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PRESENT STATUS OF AQUATIC MACROPHYTES OF FOUR FRESH WATER ECOSYSTEMS OF ELLANDHAKUTA AND ITS SURROUDING VILLAGES, KARIM NAGAR DISTRICT, TELANGANA. INDIA

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ABSTRACT

Present study was conducted on four fresh water ecosystems to analyses,the importance of fresh ecosystems biological components, species diversity, alienspecies, aquatic macrophytes distribution in four villages around study area was studied during 2012-2014. One hundred and ten different species of were recorded in 41 families in these 24 from Dicotyledons, 14, Monocots, two from Pteridophyta, one from Algae total Genera 84. Poaceae was the most dominant families with 14 species followed by Cyperaceae (10species), Asteraceae(9), Euphorbhiaceae (7), and Twenty five families were represented by one species each. But unfortunately, such very resourceful fresh water ecosystems are gradually degrading due to various natural and manmade activities like, development of commercial fisheries, excessive growth of invasive aquatic weeds mainly Eichhornia crassipes (Mart.) S.L., Leersia hexandra SW and Hymenachne acutigluma (Steud) Gill which are suppressing the growth of other associated species,causing of loss of native biota. The migratory birds are *Actitis hypoleucos, Ardea purpurea, Plegadis chihi, Mycteria leucocephala.*

Key Words: Macrophytes, Invasive weeds, Native biota, Emergent anchored weeds

INTRODUCTION

Pond Eco systems composed of distinct habitats in influenced by biological, physical and chemical processes. In fresh water bodies nutrients ply major role, if excess they can lead to development of eutrofication. Aquatic macrophytes are larger grow continuously and show different groups, dominants in different season variations (Carpenter and large 1986). Lentic bodies are a god habitat for growing of different visitation. Comparative studies on floristic assemblage, diversity occurrence of various habit forms of macrophytes are growing four fresh water ecosystems of Ellandakunta village, Karimnagar district. in this one is proposed as mini reservoir for drinking water supply to nearly thirty villages of surroundings of study area .the another three are purely used for agriculture purpose and used pisciculture purpose by local people who are living with catch the and sold. Macrophytes are good accumulators of heavy metals (Delvin 1967, Chung et. all, 1974). Macrophytes exert a pleotrophic effect on the development of the littoral macro benthos the submerged are of emergent macrophytes and the submerged aquatics may form to an enormous substrate for colonization. (Gosh SK, 2005) Present study main purpose SITE I as declared Mini Reservoir

by the Govt of Andhra Pradesh (Present Telangana).

Diversity is commonly used to describe number, variety and variability of living organisms (Kumar and Singh, at all). Finally used to assess the biological complexity and integrity of the fresh water ecosystems threats to these such as pollutions of different kinds unfavorable changes, acidification and alien species invasion lead to reduction of native macrophytic biodiversity which also threatens the fauna biodiversity of fresh water ecosystems (Upen and Deka and Sarada Kanta Sharma 2014 & Pankaj et al, 2014). Conservation of fresh water biodiversity facing serious challenges due to lack of awareness about their magnitude and importance in this paper we present the check list of macrophytic flora and their present status also mentioned their IUCN status ,category.

MATERIALS AND METHODS

Study area of present was situated in village of Ellandakunta, district Karimnagar, Telangana, India. This village is well known to this district and nearby districts according to a folk tale predominant in this area that Lord Rama on his banishment from his native land spent some time of his exiled life in a forest of this vicinity. During that period he received the news of father Dasharadha"s death. Rama on the tenth day of his father's demise performed a ceremony. as mark of respect to his father he offered a tree's fruit saplings, that particular plant called of "Ellanda" plant (Diospyrus sp). For the study select four fresh water bodies are located in this village and surroundings (Ramanna pally, Dharmaram, Shayampeta, China Komati pally) which are namely Oora cheruvu occupying nearly eighty (80) acres SITE-I, Gundla cheru occupying seventy five (75) acres SITE-II, Sanyayi pond occupying nearly fifty (50) acres SITE III.SITE IV occupies nearly 60 acres .Area temperature are Max.42^0 Min 20^0. PH ranges SITE-I (6.2-8.1) SITE II (6.5-8.0) SITE III(5.9-8.0) SITE IV(6.1-8.5). Macrophytes sampling was collected from April 2012 to July 2014 by the using of quadrates of 28, 36, 17 measurements. Methods applied by Raunkiers (1934). Studies on aquatic and marshland plants of India are well documented by many authors including Biswas & Calder (1937), Subramanyam (1962), Chavan & Sabins (1961), Maheshwari (1960), Majumdar (1965), Mirashi (1954Unni (1967), Sen & Chatterjee (1959), Vyas (1964), Bhaskar & Razi (1973), Kachroo (1984), Chowdhury (2009), and Chowdhury & Das (2010, 2011).

