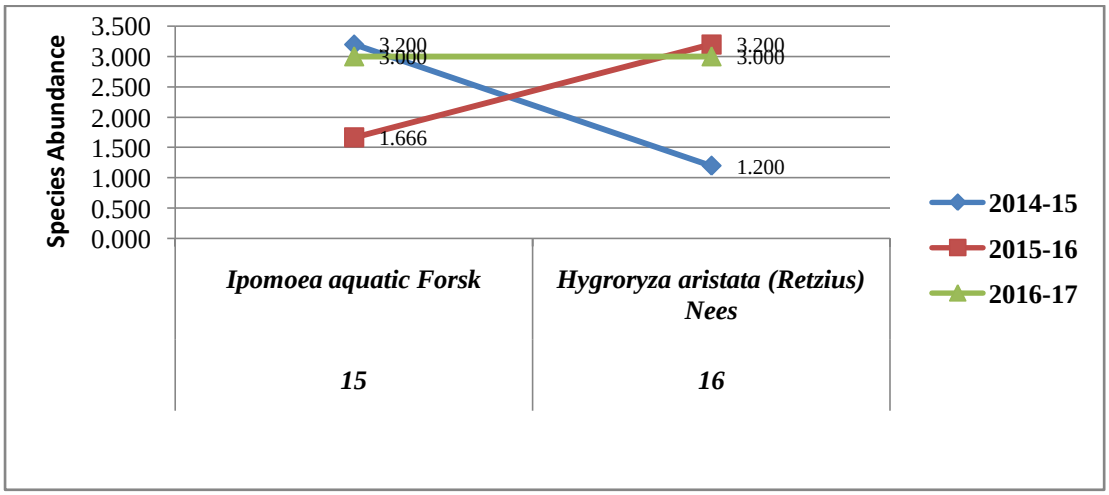
The red line graph gives the abundance of the year 2015-16 with the values of no *15. Ipomoea aquatica* Forssk.- 2.840, *16. Hygroryza aristata (*Retz.) Nees.- *1.470*

The green line graph indicates the abundance of the year 2016-17 of the species such as *15. Ipomoea aquatica* Forssk.- 3.500, *16. Hygroryza aristata (*Retz.) Nees.- *1.110* The Limit value is in between 0 to 4.000

Table no.20. ii.B

Years (November to November)	**Decrease in Abundance in Post Monsoon Emergent Macrophytes (Sp. no. 16) with abundance value**
	*16. Hygroryza aristata (*Retz.) Nees.
2014-15	2.070
2015-16	1.470
2016-17	1.110

20. iii. **Fig No-20.iii.**



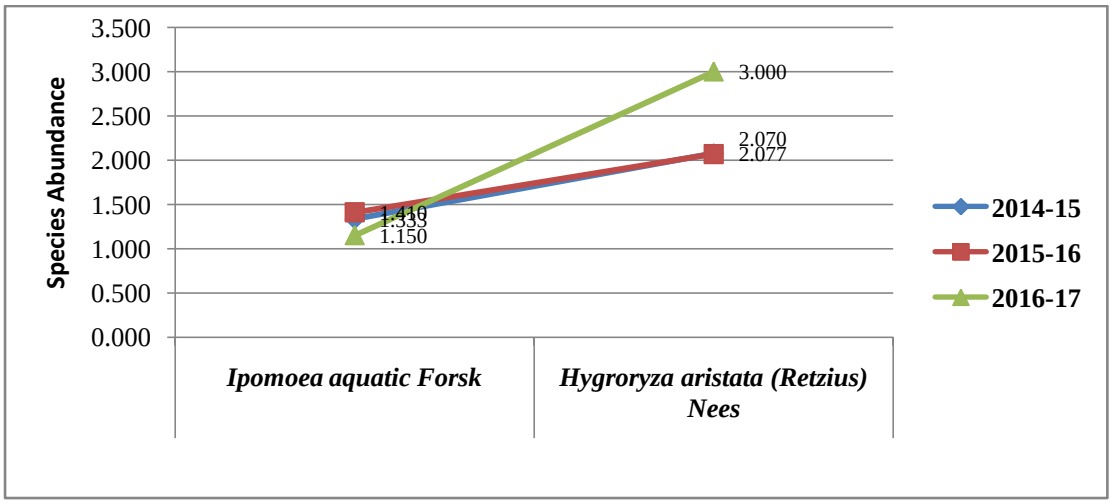
Post Monsoon Abundance of Rooted Floating Shoot Macrophytes (S. no.15 and 16)

It is Post Monsoon abundance graph of Rooted Floating Shoot Macrophytes (Sl no.15 and 16) which is represented by line graphs. The blue line graph of abundance of the macrophyte sp in 2014-15 represents *15. Ipomoea aquatica* Forssk. 3.200, *16. Hygroryza aristata (*Retz.) Nees. *1.200*

The red line graph gives the abundance of the year 2015-16 with the values of no *15. Ipomoea aquatica* Forssk. 1.666, *16. Hygroryza aristata (*Retz.) Nees. *3.200*

The green line graph indicates the abundance of the year 2016-17 of the species such as *15. Ipomoea aquatica* Forssk. 3.000, *16. Hygroryza aristata (*Retz.) Nees. *3.000.* The Limit value is in between 0 to 3.500

20. iv. **Fig No-20.iv.**



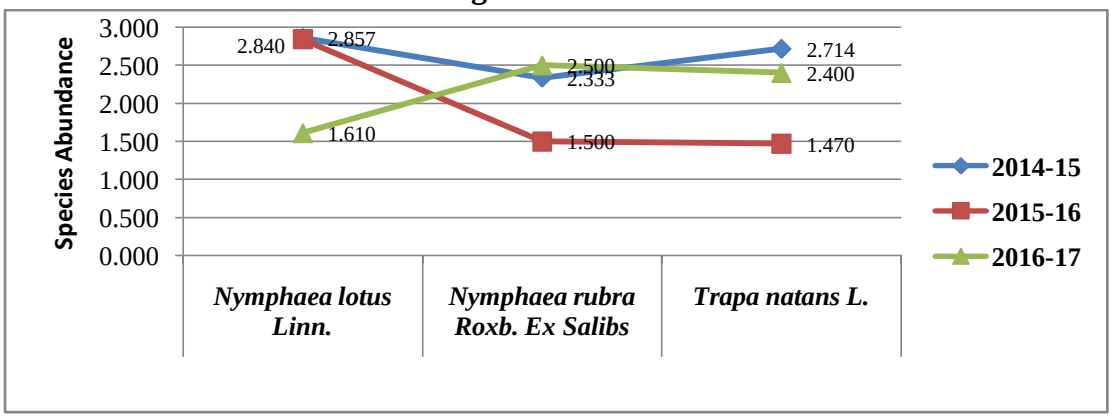
Winter Abundance of Rooted Floating Shoot Macrophytes (Sp.no. 15 and 16)

It is winter abundance graph of Rooted Floating Shoot Macrophytes (Sl no.15 and 16) which is represented by line graphs. The blue line graph of abundance of the macrophyte sp in 2014-15 represents *15. Ipomoea aquatica* Forssk. 1.333, *16. Hygroryza aristata (*Retz.) Nees. *2.070*

The red line graph gives the abundance of the year 2015-16 with the values of no *15. Ipomoea aquatica* Forssk. 1.410, *16. Hygroryza aristata (*Retz.) Nees. *2.077* .The green line graph indicates the abundance of the year 2016-17 of the species such as *15. Ipomoea aquatica* Forssk. 1.150, *16. Hygroryza aristata (*Retz.) Nees. *3.000.* The Limit value is in between **1.150 to 3.00**

21. Macrophyte Abundance of ***Rooted Floating Leaves*** Macrophytes (Sp.no.17, 18 and 19)

21. i. **Fig no- 21.i.**



Pre Monsoon Abundance of Rooted Floating Leaves Macrophytes

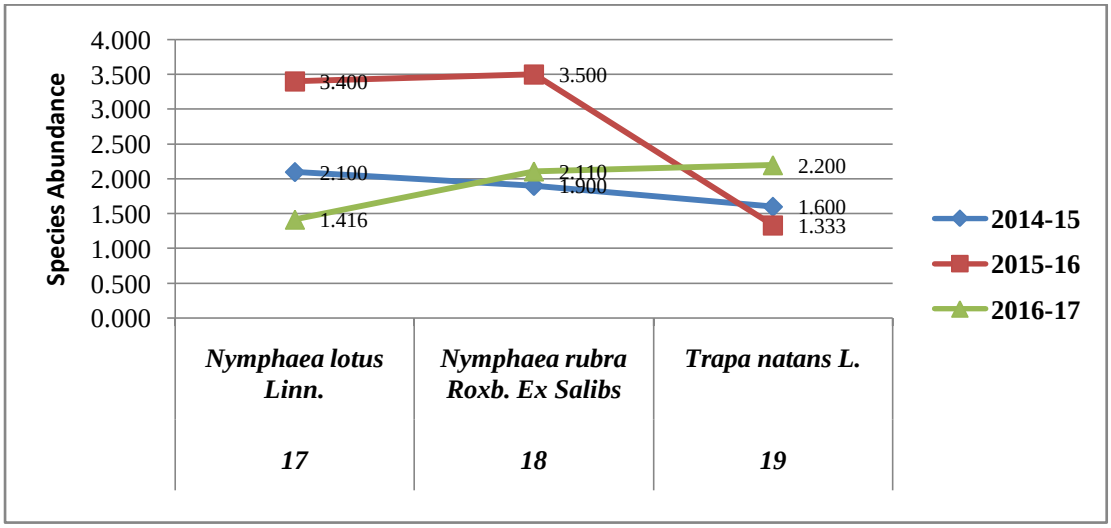
(Sp.no.17, 18 and 19)

It is Pre Monsoon abundance graph of Rooted Floating Leaves Macrophytes (Sl no.17, 18 and 19) which is represented by line graphs. The blue line graph of abundance of the macrophyte sp in 2014-15 represents *17. Nymphaea lotus* Linn. 2.857, *18. Nymphaea rubra* Roxb. Ex Salibs 2.333, *19.Trapa natans* L.2.714

The red line graph gives the abundance of the year 2015-16 with the values of no *17. Nymphaea lotus* Linn. 2.840, *18. Nymphaea rubra* Roxb. Ex Salibs 1.500, *19.Trapa natans* L.1.470

The green line graph indicates the abundance of the year 2016-17 of the species such as *17. Nymphaea lotus* Linn. 1.610, *18. Nymphaea rubra* Roxb. Ex Salibs 2.500, *19. Trapa natans* L. 2.400. The Limit value is in between **1.470 to 2.857**

21. ii. **Fig no- 21.ii.**



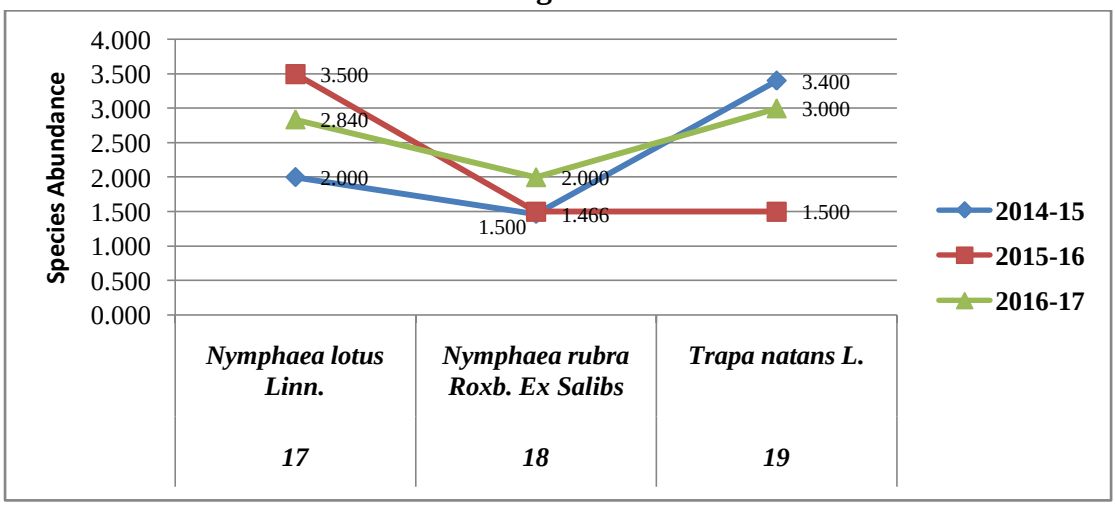
Monsoon Abundance of Rooted Floating Leaves Macrophytes (Sp.no.17, 18 and 19)

It is Monsoon abundance graph of Rooted Floating Leaves Macrophytes (Sl no.17, 18 and 19) which is represented by line graphs. The blue line graph of abundance of the macrophyte sp in 2014-15 represents *17. Nymphaea lotus* Linn. 2.100, *18. Nymphaea rubra* Roxb. Ex Salibs 1.900, *19.Trapa natans* L.1.600

The red line graph gives the abundance of the year 2015-16 with the values of no *17. Nymphaea lotus* Linn. 3.900, *18. Nymphaea rubra* Roxb. Ex Salibs 3.500, *19. Trapa natans* L.1.333

The green line graph indicates the abundance of the year 2016-17 of the species such as *17. Nymphaea lotus* Linn. 1.416, *18. Nymphaea rubra* Roxb. Ex Salibs 2.110, *19. Trapa natans* L. 2.200. The Limit value is in between **1.333 to 3.500**

21. iii. **Fig no- 21.iii.**



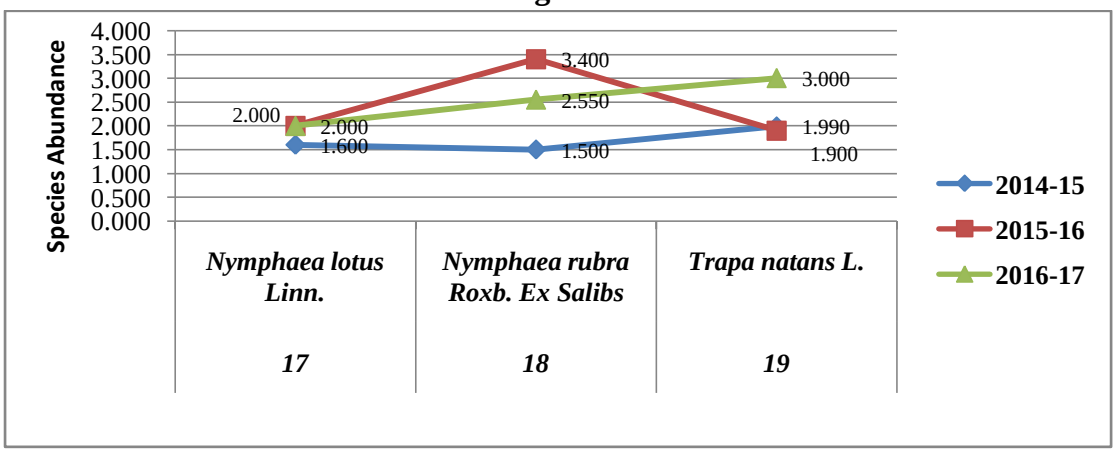
Post Monsoon Abundance of Rooted Floating Leaves Macrophytes (Sl.no.17, 18 and 19)

It is Post Monsoon abundance graph of Rooted Floating Leaves Macrophytes (Sl no.17, 18 and 19) which is represented by line graphs. The blue line graph of abundance of the macrophyte sp in 2014-15 represents *17. Nymphaea lotus* Linn. 2.000, *18. Nymphaea rubra* Roxb. Ex Salibs 1.466, *19.Trapa natans* L. 3.400

The red line graph gives the abundance of the year 2015-16 with the values of no *17. Nymphaea lotus* Linn. 3.500, *18. Nymphaea rubra* Roxb. Ex Salibs 1.500, *19. Trapa natans* L.1.500

The green line graph indicates the abundance of the year 2016-17 of the species such as *17. Nymphaea lotus* Linn. 2.840, *18. Nymphaea rubra* Roxb. Ex Salibs 2.000, *19. Trapa natans* L. 3.000. The Limit value is in between **1.466 to 3.500**

21. iv. **Fig no- 21.iv.**



Winter Abundance of Rooted Floating Leaves Macrophytes (Sp. no.17, 18 and 19)

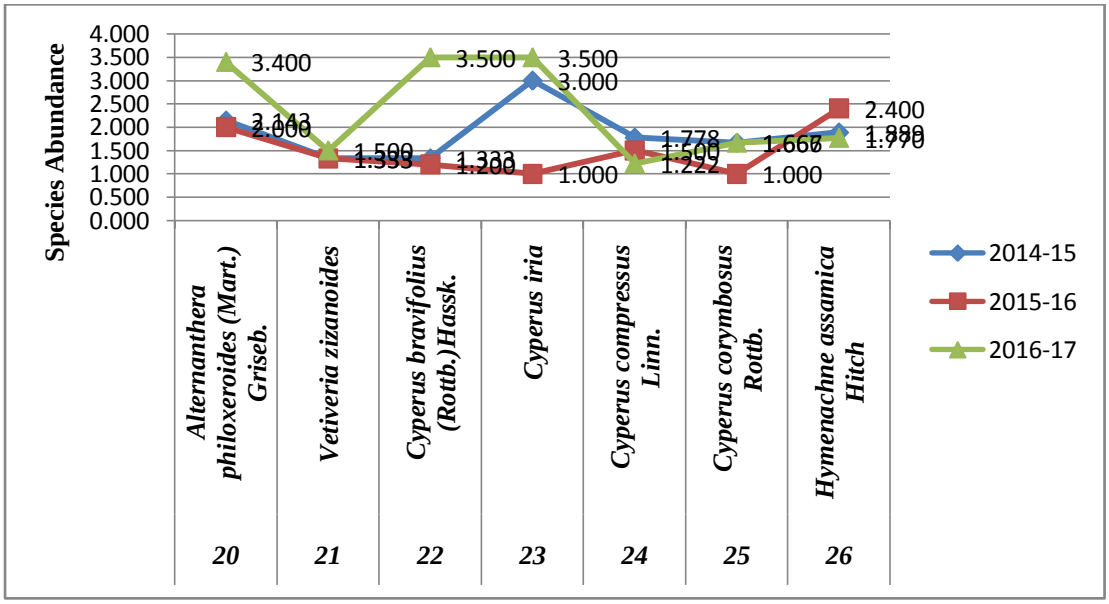
It is winter abundance graph of Rooted Floating Leaves Macrophytes (Sl no.17, 18 and 19) which is represented by line graphs. The blue line graph of abundance of the macrophyte sp in 2014-15 represents *17. Nymphaea lotus* Linn. 1.600, *18. Nymphaea rubra* Roxb. Ex Salibs 1.500, *19. Trapa natans* L. 1.990

The red line graph gives the abundance of the year 2015-16 with the values of no *17. Nymphaea lotus* Linn. 2.000, *18. Nymphaea rubra* Roxb. Ex Salibs 3.400, *19. Trapa natans* L.1.900

The green line graph indicates the abundance of the year 2016-17 of the species such as *17. Nymphaea lotus* Linn. 2.000, *18. Nymphaea rubra* Roxb. Ex Salibs 2.550, *19. Trapa natans* L. 3.000. The Limit value is in between **1.500 to 3.400**

22. Macrphpyte Abundance of ***Emergent*** Macrophytes (Sp. no. 20 to 26)

22. i. **Fig no- 22.i. A**



Pre Monsoon Abundance of Emergents Macrophytes (Sp. no. 20 to 26)

The graph is Pre Monsoon Abundance of Emargents Macrophytes (Sl. no. 20 to 26) which is represented by line graphs. The blue line graph of abundance of the macrophyte sp in 2014-15 represents *20. Alternanthera philoxeroides* (Mart.) Grisep. 2.143, *21.Vetiveria zizanoides (*L.) Nass.*1.333, 22. Cyperus bravifolius* (Rottb.) Hassk.1.333, *23. Cyperus iria 3.000, 24. Cyperus compressus* L. 1.778, *25. Cyperus corymbosus* Rottb. 1.666, *26. Hymenachne assamica* Hitch 1.889

The red line graph gives the abundance of the year 2015-16 with the values of no *20. Alternanthera philoxeroides* (Mart.) Grisep. 2.000, *21. Vetiveria zizanoides*

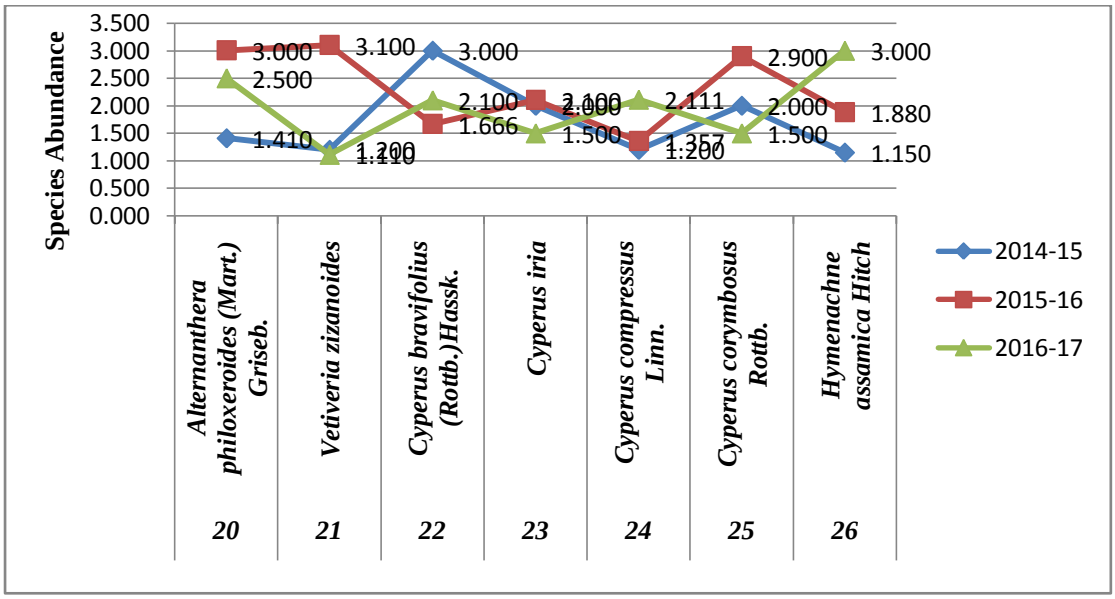
*(*L.) Nass. 1.500, *22. Cyperus bravifolius* (Rottb.) Hassk. 1.200, *23. Cyperus iria 1.000, 24. Cyperus compressus* L. 1.500, *25. Cyperus corymbosus* Rottb. 1.000, *26. Hymenachne assamica* Hitch 2.400

The green line graph indicates the abundance of the year 2016-17 of the species such as *20. Alternanthera philoxeroides* (Mart.) Grisep. 3.400, *21. Vetiveria zizanoides (*L.) Nass. *1.333, 22. Cyperus bravifolius* (Rottb.) Hassk. 3.500, *23. Cyperus iria 3.500, 24. Cyperus compressus* L. 1.222, *25. Cyperus corymbosus* Rottb. 1.666, *26. Hymenachne assamica* Hitch 1.770 The Limit value is in between **1.000 to 3.500**

Table no. 22.i. B

Years (November to November)	**Decrease in Abundance in Post Monsoon Emergent Macrophytes (Sp.no. 24) with Abundance value**
	24. Cyperus compressus L.
2014-15	1.778
2015-16	1.500
2016-17	1.222

22. ii. **Fig no- 22.ii.**



Monsoon Abundance of Emergents Macrophytes (Sl. no. 20 to 26)

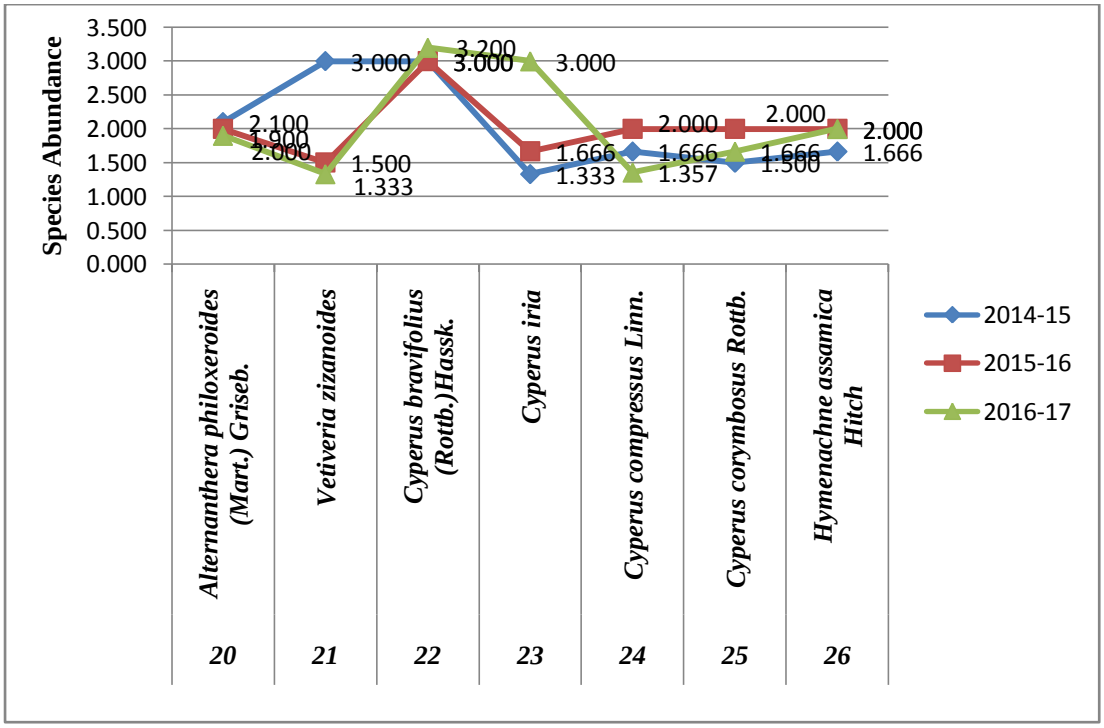
The graph is Monsoon Abundance of Emargents Macrophytes (Sl. no. 20 to 26) which is represented by line graphs. The blue line graph of abundance of the macrophyte sp in 2014-15 represents *20. Alternanthera philoxeroides* (Mart.) Grisep.

