

Table 2: Aquatic Macrophytes reported from Saraiyaman Lake, Bettiah in November 2014

Species name	Family
1. <i>Caldesia parnassiifolia</i> (Bassi ex Linnaeus) Parlatore	[Alismataceae]
2. <i>Ceratophyllum demersum</i> Linnaeus	[Ceratophyllaceae]
3. <i>Eichhornia crassipes</i> (Martius) Solms-Laubach	[Pontederiaceae]
4. <i>Hydrilla verticillata</i> (Linnaeus fil.) Royle	[Hydrocharitaceae]
5. <i>Limnophila indica</i> (Linnaeus) Druce	[Scrophulariaceae]
6. <i>Najas indica</i> (Willdenow) Chamisso	[Najadaceae]
7. <i>Nelumbu nucifera</i> Gaertner	[Nelumbonaceae]
8. <i>Nymphaea pubescens</i> Willdenow	[Nymphaeaceae]
9. <i>Nymphoides indica</i> (Linnaeus)	[Menyanthaceae]
10. <i>Nymphoides hydrophylla</i> (Loureiro)	[Menyanthaceae]
11. <i>Phragmites karka</i> (Retzius) Steudel	[Poaceae]
12. <i>Potamogeton malaianus</i> Miquel	[Potamogetonaceae]
13. <i>Utricularia foveolata</i> Edgeworth	[Lentibulariaceae]
14. <i>Typha latifolia</i> Linnaeus	[Typhaceae]

Table 3: Zooplankton diversity at three different locations of Saraiyaman Lake, Bettiah in November 2014

Zooplankton	Sampling site # 1	Sampling site # 2	Sampling site # 3
Rotifera			
Order - Ploimida			
Family - Asplanchnidae			
1. <i>Asplanchna brightwelli</i>	+	-	-
Family - Brachionidae			
2. <i>Anuraeopsis fissa</i>	-	+	+
3. <i>Brachionus angularis</i>	+	-	-
4. <i>B. Caudatus</i>	+	-	-
5. <i>B. diversicornis</i>	+	-	-
6. <i>B. forficula</i>	-	-	+
7. <i>B. fulcatus</i>	+	-	+
8. <i>B. rubens</i>	+	-	-
9. <i>Keratella lenzi</i>	+	+	+
10. <i>K. quadrata</i>	+	-	+
11. <i>K. tropica</i>	+	+	+
Family - Synchaetidae			
12. <i>Polyarthra sp.</i>	-	-	+
Family - Trichotridae			
13. <i>Macrochaetus sericus</i>	+	-	-
Family - Collurellidae			
14. <i>Colurella sulcata</i>	+	-	-
Family - Lecanidae			
15. <i>Lecane curvicornis</i>	+	-	-
16. <i>Lecane sp.</i>	+	-	-
Family - Trichocercidae			
17. <i>Trichocerca cylindrica</i>	+	-	-
18. <i>Trichocerca rattus</i>	-	+	-
19. <i>Trichocerca similis</i>	+	-	-
Order - Gnesiotrocha			
Family - Filiniidae			
20. <i>Filinia longiseta</i>	+	+	+
Family - Testudinellidae			
21. <i>Pompholyx sulcata</i>	-	+	-
Cladocera			
Family - Chydoridae			
22. <i>Chydorus ovalis</i>	-	+	+
Family - Daphniidae			
23. <i>Ceriodaphnia reticulata</i>	+	+	+
24. <i>Daphnia carinata</i>	-	-	+

25. <i>Daphnia lumholtzi</i>	-	-	+
26. <i>Daphnia pulex</i>	-	-	+
27. <i>Daphnia</i> sp.	+	-	-
28. <i>Scapholebris kingi</i>	+	-	-
Family - Moinidae			
29. <i>Moina macrocopa</i>	+	-	-
30. <i>Moina weismanni</i>	-	-	+
Family - Macrothricidae			
31. <i>Macrothrix</i> sp.	-	+	-
Family - Sididae			
32. <i>Diaphanosoma</i> sp.	+	-	-
Copepoda			
Family - Cyclopidae			
33. <i>Cyclops magnus</i>	+	-	-
34. <i>Eucyclops prionophorus</i>	+	-	-
35. <i>Mesocyclops hyalinus</i>	+	+	+
36. <i>Mesocyclops leuckarti</i>	+	+	-
37. <i>Mesocyclops</i> sp.	-	-	+
Family - Diaptomidae			
38. <i>Diaptomus</i> sp.	+	-	-
39. <i>Heliodiaptomus</i> sp.	+	-	-
40. <i>Neodiaptomus</i> sp.	-	-	+
41. Nauplii	+	+	+
Number of taxa present	28	12	18
Beta diversity (β)	1.464	3.417	2.278