Plants were uprooted ,thoroughly washed and drying followed by pressing in news papers, weather specimens collected free floating and rooted floating were stored in 4%formaline solution (Cook 1996.) Macrophytes sorted out to species wise and given to them number, data collected from location about their frequency, abundance, density. In these four sites SITE II is located the down steam of SITE-I. SITE-I filling of water is mainly from fields of above and S.R.S.P.canal (Sree Ram Sagar Project (Nizamabad, Telangana) which is one of main downstream canal of L.M.D reservoir (Lower Manair dam) which is located in Karimnagar. SITE III and SITE IV depends mainly by rain water .The species identified with standard books,Laboratory manuals and also compared with Herbaria of Department of Botany, Osmania University, Hyderabad, Telangana, India. In three sites filling of water during July to December, the inundation period during July to February, remain time four months i.e. March to June in dry conditions to favor for quick growth of emergent weeds.

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RESULTS AND DISCUSSION

A total number species are 110; in 84 (Table. No. 01) genera and 41 families recorded during the study (Table No.2). This qualitative floristic survey conducted in this location was first time. Maximum species were recorded in site I, and followed by site III, site IV site II. The families with maximum number of species include Poaceae (15), Austaraceae (9) Cyperaceae (8), Euphorbiaceae (7), Pappilionaceae (5), Amaranthaceae, Onagraceae, Nymphaceae, Boraginaceae, lythraceae, Acanthaceae, 3 species (Hydrocharitaceae, Molluginaceae, Commellinaceae), 2 species (Convolvulaceae,

Lemnaceae, Potamogetanaceae, Najadaceae, Rubiaceae,). Monospecific familiesare Alismataceae, Apanogetanaceae, Araceae, Brassicaceae, Ceasalphinaceae, Characeae, Ceratophyllaceae, Elaeoclaracea, emalvaceae, Marsiliaceae, Oxalidaceae, Papavaraceae, Polygoniaceae, ponteridaceae, Portulacaceae, Salviniaceae, Scropulariaceae, Thypaceae, Verbinaceae (Table No. 2).

The maximum families were recorded in site followed by I, III, IV, IV. Among morphophysiological categories i.e Free floating (FF), Rooted and floating (RFL), Submerged anchored (SA), Emergent anchored weeds (EA). Above these emergent weed species are predominant in all sites and followed by submerged anchored, rooted and floating, free floating.

Table No. 1 Total Plant Species, Family Name, Habit, Life form, IUCN Categories 2014 Version 2014.2

(H=herb,Us=uder shrub,Cl=climber ,P=presence of species ,A =absence of species,FF=free floating,RFL=rooted floating and anchored,EA=emergent anchored,DD=data defiecient,LC=least cornerced,NE=not evaluated)