1.410, *21. Vetiveria zizanoides (*L.) Nass. *1.200, 22. Cyperus bravifolius* (Rottb.) Hassk. 3.000 *23. Cyperus iria 2.100, 24. Cyperus compressus* L. 1.200, *25. Cyperus corymbosus* Rottb. 2.000, *26. Hymenachne assamica* Hitch 1.150

The red line graph gives the abundance of the year 2015-16 with the values of no *20. Alternanthera philoxeroides* (Mart.) Grisep. 3.000, *21. Vetiveria zizanoides (*L.) Nass. 3.100, *22. Cyperus bravifolius* (Rottb.) Hassk. 1.666, *23. Cyperus iria 2.000, 24. Cyperus compressus* L.1.357, *25.Cyperus corymbosus* Rottb. 2.900,*26. Hymenachne assamica* Hitch 1.880

The green line graph indicates the abundance of the year 2016-17 of the species such as *20. Alternanthera philoxeroides* (Mart.) Grisep. 2.500, *21. Vetiveria zizanoides (*L.) Nass 1.200, *22. Cyperus bravifolius* (Rottb.) Hassk. 2.100, *23. Cyperus iria 1.500, 24. Cyperus compressus* L. 2.111, *25. Cyperus corymbosus* Rottb. 1.500, *26. Hymenachne assamica* Hitch 3.000. The Limit value is in between **1.110 to 3.100**

22. iii. **Fig no- 22.iii.A**



Post Monsoon Abundance of Emergents Macrophytes (Sp. no. 20 to 26

The graph is Post monsoon abundance of Emergent Macrophytes (Sl. no. 20 to 26) which is represented by line graphs. The blue line graph of abundance of the macrophyte sp in 2014-15 represents *20. Alternanthera philoxeroides* (Mart.)

Grisep. 2.100, *21. Vetiveria zizanoides (*L.) Nass. *1.500, 22. Cyperus bravifolius* (Rottb.) Hassk. 3.000, *23. Cyperus iria 1.333, 24. Cyperus compressus* L. 1.375, *25. Cyperus corymbosus* Rottb. 1.500, *26. Hymenachne assamica* Hitch 1.666

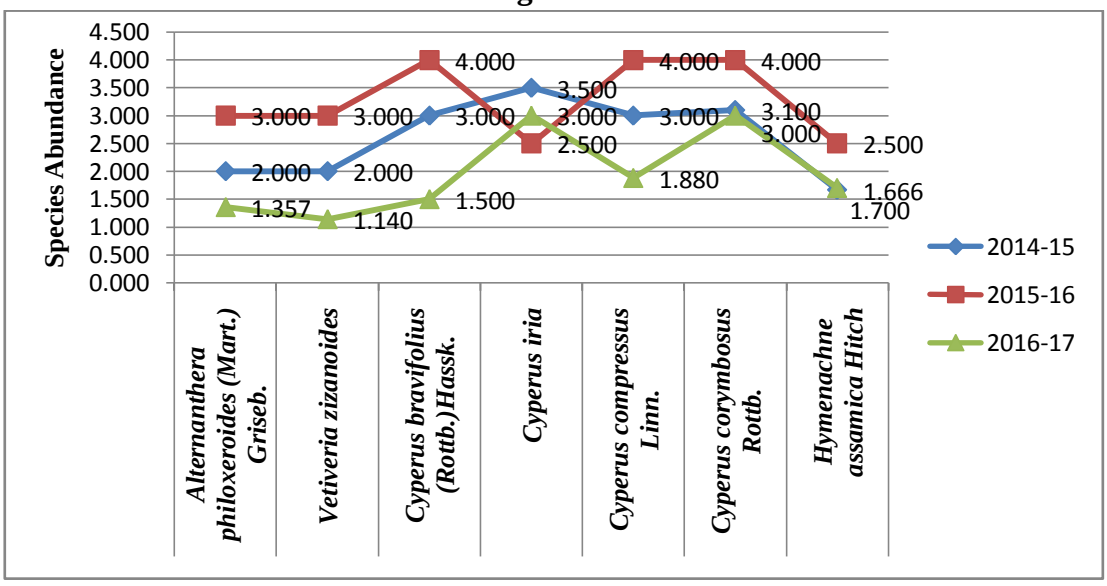
The red line graph gives the abundance of the year 2015-16 with the values of nos *20. Alternanthera philoxeroides* (Mart.) Grisep. 1.900, *21. Vetiveria zizanoides (*L.) Nass. 1.500, *22. Cyperus bravifolius* (Rottb.) Hassk. 3.000, *23. Cyperus iria 1.666, 24.Cyperus compressus* L. 2.000, *25. Cyperus corymbosus* Rottb. 2.000, *26. Hymenachne assamica* Hitch 2.000

The green line graph indicates the abundance of the year 2016-17 of the species such as *20. Alternanthera philoxeroides* (Mart.) Grisep.2.200, *21. Vetiveria zizanoides (*L.) Nass 1.500, *22. Cyperus bravifolius* (Rottb.) Hassk. 3.200, *23. Cyperus iria 1.666, 24. Cyperus compressus* L. 1.357, *25. Cyperus corymbosus* Rottb. 2.000, *26. Hymenachne assamica* Hitch 3.000. The Limit value is in between **1.333 to 3.200**

Table no. 22. iii. B

Years (November to November)	**Decrease in Abundance in Post Monsoon Emergent Macrophytes (Sp. no. 21) with Abundance value**
	*21. Vetiveria zizanoides (*L.) Nass.
2014-15	3.000
2015-16	1.500
2016-17	1.333

22. iv **Fig no- 22.iv.**



Winter Abundance of Emargents Macrophytes (Sp. no. 20 to 26)

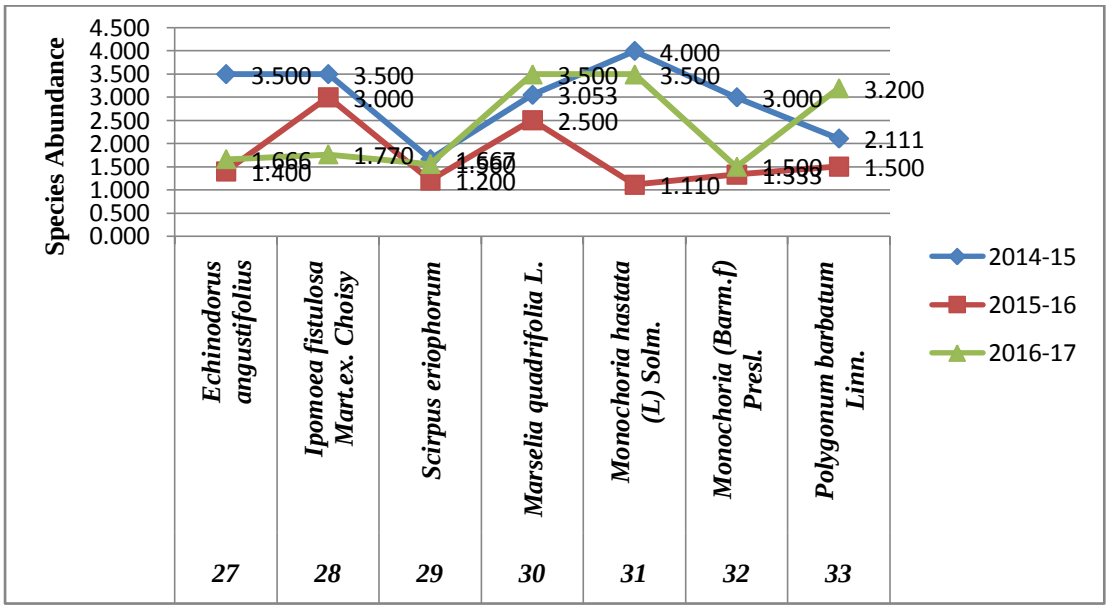
The graph is winter abundance of Emergent Macrophytes (Sl. no. 20 to 26) which is represented by line graphs. The blue line graph of abundance of the macrophyte sp in 2014-15 represents *20. Alternanthera philoxeroides* (Mart.) Grisep. 2.000, *21. Vetiveria zizanoides (*L.) Nass. *2.000, 22. Cyperus bravifolius* (Rottb.) Hassk. 3.000, *23. Cyperus iria 3.000, 24. Cyperus compressus* L. 3.000, *25. Cyperus corymbosus* Rottb. 1.500, *26. Hymenachne assamica* Hitch 1.666

The red line graph gives the abundance of the year 2015-16 with the values of nos *20. Alternanthera philoxeroides* (Mart.) Grisep. 3.000, *21. Vetiveria zizanoides (*L.) Nass. 3.000, *22. Cyperus bravifolius* (Rottb.) Hassk. 4.000, *23. Cyperus iria 2.500, 24. Cyperus compressus* L. 4.000, *25. Cyperus corymbosus* Rottb. 4.000, *26. Hymenachne assamica* Hitch 2.500

The green line graph indicates the abundance of the year 2016-17 of the species such as *20. Alternanthera philoxeroides* (Mart.) Grisep. 1.357, *21. Vetiveria zizanoides (*L.) Nass 1.140, *22. Cyperus bravifolius* (Rottb.) Hassk. 1.500, *23. Cyperus iria3.000, 24. Cyperus compressus* L. 1.880, *25. Cyperus corymbosus* Rottb. 3.000, *26. Hymenachne assamica* Hitch 1.700. The Limit value is in between **1.140 to 4.000**

23. Macrophyte Abundance of ***Emergent*** Macrophytes (Sp.. no. 27 to 33)

23. i. **Fig no- 23.i. A**



Pre Monsoon Abundance of Emargents Macrophytes (Sp.. no. 27 to 33

The graph is Pre monsoon abundance of Emergent Macrophytes (Sl. no.27 to 33)

which is represented by line graphs. The blue line graph of abundance of the macrophyte species in 2014-15 represents 27. *Echinodorus angustifolius* 3.500, *28. Ipomoea fistulosa* Mart.ex.Choisy. 3.500, *29. Scirpus eriophorum* L.1.667, *30. Marselia quadrifolia* L. 3.053, *31. Monochoria hastate* (L.) Solm.4.000, *32. Monochoria* C. Presl. 3.000, *33. Polygonum barbatum* Linn. 2.111

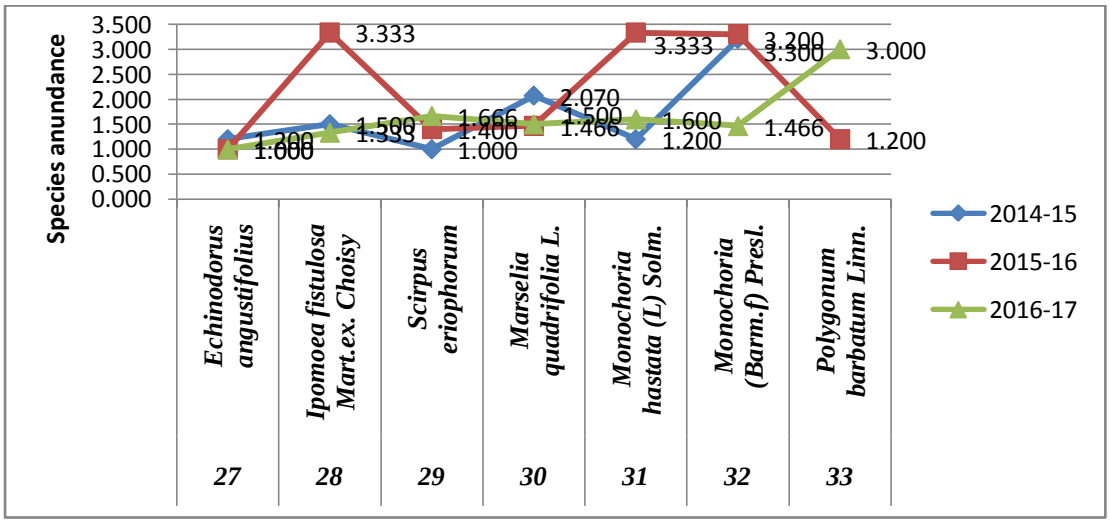
The red line graph gives the abundance of the year 2015-16 with the values of nos 27. *Echinodorus angustifolius* 1.400, *28. Ipomoea fistulosa* Mart.ex.Choisy. 3.000, *29. Scirpus eriophorum* L. 1.200 *30. Marselia quadrifolia* L. 2.500, *31. Monochoria hastate* (L.) Solm. 1.110, *32. Monochoria* C. Presl. 1.333, *33. Polygonum barbatum* Linn.1.500

The green line graph indicates the abundance of the year 2016-17 of the species such as 27. *Echinodorus angustifolius* 1.666, *28. Ipomoea fistulosa* Mart.ex.Choisy. 1.770, *29. Scirpus eriophorum* L. 1.330, *30. Marselia quadrifolia* L. 3.500, *31. Monochoria hastate* (L.) Solm.1.110, *32. Monochoria* C. Presl. 1.333, *33. Polygonum barbatum* Linn. 3.200. The Limit value is in between 1.11**0 to 3.400**

23.i. **Table no. 23. i. B**

Years (November to November)	**Decrease in Abundance in Post Monsoon Emergent Macrophytes (Sp. no. 28) with Abundance value**
	28. Ipomoea fistulosa Mart.ex.Choisy.
2014-15	3.500
2015-16	3.000
2016-17	1.770

23. ii. **Fig no-23.ii.**



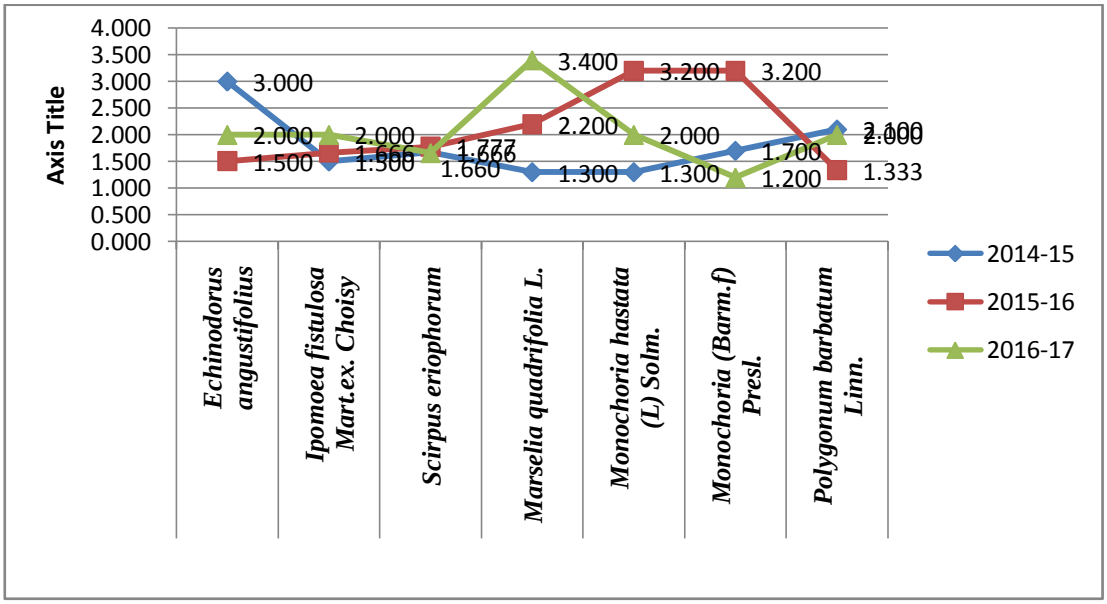
Monsoon Abundance of *Emergent* Macrophytes (Sp.no. 27 to 33)

The graph is Monsoon abundance of Emergent Macrophytes (Sl. no.27 to 33) which is represented by line graphs. The blue line graph of abundance of the macrophyte species in 2014-15 represents 27. *Echinodorus angustifolius* 1.200, *28. Ipomoea fistulosa* Mart.ex.Choisy. 1.500 *29. Scirpus eriophorum* L.1.000, *30. Marselia quadrifolia* L. 2.070, *31. Monochoria hastate* (L.) Solm.1.200, *32. Monochoria* C. Presl. 3.333, *33. Polygonum barbatum* Linn. 1.200

The red line graph gives the abundance of the year 2015-16 with the values of nos 27. *Echinodorus angustifolius* 1.000, *28. Ipomoea fistulosa* Mart.ex.Choisy. 3.333, *29. Scirpus eriophorum* L. 1.400 *30. Marselia quadrifolia* L. 1.466, *31. Monochoria hastate* (L.) Solm. 3.200, *32. Monochoria* C. Presl. 3.200, *33. Polygonum barbatum* Linn.1.200

The green line graph indicates the abundance of the year 2016-17 of the species such as 27. *Echinodorus angustifolius* 1.200, *28. Ipomoea fistulosa* Mart.ex.Choisy. 1.333, *29. Scirpus eriophorum* L. 1.666, *30. Marselia quadrifolia* L. 1.466, *31. Monochoria hastate* (L.) Solm.1.600, *32. Monochoria* C. Presl1.466, *33. Polygonum barbatum* Linn. 3.000. The Limit value is in between **1 to 3.333**

23. iii. **Fig no-23.iii.**



Post Monsoon Abundance of *Emergent* Macrophytes (Sp. no. 27 to 33)

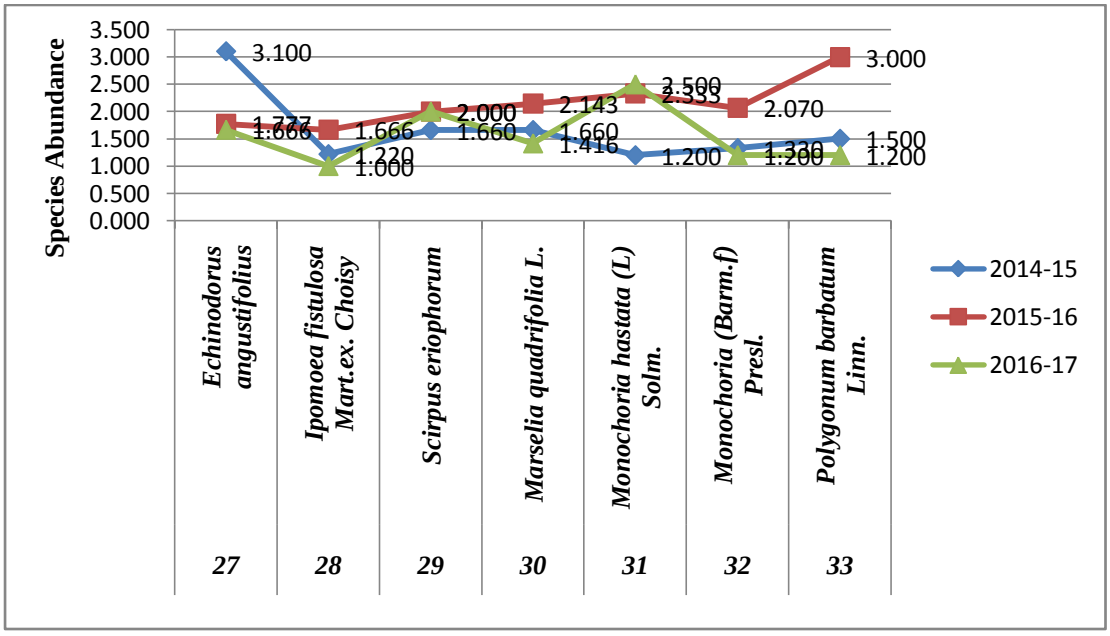
The graph is Monsoon abundance of Emergent Macrophytes (Sl. no.27 to 33) which is represented by line graphs. The blue line graph of abundance of the macrophyte species in 2014-15 represents 27. *Echinodorus angustifolius* 1.200, *28. Ipomoea fistulosa* Mart.ex.Choisy. 1.500 *29. Scirpus eriophorum* L.1.000, *30.*

Marselia quadrifolia L. 2.070, *31. Monochoria hastate* (L.) Solm.1.200, *32. Monochoria* C. Presl. 3.333, *33. Polygonum barbatum* Linn. 1.200

The red line graph gives the abundance of the year 2015-16 with the values of nos 27. *Echinodorus angustifolius* 1.000, *28. Ipomoea fistulosa* Mart.ex.Choisy. 3.333, *29. Scirpus eriophorum* L. 1.400 *30. Marselia quadrifolia* L. 1.466, *31. Monochoria hastate* (L.) Solm. 3.200, *32. Monochoria* C. Presl. 3.200, *33. Polygonum barbatum* Linn.1.200

The green line graph indicates the abundance of the year 2016-17 of the species such as 27. *Echinodorus angustifolius* 1.200, *28. Ipomoea fistulosa* Mart.ex.Choisy. 1.333, *29. Scirpus eriophorum* L. 1.666, *30. Marselia quadrifolia* L. 1.466, *31. Monochoria hastate* (L.) Solm.1.600, *32. Monochoria* C. Presl1.466, *33. Polygonum barbatum* Linn. 3.000. The Limit value is in between **1.200 to 3.400**

23. iv. **Fig no- 23.iv.**



Winter Abundance of *Emergent* Macrophytes (Sp. no. 27 to 33)

The graph is winter abundance of Emergent Macrophytes (Sl. no.27 to 33) which is represented by line graphs. The blue line graph of abundance of the macrophyte species in 2014-15 represents 27. *Echinodorus angustifolius* 3.100, *28. Ipomoea fistulosa* Mart.ex.Choisy. 1.220, *29. Scirpus eriophorum* L. 1.666, *30.Marselia quadrifolia* L. 1.666, *31. Monochoria hastate* (L.) Solm.1.200, *32. Monochoria* C. Presl. 1.330, *33. Polygonum barbatum* Linn. 1.500

The red line graph gives the abundance of the year 2015-16 with the values of nos 27. *Echinodorus angustifolius* 1.777, *28. Ipomoea fistulosa* Mart.ex.Choisy. 1.666, *29. Scirpus eriophorum* L. 2.000 *30. Marselia quadrifolia* L. 2.143, *31. Monochoria hastate* (L.) Solm. 2.333, *32. Monochoria* C. Presl. 2.070, *33. Polygonum barbatum* Linn.3.000

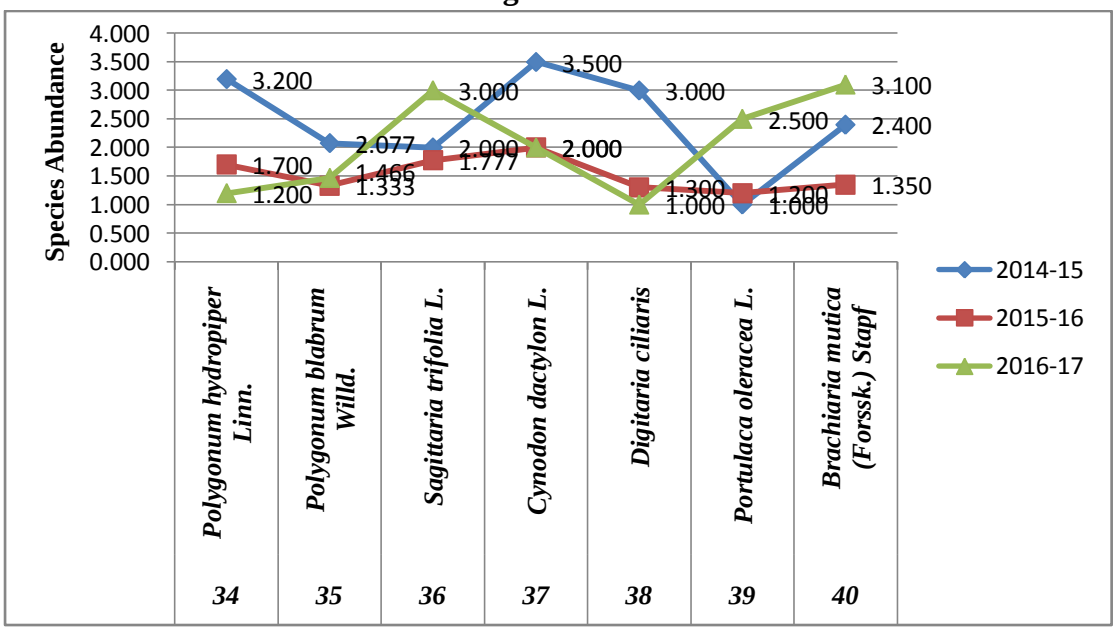
The green line graph indicates the abundance of the year 2016-17 of the species such as 27. *Echinodorus angustifolius* 1.666, *28. Ipomoea fistulosa* Mart.ex.Choisy. 1.000, *29. Scirpus eriophorum* L. 2.000, *30 .Marselia quadrifolia* L1.416, *31. Monochoria hastate* (L.) Solm.2.500, *32.Monochoria* C. Presl 1.200, *33. Polygonum barbatum* Linn. 1.200. The Limit value is in between **1 to 3.100**