Note: (+) = Present; (-) = Absent

Table 4: Zooplankton diversity (individual/ litre) at Saraiyaman Lake, Bettiah in November 2014

Zooplankton	Sampling site # 1	Sampling site # 2	Sampling site # 3
<i>Asplanchna brightwelli</i>	0	0	300
<i>Anuraeopsis fissa</i>	0	300	0
<i>Brachionus angularis</i>	300	0	0
<i>B. Caudatus</i>	300	0	0
<i>B. diversicornis</i>	300	0	0
<i>B. fulcatus</i>	300	0	0
<i>B. rubens</i>	300	0	0
<i>Keratella tropica</i>	2400	300	0
<i>K. lenzi</i>	1500	0	0
<i>Polyarthra sp.</i>	0	300	0
<i>Filinia longiseta</i>	600	0	600
<i>Ceriodaphnia reticulate</i>	1200	0	900
<i>Daphnia pulex</i>	0	0	300
<i>Daphnia sp.</i>	600	0	0
<i>Macrothrix sp.</i>	600	0	0
<i>Mesocyclops hyalinus</i>	300	0	0
<i>Mesocyclops leuckarti</i>	2100	0	0
<i>Heliodiaptomus sp.</i>	300	0	0
<i>Neodiaptomus sp.</i>	0	0	300
Nauplii	5400	900	1500
Total number of organism	16500	1800	3900
Total number of taxa	15	4	6
Beta diversity (β)	1.333	5.000	3.333
Shannon diversity index (H')	2.189	1.242	1.586
Shannon Hmax	2.708	1.386	1.792
Shannon Evenness index (J')	0.808	0.896	0.885

Note: Shannon's species diversity index (H') is calculated using log value of natural log.

Table 5: Benthic macro-invertebrates reported from Saraiyaman Lake, Bettiah in November 2014

	Species name	Family	Phylum
1.	<i>Bellamya bengalensis</i> (Lamarck 1822)	Viviparidae	Mollusca
2.	<i>Lymnaea accuminata</i> (Lamarck, 1822)	Lymnaeidae	Mollusca
3.	<i>Melanoides tuberculatus</i> (O. F. Müller, 1774)	Thiaridae	Mollusca
4.	<i>Indoplanorbis exustus</i> (Deshayes, 1834)	Planorbidae	Mollusca
5.	<i>Gyraulus convexiusculus</i> (Hutton, 1849)	Planorbidae	Mollusca
6.	<i>Gyraulus labiatus</i> (Benson, 1850)	Planorbidae	Mollusca
7.	<i>Segmentina</i> sp.	Planorbidae	Mollusca
8.	<i>Aulodrilus</i> sp.	Tubificidae	Annelida
9.	<i>Branchiodrilus semperi</i>	Naididae	Annelida
10.	<i>Stenocypris</i> larvae	Cypridae	Arthropoda
11.	<i>Cybister</i> sp.	Dysticidae	Arthropoda
12.	<i>Dystiscus</i> larva	Dysticidae	Arthropoda
13.	<i>Gomphus</i> sp.	Gomphidae	Arthropoda
14.	Unidentified insect pupa*	-	Arthropoda