Sl No	Scientific name	Family	Habit	SITES I	II	III	IV	Life form	IUCN Version 2014.2
1	*Aerva laneta*	Amaranthaceae	H	P	A	A	P	EA	NE
2	*Aeschynomene aspera* L.	Papilionaceae	Us	P	P	A	P	EA	LC
3	*A. indica* L.	Papilionaceae	Us	A	A	P	P	EA	NE
4	*Ageratum conyzoides* L.	Asteraceae	H	P	P	P	P	EA	NE
5	*Alysicarpus vaginalis* **(**L)DC	Papilionaceae	Us	P	P	P	P	EA	NE
6	*Amaranthus virides* L.	Amaranthaceae	H	P	A	P	P	EA	NE
7	*Ammania buccifera*	Lythraceae	H	P	P	P	P	EA	NE
8	*A.roxiburghi*	Lythraceae	H	P	P	P	P	EA	NE
9	*Alternanthera philoxeroides* (Mar) Grisep.	Amaranthaceae	H	P	P	P	P	EA	NE
10	*A. pungens*	Amaranthaceae	H	P	P	P	P	EA	NE
11	*A. sessilis* (L.) R.Br.ex DC.	Amaranthaceae	H	P	P	P	P	SM	DD
12	*Aponogeton appendiculatus* H.Brug	Aponogetonaceae	H	P	A	P	A	SA	NE
13	*Argemone mexicana* L.	Papaveraceae	H	P	A	P	P	EA	NE
14	*Aurundo donax* L.	Poaceae	H	P	P	P	P	EA	NE
15	*Auxonopus compressus* (Sw.) P. Beauv.	Poaceae	H	P	A	P	P	EA	NE
16	*Azolla pinnata R.Br.*	Salviniceae	H	P	P	P	A	FF	LC
17	*Bergia capensis acquatica*	Elatinaceae	H	P	A	P	A	EA	NE
18	*Breniya retusa*	Euphorbiaceae	H	P	P	P	A	EA	NE
19	*Carex baceans* Nees	Poaceae	H	P	A	P	P	EA	NE
20	*Cassia tora* L.	Caesalpiniaceae	H	P	A	P	A	EA	LC
21	*Ceratophyllum demersum* L.	Ceratophyllaceae	H	P	P	P	P	SA	NE
22	Chara globularis J.	Characeae		P	P	P	P	SA	NE
23	Coldenia procumbena	Boraginaceae	H	P	P	P	P	EA	NE
24	*Commelina benghalensis* L.	Commelinaceae	H	P	P	P	P	SA	LC
25	*C. haskarhi*.**L**	Commelinaceae	H	P	P	P	P	SA	NE
26	*Croton banaplandium*	Euphorbiaceae	H	P	A	P	P	EA	NE
27	*Cuphea balsamona* Chem et Sahlocht	Lythraceae	H	P	A	P	A	EA	NE