Table no. 23. iv.B

Years (November to November)	**Decrease in Abundance in Winter Emergent Macrophytes (Sp. no. 27) with Abundance value**
	27. *Echinodorus angustifolius*
2014-15	3.100
2015-16	1.777
2016-17	1.666

Macrophyte Abundance of ***Emergent*** Macrophytes (Sp. no. 34 to 40)

24. i. **Fig no- 24.i.A**



Pre Monsoon Abundance of *Emergent* Macrophytes (Sp. no. 34 to 40)

The graph represents the Pre monsoon abundance of Emergent Macrophytes (Sl. no.34 to 40) which is also represented by line graphs. The blue line graph of abundance of the macrophyte species in 2014-15 represents *34. Polygonum hydropiper* Linn. 3.200, *35. Polygonum glabrum* Willd. 2.077, *36. Sagittaria trifolia* L. 2.000, *37. Cynodon dactylon (*L.) Pers. 3.500, *38. Digitaria ciliaris* (Retzius) Koeler. 3.000, *39. Portulaca quadrifida* L. 1.000, 40. *Brachiaria mutica* (Forssk.) Stapf.2.400

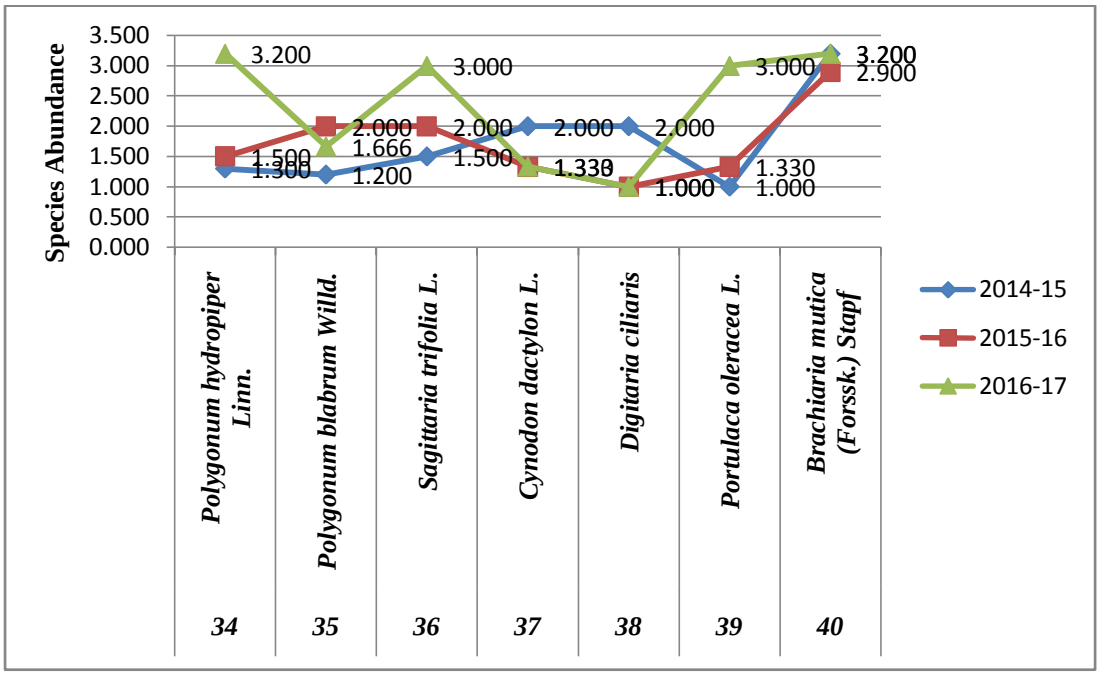
The red line graph gives the abundance of the year 2015-16 with the values of nos *34. Polygonum hydropiper* Linn. 1.700, *35. Polygonum glabrum* Willd.1.466, *36. Sagittaria trifolia* L. 1.777, *37. Cynodon dactylon (*L.) Pers. 2.000, *38. Digitaria ciliaris* (Retzius) Koeler. 1.300, *39. Portulaca quadrifida* L. 1.200, 40. *Brachiaria mutica* (Forssk.) Stapf.1.350

The green line graph indicates the abundance of the year 2016-17 of the species such as *34. Polygonum hydropiper* Linn. 1.200, *35. Polygonum glabrum* Willd. 1.466, *36. Sagittaria trifolia* L. 3.000, *37. Cynodon dactylon (*L.) Pers. 2.000, *38. Digitaria ciliaris* (Retzius) Koeler. 1.00, *39. Portulaca quadrifida* L. 2.500, 40. *Brachiaria mutica* (Forssk.) Stapf. 3.100. The Limit value is in between **1 to 3.500**

Table no. 24. i. B

Years (November to November)	**Decrease in Abundance in Pre Monsoon Emergent macrophytes (Sp. no.34 and 38) with Abundance value**	
	34. Polygonum hydropiper Linn.	*38. Digitaria ciliaris* (Retzius) Koeler.
2014-15	3.200	3.000
2015-16	1.700	1.300
2016-17	1.200	1.000

24. ii. **Fig no- 24.ii.**



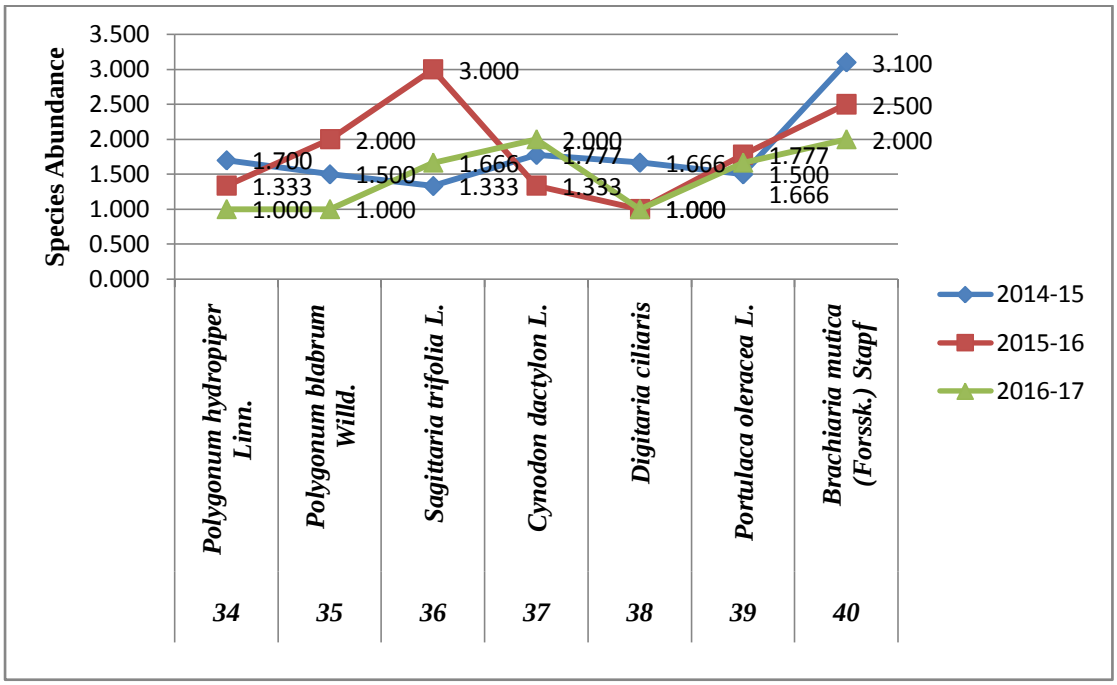
Monsoon Abundance of *Emergent* Macrophytes (Sp. no.34 to sl no 40)

The graph represents the Pre monsoon abundance of Emergent Macrophytes (Sl. no.34 to 40) which is also represented by line graphs. The blue line graph of abundance of the macrophyte species in 2014-15 represents *34. Polygonum hydropiper* Linn. 1.300, *35. Polygonum glabrum* Willd. 1.200, *36. Sagittaria trifolia* L. 1.500, *37. Cynodon dactylon (*L.) Pers. 2.000, *38. Digitaria ciliaris* (Retzius) Koeler. 2.000, *39. Portulaca quadrifida* L. 1.000, 40. *Brachiaria mutica* (Forssk.) Stapf.3.200.

The red line graph gives the abundance of the year 2015-16 with the values of nos *34. Polygonum hydropiper* Linn. 1.500, *35. Polygonum glabrum* Willd. 2.000, *36. Sagittaria trifolia* L. 2.000, *37. Cynodon dactylon (*L.) Pers. 1.333, *38. Digitaria ciliaris* (Retzius) Koeler. 1.000, *39. Portulaca quadrifida* L1.333, 40. *Brachiaria mutica* (Forssk.) Stapf. 2.900

The green line graph indicates the abundance of the year 2016-17 of the species such as *34. Polygonum hydropiper* Linn. 3.200, *35. Polygonum glabrum* Willd. 1.666, *36. Sagittaria trifolia* L. 3.000, *37. Cynodon dactylon (*L.) Pers. 1.333, *38. Digitaria ciliaris* (Retzius) Koeler. 1.000, *39. Portulaca quadrifida* L. 3.000, 40. *Brachiaria mutica* (Forssk.) Stapf. 3.200. The Limit value is in between **1 to 3.200**

24. iii. **Fig no- 24.iii. A.**



Post Monsoon Abundance of *Emergent* Macrophytes (Sp no. 34 to 40)

The graph represents the Post monsoon abundance of Emergent Macrophytes (Sl. no.34 to 40) which is also represented by line graphs. The blue line graph of abundance of the macrophyte species in 2014-15 represents *34. Polygonum hydropiper* Linn. 1.700, *35. Polygonum glabrum* Willd. 1.500, *36. Sagittaria trifolia* L. 1.666, *37. Cynodon dactylon (*L.) Pers. 1.777, *38. Digitaria ciliaris* (Retzius) Koeler. 1.666, *39. Portulaca quadrifida* L. 1.500, 40. *Brachiaria mutica* (Forssk.) Stapf.3.100

The red line graph gives the abundance of the year 2015-16 with the values of nos *34. Polygonum hydropiper* Linn. 1.333, *35. Polygonum glabrum* Willd.2.000, *36. Sagittaria trifolia* L. 3.000, *37. Cynodon dactylon (*L.) Pers.2.000, *38. Digitaria ciliaris* (Retzius) Koeler. 1.000, *39. Portulaca quadrifida* L. 1.200, 40. *Brachiaria mutica* (Forssk.) Stapf.1.350

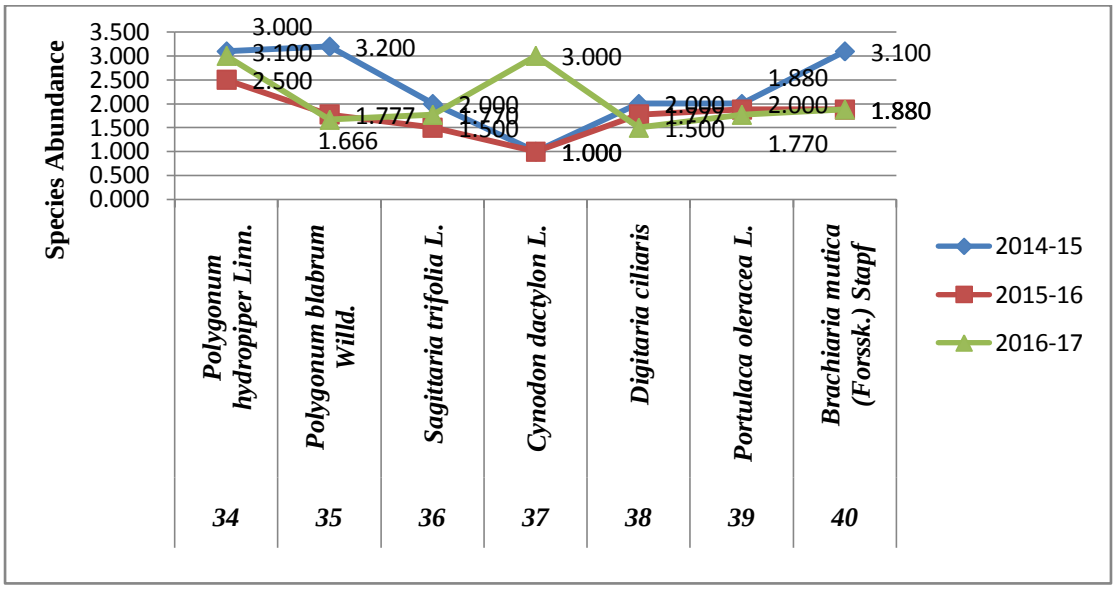
The green line graph indicates the abundance of the year 2016-17 of the species such as *34. Polygonum hydropiper* Linn. 1.200, *35. Polygonum glabrum* Willd. 1.466, *36. Sagittaria trifolia* L. 3.000, *37. Cynodon dactylon (*L.) Pers. 2.000, *38. Digitaria ciliaris* (Retzius) Koeler. 1.00, *39. Portulaca quadrifida* L.1.666, 40. *Brachiaria mutica* (Forssk.) Stapf. 2.000. The Limit value is in between

1 to 3.000

Table no. 24. iii. B

Years (November to November)	Decrease in Abundance in Post Monsoon Emergent Macrophytes (Sp. no.34 and 40) with Abundance value	
	34. Polygonum hydropiper Linn.	40. <u>*Brachiaria mutica*</u> (Forssk.) Stapf.
2014-15	1.700	3.100
2015-16	1.373	2.500
2016-17	1.000	2.000

24. iv. **Fig no- 24.iv. A**



Winter Abundance of *Emergent* Macrophytes (Sp. no. 34 to 40)

The graph represents the Post monsoon abundance of Emergent Macrophytes (Sl. no.34 to 40) which is also represented by line graphs. The blue line graph of abundance of the macrophyte species in 2014-15 represents *34. Polygonum hydropiper* Linn. 3.000, *35. Polygonum glabrum* Willd. 1.666, *36. Sagittaria trifolia* L. 1.777, *37. Cynodon dactylon* (L.) Pers. 1.000, *38. Digitaria ciliaris* (Retzius) Koeler. 1.500, *39. Portulaca quadrifida* L. 1.770, 40. <u>*Brachiaria mutica*</u> (Forssk.) Stapf.1.800

The red line graph gives the abundance of the year 2015-16 with the values of nos *34. Polygonum hydropiper* Linn. 2.500, *35. Polygonum glabrum* Willd.1.777, *36. Sagittaria trifolia* L 1.500, *37. Cynodon dactylon* (L.) Pers.2.000, *38. Digitaria*

ciliaris (Retzius) Koeler. 1.000, *39. Portulaca quadrifida* L. 1.200, 40. *Brachiaria mutica* (Forssk.) Stapf.1.880

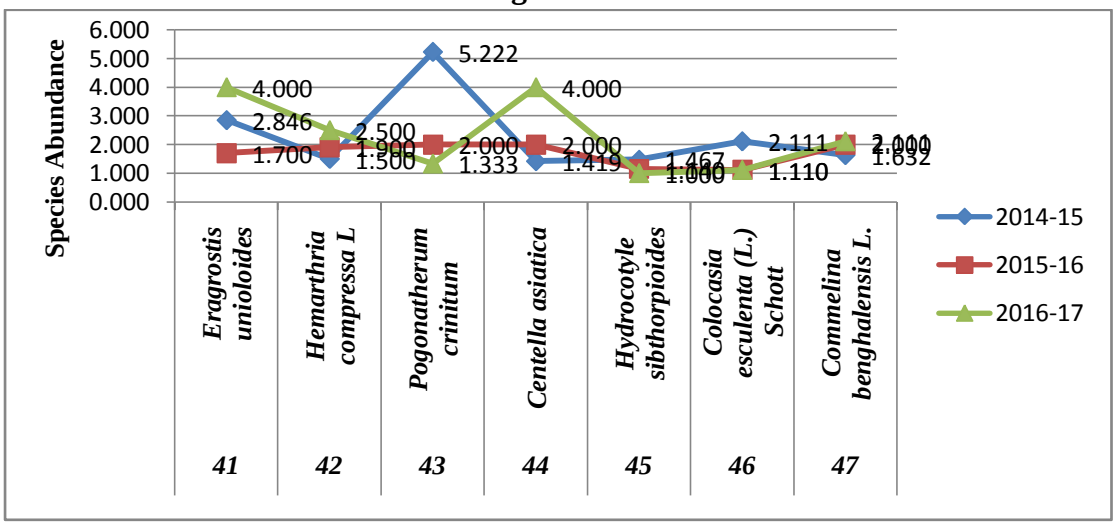
The green line graph indicates the abundance of the year 2016-17 of the species such as *34. Polygonum hydropiper* Linn. 3.100, *35. Polygonum glabrum* Willd. 1.666, *36. Sagittaria trifolia* L. 1.770, *37. Cynodon dactylon (*L.) Pers. 1.000, *38. Digitaria ciliaris* (Retzius) Koeler. 1.500, *39. Portulaca quadrifida* L. 1.770, 40. *Brachiaria mutica* (Forssk.) Stapf. 1.880. The Limit value is in between **1 to 3.200**

Table no. 24. iv. B

Years (November to November)	**Decrease in Abundance in Winter Emergent Macrophytes (Sl. no.34,35, 36 and 38) with abundance value**			
	34. Polygonum hydropiper Linn.	*35. Polygonum glabrum* Willd.	*36. Sagittaria trifolia* L.	*38. Digitaria ciliaris* (Retzius) Koeler.
2014-15	3.100	3.200	2.000	2.000
2015-16	3.000	1.777	1.777	1.777
2016-17	2.500	1.660	1.500	1.500

25. Macrophyte Abundance of *Emergent* Macrophytes (Sp. no. 41 to 47)

25. i. **Fig no- 25.i. A**



Pre Monsoon Abundance of *Emergent* Macrophytes (Sp. no. 41 to 47)

The graph represents the Pre monsoon abundance of Emergent Macrophytes (Sl. no.41 to 47) which is also represented by line graphs. The blue line graph of abundance of the macrophyte species in 2014-15 represents *41. Eragrostis unioloides*(Retzius) Nees.2.846, *42. Hemarthria compressa* L. 1.500, *43.*

Pogonatherum crinitum (T.) Kunth. 5.222, 44. *Centella asiatica* L. 1.419, 45. *Hydrocotyl sibthorpioides* Lmmk. 1.467, *46. Colocasia esculenta* (L.) Schott *2.111, 47. Commelina benghalensis* L. 1.632

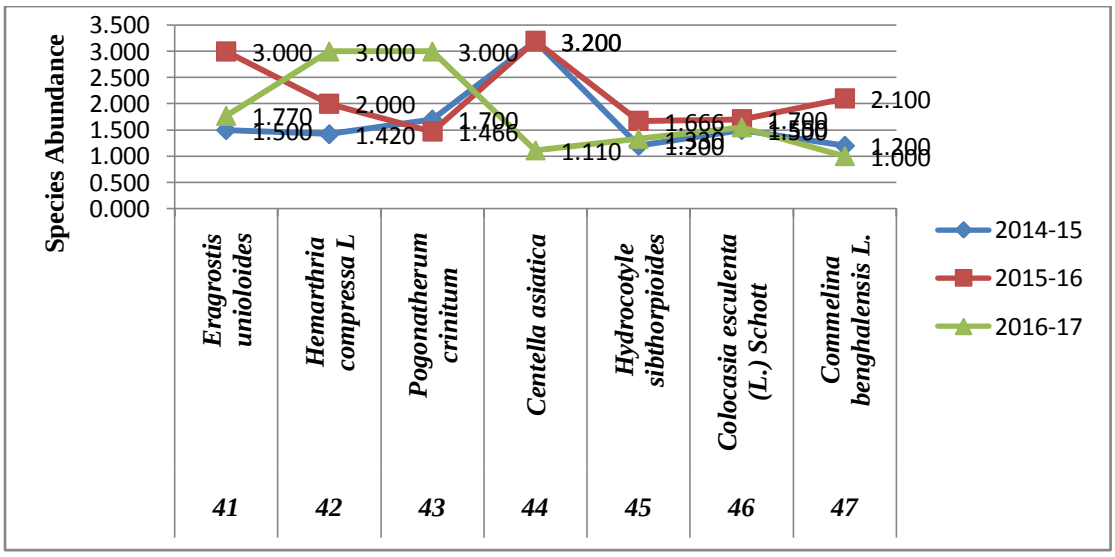
The red line graph gives the abundance of the year 2015-16 with the values of nos *41. Eragrostis unioloides*(Retzius) Nees.*1.700, 42. Hemarthria compressa* L. 1.500, *43. Pogonatherum crinitum* (T.) Kunth. 1.333, 44. *Centella asiatica* L. 1.419, 45. *Hydrocotyl sibthorpioides* Lmmk. 1.000, *46. Colocasia esculenta* (L.) Schott 1.110, *47. Commelina benghalensis* L. 2.111

The green line graph indicates the abundance of the year 2016-17 of the species such as *41. Eragrostis unioloides*(Retzius) Nees. *1.700, 42. Hemarthria compressa* L. 1.900, *43. Pogonatherum crinitum* (T.) Kunth. 2.000, 44. *Centella asiatica* L. 2.000, 45. *Hydrocotyl sibthorpioides* Lmmk. 1.140, *46. Colocasia esculenta* (L.) Schott 1.110, *47. Commelina benghalensis* L. 2.111. The Limit value is in between **1 to 5.222**

Table no. 25.i. B

Years (November to November)	**Decrease in Abundance in Pre Monsoon Emergent Macrophytes (Sp. no.41) with Abundance value**
	43. Pogonatherum crinitum (T.) Kunth.
2014-15	5.222
2015-16	2.000
2016-17	1.333

25. ii. **Fig no- 25.ii.**



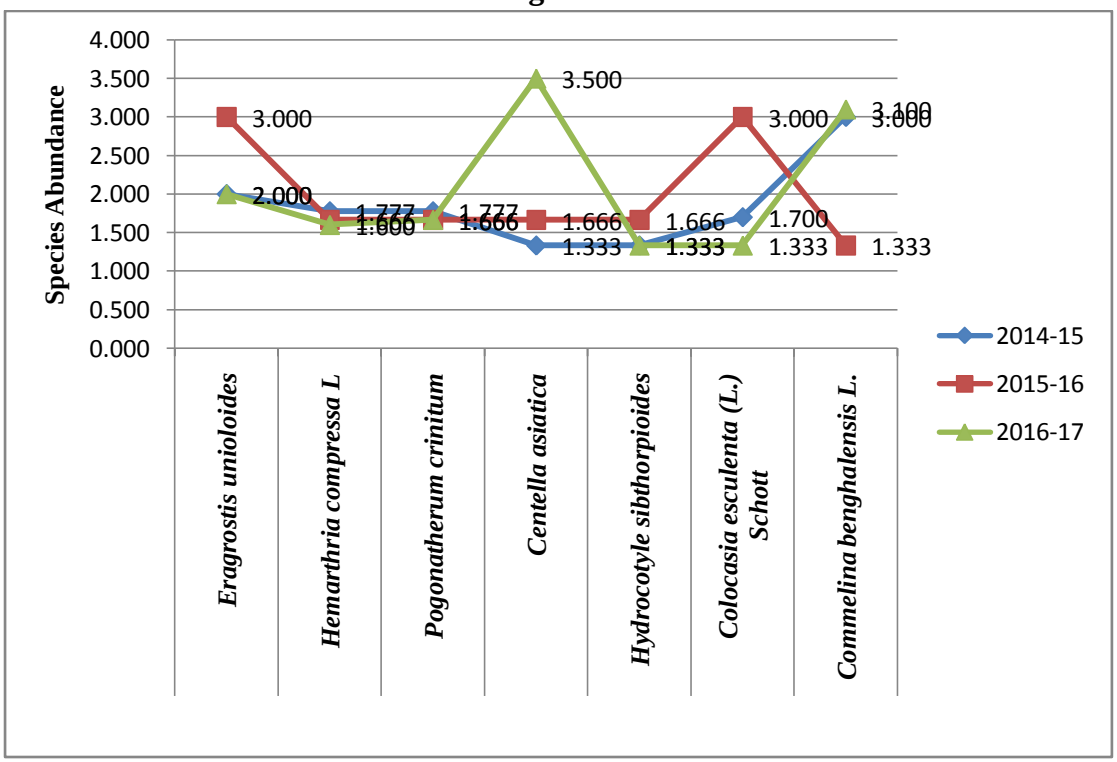
Monsoon Abundance of *Emergent* Macrophytes (Sp. no. 41 to 47)

The graph represents the monsoon abundance of Emergent Macrophytes (Sl. no.41 to 47) which is also represented by line graphs. The blue line graph of abundance of the macrophyte species in 2014-15 represents *41. Eragrostis unioloides*(Retzius) Nees. 1.500, *42. Hemarthria compressa* L 1.420,*43. Pogonatherum crinitum* (T.) Kunth. 1.700, 44. *Centella asiatica* L. 3.200, 45. *Hydrocotyl sibthorpioides* Lmmk. 1.200, *46. Colocasia esculenta* (L.) Schott *1.550, 47. Commelina benghalensis* L. 1.200