Table 6: Fishes of Saraiyaman Lake, Bettiah

Local name	Common name	Scientific name	Family†
1. Pottiah ^{I*}	Spotfin swamp barb	<i>Puntius sophore</i> (Hamilton)	Cyprinidae
2. Kotree (Kaoli), Pothia ^I	Ticto barb, Two-spot barb	<i>Puntius ticto</i> (Hamilton)	Cyprinidae
3. Rehu [*]	Rohu	<i>Labeo rohita</i> (Hamilton)	Cyprinidae
4. Katla [*]	Catla	<i>Catla catla</i> (Hamilton)	Cyprinidae
5. Naini [*]	Mrigal	<i>Cirrhinus mrigala</i> (Hamilton)	Cyprinidae
6. Reva [*]	Reba carp	<i>Cirrhinus reba</i> (Hamilton)	Cyprinidae
7. Chelwa [*]	Gora chela	<i>Securicula gora</i> (Hamilton)	Cyprinidae
8. Dendua [*]	Flying barb	<i>Esomus danricus</i> (Hamilton)	Cyprinidae
9. Grass carp [*]	Grass carp	<i>Ctenopharyngodon idella</i> (Valenciennes)	Cyprinidae
10. Tengra [*]	Tengara mystus	<i>Mystus tengara</i> (Hamilton)	Bagridae
11. Tengra [*]	Striped dwarf catfish	<i>Mystus vittatus</i> (Bloch)	Bagridae
12. Kanti (Palwa) [*]	Gangetic mystus	<i>Mystus cavasius</i> (Hamilton)	Bagridae
13. Kauwamachh ^I	Freshwater garfish	<i>Xenentodon cancila</i> (Hamilton-Buchanan)	Belonidae
14. Moi (Patara) [*]	Grey Featherback	<i>Notopterus notopterus</i> Lacepede	Notopteridae
15. Chital [*]	Humped Featherback	<i>Chitala chitala</i> (Hamilton)	Notopteridae

16. Barari [*]	Gangetic goonch	<i>Bagarius bagarius</i> (Hamilton)	Sisoridae
17. Mangur [*]	Magur	<i>Clarias batrachus</i> (Linnaeus)	Claridae
18. Singhi [*]	Stinging catfish	<i>Heteropneustes fossilis</i> (Bloch)	Heteropneustidae
19. Bami [*]	Tire-track spiny eel	<i>Mastacembalus armatus</i> (Lacepede)	Mastacembelidae
20. Gainchi [*]	Striped spiny eel	<i>Macrognathus pancalus</i> Hamilton	Mastacembelidae
21. Kawai [*]	Climbing perch	<i>Anabas testudineus</i> (Bloch)	Anabantidae
22. Jalkapur [*]	Indian butter-catfish	<i>Ompok bimaculatus</i> (Bloch)	Siluridae
23. Chanari ^{1*}	Himalayan glassy perchlet	<i>Chanda baculis</i> (Hamilton)	Chandidae
24. Channe, Gurdi, Sirsa ¹	Elongate glass-perchlet	<i>Chanda nama</i> Hamilton	Chandidae
25. Basari (Kalbasu) [*]	Kalbasu, Black rohu	<i>Labeo calbasu</i> (Hamilton)	Cyprinidae
26. Garai [*]	Spotted snakehead	<i>Channa punctatus</i> (Bloch)	Channidae
27. Saunri [*]	Striped or Banded snakehead	<i>Channa striata</i> (Bloch)	Channidae
28. Bhaunda [*]	Giant snakehead	<i>Channa marulias</i> (Hamilton)	Channidae
29. Jhinga [*]	Freshwater shrimp	<i>Macrobrachium</i> sp.	

¹ Recorded during our survey on November 4-5, 2014 (there is possibility of many more fishes from this lake as sampling could not be done properly due to lack of time and lack of proper fishing gears).

^{*} Reported to be found commonly by Sri Jamuna Chaudhari and Chandi Sahni of Tumkaria village, Saraiya Maan, Bettiah on November 5th, 2014 in their earlier catches.

†Classification of Nelson (1994) has been adopted upto family and valid names of genera given by Eschmeyer (2007) were followed.