Sl No	Scientific name	Family	Habit	SITES I	II	III	IV	Life form	IUCN Version 2014.2
28	*Cynodon dactylon* (L) Pers.	Poaceae	H	P	P	P	P	EA	NE
	Cynoglossum zeylanicum (Vahl.)								NE
29	Thunb.ex Lehm.	Boraginaceae	H	P	A	P	A	SA	
30	*Cyperus compressus* L.	Cyperaceae	H	P	A	P	P	EA	LC
31	*C. corymbosus* Rottb.	Cyperaceae	H	P	A	P	P	EA	LC
32	*c.difformis*	Cyperaceae	H	P	P	P	P	EA	LC
33	*C.rotundus* L.	Cyperaceae	H	P	P	P	P	EA	LC
	Dactelocteium aegypticum	Poaceae							NE
34			H	P	A	P	A	EA	
35	*Dentella repens* Forst.	Rubiaceae	H	P	A	P	P	EA	NE
36	*Desmodium triflorum* (L.) DC.	Fabaceae	H	P	P	P	P	EA	LC
37	*Digitaria sanguinalis*	Poaceae	H	P	P	P	P	EA	NE
38	*Eclipta alba.* (L.) L.	Asteraceae	H					EA	DD
39	*E. prostrata* (L.) L.	Asteraceae	H	P	P	P	P	EA	DD
40	*Eichhornia crassipes* (Mart.) S.L.	Pontederiaceae	H	P	A	A	P	FF	NE
	Elaeocharis dulcis (Burm.F.)								NE
41	Henschel.	Elaeocharaceae	H	A	A	P	P	EA	
42	*Enhydra fluctuans* Lour.	Asteraceae	H	P	A	P	A	EA	NE
43	*Ergastostis pilosa*	Poaceae	H	P	A	P	A	EA	NE
44	*Euphorbia hirta* L.	Euphorbiaceae	H	P	P	P	P	EA	NE
45	*E.serpens Kunth.*	Euphorbiaceae	H	P	A	P	P	EA	NE
46	*Fimbristylis bisumbellata*	Cyperaceae	H	P	P	P	A	EA	LC
47	*Glinnus lotoides*	molluginaceae	H	P	P	P	P	EA	NE
48	*Grangea maderaspatana* (L.) Poir.	Asteraceae	H	P	P	P	P	SA	LC
49	*Heliotrophium curasavica*	Boraginaceae	H	P	P	P	P	EA	NE
50	*H.indica*	Boraginaceae	H	P	P	P	P	EA	NE
51	*Hydrilla verticillata* (L.f.) Royle.	Hydrocharitaceae	H	P	P	P	P	SA	LC
52	*Hygrophila sculli.*	Acanthaceae	H	P	A	P	A	SA	NE
53	*H.spinosa*	Acanthaceae	H	P	P	P	A	SA	NE
54	*Hygroryza aristata* (Retz.) Nees.	Poaceae	H	P	P	P	P	RFL	NE
55	*Ipomoea aquatica* Forssk.	Convolvulaceae	H	P	P	P	P	RFL	LC
56	*I. carnea* Jaeq.	Convolvulaceae	Sh	P	P	P	P	EA	NE
57	*Jussiea repens*	Onagraceae	H	P	P	P	A	SA	NE
58	*Kyllinga monocephela* Roxb.	Cyperaceae	H	P	P	P	P	EA	NE
59	*Leersia hexandra* Sw.	Poaceae	H	P	A	P	P	EA	NE
60	*Lemna purpusilla* Torrey	Lemnaceae	H	P	P	P	P	FF	NE
61	*Leucas aspera* Link	Lamiaceae	H	P	A	P	A	EA	NE
62	*Ludwigia adscandens* (L.) Hara	Onagraceae	H	P	P	P	P	RFL	NE
63	*L. parviflora* Roxb.	Onagraceae	H	P	A	P	A	EA	NE
64	*L. perennis* L.	Onagraceae	H	A	A	P	P	EA	NE
65	*L.octavalis*	Onagraceae	H	P	P	P	A	EA	NE
66	*Marsalia quadrifolia L.*	Marseliaceae	H	P	P	P	P	EA	NE
67	*Mikania micrantha* Willd.	Asteraceae	H	P	P	A	A	EA	NE
68	*Mollugo nudiflora*	Molluginaceae	H	A	P	P	P	EA	NE
69	*M.pentaphylla*	Molluginaceae	H	P	P	P	P	EA	NE
70	*Murdania nudiflora*	Commelinaceae	H	P	P	P	A	SA	NE
71	*Najas indica* (Willd.) Cham.	Najadaceae	H	P	P	P	P	SA	LC
72	*N. minor* All.	Najadaceae	H	P	P	P	P	SA	LC