The red line graph gives the abundance of the year 2015-16 with the values of nos *41. Eragrostis unioloides*(Retzius) Nees.*3.000, 42. Hemarthria compressa* L. 2.000, *43. Pogonatherum crinitum* (T.) Kunth. 1.466, 44. *Centella asiatica* L 3.200, 45. *Hydrocotyl sibthorpioides* Lmmk. 1.666, *46. Colocasia esculenta* (L.) Schott 1.700, 47. *Commelina benghalensis* L. 2.100

The green line graph indicates the abundance of the year 2016-17 of the species such as *41. Eragrostis unioloides*(Retzius) Nees. *1.770, 42. Hemarthria compressa* L. 3.000, *43. Pogonatherum crinitum* (T.) Kunth. 3.000, 44. *Centella asiatica* L. 1.110, 45. *Hydrocotyl sibthorpioides* Lmmk. 1.330, *46. Colocasia esculenta* (L.) Schott 1.550, *47. Commelina benghalensis* L.1.000. The Limit value is in between **1 to 3.200**

25. iii. **Fig no- 25.iii.**



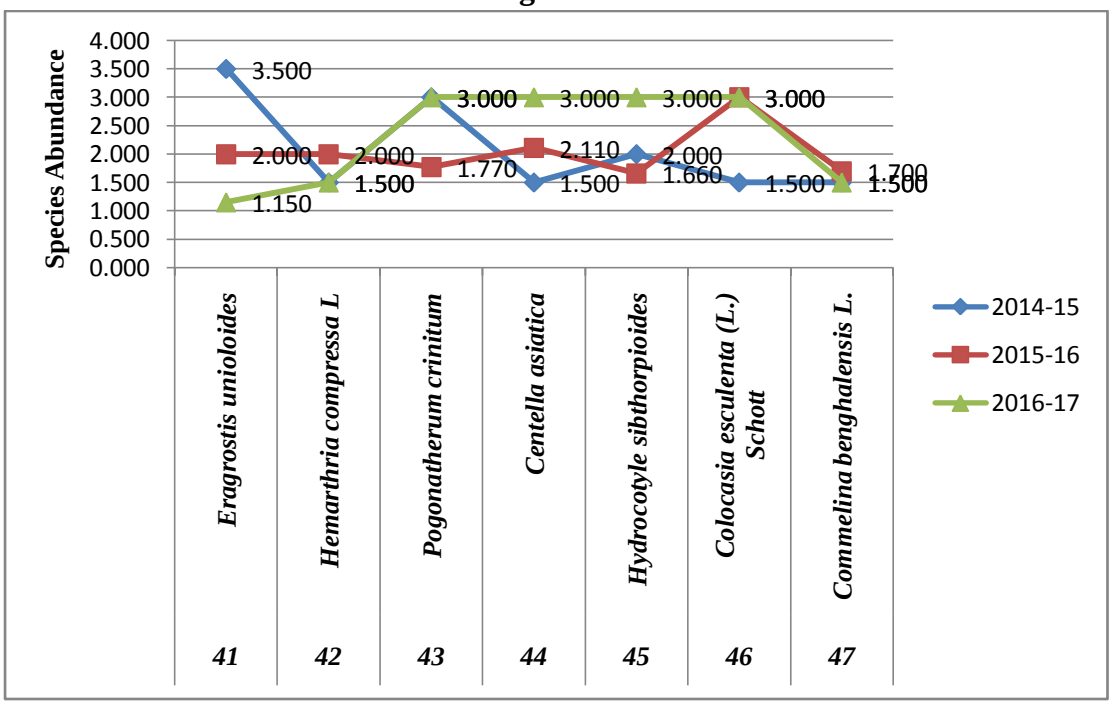
Post Monsoon Abundance of *Emergent* Macrophytes (Sp. no. 41 to 47)

The graph represents the Post monsoon abundance of Emergent Macrophytes (Sl. no.41 to 47) which is also represented by line graphs. The blue line graph of abundance of the macrophyte species in 2014-15 represents *41. Eragrostis unioloides*(Retzius) Nees. 2.000, *42. Hemarthria compressa* L. 1.770, *43. Pogonatherum crinitum* (T.) Kunth. 1.770, 44. *Centella asiatica* L. 1.333, 45. *Hydrocotyl sibthorpioides* Lmmk. 1.333, *46. Colocasia esculenta* (L.) Schott *1.666, 47. Commelina benghalensis* L. 3.100

The red line graph gives the abundance of the year 2015-16 with the values of nos *41. Eragrostis unioloides*(Retzius) Nees.*3.000, 42. Hemarthria compressa* L. 1.666, *43. Pogonatherum crinitum* (T.) Kunth. 1.666, 44. *Centella asiatica* L. 1.666, 45. *Hydrocotyl sibthorpioides* Lmmk. 1.6660, *46. Colocasia esculenta* (L.) Schott 3.000, *47. Commelina benghalensis* L. 1.333

The green line graph indicates the abundance of the year 2016-17 of the species such as *41. Eragrostis unioloides*(Retzius) Nees. *2.000, 42. Hemarthria compressa* L. 1.600, *43. Pogonatherum crinitum* (T.) Kunth. 1.666, 44. *Centella asiatica* L. 3.500, 45. *Hydrocotyl sibthorpioides* Lmmk. 1.333, *46. Colocasia esculenta* (L.) Schott 1.333, *47. Commelina benghalensis* L. 3.100. The Limit value is in between **1.333 to 3.500**

25. iv. **Fig no- 25.iv. A**



Winter Abundance of *Emergent* Macrophytes (Sp. no. 41 to 47)

The graph represents the Post monsoon abundance of Emergent Macrophytes (Sl. no.41 to 47) which is also represented by line graphs. The blue line graph of abundance of the macrophyte species in 2014-15 represents *41. Eragrostis unioloides*(Retzius) Nees. 3.500, *42. Hemarthria compressa* L. 1.500, *43. Pogonatherum crinitum* (T.) Kunth. 3.000, 44. *Centella asiatica* L. 3.000, 45. *Hydrocotyl sibthorpioides* Lmmk. 3.000, *46. Colocasia esculenta* (L.) Schott *3.000 47. Commelina benghalensis* L. 1.500

The red line graph gives the abundance of the year 2015-16 with the values of nos *41. Eragrostis unioloides*(Retzius) Nees.*2.000, 42. Hemarthria compressa* L. 2.000, *43. Pogonatherum crinitum* (T.) Kunth 1.770, 44. *Centella asiatica* L. 2.110, 45. *Hydrocotyl sibthorpioides* Lmmk. 1.600, *46. Colocasia esculenta* (L.) Schott 3.000, *47. Commelina benghalensis* L. 1.700

The green line graph indicates the abundance of the year 2016-17 of the species such as *41. Eragrostis unioloides*(Retzius) Nees. *1.150, 42. Hemarthria compressa* L. 1.500, *43. Pogonatherum crinitum* (T.) Kunth. 3.000, 44. *Centella asiatica* L. 3.000, 45. *Hydrocotyl sibthorpioides* Lmmk. 3.000, *46. Colocasia esculenta* (L.) Schott 3.000, *47. Commelina benghalensis* L. 1.500. The Limit value is in between **1.150 to 3.500**

Table no. 15.iv. B

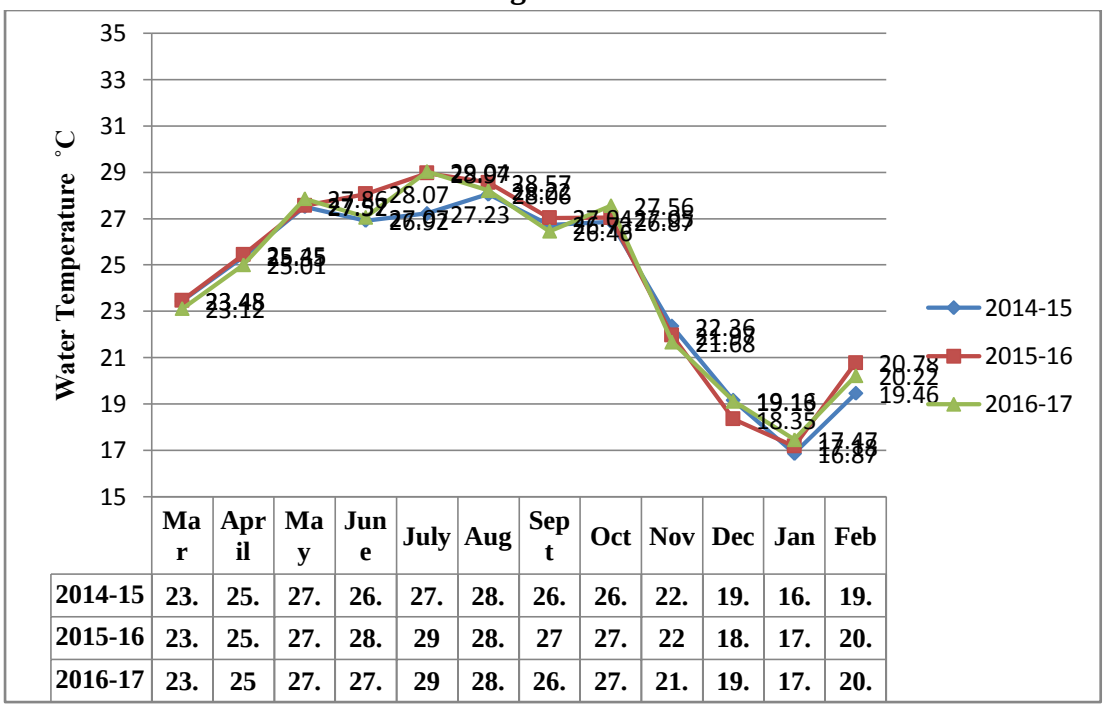
Years (November to November)	**Decrease in Abundance in Pre Monsoon Emergent Macrophytes (Sl. No 41) with Abundance value**
	41. Eragrostis unioloides (Retzius) Nees.
2014-15	3.500
2015-16	2.000
2016-17	1.150

WATER TEST RESULTS OF DIPLAI BEEL:

26. WATER TEST RESULT OF DIPLAI BEEL WATER IN 2014-15, 2015-16 and 2016-17:

26. i. Water temperature (C˚)

Fig no. 26.i.



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	23.	25.	27.	26.	27.	28.	26.	26.	22.	19.	16.	19.
2015-16	23.	25.	27.	28.	29	28.	27	27.	22	18.	17.	20.
2016-17	23.	25	27.	27.	29	28.	26.	27.	21.	19.	17.	20.

Water Temperature (˚C)

The blue, red and green line graphs represent water temperature of Diplai Beel in the years 2014-15, 2015-16 and 2016-17.

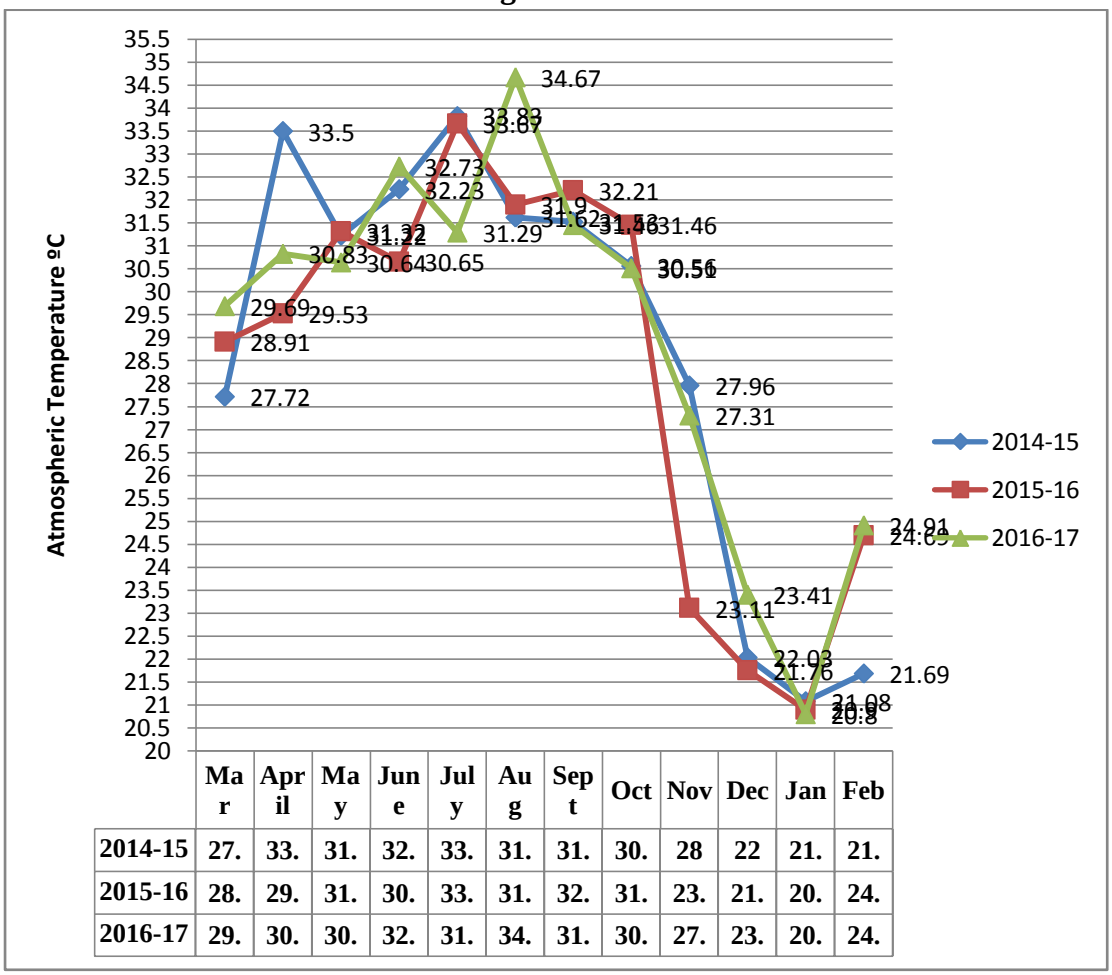
In March of 2014-15 the temperature starts at 23.45˚C and optimum temperature becomes 28.06˚C in August. In December temperature becomes minimum at 16.87˚C with a total difference of 11.19˚C

But in 2015-16 the temperature in March is 23.48˚C and optimum temperature becomes 28.97˚C in July. In January temperature becomes minimum at 17.18˚C with a total difference of 10.86˚C

Again in n 2015-16 the temperature in March is 23.12˚C and optimum temperature becomes 29.04˚C in July. In January temperature becomes minimum at 17.47˚C with a total difference of 10.62˚C. The three yearly ratios are 11.19˚C: 10.86˚C: 10.62˚C.

26. ii. Atmospheric Temperature (˚C)

Fig no. 26.ii.



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	27.	33.	31.	32.	33.	31.	31.	30.	28	22	21.	21.
2015-16	28.	29.	31.	30.	33.	31.	32.	31.	23.	21.	20.	24.
2016-17	29.	30.	30.	32.	31.	34.	31.	30.	27.	23.	20.	24.

Diplai Beel Atmospheric Temperature in 2014-15, 2015-16 and 2016-17

The blue, red and green line graphs represent water temperature of Diplai Beel in the years 2014-15, 2015-16 and 2016-17.

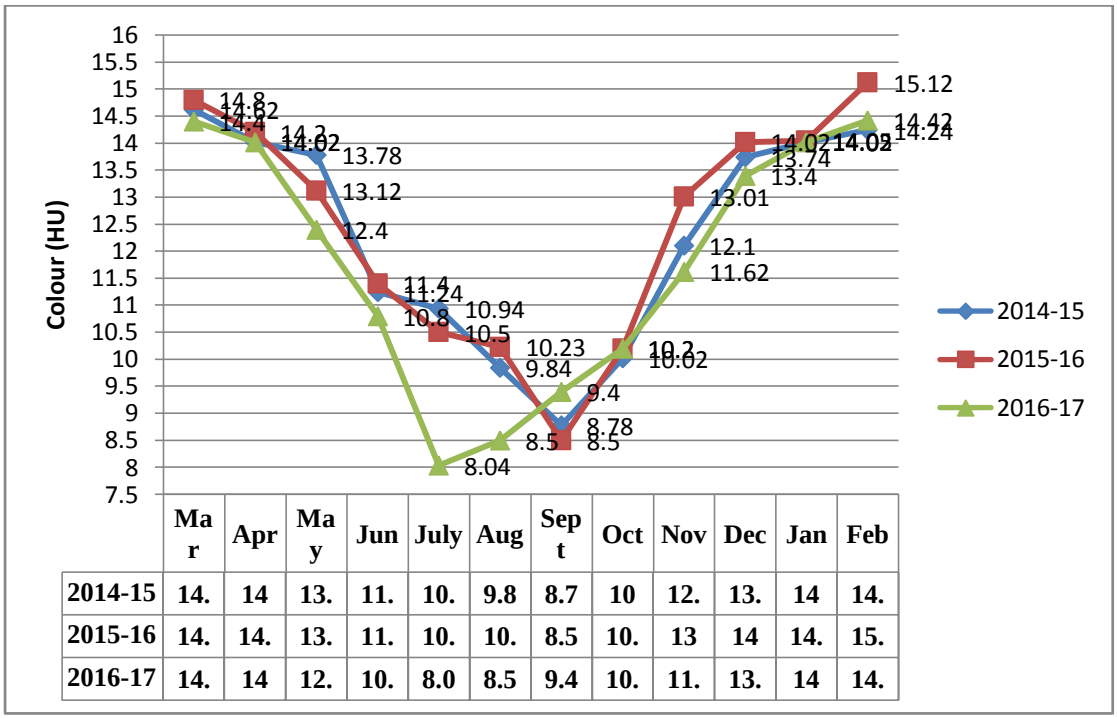
In March of 2014-15 (Blue line graph) the temperature starts at 27.72˚C and optimum temperature becomes 33.83˚C in July. In January temperature becomes minimum at 21.08˚C with a total difference of 12.75˚C

But in 2015-16 (Red line graph) the temperature in March is 23.48˚C and optimum temperature becomes 28.97˚C in July. In January temperature becomes minimum at 17.18˚C with a total difference of 11.89˚C

Again in n 2015-16 (Green line graph) the temperature in March is 23.12˚C and optimum temperature becomes 29.04˚C in July. In January temperature becomes minimum at 17.47˚C with a total difference of 10.62˚C. The three yearly ratio is **12.75˚C : 11.89˚C : 10.62˚C**

26. iii. Water Colour (HU)

Fig no. 26.iii.



	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	14.	14	13.	11.	10.	9.8	8.7	10	12.	13.	14	14.
2015-16	14.	14.	13.	11.	10.	10.	8.5	10.	13	14	14.	15.
2016-17	14.	14	12.	10.	8.0	8.5	9.4	10.	11.	13.	14	14.

Diplai Beel Water colour in 2014-15, 2015-16 and 2016-17

The blue, red and green line graphs represent Water Clour of Diplai Beel in the years 2014-15, 2015-16 and 2016-17.

The Blue line graph represents the water colour of 2014-15. It is 14.62 HU in March which is optimum and becomes minimum in September by 08.78 HU. The colour value rises again and becomes 14.24 HU in February. Total difference of max and mim water colour in this period is 5.440 HU.

The Red line graph represents the water colour of 2015-16. It is 14.80 HU in March which is optimum and becomes minimum in September by 08.50 HU. The colour value rises again and becomes 15.12 HU in February. Total difference of max and mim water colour in this period is 6.30 HU.

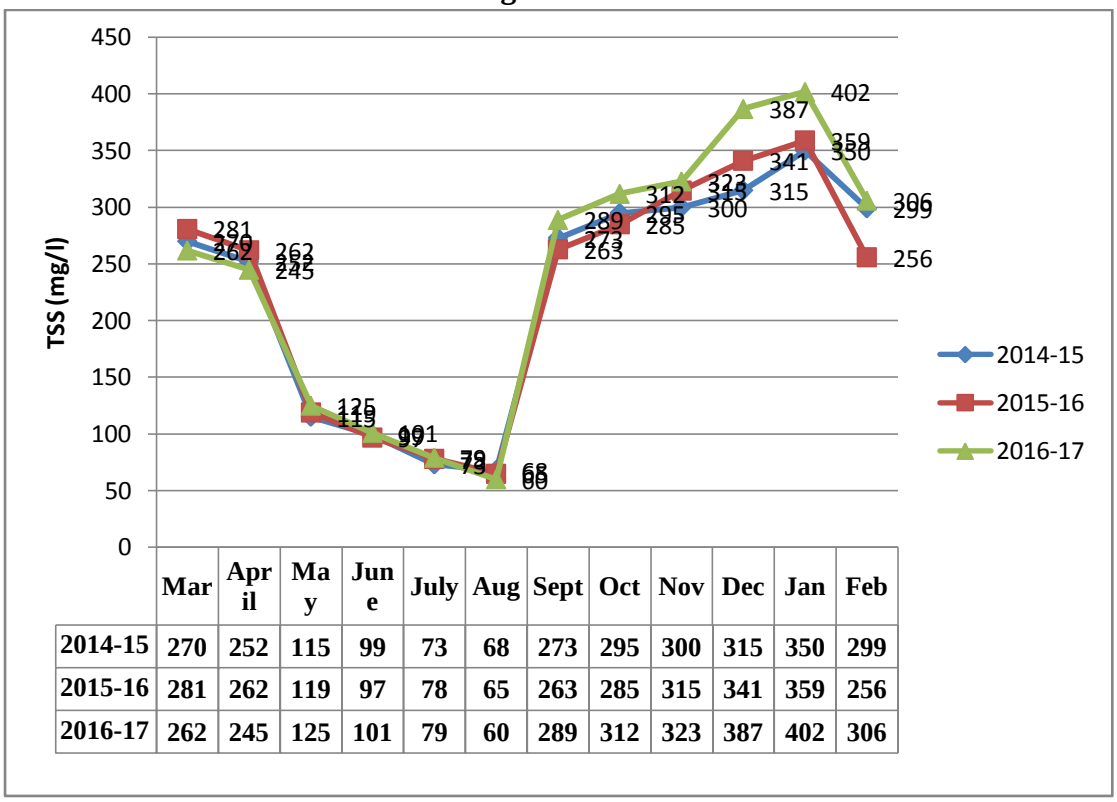
The Green line graph represents the water colour of 2016-17. It is 14.40 HU in March which is optimum and becomes minimum in September by 09.40 HU. The colour value rises again and becomes 14.42 HU in February. Total difference of max and mim water colour in this period is 5.00 HU. The 3 yearly ratio is 5.440 : 6.30 : 5.00

26. iv. Water odour (Agree/Disagree)

It is found disagreeble due to different odours in different sites of Diplai Beel in study period.

26. v. Total Suspended Solids (TSS) mg/L

Fig no. 26.v.



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	270	252	115	99	73	68	273	295	300	315	350	299
2015-16	281	262	119	97	78	65	263	285	315	341	359	256
2016-17	262	245	125	101	79	60	289	312	323	387	402	306

Total Suspended Solids (T S S) mg/L

The line graphs represent Total Suspended Solids (T S S) of Diplai Beel water in the years 2014-15, 2015-16 and 2016-17.

The Blue line graph represents the Total Suspended Solids (T S S) of water in 2014-15. It is 350 mg/L in January, 2015 which is maximum and becomes minimum in August by 68 mg/L Total difference of max and mim TSS in this period is 282 mg/L

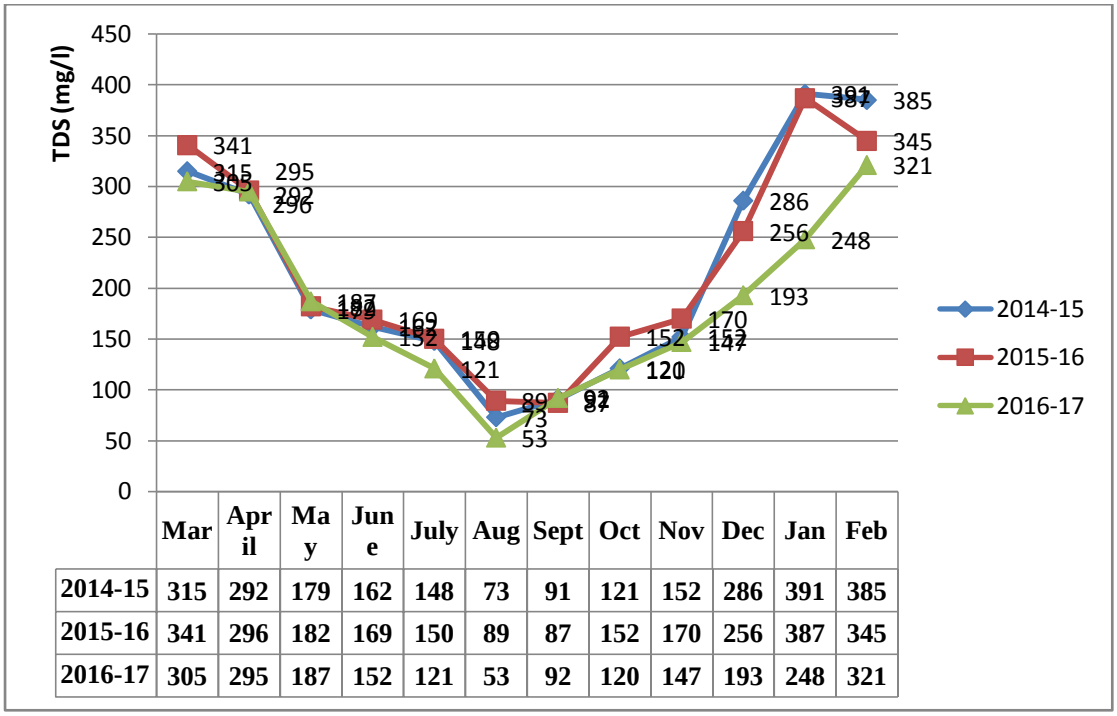
The Red line graph represents the Total Suspended Solids (T S S) of water in 2015-16. It is 359 mg/L in January, 2016 which is maximum and becomes minimum in August by 65 mg/L Total difference of max and mim TSS in this period is 294 mg/L

The green line graph represents the Total Suspended Solids (T S S) of water in

2016-17. It is 402 mg/L in January, 2015 which is maximum and becomes minimum in August by 60 mg/L Total difference of max and mim TSS in this period is 342 mg/L. The 3 yearly ratio is 282 : 294 : 342

26. vi. Total Dissolved Solid (TDS) mg/L

Fig no. 26.vi.