Table 7: Birds of Saraiyaman Lake, Bettiah

Common name	Scientific name	Family	Population Status†
1. Black Drongo ^I	<i>Dicrurus macrocercus</i>	Dicruridae	Breeding Resident
2. Brown headed Barbet ^{I*}	<i>Megalaima zeylanica</i>	Capitonidae	Breeding Resident
3. Crested serpent Eagle *	<i>Spilornis cheela</i>	Accipitridae	Breeding Resident
4. Common Moorhen ^I	<i>Gallinula chloropus</i>	Rallidae	Breeding Resident
5. White breasted Waterhen ^I	<i>Amaurornis phoenicurus</i>	Rallidae	Breeding Resident
6. Common Coot ^{I*}	<i>Fulica atra</i>	Rallidae	Breeding Resident
7. White-eyed Pochard (Ferruginous Pochard) *	<i>Aythya nyroca</i>	Anatidae	Winter Visitor
8. Red crested Pochard *	<i>Rhodonessa rufina</i>	Anatidae	Winter Visitor
9. Northern Pintail *	<i>Anas acuta</i>	Anatidae	Winter Visitor
10. Common Teal *	<i>Anas trecca</i>	Anatidae	Winter Visitor
11. Gadwall ^I	<i>Anas strepera</i>	Anatidae	Winter Visitor
12. Mallard ^I	<i>Anas platyrhynchos</i>	Anatidae	Winter Visitor
13. Common Stonechat *	<i>Saxicola torquata</i>	Muscicapidae	Winter visitor
14. Red wettled Lapwing *	<i>Vanellus indicus</i>	Charadriidae	Breeding Resident
15. Little Cormorant *	<i>Phalacrocorax niger</i>	Phalacrocoracidae	Breeding Resident
16. Rose ringed Parakeet ^I	<i>Psittacula krameri</i>	Psittacidae	Breeding Resident
17. Red vented Bulbul *	<i>Pycnonotus cafer</i>	Pycnonotidae	Breeding Resident
18. Pond Heron ^{I*}	<i>Ardeola grayii</i>	Ardeidae	Breeding Resident

19. Purple Heron *	<i>Ardea purpurea</i>	Ardeidae	Breeding Resident
20. Intermediate Egret *	<i>Mesophoyx intermedia</i>	Ardeidae	Breeding Resident
21. Cattle Egret ¹	<i>Bubulcus ibis</i>	Ardeidae	Breeding Resident
22. Asian open billed Stork *	<i>Anastomus oscitans</i>	Ciconiidae	Breeding Resident
23. Indian grey Hornbill ¹	<i>Ocyeros birostris</i>	Bucerotidae	Breeding Resident
24. Rufous Treepie ¹	<i>Dendrocitta vagabunda</i>	Corvidae	Breeding Resident
25. House Crow ¹	<i>Corvus splendens</i>	Corvidae	Breeding Resident
26. White-throated Kingfisher ^{1*}	<i>Halcyon smyrnensis</i>	Alcedinidae	Breeding Resident
27. Common Kingfisher *	<i>Alcedo atthis</i>	Alcedinidae	Breeding Resident
28. Pied Kingfisher *	<i>Ceryle rudis</i>	Alcedinidae	Breeding Resident
29. Indian Roller *	<i>Coracias benghalensis</i>	Coraciidae	Breeding Resident
30. Brown fish Owl *	<i>Ketulpa zeylonensis</i>	Strigidae	Breeding Resident
31. Great Tit *	<i>Parus major</i>	Paridae	Breeding Resident
32. Black-rumped Flameback ¹	<i>Dinopium benghalense</i>	Picidae	Breeding Resident
33. Bronze winged Jacana *	<i>Metopidius indicus</i>	Jacanidae	Breeding Resident
34. Pheasant-tailed Jacana *	<i>Hydrophasianus chirurgus</i>	Jacanidae	Breeding Resident

¹ = Recorded by our team, visited the Saraiyaman Lake on November 4th -5th, 2014

* = Reported by Sri H. K. Roy, DFO, Bettiah on February 5th, 2015

† = Population status is as per Grimmett et al. (2007)