Sl No	Scientific name	Family	Habit	SITES I	II	III	IV	Life form	IUCN Version 2014.2
73	*Nymphaea alba* L.	Nymphaeaceae	H	P	P	P	A	RFL	LC
74	*N.nouchali* Burm.f.	Nymphaeaceae	H	P	P	P	P	RFL	LC
75	*Nymphoides cristata* (Roxb.)Kuntze	Nymphaeaceae	H	P	P	P	P	RFL	LC
76	*N.indica* (L.) Kuntze	Nymphaeaceae	H	P	P	P	P	RFL	LC
77	*Oldenlindia corymbosa* L.	Rubiaceae	H	P	P	P	P	EA	NE
78	*Ottelia alismoides* (L.) Pers.	Hydrocharitaceae	H	P	P	P	P	SA	LC
79	*Oxlis corniculata* L.	Oxalidaceae	H	P	A	P	P	SA	NE
80	*Panicum repens* L.	Poaceae	H	P	A	P	A	SA	LC
81	*Parthenium hysterophorus* L.	Asteraceae	H	P	P	P	P	EA	NE
82	*Phalaris aurundinosa*	Poaceae	H	P	A	P	A	SA	NE
83	*Phyla nodiflora* (L.) Greene	Verbenaceae	H	P	P	P	P	SA	LC
84	*Phyllanthus nururi* L.	Euphorbiaceae	H	P	P	P	P	EA	NE
85	*P.maderespetansis*.L	Euphorbiaceae	H	P	A	P	A	EA	NE
86	*P.vigratus* .G.frost	Euphorbiaceae	H	P	A	P	A	EA	NE
87	*Pistia stratiotes* L.	Araceae	H	P	P	A	A	FF	NE
88	*Polygonum plebium*L.	Polygonaceae	H	P	A	P	P	EA	NE
89	*Potomogeton crispus* L.	Potamogetonaceae	H	P	A	P	P	SA	NE
90	*P.pectinatus*	Potamogetonaceae	H	P	P	P	A	SA	NE
91	*Puccinella sp.*	Poaceae	H	P	P	P	P	EA	NE
92	*Rorippa palustris*	Brassicaceae	H	P	P	P	P	EA	NE
93	*Rotala densiflora* Koehne	Lythraceae	H	P	P	P	P	SA	LC
94	*Rungia parviflora* (Retz.) Nees.	Acanthaceae	H	P	A	P	P	SA	NE
95	*Sagittaria sagittifolia* L.	Alismaceae	H	A	A	P	A	EA	LC
96	*Schoenoplectus articulatus* (L.)	Cyperaceae	H	P	P	P	A	EA	NE
97	*Scirpus articulatus* L.	Cyperaceae	H	P	P	P	P	EA	NE
98	*S.*sp.	Cyperaceae	H	A	A	A	P	EA	NE
99	*Scoparia dulcis* L.	Scrophulariaceae	H	P	A	P	P	EA	NE
100	*Setaria verticillata* (L.) P.Beauv.	Poaceae	H	P	P	P	P	EA	NE
101	*Sphenoclea zylanica*	Sphenocleaceae	H	P	A	A	A	EA	NE
102	*Spirodela polyrrhiza* (L.)Schl.	Lemnaceae	H	P	A	P	A	FF	LC
103	*Tetrastigma obovatum*	Papilionaceae	Cl	A	A	P	A	EA	NE
104	*Trianthema portulacanthem*	Portulacaeae	H	P	P	P	P	EA	NE
105	*Typhaa aungstifolia*.	Typhaceae	H	P	P	P	A	EA	NE
106	*Urena lobata* L.	Malvaceae	H	P	A	P	A	EA	NE
107	*Valisnaria spiralis* Linn.	Hydrocharitaceae	H	P	P	P	P	SA	NE
108	*Vernonia anagallis-aquatica* (L.) Lees.	Asteraceae	H	P	A	A	P	SA	NE
109	*Vetiveria zizanoides* (L.) Nass	Poaceae	H	P	P	P	A	EA	NE
110	*Xanthium strumarium* L.	Asteraceae	H	P	P	P	P	EA	NE

But the else are varying site wise the availabity of their resources like of habitat, pH, inter specific competitions etc. Presence of *Ipomea carnea*, *Pistia stratoides* (Fig), *Eichornia crassipes* indicated that SITE I was clear sign for invasion of alien species SITE IV also show alien species but not as like SITE I, SITE II shows the balance between alien species and native biota. But in case of site III shows majority of native biota with i.e. *Najas indica Valisnaria spiralis*. Among these during January to april *Valisnaria spiralis* and

Najas indica predominant .weather SITE I shows predominance of *Pistia stratoides, Ipomea carnea.* This is clearly indicates that *lotic* ecosystems to save their species is an essential thing.

Qualitative and quantitative survey said that fresh water biota's composition are very important for purification of, if macrophytes composition favorable to purity of water it is clear sign for decreasing of usage of chemicals