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	315	292	179	162	148	73	91	121	152	286	391	385
2015-16	341	296	182	169	150	89	87	152	170	256	387	345
2016-17	305	295	187	152	121	53	92	120	147	193	248	321

Total Dissolved Solid (TDS) mg/L

The line graphs represent Total Dissolved Solids (T D S) of Diplai Beel water in the years 2014-15, 2015-16 and 2016-17.

The Blue line graph represents the Total Disolved Solids (T D S) of water in 2014-15.

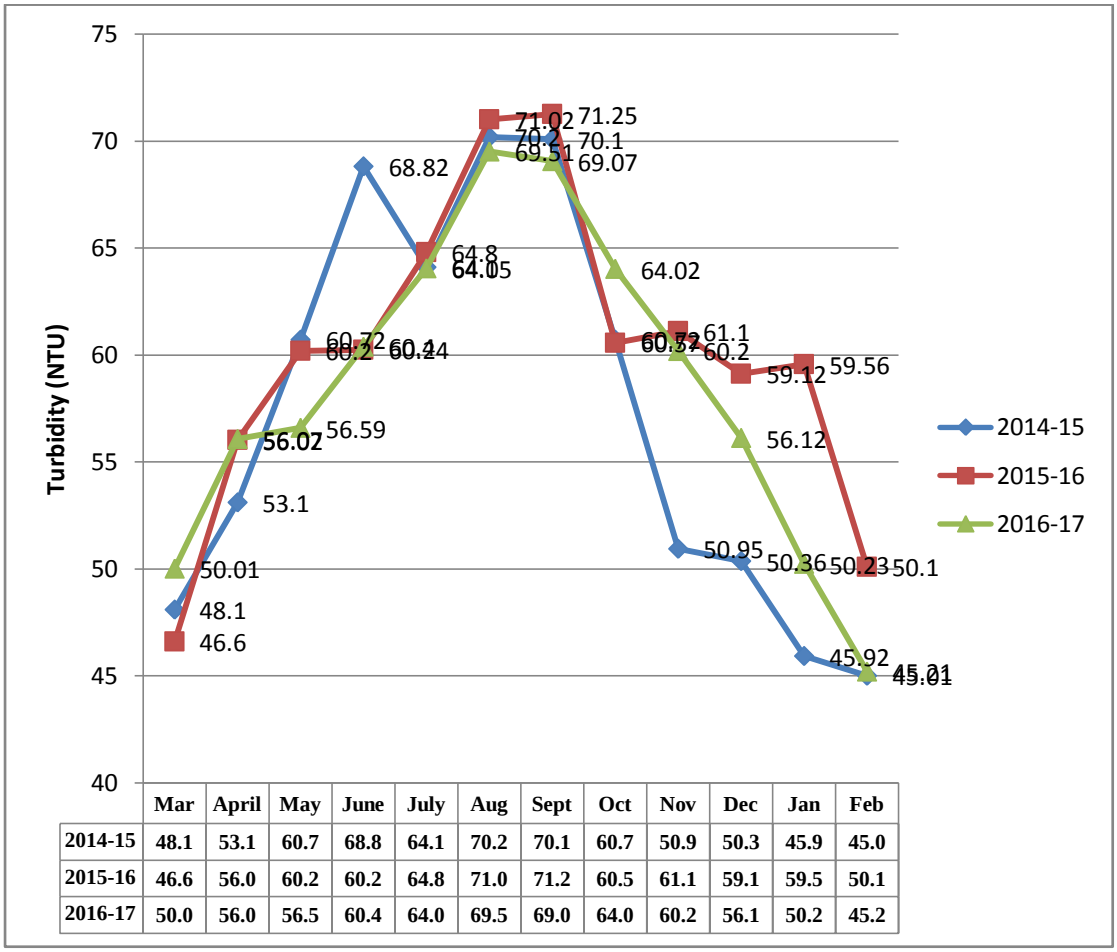
It is 385 mg/L in February 2015 which is maximum and becomes minimum in August by 73 mg/L Total difference of max and mim TDS in this period is 312 mg/L.

The Red line graph represents the Total Disolved Solids (T D S) of water in 2015-16. It is 387 mg/L in January, 2016 which is maximum and becomes minimum in Septembert by 87 mg/L Total difference of max and min TDS in this period is 282 mg/L.

The Green line graph represents the Total Disolved Solids (T D S) of water in 2016-17. It is 321 mg/L in February, 2017 which is maximum and becomes minimum in August by 53 mg/L Total difference of max and mim TDS in this period is 268 mg/L.The 3 yearly ratio is 312: 282 : 268

6. vii. Tubidity NTU

Fig no. 26.vii.



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	48.1	53.1	60.7	68.8	64.1	70.2	70.1	60.7	50.9	50.3	45.9	45.0
2015-16	46.6	56.0	60.2	60.2	64.8	71.0	71.2	60.5	61.1	59.1	59.5	50.1
2016-17	50.0	56.0	56.5	60.4	64.0	69.5	69.0	64.0	60.2	56.1	50.2	45.2

Tubidity (NTU)

The line graphs represent of Diplai Beel water Tubidity in NTU in the years 2014-15, 2015-16 and 2016-17.

The Blue line graph represents the Tubidity of water in 2014-15. It is 70.20 NTU in August 2014, which is maximum and becomes minimum in August by 45.01 NTU otal difference of max and mim turbidity in this period is 25.19 NTU

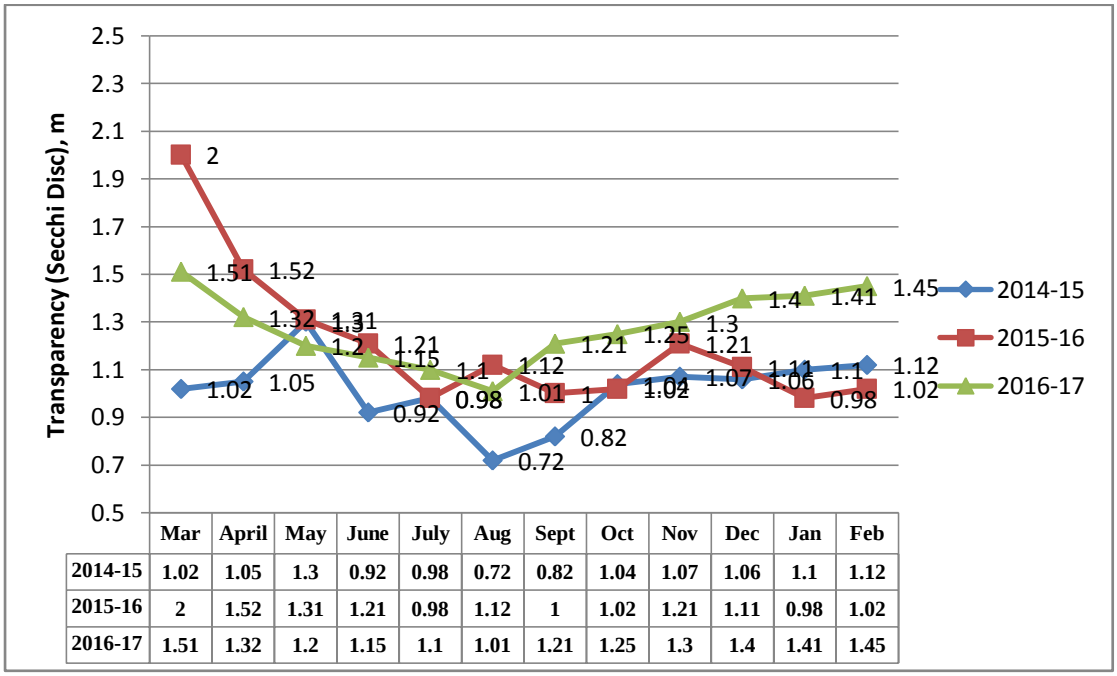
The Red line graph represents the Tubidity of water in 2015-16. It is 71.25 NTU in September, 2015, which is maximum and becomes minimum in February by 50.10 NTU. Total difference of max and mim turbidity in this period is 21.15 NTU

The Green line graph represents the Tubidity of water in 2016-17. It is 70.20 NTU in August 2014 which is maximum and becomes minimum in February by 45.21 NTU. Total difference of max and mim turbidity in this period is 24.39 NTU.

The 3 yearly ratio is 25.19 : 21.15 : 24.39

26. viii. Transparency Secchi Disc (m)

Fig no. 26.viii.



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	1.02	1.05	1.3	0.92	0.98	0.72	0.82	1.04	1.07	1.06	1.1	1.12
2015-16	2	1.52	1.31	1.21	0.98	1.12	1	1.02	1.21	1.11	0.98	1.02
2016-17	1.51	1.32	1.2	1.15	1.1	1.01	1.21	1.25	1.3	1.4	1.41	1.45

Transparency (Secchi Disc)

The line graphs represent of Diplai Beel water Tubidity in the years 2014-15, 2015-16 and 2016-17.

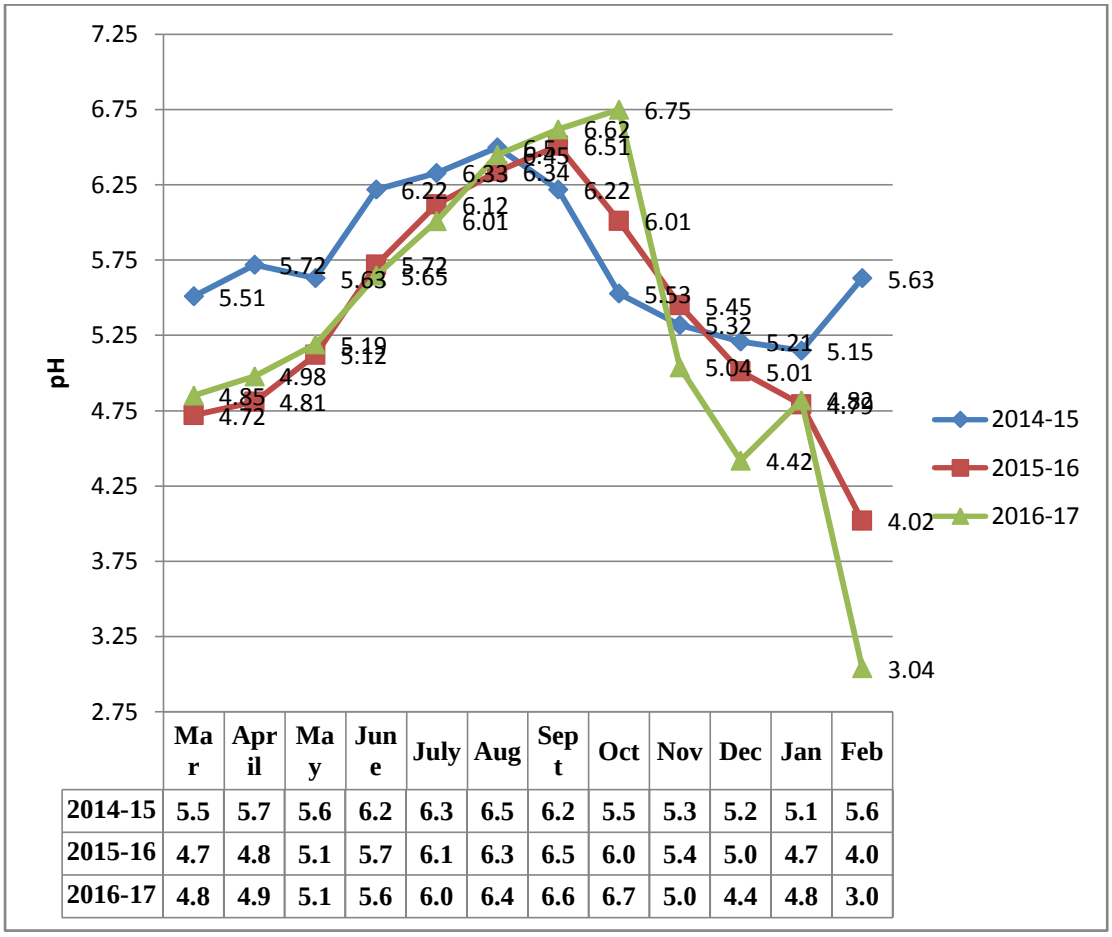
The Blue line graph represents the Transparency of water in 2014-15. It is 1.30 Secchi disk (m) in 2014, which is maximum and becomes minimum 0.72 in August. The total difference of max and min in this period is 0.58 Secchi disk (m).

The Red line graph represents the Transparency of water in 2015-16. It is 2.00 Secchi disk (m) in July, 2015, which is maximum and becomes minimum 0.98 Secchi disk (m) in March.The total difference of max and min in this period is 1.02 Secchi disk (m)

The Green line graph represents the Transparency of water in 2016-17. It is 1.51 Secchi disk (m) in 2016, which is maximum and becomes minimum 1.01 in March by total difference of max and min in this period is 0.50 Secchi disk (m) The 3 yearly ratio is 0.58 : 1.20 : 0.50

6. ix. pH

Fig no. 26.ix.



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	5.5	5.7	5.6	6.2	6.3	6.5	6.2	5.5	5.3	5.2	5.1	5.6
2015-16	4.7	4.8	5.1	5.7	6.1	6.3	6.5	6.0	5.4	5.0	4.7	4.0
2016-17	4.8	4.9	5.1	5.6	6.0	6.4	6.6	6.7	5.0	4.4	4.8	3.0

pH (Potant of Hydrogen)

The line graphs represent pH of Diplai Beel water in the years 2014-15, 2015-16 and 2016-17.

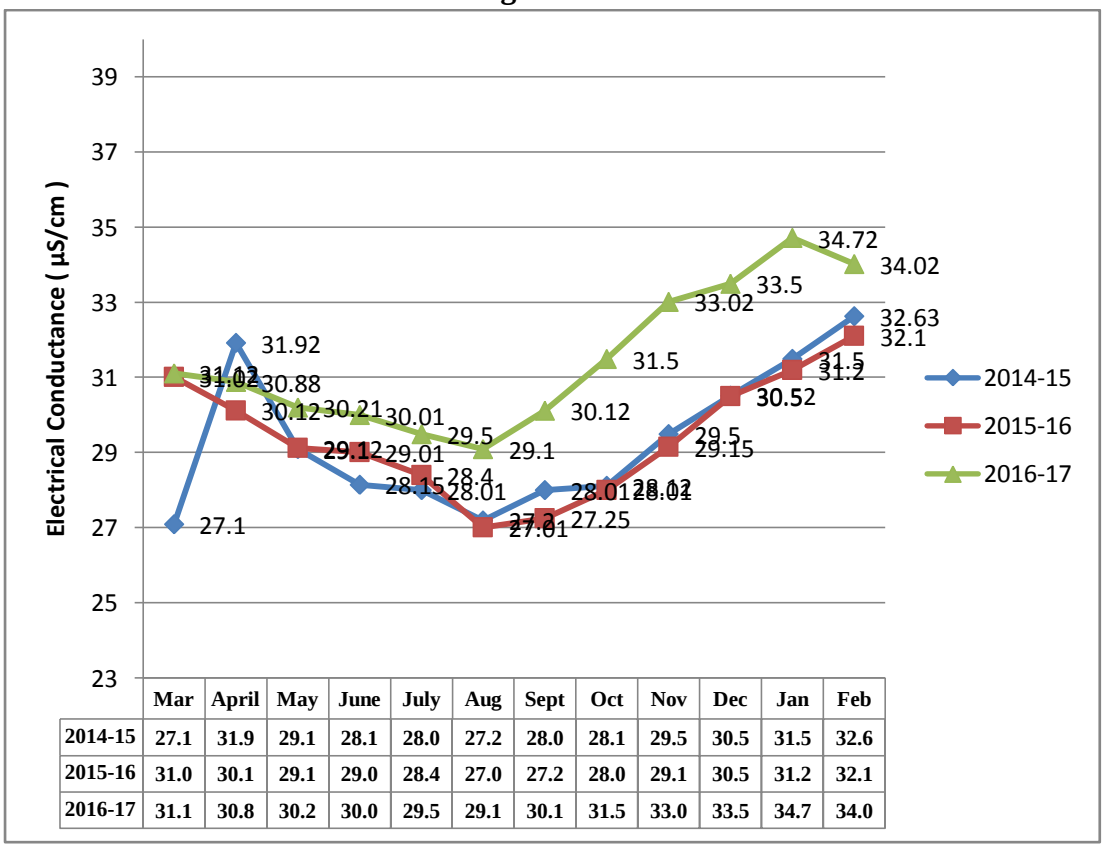
The Blue line graph represents the pH of water in 2014-15. It is **6.50** in August which is maximum and becomes minimum **3.63** in February. The total difference of max and min in this period is **2.86**

The Red line graph represents the pH of water in 2015-16 . It is **6.51** in September which is maximum and becomes minimum **4.02** in February. The total difference of max and min in this period is **2.49**

The Green line graph represents the pH of water in 2016-17. It is **6.75** in October which is maximum and becomes minimum **3.04** in February. The total difference of max and min in this period is **3.71**

26. x. Electrical Conductance µS/cm

Fig no. 26.x.



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	27.1	31.9	29.1	28.1	28.0	27.2	28.0	28.1	29.5	30.5	31.5	32.6
2015-16	31.0	30.1	29.1	29.0	28.4	27.0	27.2	28.0	29.1	30.5	31.2	32.1
2016-17	31.1	30.8	30.2	30.0	29.5	29.1	30.1	31.5	33.0	33.5	34.7	34.0

Electrical Conductance (µS/cm)

The line graphs represent Electrical Conductance (µS/cm) of Diplai Beel water in the years 2014-15, 2015-16 and 2016-17.

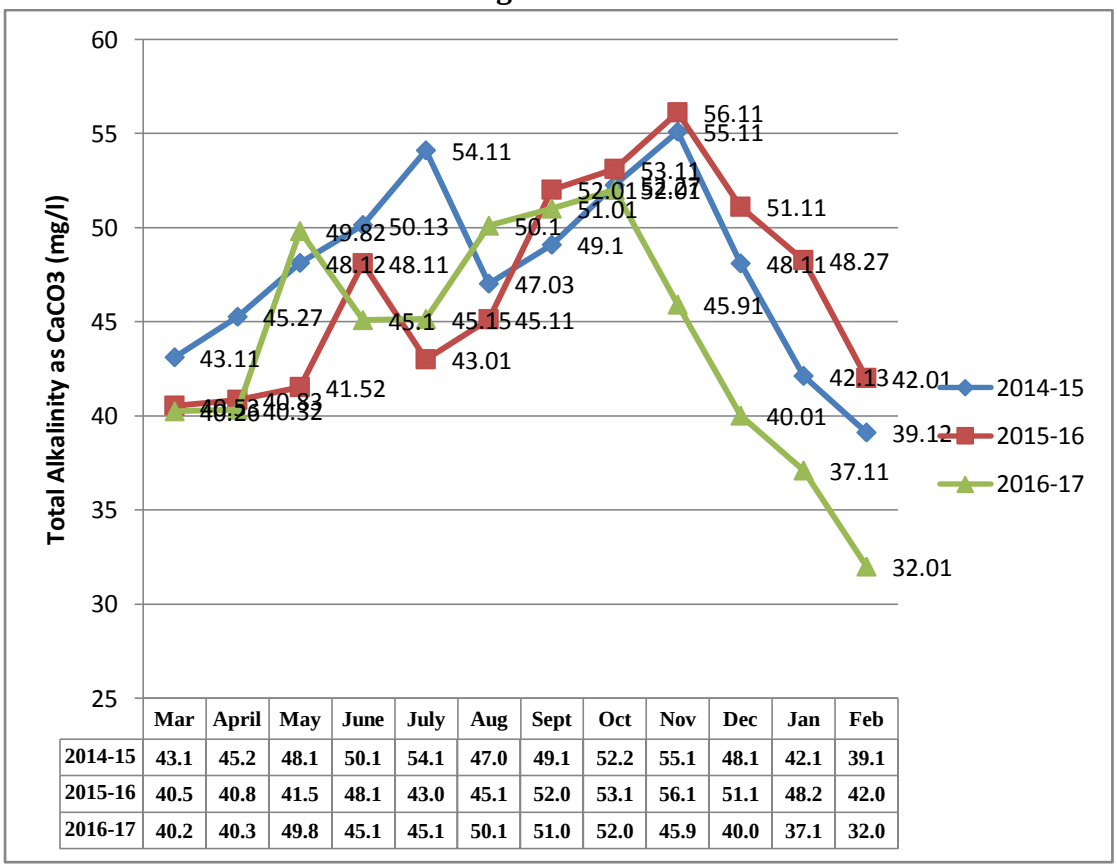
The Blue line graph represents the Electrical Conductance (µS/cm) of Diplai Beel water in 2014-15. It is **32.63** in February which is max and it becomes min **22.10** in March. The total ECdifference of max and min in this period is **10.53**

The Red line graph represents the Electrical Conductance (µS/cm) of water in 2015-16. It is **32.10** in February which is maximum and it becomes minimum **27.01** in August. The total EC difference of max and min in this period is **05.09**

The Green line graph represents the Electrical Conductance (µS/cm) of water in 2016-17. It is **34.72** in January which is maximum and it becomes minimum **29.10** in August. The total EC difference of max and min in this period is **5.62**

26. xi. Total alkality as $CaCO_3$ mg/L

Fig no. 26.xi.



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	43.1	45.2	48.1	50.1	54.1	47.0	49.1	52.2	55.1	48.1	42.1	39.1
2015-16	40.5	40.8	41.5	48.1	43.0	45.1	52.0	53.1	56.1	51.1	48.2	42.0
2016-17	40.2	40.3	49.8	45.1	45.1	50.1	51.0	52.0	45.9	40.0	37.1	32.0

Total alkality as $CaCO_3$ (mg/L)

The line graphs represent Total alkality (mg/L) of Diplai Beel water in the years 2014-15, 2015-16 and 2016-17.

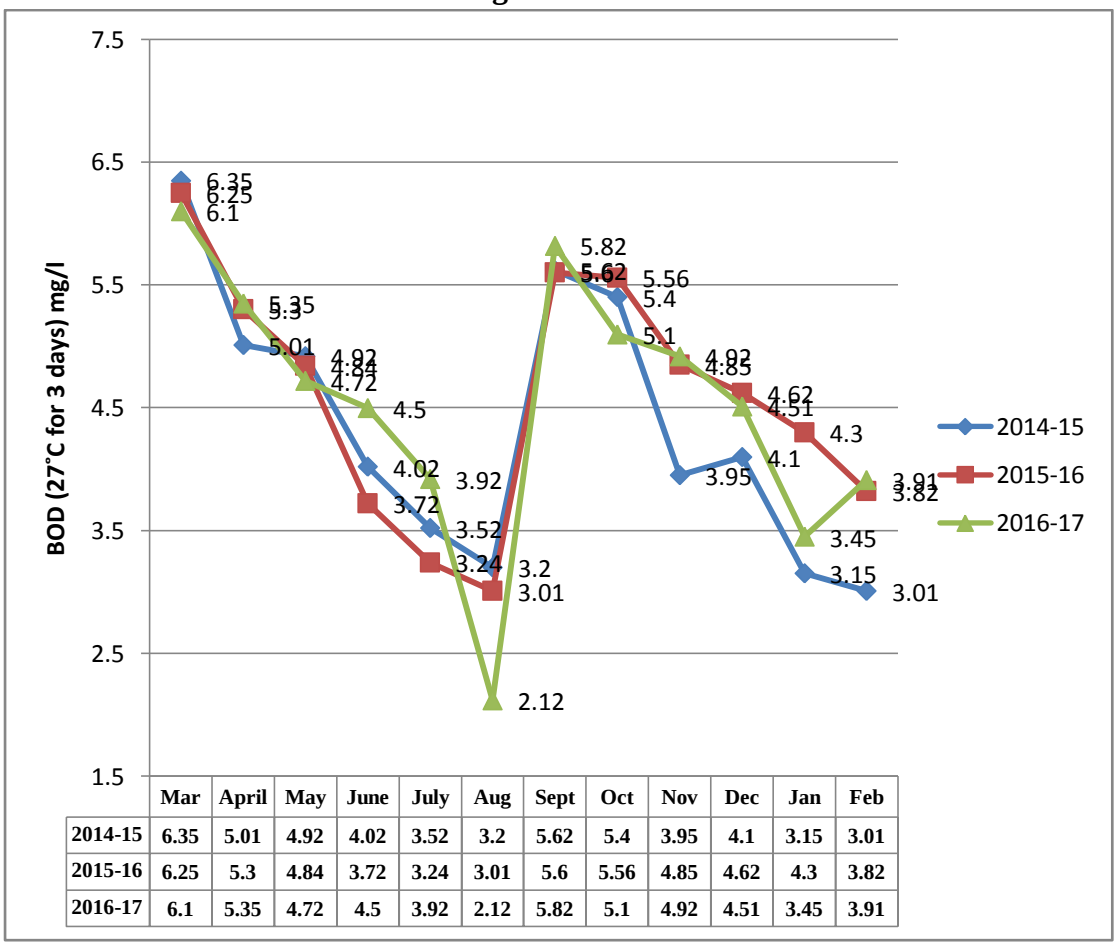
The Blue line graph represents the Total alkality (mg/L) of Diplai Beel water in 2014-15. It is **55.11** in November which is maximum and it becomes minimum **39.12** in February. The total total alkality difference of max and min in this period is **15.99**

The Red line graph represents the Total alkality (mg/L) of water in 2015-16. It is **56.11** in November which is maximum and it becomes minimum **40.53** in March. The total total alkality difference of max and min in this period is **05.09**

The Green line graph represents the Total alkality (mg/L) of water in 2016-17. It is **52.01** in October which is maximum and it becomes minimum in **32.01** in February. The total total alkality difference of max and min in this period is **20.00**

26. xii. Biological Oxygen Demand (BOD) mg/L

Fig no. 26.xii.