Table 8: Depth profile of Saraiyaman Lake, Bettiah recorded on November 5, 2014

<u>Land–mark</u>	<u>Geographical coordinates</u>	<u>Depth (feet)</u>
A. Opposite Forest Rest House	a. 26°48'47N/ 84°26'06 E	22.0
	b. 26°48'46N/ 84°26'06 E	28.0
	c. 26°48'45 N/ 84°26'06 E	24.2
	d. 26°48'43 N/ 84°26'05 E	19.4
B. Opposite Watch Tower	a. 26°48'48 N/ 84°25'53 E	11.2
	b. 26°48'48 N/ 84°25'51 E	31.0
	c. 26°48'46 N/ 84°25'51 E	28.0
	d. 26°48'46 N/ 84°25'50 E	19.8
C. Opposite Palm Tree	a. 26°48'37 N/ 84°25'32 E	19.0
	b. 26°48'37N/ 84°25'33 E	27.8
	c. 26°48'37 N/ 84°25'36 E	29.0
	d. 26°48'37 N/ 84°25'37 E	16.6
D. Opposite Jamun Tree (Bhangar Yadav's Hide)	a. 26°48'24 N/ 84°25'25 E	19.0
	b. 26°48'23 N/ 84°25'25 E	29.1
	c. 26°48'23 N/ 84°25'26 E	23.0
	d. 26°48'22 N/ 84°26'27 E	17.2
E. Near Majharia village	a. 26°48'00 N/ 84°25'35 E	12.7
	b. 26°48'00 N/ 84°25'34 E	19.5
	c. 26°47'59 N/ 84°25'33 E	22.6
	d. 26°47'59 N/ 84°25'28 E	18.0
F. Upstream Bangla ghat (Opposite dry tree)	a. 26°48'39 N/ 84°26'25 E	19.5
	b. 26°48'39 N/ 84°26'24 E	25.3
	c. 26°48'38 N/ 84°26'23 E	20.2
	d. 26°48'39 N/ 84°26'23 E	11.6
G. Opposite Mango-tree orchard (Besides Banyan tree)	a. 26°48'25 N/ 84°26'42 E	15.2
	b. 26°48'25 N/ 84°26'41 E	22.0
	c. 26°48'24 N/ 84°26'41 E	21.0
	d. 26°48'23 N/ 84°26'41 E	17.0
H. Opposite Shishwa Sharai temple	a. 26°48'02 N/ 84°26'53 E	18.1
	b. 26°48'02 N/ 84°26'53 E	23.0
	c. 26°48'01 N/ 84°26'53 E	18.9
	d. 26°48'01 N/ 84°26'52 E	12.3
I. Near Tumkariya village (Near enclosed fishing area)	a. 26°47'39 N/ 84°26'54 E	10.7
	b. 26°47'39 N/ 84°26'53 E	21.0
	c. 26°47'39 N/ 84°26'52 E	19.3
	d. 26°47'39 N/ 84°26'51 E	11.2

Figure 1: Saraiyaman Lake, Bettiah showing its depth profile as recorded on November 5, 2014

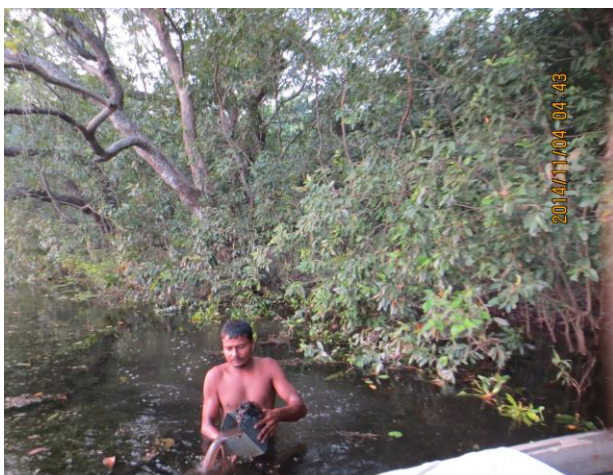




Collection of plankton sample



Concentrated plankton sample



Collecting benthos sample with a dredge



Transferring the dredged sediment



Benthic fauna in a sorting tray

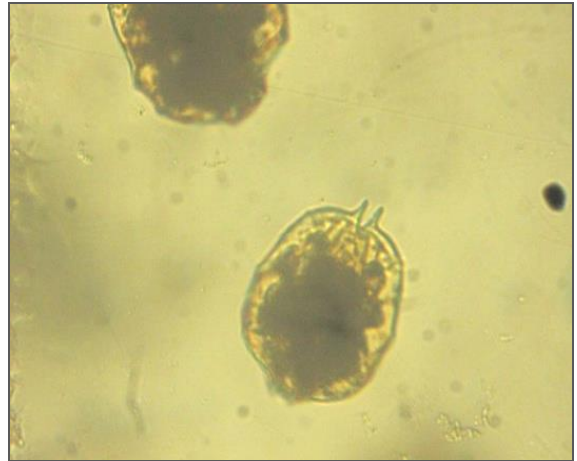
(Photographs by G. P. Purusharti)

Plate 1: Photographs of plankton and benthos sampling

Plate 2: Some of the identified zooplankton from the Saraiyaman Lake, Bettiah collected in November, 2014