Table No. 2. Top families, Genera, Species, Contribution of sites

S. No	Top families	Genera	Species	Contribution %
1	Poaceae	13	14	12.72
2	Cyperaceae	5	10	9.00
3	Asteraceae	7	9	8.18
4	Euphorbiaceae	4	7	6.3
5	Papilionaceae	4	5	4.5
6	Amaranthaceae	3	5	4.5
7	Onagraceae	2	5	4.5
8	Boraginaceae	3	4	3.6
9	Lythraceae	3	4	3.6
10	Nymphaeaceae	2	4	3.6
11	Hydrocharitaceae	3	3	2.7
12	Acanthaceae	2	3	2.7
13	Molluginaceae	2	3	2.7
14	Commelinaceae	2	3	2.7
15	Lemnaceae	2	2	1.8
16	Rubiaceae	2	2	1.8
17	Convolvulaceae	1	2	1.8
18	Najadaceae	1	2	1.8
19	Potamogetonaceae	1	2	1.8
20	Alismaceae	1	1	0.9
21	Aponogetonaceae	1	1	0.9
22	Araceae	1	1	0.9
23	Brassicaceae	1	1	0.9
24	Caesalpiniaceae	1	1	0.9
25	Ceratophyllaceae	1	1	0.9
26	Characeae	1	1	0.9
27	Elaeocharaceae	1	1	0.9
28	Elatinaceae	1	1	0.9
29	Lamiaceae	1	1	0.9
30	Malvaceae	1	1	0.9
31	Marseliaceae	1	1	0.9
32	Oxalidaceae	1	1	0.9
33	Papaveraceae	1	1	0.9
34	Polygonaceae	1	1	0.9
35	Pontederiaceae	1	1	0.9
36	Portulacaeae	1	1	0.9
37	Salviniceae	1	1	0.9
38	Scrophulariaceae	1	1	0.9
39	Sphenocleaceae	1	1	0.9
40	Typhaceae	1	1	0.9
41	Verbenaceae	1	1	0.9
Total	41	84	110	100

to purify of water especially drinking purpose and growth of aquatic fauna particularly fish species. Majority of taxa from angiosperms contributed in four sites .Low taxa reported from Pteridophyta, no species reported from Bryophytes.

Among angiosperms the ratio of dicots 3, monocots 2 and overall percentage of angiosperms are 92.7 followed by Pteridophyta, Algae (Figure-2) predominance of monocots due to high degree of polyploidation consequently increase seed size tendency to vegetative reproduction and resistance to herbivores in above study common species number 52 and their % 47 of all species in these Ammania buccifera, Coldenia procumbena, Glinnus lotoides, Marsalia quadrifolia L, Najas Indica (Willd.) Cham, Valisnaria spiralis Linn, Rorippa palustris, Phyla nodiflora (L.) Greene, Ottelia alismoides (L) Pers are predominant species where as SITE III Valisnaria spiralis where macrophytes exhibit peculiar zonation patterns formed. In comparison taken on IUCN status of species overall was under Data deficient (DD) category species no. 3, 2.72 %. Not evaluated (NE) category species No. 83, 75. 47%, least concerned (LC) species No. 24, 21.81 %. In site I DD 3, NE 73, LC 28 ,.In site II DD 3, NE 46, LC 19, In site III DD 3, NE 76, LC 23, And site IV DD 3, NE 55, LC 18 (Figure-1). The above data represents species diversity and inter specific competition high in SITE I, followed by site III, site IV, site II. *Sphenochlea zylanica* appear only in site I and also observe some