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	6.35	5.01	4.92	4.02	3.52	3.2	5.62	5.4	3.95	4.1	3.15	3.01
2015-16	6.25	5.3	4.84	3.72	3.24	3.01	5.6	5.56	4.85	4.62	4.3	3.82
2016-17	6.1	5.35	4.72	4.5	3.92	2.12	5.82	5.1	4.92	4.51	3.45	3.91

Biological Oxygen Demand, BOD **(mg/L)**

The line graphs represent Biological Oxygen Demand (mg/L) of Diplai Beel water in the years 2014-15, 2015-16 and 2016-17.

The Blue line graph represents the Biological Oxygen Demand (mg/L) of Diplai Beel water in 2014-15. It is **6.35** in March which is max and it becomes min **3.01** in February. The total BOD difference of max and min in this period is **3.34**

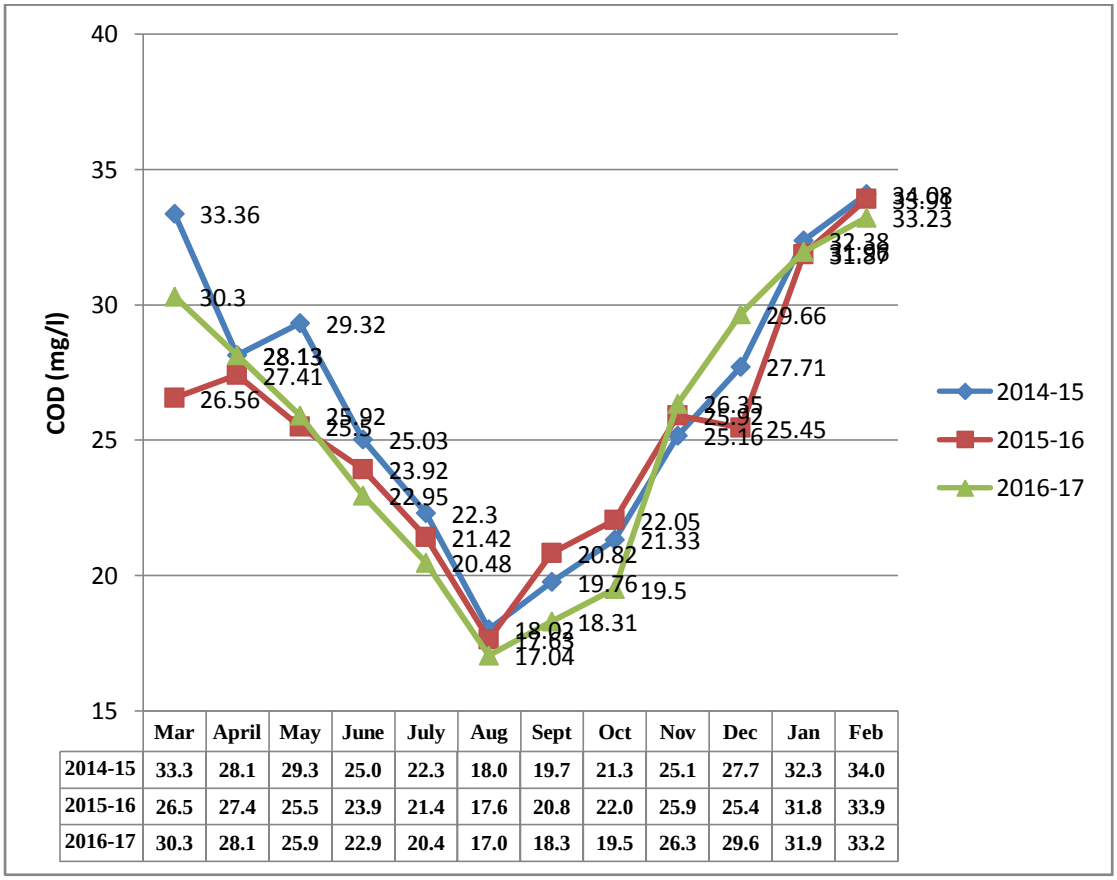
The Red line graph represents the Biological Oxygen Demand (mg/L) of water in 2015-16. It is **6.25** in March which is maximum and it becomes min **3.01** in August . The total BOD difference of max and min in this period is **3.24**

The Green line graph represents the Biological Oxygen Demand (mg/L) of water in 2016-17. It is **6.10** in March which is maximum and it becomes minimum **2.12** in.

The total BOD difference of max and min in this period is **3.98**

26. xiii. Chemical Oxygen Demand (COD) mg/L

Fig no. 26.xiii.



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	33.3	28.1	29.3	25.0	22.3	18.0	19.7	21.3	25.1	27.7	32.3	34.0
2015-16	26.5	27.4	25.5	23.9	21.4	17.6	20.8	22.0	25.9	25.4	31.8	33.9
2016-17	30.3	28.1	25.9	22.9	20.4	17.0	18.3	19.5	26.3	29.6	31.9	33.2

Chemical Oxygen Demand as COD (mg/L)

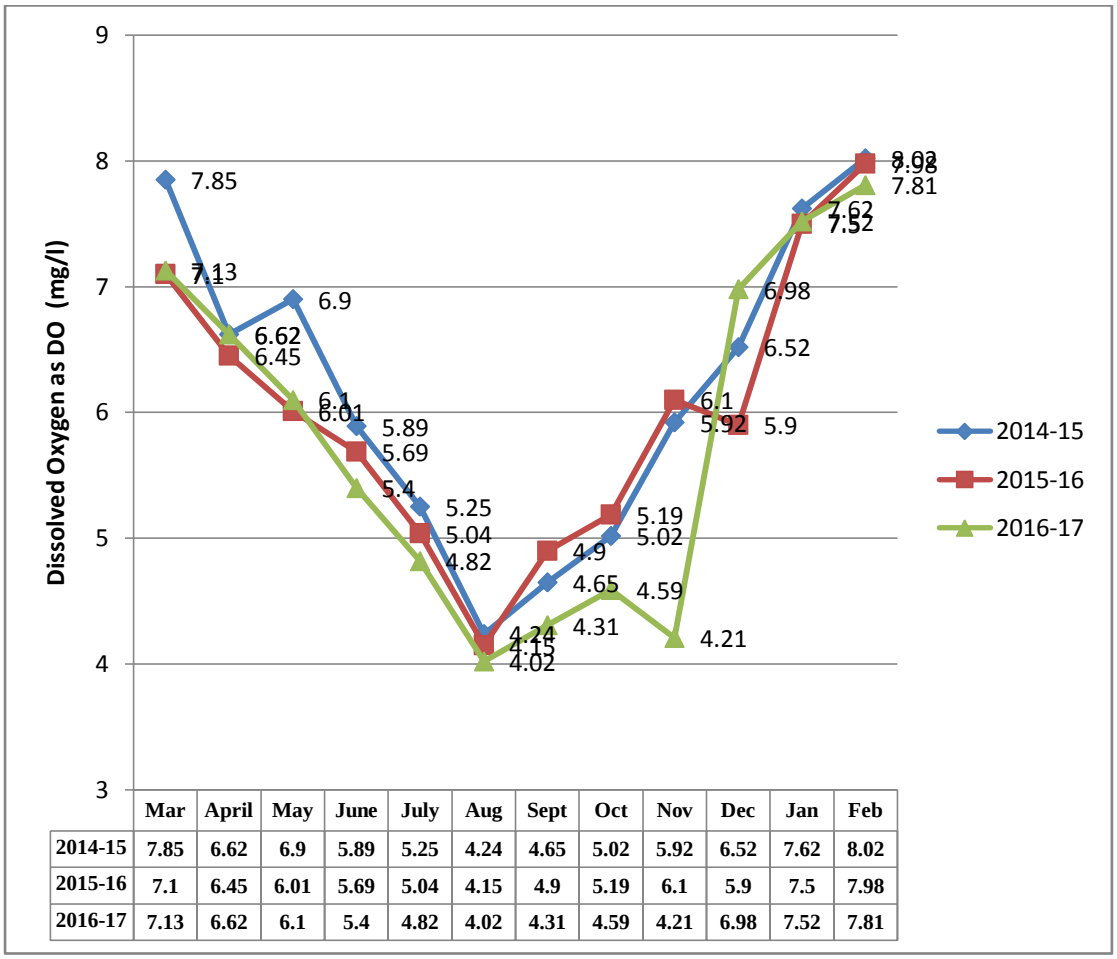
The line graphs represent Chemical Oxygen Demand (mg/L) of Diplai Beel water in the years 2014-15, 2015-16 and 2016-17.

The Blue line graph represents the Chemical Oxygen Demand (mg/L) of Diplai Beel water in 2014-15. It is **34.08** in February which is max and it becomes min **18.02** in August. The total COD difference of max and min in this period is **16.06**

The Red line graph represents the Chemical Oxygen Demand (mg/L) of water in 2015-16. It is **33.91** in February which is maximum and it becomes min **17.63** in August . The total COD difference of max and min in this period is **16.28**

The Green line graph represents the Chemical Oxygen Demand (mg/L) of water in 2016-17. It is **33.23** in February which is maximum and it becomes minimum **17.04** in August.The total COD difference of max and min in this period is **16.19**

26. xiv. Dissolved Oxygen (DO) mg/L



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	7.85	6.62	6.9	5.89	5.25	4.24	4.65	5.02	5.92	6.52	7.62	8.02
2015-16	7.1	6.45	6.01	5.69	5.04	4.15	4.9	5.19	6.1	5.9	7.5	7.98
2016-17	7.13	6.62	6.1	5.4	4.82	4.02	4.31	4.59	4.21	6.98	7.52	7.81

Dissolved Oxygen as DO (mg/L)

The line graphs represent Dissolved Oxygen (mg/L) of Diplai Beel water in the years 2014-15, 2015-16 and 2016-17.

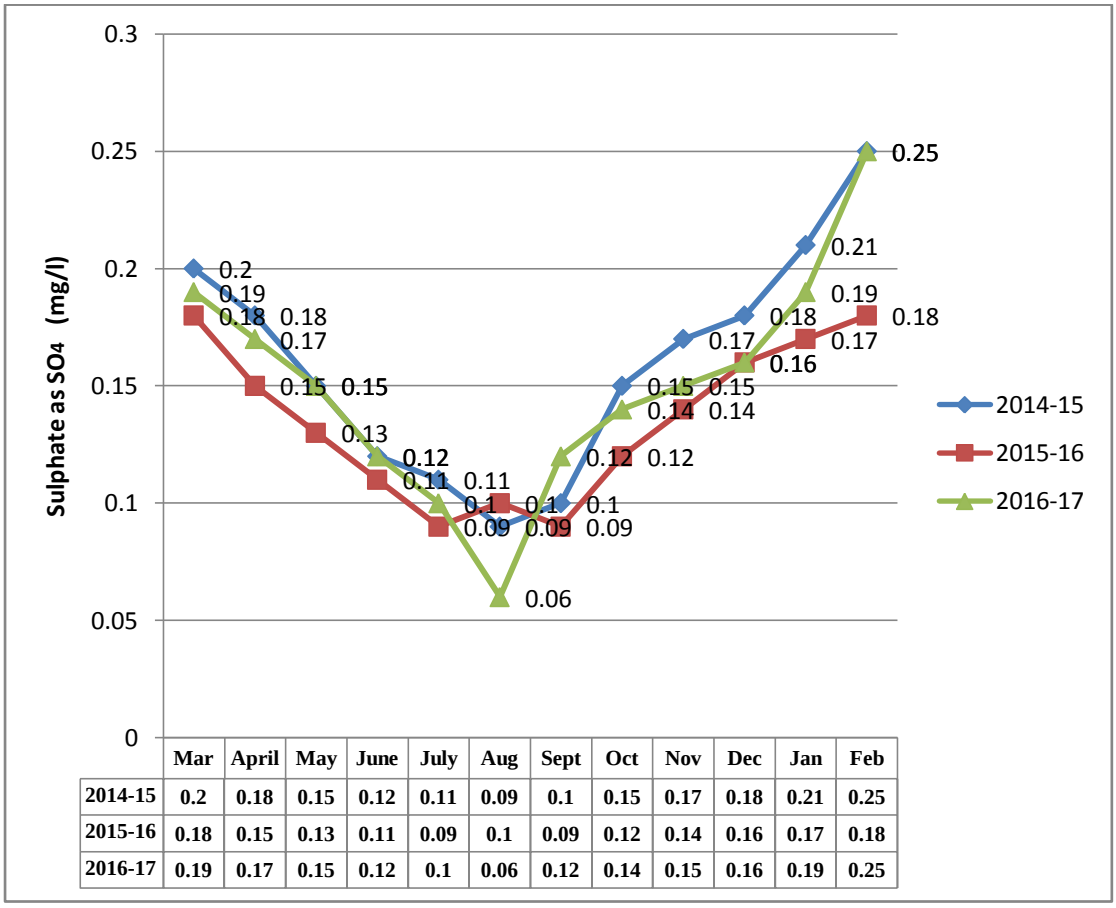
The Blue line graph represents the Dissolved Oxygen (mg/L) of Diplai Beel water in 2014-15. It is **8.02** in February which is max and it becomes min **4.24** in August. The total DO difference of max and min in this period is **3.78**

The Red line graph represents the Dissolved Oxygen (mg/L) of water in 2015-16. It is **7.98** in February which is maximum and it becomes min **4.15** in August. The total DO difference of max and min in this period is **3.83**

The Green line graph represents the Dissolved Oxygen (mg/L) of water in 2016-17.It is **7.81** in February which is maximum and it becomes minimum **4.02** in August.The total DO difference of max and min in this period is **3.79**

26. xv. Sulphate as SO_4 mg/L

Fig no. 26.xv.



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	0.2	0.18	0.15	0.12	0.11	0.09	0.1	0.15	0.17	0.18	0.21	0.25
2015-16	0.18	0.15	0.13	0.11	0.09	0.1	0.09	0.12	0.14	0.16	0.17	0.18
2016-17	0.19	0.17	0.15	0.12	0.1	0.06	0.12	0.14	0.15	0.16	0.19	0.25

Sulphate as SO_4 (mg/L)

The line graphs represent Sulphate as SO_4 (mg/L) of Diplai Beel water for the years 2014-15, 2015-16 and 2016-17.

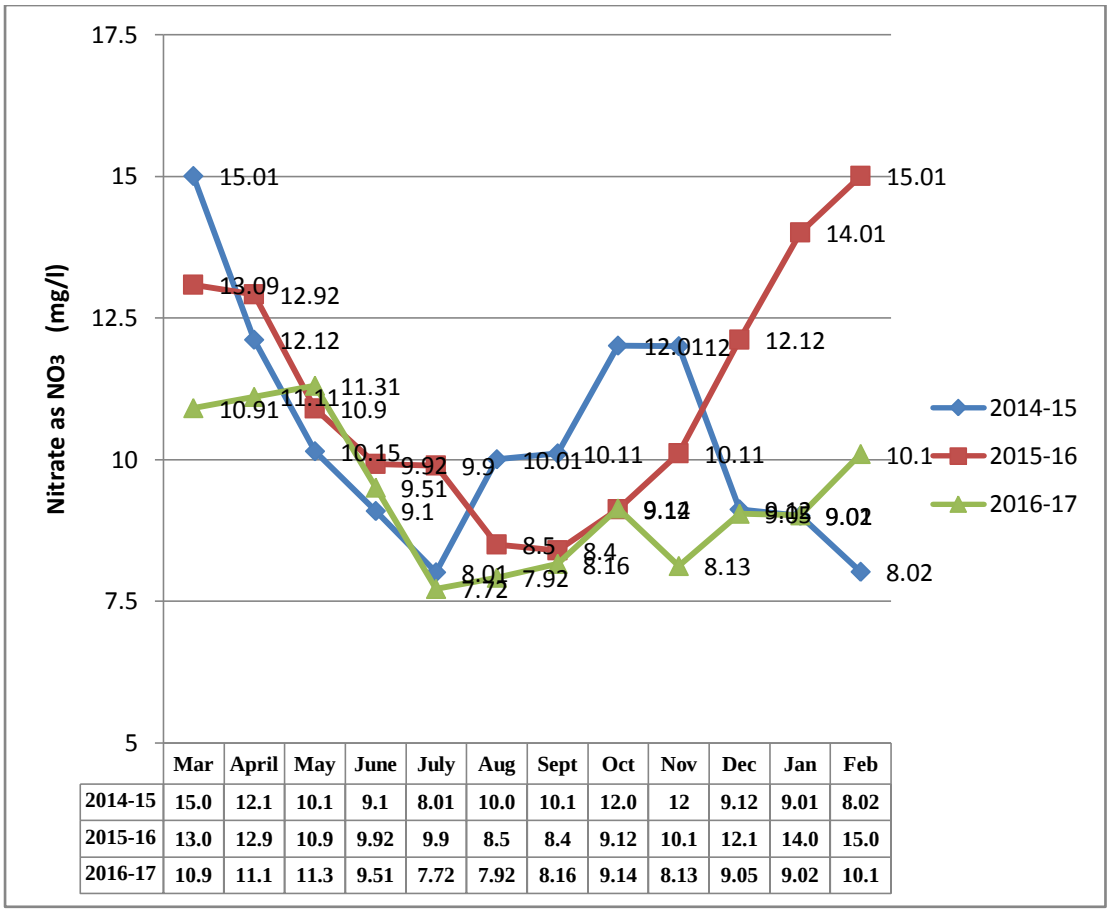
The Blue line graph represents the Sulphate as SO_4 (mg/L) of Diplai Beel water in 2014-15. The max value of this is **0.25** in February and min **0.09** in August. The total Sulphate difference of max and min in this period is **0.16**

The Red line graph represents the Sulphate as SO_4 (mg/L) of Diplai Beel water in 2015-16. The max value is **0.18** in February and min **0.09** in September. The total Sulphate difference of max and min in this period is **0.09**

The Green line graph represents the Sulphate as SO_4 (mg/L) of Diplai Beel water in 2016-17. The max value is **0.25** in February and min **0.06** in August. The total Sulphate difference of max and min in this period is **0.19**

26. xvi. Nitrate as NO_3 mg/L

Fig no. 26.xvi.



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	15.0	12.1	10.1	9.1	8.01	10.0	10.1	12.0	12	9.12	9.01	8.02
2015-16	13.0	12.9	10.9	9.92	9.9	8.5	8.4	9.12	10.1	12.1	14.0	15.0
2016-17	10.9	11.1	11.3	9.51	7.72	7.92	8.16	9.14	8.13	9.05	9.02	10.1

Nitrate as NO_3 (mg/L)

It is a line graph figure. It represents Nitrate as NO_3 (mg/L) of Diplai Beel water for the years 2014-15, 2015-16 and 2016-17.

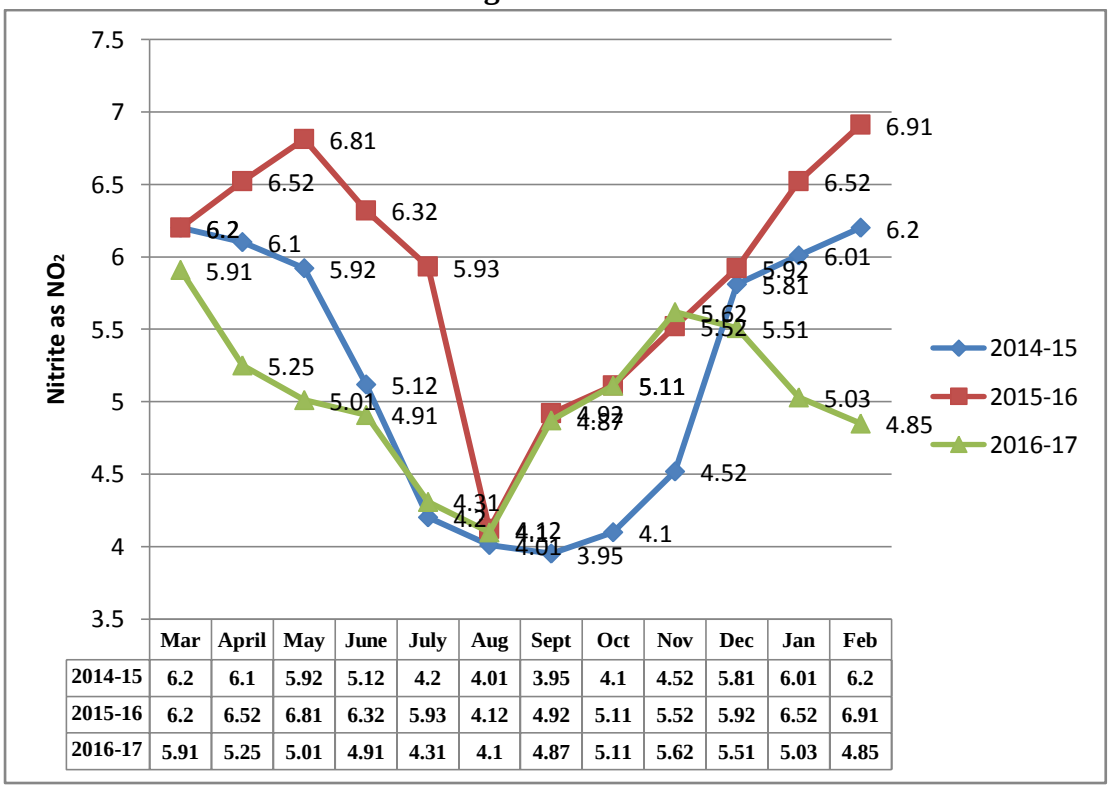
The Blue line graph represents the Nitrate as NO_3 (mg/L) of Diplai Beel water for 2014-15. The max value of this is **15.01** in March and min **8.01** in July. The total difference of this period is **7.00**

The Red line graph represents the Nitrate as NO Nitrite$_3$ (mg/L) of Diplai Beel water for 2015-16. The max value is **15.01** in February and min **8.40** in September. The total difference of max and min in this period is **6.61**

The Green line graph represents the Nitrate as NO_3 (mg/L) of Diplai Beel water for 2016-17. The max value is **5.92** in August and min **0.02** in February. The total difference of this period is **5.90**

26. xvii. Nitrite as NO_2 mg/L

Fig no. 26.xvii.



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	6.2	6.1	5.92	5.12	4.2	4.01	3.95	4.1	4.52	5.81	6.01	6.2
2015-16	6.2	6.52	6.81	6.32	5.93	4.12	4.92	5.11	5.52	5.92	6.52	6.91
2016-17	5.91	5.25	5.01	4.91	4.31	4.1	4.87	5.11	5.62	5.51	5.03	4.85

Nitrite as NO_2 (mg/L)

It is a line graph figure. It represents Nitrite as NO_2 (mg/L) of Diplai Beel water for the years 2014-15, 2015-16 and 2016-17.