Asplanchna brightwelli



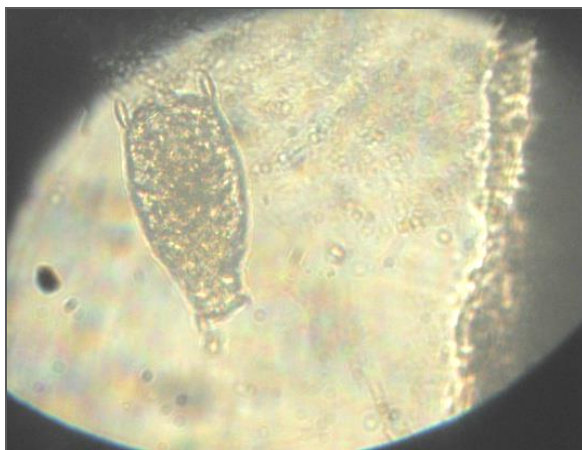
Brachionus angularis



Brachionus caudatus



Brachionus diversicornis



Brachionus forficula



Brachionus rubens

(Photographs by Dr. Neetu)

Plate 3: Some other identified zooplankton from the Lake



Filinia longiseta



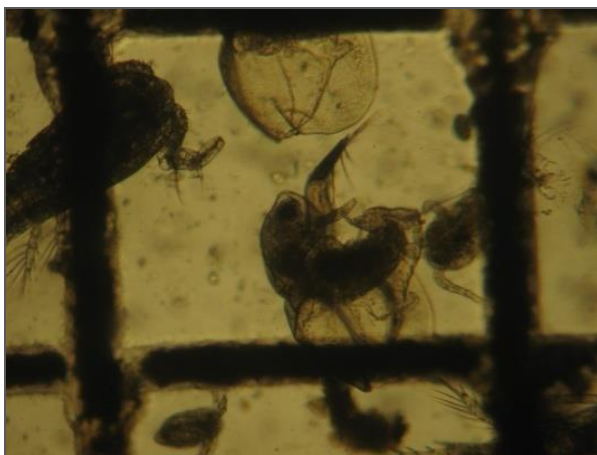
Keratella tropica



Lecane sp.



Polyarthra sp.



Moina macrocopa and *Mesocyclops leuckarti*



Nauplius larva

(Photographs by Dr. Neetu)

Plate 4: Some of the identified benthic fauna from the Lake collected in November, 2014



Bellamya bengalensis



Melanoides tuberculatus



Lymnaea accuminata



Indoplanorbis exustus



Gyrulus convexiusculus



Gomphus sp.

(Photographs by G. P. Purusharti)

Plate 5: Some identified macrophytes of the Lake in November 2014



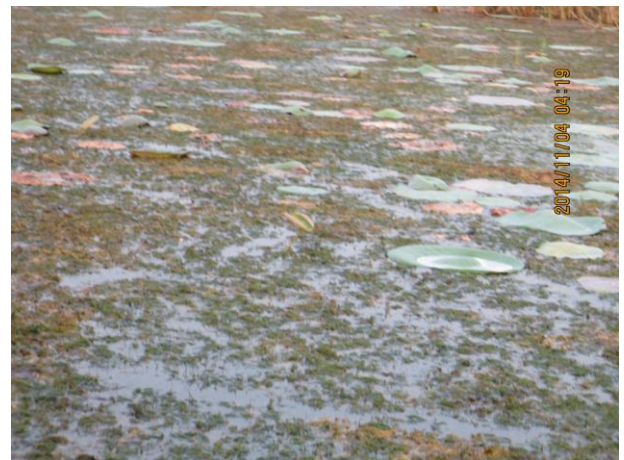
Heavy infestation of *Najas indica*



Leaves of *Nymphoides indica* with reeds



**Leaves of *Nymphaea pubescens* and
*Caldesia parnassifolia***



***Hydrilla verticillata* plants infestation**



***Eichornia crassipes* plant**



***Nymphoides hydrophylla* plant with flower**

(Photographs by G. P. Purusharti)



***Nelumbo nucifera* plants at Saraiyaman Lake**



***Nelumbo nucifera* leaf, Herbarium Record, Saraiyaman Lake**



***Najas indica* vegetation at Saraiyaman Lake**



***Limnophila indica* habitat at Saraiyaman**



***Potamogeton malaianus* habitat at Saraiyaman**



***Limnophila indica* flowering shoots**

(Photo credit: Nesemann and Sharma, 2012 and Sharma and Nesemann, 2013)