Figure-1. 3 IUCN VERSION 2014.2. Analysis of Ecological occupancy wise

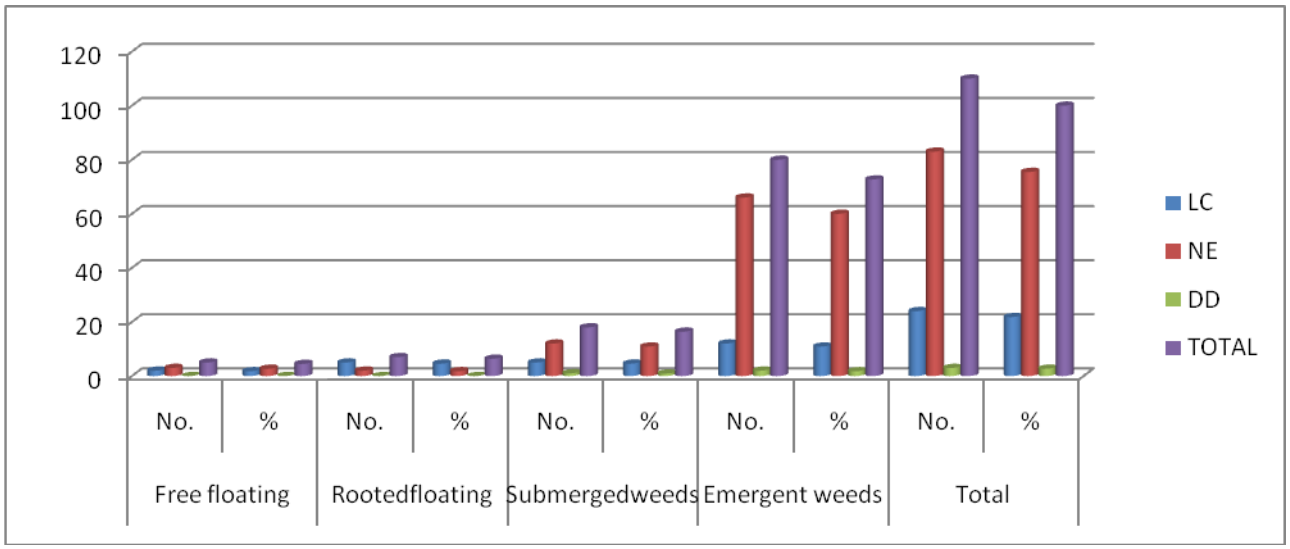
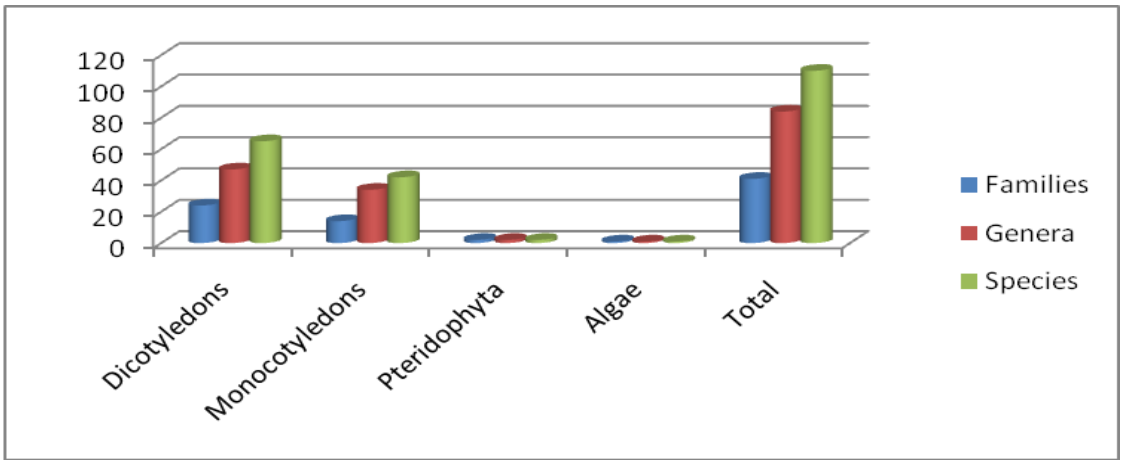


Figure-3. Group wise, Family wise, Genera wise, Species wise analysis



migratory birds in these all sites but more number of birds are appear at site I, and followed by site II, site IV, site IV. The birds are *Actitis hypoleucos, Ardea purpurea, Plegadis chihi, Mycteria leucocephala.*

Aerva laneta

Glinnus lotoides

Coldenia procumbena

***Dentella repens* Forst**

Naja minor All.

Cassia tora L

.

Oldenlindiacorymbosa L Lemnapurpusilla Torrey

***Sphenoclea zylanica* Gaertn**

Rorippa palustris

***Ipomoea aquatica* Forssk**

Alternanthera pungens

Heliotrophium curasavica

***Pistia stratiotes* L**

***Ottelia alismoides* (L.)Pers.&*Nymphoidescristata* (Roxb.)Kuntze**

Typhaa aungstifolia

***Valisnaria spiralis* Linn**

***Nymphea nouchali* Burm.f.**

CONCLUSIONS

During this study indicates that if the anthropogenic activities interrupted fresh water ecosytesms, then fresh water ecosystem no longer to survive. Introducing of alien flora is causing serious damage of native biota. Emergent anchored weeds are dominant during the year especially post monsoon period, free floating ,rooted and floated are dominant during rainy and winter season .Species diversity observes in all site during post monsoon only.

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