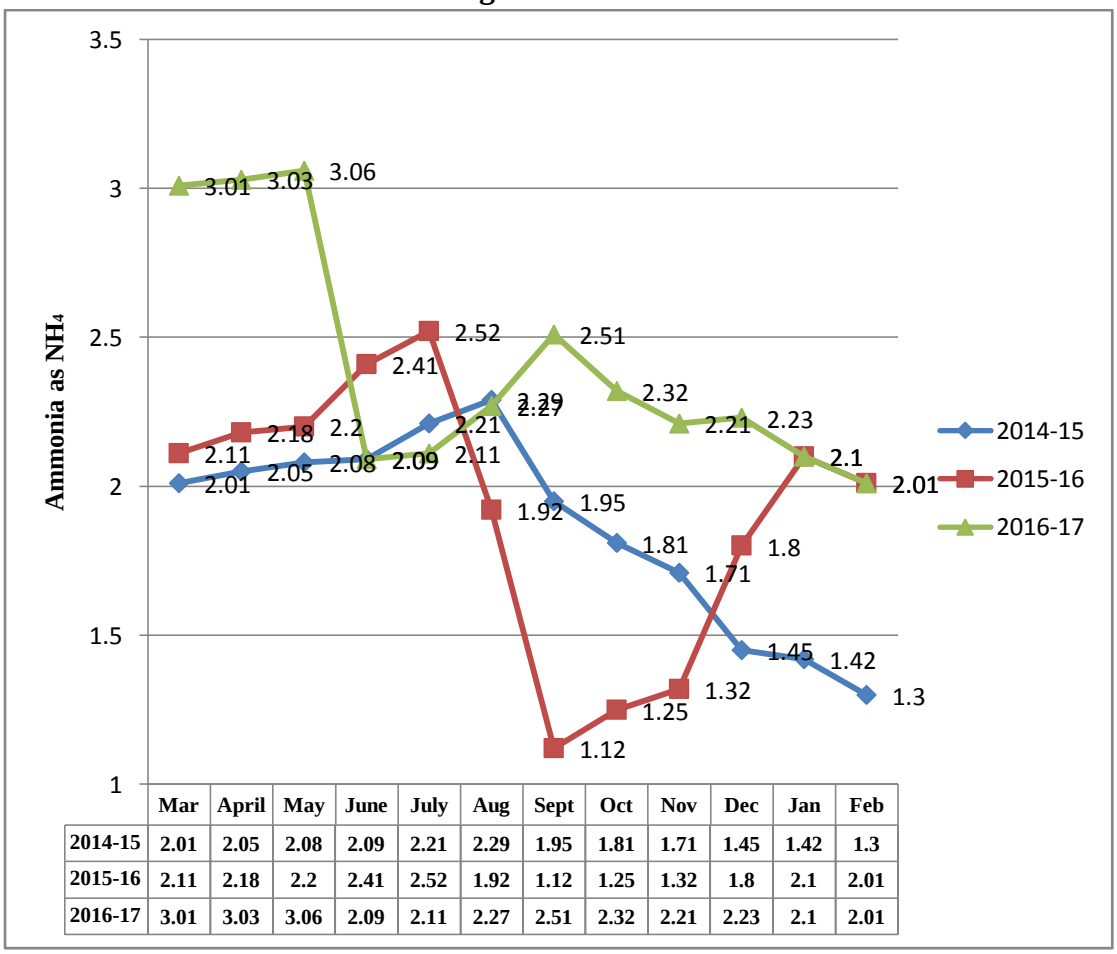
The Blue line graph represents the Nitrite as NO_2 (mg/L) of Diplai Beel water for 2014-15. The max value of this is **6.20** in February and min **3.95** in September. The total Nitrite difference of this period is **2.25**

The Red line graph represents the Nitrite as NO_2 (mg/L) of Diplai Beel water for 2015-16. The max value is **6.91** in February and min **4.21** in August. The total Nitrite difference of max and min in this period is **2.70**

The Green line graph represents the Nitrite as NO_2 (mg/L) of Diplai Beel water for 2016-17. The max value is **5.91** in January and min **4.10** in August. The total Nitrite difference of this period is **1.81**

26. xviii. Ammonia as NH_4-N mg/L

Fig no. 26.xviii.



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	2.01	2.05	2.08	2.09	2.21	2.29	1.95	1.81	1.71	1.45	1.42	1.3
2015-16	2.11	2.18	2.2	2.41	2.52	1.92	1.12	1.25	1.32	1.8	2.1	2.01
2016-17	3.01	3.03	3.06	2.09	2.11	2.27	2.51	2.32	2.21	2.23	2.1	2.01

Ammonia as NH_4 (mg/L)

It is a line graph figure. It represents ammonia as NH_4 (mg/L) of Diplai Beel water for the years 2014-15, 2015-16 and 2016-17.

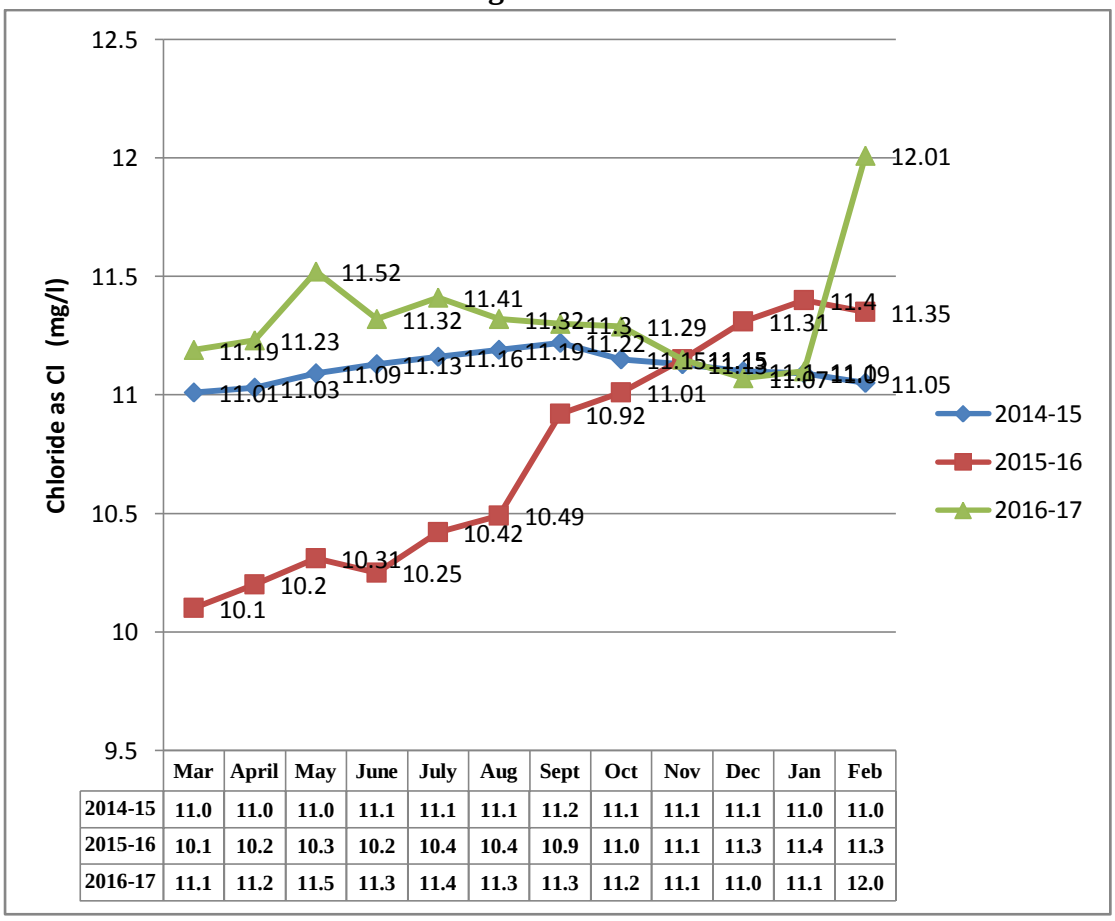
The Blue line graph represents the ammonia as NH_4 (mg/L) of Diplai Beel water for 2014-15. The max value of this is **2.29** in August and min **1.30** in February. The total ammonia difference of this period is **0.99**

The Red line graph represents the ammonia as NH_4 (mg/L) of Diplai Beel water for 2015-16. The max value is **2.52** in July and min **1.12** in Septenber. The total ammonia difference of max and min in this period is **1.40**

The Green line graph represents the ammonia as NH_4 (mg/L) of Diplai Beel water for 2016-17. The max value is **3.06** in May and min **2.01** in August. The total ammonia difference of this period is **1.05**

26. xix. Cloride as Cl mg/L

Fig no. 26.xix.



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	11.0	11.0	11.0	11.1	11.1	11.1	11.2	11.1	11.1	11.1	11.0	11.0
2015-16	10.1	10.2	10.3	10.2	10.4	10.4	10.9	11.0	11.1	11.3	11.4	11.3
2016-17	11.1	11.2	11.5	11.3	11.4	11.3	11.3	11.2	11.1	11.0	11.1	12.0

Cloride as Cl (mg/L)

It is a line graph figure. It represents Cloride as Cl (mg/L) of Diplai Beel water for the years 2014-15, 2015-16 and 2016-17.

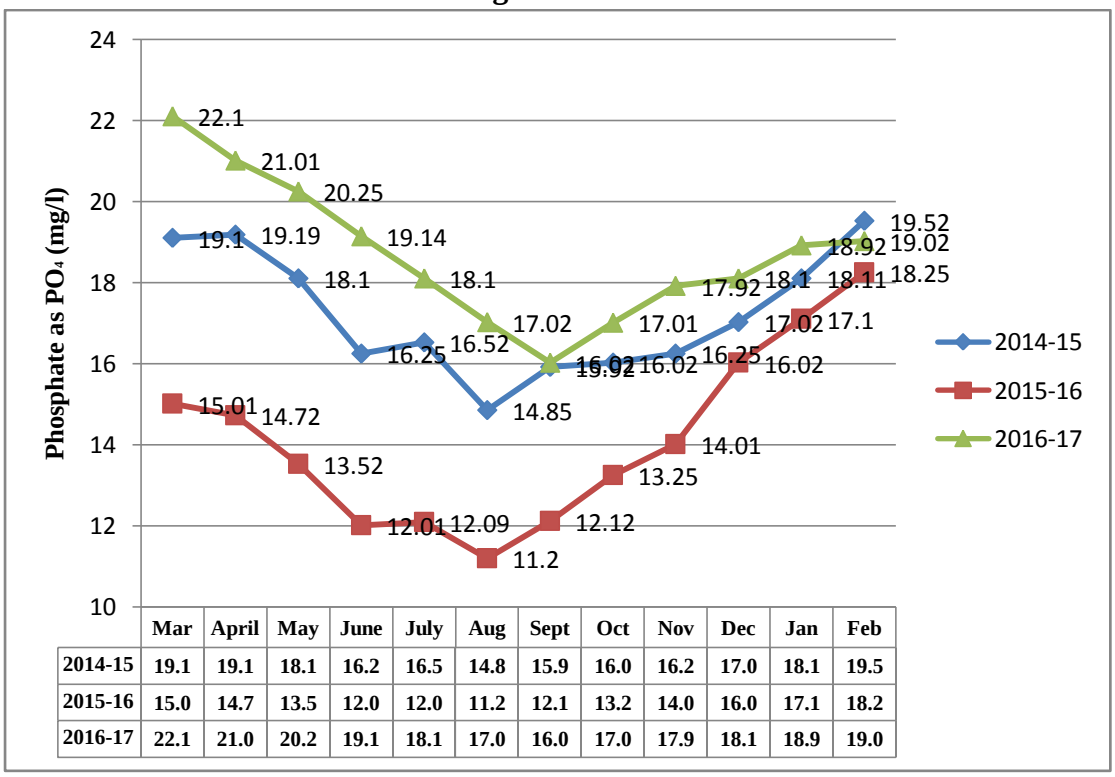
The Blue line graph represents the Cloride as Cl (mg/L) of Diplai Beel water for 2014-15. The max value of this is **11.22** in September and min **11.01** in March. The total cloride difference of this period is **0.21**

The Red line graph represents the Cloride as Cl (mg/L) of Diplai Beel water for 2015-16. The max value is **11.35** in Feb and min **10.10** in Septenber. The total cloride difference of max and min in this period is **1.25**

The Green line graph represents the Cloride as Cl (mg/L) of Diplai Beel water for 2016-17. The max value is **11.52** in May and min **2.01** in Feb. The total cloride difference of this period is **9.51**

26. xx. Phosphate as PO_4 mg/L

Fig no. 26.xx.



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	19.1	19.1	18.1	16.2	16.5	14.8	15.9	16.0	16.2	17.0	18.1	19.5
2015-16	15.0	14.7	13.5	12.0	12.0	11.2	12.1	13.2	14.0	16.0	17.1	18.2
2016-17	22.1	21.0	20.2	19.1	18.1	17.0	16.0	17.0	17.9	18.1	18.9	19.0

Phosphate as PO_4 (mg/L)

It is a line graph figure. It represents Phosphate as PO_4 (mg/L) of Diplai Beel water for the years 2014-15, 2015-16 and 2016-17.

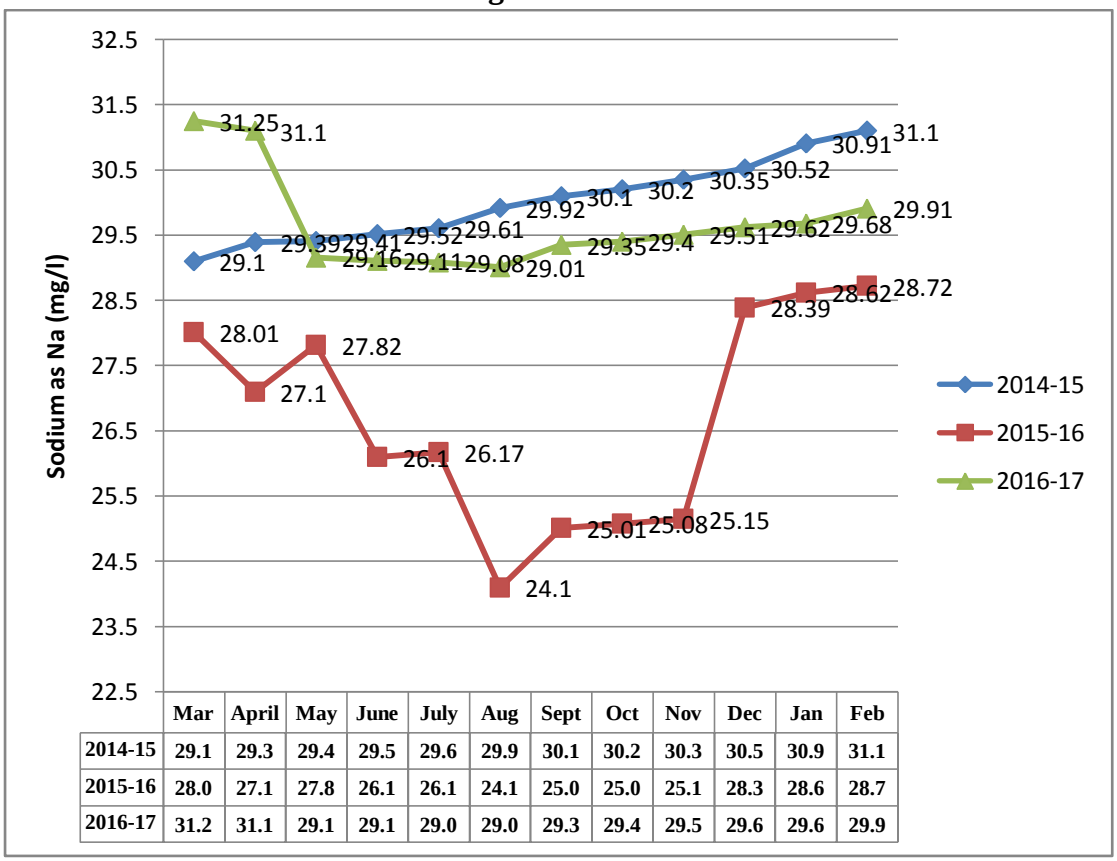
The Blue line graph represents the Phosphate as PO_4 (mg/L) of Diplai Beel water for 2014-15. The max value of this is **19.52** in February and min **14.85** August in March. The total Phosphate difference of this period is **4.67**

The Red line graph represents the Phosphate as PO_4 (mg/L) of Diplai Beel water for 2015-16. The max value is **18.25** in Feb and min **11.20** in Augustr. The total Phosphate difference of max and min in this period is **7.05**

The Green line graph represents the Phosphate as PO_4 (mg/L) of Diplai Beel water for 2016-17. The max value is **22.10** in March and min **16.02** in September. The total Phosphate difference of this period is **5.98**

26. xxi. Sodium as Na mg/L

Fig no. 26.xxi.



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	29.1	29.3	29.4	29.5	29.6	29.9	30.1	30.2	30.3	30.5	30.9	31.1
2015-16	28.0	27.1	27.8	26.1	26.1	24.1	25.0	25.0	25.1	28.3	28.6	28.7
2016-17	31.2	31.1	29.1	29.1	29.0	29.0	29.3	29.4	29.5	29.6	29.6	29.9

Sodium as Na (mg/L)

It is a line graph figure. It represents Sodium as Na (mg/L) of Diplai Beel water for the years 2014-15, 2015-16 and 2016-17.

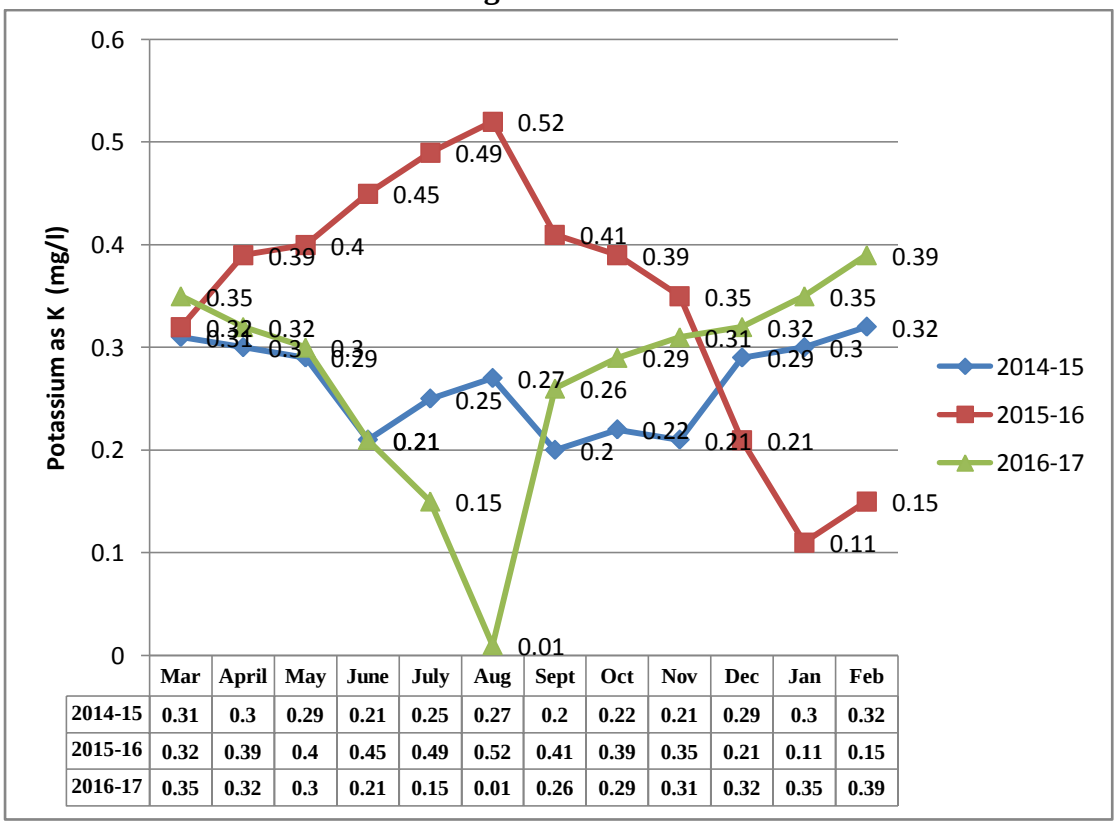
The Blue line graph represents the Sodium as Na (mg/L) of Diplai Beel water for 2014-15. The max value of this is **31.10** in February and min **29.10** in March. The total Sodium difference of this period is **2.00**

The Red line graph represents the Sodium as Na (mg/L) of Diplai Beel water for 2015-16. The max value is **28.72** in Feb and min **24.10** in August. The total Sodium difference of max and min in this period is **4.62**

The Green line graph represents the Sodium as Na (mg/L) of Diplai Beel water for 2016-17. The max value is **31.25** in March and min **29.01** in August. The total Sodium difference of this period is **2.25**

26. xxii. Potassium as K mg/L

Fig no. 26.xxii.



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	0.31	0.3	0.29	0.21	0.25	0.27	0.2	0.22	0.21	0.29	0.3	0.32
2015-16	0.32	0.39	0.4	0.45	0.49	0.52	0.41	0.39	0.35	0.21	0.11	0.15
2016-17	0.35	0.32	0.3	0.21	0.15	0.01	0.26	0.29	0.31	0.32	0.35	0.39

Potassium as K (mg/L)

It is a line graph figure. It represents Potassium as K (mg/L) of Diplai Beel water for the years 2014-15, 2015-16 and 2016-17.

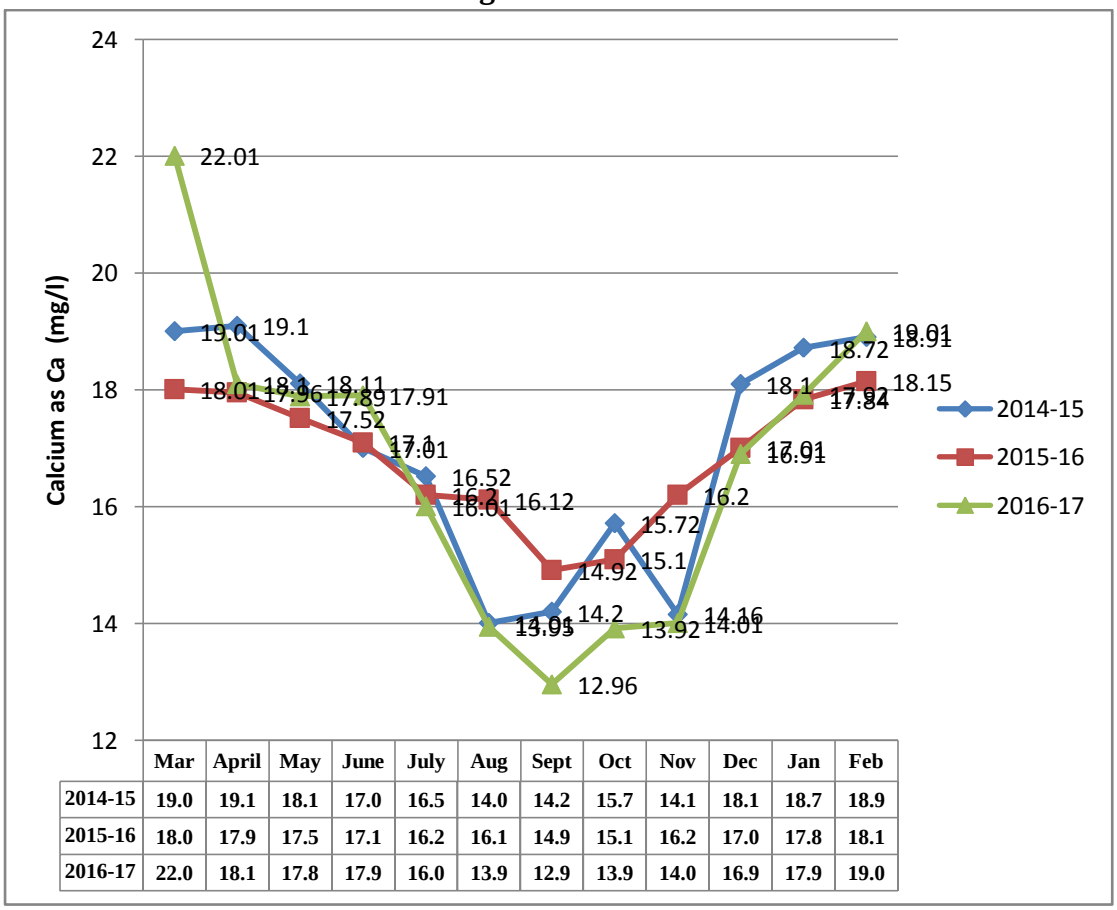
The Blue line graph represents the Potassium as K (mg/L) of Diplai Beel water for 2014-15. The max value of this is **0.32** in February and min **0.20** in September. The total Potassium difference of this period is **0.12**

The Red line graph represents the Potassium as K (mg/L) of Diplai Beel water for 2015-16. The max value is **0.52** in August and min **0.11** in Januaryt. The total Potassium difference of max and min in this period is **0.41**

The Green line graph represents the Potassium as K (mg/L) of Diplai Beel water for 2016-17. The max value is **0.39** in February and min **0.01** in August. The total Potassium difference of this period is **0.38**

26. xxiii. Calcium as Ca mg/L

Fig no. 26.xxiii.



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	19.0	19.1	18.1	17.0	16.5	14.0	14.2	15.7	14.1	18.1	18.7	18.9
2015-16	18.0	17.9	17.5	17.1	16.2	16.1	14.9	15.1	16.2	17.0	17.8	18.1
2016-17	22.0	18.1	17.8	17.9	16.0	13.9	12.9	13.9	14.0	16.9	17.9	19.0

Calcium as Ca (mg/L)

It is a line graph figure. It represents Calcium as Ca (mg/L) of Diplai Beel water for the years 2014-15, 2015-16 and 2016-17.

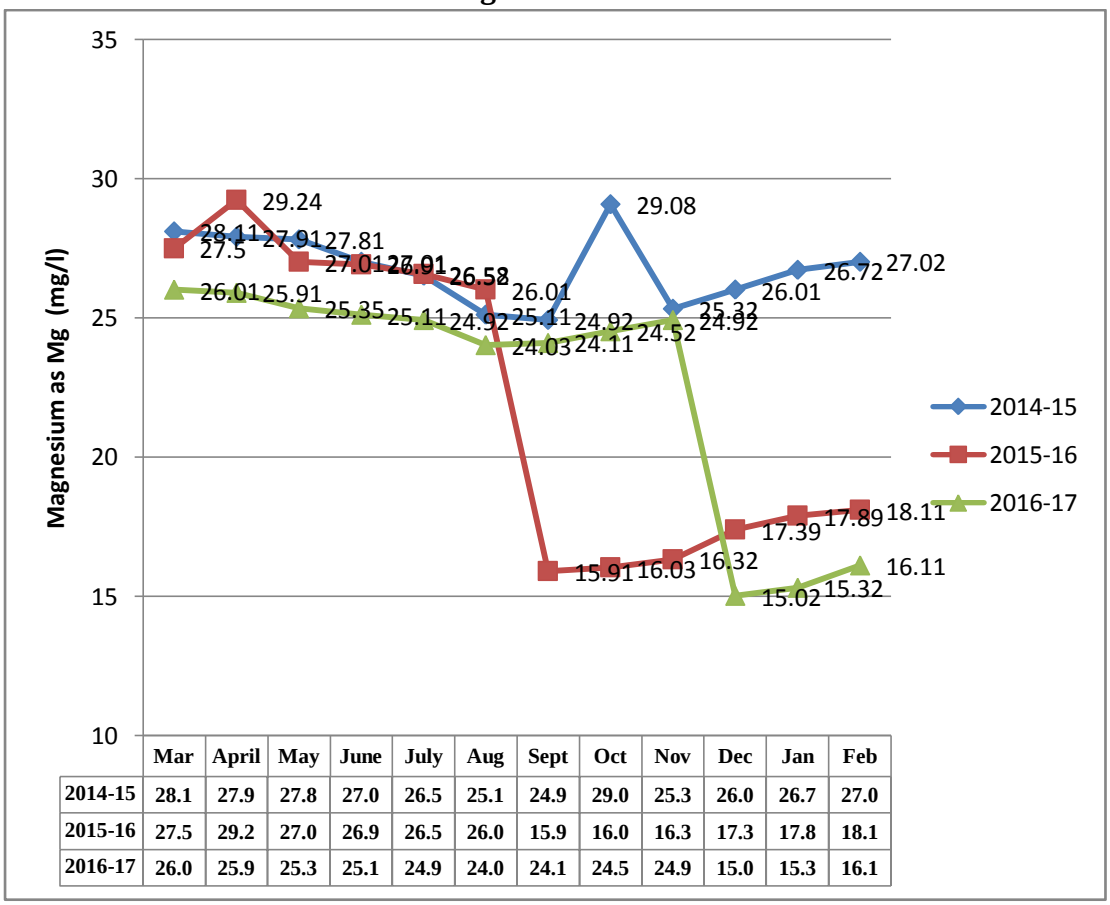
The Blue line graph represents the Calcium as Ca (mg/L) of Diplai Beel water for 2014-15. The max value of this is **0.32** in February and min **0.20** in September. The total Calcium difference of this period is **0.12**

The Red line graph represents the Calcium as Ca (mg/L) of Diplai Beel water for 2015-16. The max value is **0.52** in August and min **0.11** in Januaryt. The total Calcium difference of max and min in this period is **0.41**

The Green line graph represents the Calcium as Ca (mg/L) of Diplai Beel water for 2016-17. The max value is **0.39** in February and min **0.01** in August. The total Calcium difference of this period is **0.38**

26. xxiv. Magnesium as Mg mg/L

Fig no. 26.xxiv.



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	28.1	27.9	27.8	27.0	26.5	25.1	24.9	29.0	25.3	26.0	26.7	27.0
2015-16	27.5	29.2	27.0	26.9	26.5	26.0	15.9	16.0	16.3	17.3	17.8	18.1
2016-17	26.0	25.9	25.3	25.1	24.9	24.0	24.1	24.5	24.9	15.0	15.3	16.1

Magnesium as Mg (mg/L)

It is a line graph figure. It represents Magnesium Mg (mg/L) of Diplai Beel water for the years 2014-15, 2015-16 and 2016-17.

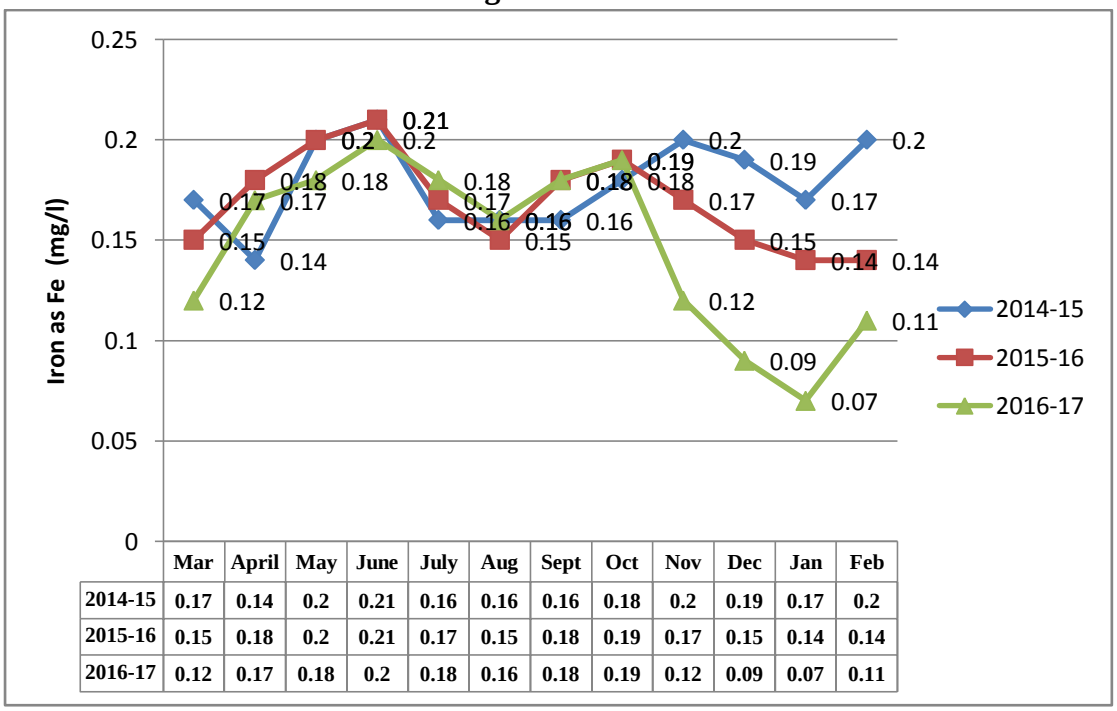
The Blue line graph represents the Magnesium Mg (mg/L) of Diplai Beel water for 2014-15. The max value of this is **29.08** in October and min **24.02** in September. The total Magnesium difference of this period is **5.06**

The Red line graph represents the Magnesium Mg (mg/L) of Diplai Beel water for 2015-16. The max value is **29.24** in April and min **15.91** in September. The total Magnesium difference of max and min in this period is **28.83**

The Green line graph represents the Magnesium Mg (mg/L) of Diplai Beel water for 2016-17. The max value is **26.01** in March and min **15.02** in December. The total Magnesium difference of this period is **10.99**

26. xxv. Iron as Fe mg/L

Fig no. 26.xxv.



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	0.17	0.14	0.2	0.21	0.16	0.16	0.16	0.18	0.2	0.19	0.17	0.2
2015-16	0.15	0.18	0.2	0.21	0.17	0.15	0.18	0.19	0.17	0.15	0.14	0.14
2016-17	0.12	0.17	0.18	0.2	0.18	0.16	0.18	0.19	0.12	0.09	0.07	0.11

Iron as Fe (mg/L)

It is a line graph figure. It represents Iron as Fe (mg/L) of Diplai Beel water for the years 2014-15, 2015-16 and 2016-17.

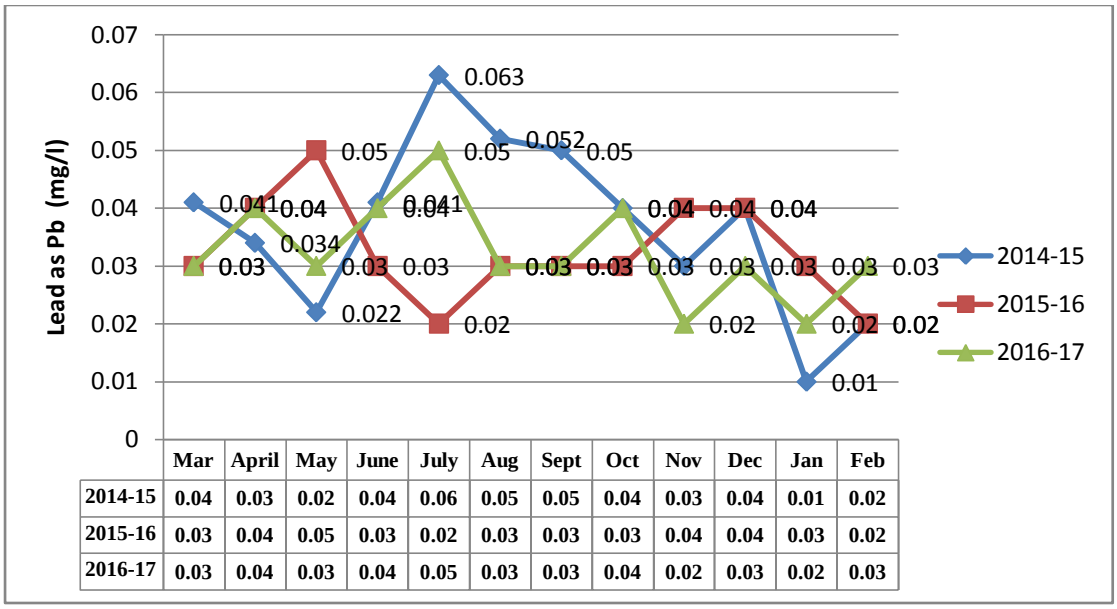
The Blue line graph represents the Iron as Fe (mg/L) of Diplai Beel water for 2014-15. The max value of this is **0.70** in February and min **0.10** in April. The total Iron difference of this period is **0.60**

The Red line graph represents the Iron as Fe (mg/L) of Diplai Beel water for 2015-16. The max value is **0.21** in June and min **0.14** in January and February. The total Iron difference of max and min in this period is **0.07**

The Green line graph represents the Iron as Fe (mg/L) of Diplai Beel water for 2016-17. The max value is **0.20** in June and min **0.07** in February. The total Iron difference of this period is **0.13**

27. Water tests for Pb, Cu and Zn for PHYTO REMEDIATION TEST STUDY:

27.i. **Fig no. 27.i.**

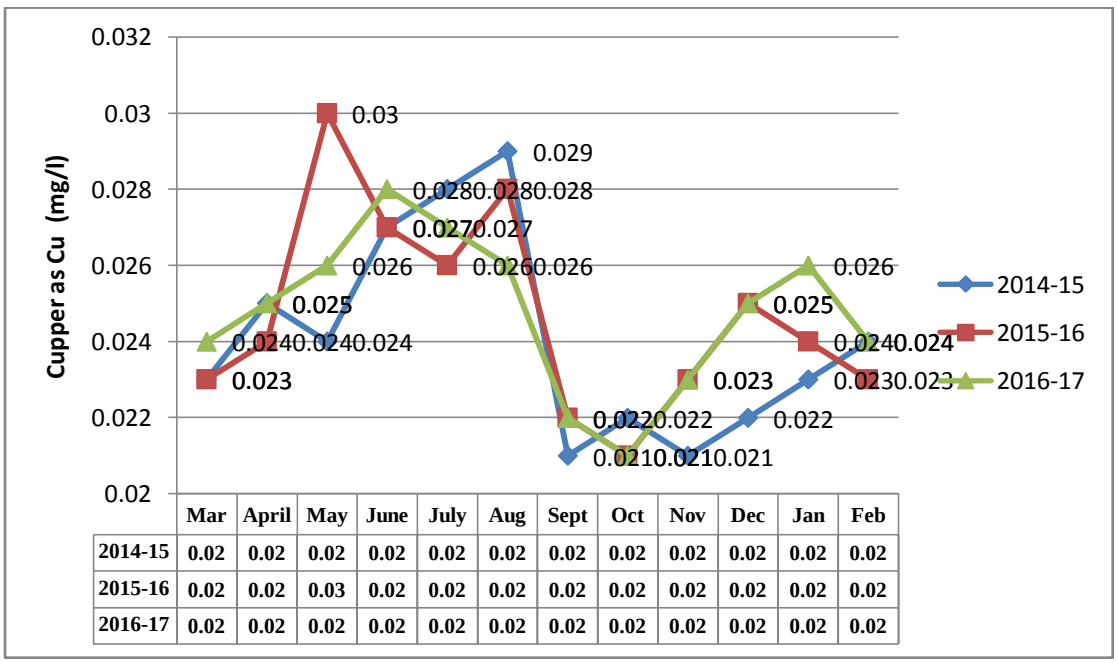


	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	0.04	0.03	0.02	0.04	0.06	0.05	0.05	0.04	0.03	0.04	0.01	0.02
2015-16	0.03	0.04	0.05	0.03	0.02	0.03	0.03	0.03	0.04	0.04	0.03	0.02
2016-17	0.03	0.04	0.03	0.04	0.05	0.03	0.03	0.04	0.02	0.03	0.02	0.03

Pb in Diplai Beel Water

The water tests of Diplai Beel shows the range of Pb values which are within 0.010 mg/L and 0.063 mg/L in 2014-15. In 2015-16 it is seen in between 0.020 mg/L and 0.050 mg/L. In 2016-17 it shows same as 2015-16. The values fluctuate within this range.

27.ii. **Fig no. 27.ii.**

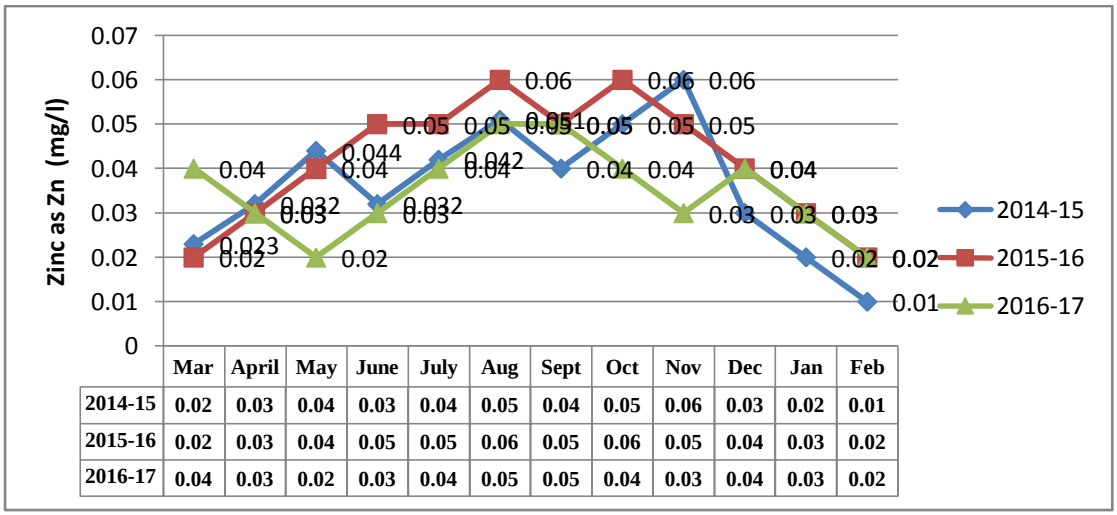


	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
2015-16	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
2016-17	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02

Cu in Diplai Beel Water

The water tests of Diplai Beel shows the range of Cu values which are within 0.021 mg/L and 0.029 mg/L in 2014-15 In 2015-16 it is seen in between 0.022 mg/L and 0.030 mg/L. In 2016-17 it shows 0.021 mg/L and 0.028 mg/L . The values fluctuate within this range.

27.iii. **Fig no. 27.iii.**



	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
2014-15	0.02	0.03	0.04	0.03	0.04	0.05	0.04	0.05	0.06	0.03	0.02	0.01
2015-16	0.02	0.03	0.04	0.05	0.05	0.06	0.05	0.06	0.05	0.04	0.03	0.02
2016-17	0.04	0.03	0.02	0.03	0.04	0.05	0.05	0.04	0.03	0.04	0.03	0.02

Zn in Diplai Beel Water

The water tests of Diplai Beel shows the range of Zn values which are within 0.021 mg/L and 0.029 mg/L in 2014-15. In 2015-16 it is seen in between 0.022 mg/L and 0.030 mg/L. In 2016-17 it shows within 0.021 mg/L and 0.028 mg/L. The values fluctuate within this range.

28. Phytoremediation study of Heavy Metals by *Lemna perpusilla Torry, Azolla pinnata R.Br.* and *Salvinia cucullata* with Comparision to Diplai Beel Water. (see Table nos. 26C, 26D, 26E)

Phytoremediation is a cost-effective plant-based approach of cleaning water and soil that takes advantage of the ability of plants to concentrate elements from the environment and to metabolize various elements in their tissues. Toxic heavy metals are the major target for phytoremediation. Phytoremediation is limited to the surface area and depth occupied by the roots of the plants. Survival of the plants is affected by the toxicity of the contaminated water and soil. Phytoextraction from plant biomass is the simplest method to know the status of trace metals present both in plants and water where the plants grow.

Phytoremediation study in 2014-15:

In the study year 2014-15 the trace metals Cu, Zn and Pb are extracted from the biomass of *Lemna perpusilla* Torry, *Azolla pinnata* R.Br *and Salvinia cucullata* along with the Diplai Beel water in laboratory by GF ASS method. **(see Table no.26C**

i. Cu content in floating plants and Diplai Beel water during 2014-15:

The minimum sorption of Cu by *Lemna perpusilla* Torry is found to be 0.15±0.011 mg/L in March and August and by *Azolla pinnata* R.Br and *Salvinia cucullata* shown values are 0.21±0.024 mg/L in August and 0.24±0.722 mg/L in February respectively. On the other hand Cu content in Diplai Beel water is found to be only 0.021±0.03 mg/L in May and November. The optimum values of Cu in the plants are 0.16±0.310 mg/L in *Lemna perpusilla* Torry (November), 0.23±0.021 mg/L in *Azolla pinnata* R.Br (November) and 0.26±0.041 mg/L in *Salvinia cucullata* but in Diplai Beel water it is found to be 0.028±0.030 mg/L.

ii. Zn content in floating plants and Diplai Beel water during 2014-15:

The optimum sorption of Zn by *Lemna perpusilla* Torry is found 0.06±0.051 mg/L in June than *Azolla pinnata* R.Br (0.050.012 mg/L) in April *and Salvinia cucullata* (0.06±0.003 mg/L) in March respectively, whereas in water Zn value is seen 0.037±0.01 mg/L in the month of July. The Zn value of *Salvinia cucullata* (0.03±0.085 mg/L) is minimum in September than the values of *Azolla pinnata* R.Br (0.04±0.012 mg/L) in September and November and *Lemna perpusilla* Torry (0.04±0.020 mg/L) in August respectively. The Zn amount in Diplai Beel water Zn is found lowest than the plants by 0.010±0.03 mg/L in October.

iii. Pb content in floating plants and Diplai Beel water during 2014-15:

The Pb is most sensitive heavy metal to plants. The maximum values in the floating macrophytes after analysis are shown by *Salvinia cucullata* is 0.66±0.090 mg/L in March and followed by *Lemna perpusilla* Torry (0.50±0.062 mg/L) in May and *Azolla pinnata* R.Br (0.30±0.010 mg/L) in July respectively. But the water Pb of Diplai Beel is 0.041±0.02 mg/L in August. The above study represents that the floating plants have high sorption capacity of Cu, Zn and Pb than the retention capacity of water

Phytoremediation study in 2015-16:

In 2015-16 again biomass of *Lemna perpusilla* Torry, *Azolla pinnata* R.Br and *Salvinia cucullata* are digested for estimation of Cu, Zn and Pb by GF ASS. **(see**

Table no.26D)

i. Cu content in floating plants and Diplai Beel water during 2015-16:

After biomass analysis for Cu of floating plants it is found to be 0.25±0.500 mg/L in September as maximum in *Salvinia cucullata.* It is followed by *Azolla pinnata* R.Br. (0.22±0.053 mg/L) in March and *Lemna perpusilla* Torry (0.15±0.150 mg/L) in July. The Cu content in Diplai water is 0.028±0.032 mg/L in August. The minimum Cu found in floating plants are *Lemna perpusilla* Torry (0.14±0.040 mg/L) in September, *Azolla pinnata* R.Br (0.21±0.003 mg/L) in November and *Salvinia cucullata* (0.24±0.212mg/L) in November. In Diplai Beel water it is recorded as (0.021±0.055 mg/L) in October.

ii. Zn content in floating plants and Diplai Beel water during 2015-16:

The minimum sorption of Zn by *Lemna perpusilla* Torry is found to be 04±0.045 mg/L in January and by *Azolla pinnata* R.Br and *Salvinia cucullata* shown values are 0.04±0.135 mg/L in July and 0.05±0.091 mg/L in October respectively. On the other hand Zn content in Diplai Beel water is found to be only 0.026±0.025 mg/L in August. The optimum values of Zn present in the plants are 0.06±0.051 mg/L in *Lemna perpusilla* Torry during May, 0.05±0.411 mg/L in *Azolla pinnata* R.Br during December and 0.06±0.520 mg/L in *Salvinia cucullata* during August but in Diplai Beel water it is found 0.051±0.032 mg/L in June.

iii. Pb ontent in floating plants and Diplai Beel water during 2015-16:

The analysis of Pb values in the floating macrophytes in 2015-16 is seen maximum in *Salvinia cucullata by* 0.66±0.062 mg/L in July and minimum by 0.65±0.005 mg/L in February. It is followed by maximum of *Lemna perpusilla* Torry (0.48±0.191 mg/L) in May and minimum by 0.47±0.122 mg/L in November. Again minimum value is seen in *Azolla pinnata* by 0.28±0.062 mg/L in August and minimum of 0.27±0.021 mg/L in October. The Diplai Beel water analysis shows maximum of 0.051±0.033 mg/L in July and minimum 0.021±0.035 mg/L in January.

Phytoremediation study in 2016-17:

In 2016-17 again biomass of *Lemna perpusilla* Torry, *Azolla pinnata* R.Br and

Salvinia cucullata are digested for estimation of Cu, Zn and Pb by GF ASS. **(see Table no.26D)**

i. Cu content in floating plants and Diplai Beel water during 2016-17:

During 2016-17 the analysis of floating plants for Cu is found to be optimum in *Lemna perpusilla* Torry by 0.15±0.099 mg/L in May, *Azolla pinnata* R.Br by 0.22±0.085 mg/L in November *and Salvinia cucullata* by 0.26±0.010 mg/L in March and August. The optimum content of Cu in Diplai Beel water is recorded as 0.024±0.023 mg/L in September and November. The minimum Cu values of the floating macrophytes are recorded as 0.14±0.054 mg/L in *Lemna perpusilla* Torry during October, 0.21±0.032 mg/L in *Azolla pinnata* R.Br during September and 0.25±0.012 mg/L *Salvinia cucullata* during September. The minimum content of Cu in Diplai Beel water is recorded as 0.023±0.020 mg/L in February.

ii. Zn content in floating plants and Diplai Beel water during 2016-17:

The optimum sorption of Zn by *Lemna perpusilla* Torry is found 0.06±0.071 mg/L in January , 0.06±0.010 mg/L by *Azolla pinnata* R.Br in January and 0.06±0.803 mg/L by *Salvinia cucullata* in March respectively, whereas in Diplai Beel water Zn value is recorded as 0.033±0.201 mg/L in the month of February. The minimum Zn value recorded in *Lemna perpusilla* Torry is 0.05±0.032 mg/L in November. In *Azolla pinnata* R.Br, Zn value becomes 0.05±0.140 mg/L in August but Zn in *Salvinia cucullata* is obtained as 0.05±0.032 mg/L in January. The Zn amount in Diplai Beel water is found 0.021±0.012 mg/L as minimum in June and December.

iii. Pb content in floating plants and Diplai Beel water during 2016-17:

The analysis of Pb in the floating macrophytes in 2016-17 is seen optimum in *Lemna perpusilla* Torry as 0.47±0.512 mg/L in April and June. In *Azolla pinnata* Pb is found as 0.28±0.056 mg/L in April. It is followed by 0.66±0.251 mg/L in *Salvinia cucullata* during December. The minimum values of Pb obtained in the floating macrophytes are as 0.47±0.032 mg/L in *Lemna perpusilla* Torry during April and July, 0.27±0.012 mg/L in *Azolla pinnata* during October and 0.65±0.214 mg/L in *Salvinia cucullata* during August respectively. The minimum Pb in Diplai Beel water recorded is 0.029±0.021 mg/L in October.