Plate 6: Some other identified macrophytes of the Lake

Plate 7: Fishes collected from Saraiyaman Lake, Bettiah in November, 2014



Puntius sophore (Spotfin swamp barb)



Puntius ticto (Ticto barb)



Xenentodon cancila (Freshwater garfish)



Chanda baculis (Himalayan glassy perchlet)



Chanda nama (Elongate glass-perchlet)

(Photographs by G. P. Purusharti)

Plate 8(a): Some other fishes reported from Saraiyaman, Bettiah



Esomus danricus (Flying barb)



Labeo calbasu (Black Rohu, Kalbasu)



Mystus cavasius (Gangetic mystus)



Bagarius bagarius (Gangetic goonch)
(Photo credit: Rajesh Kr. Sinha)

Plate 8(b): Some other fishes reported from Saraiyaman, Bettiah



Mystus tengara (Tengara mystus)

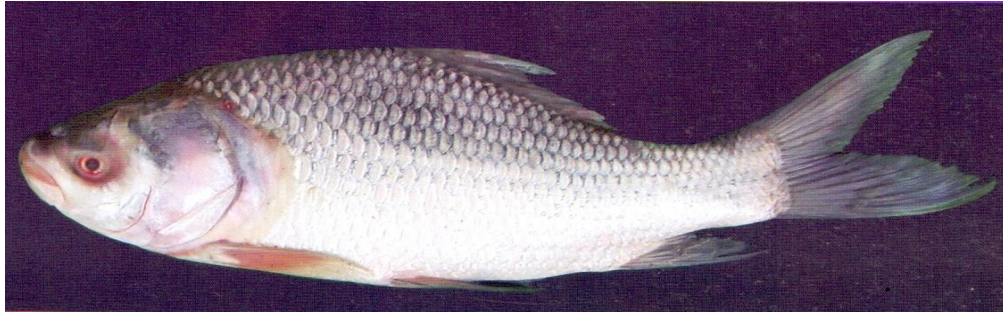


Mystus vittatus (Striped dwarf catfish)



Anabas testudineus (Climbing perch)
(Photo credit: Vishwanath *et al.* 2007)

Plate 8(c): Some other fishes reported from Saraiyaman, Bettiah



Catla catla (Catla, Indian major carp)



Labeo rohita (Rohu, Indian major carp)



Cirrihinus mrigala (Mrigal, Indian major carp)

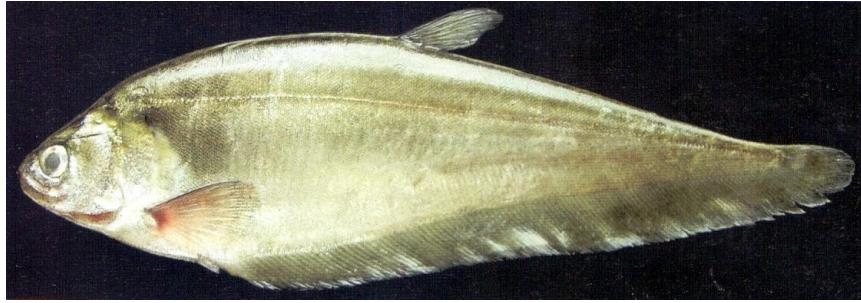


Cirrhinus reba (Reba carp)



Ctenopharyngodon idella (Grass carp)
(Photo credit: Vishwanath *et al.* 2007)

Plate 8(d): Some other fishes reported from Saraiyaman, Bettiah



Notopterus notopterus (Grey featherback)



Chitala chitala (Humped featherback)



Macrogathus punctatus (Stiped spiny eel)



Mastacembalus armatus (Tire-track spiny eel)



Securicula gora (Gora chela)
(Photo credit: Vishwanath *et al.* 2007)

Plate 8(e): Some other fishes reported from Saraiyaman, Bettiah



Channa punctatus (Spotted snakehead)



Channa striata (Striped snakehead)



Channa marulius (Giant snakehead)



Clarias batrachus (Magur, Air breathing Catfish)



Heteropneustes fossilis (Stinging catfish)



Ompok bimaculatus (Indian butter-catfish)
(Photo credit: Vishwanath *et al.* 2007)

Plate 8: Photographs of Saraiyaman visit during November 2014



Panoramic view of the Saraiyaman Lake



Sunset at Saraiyaman Lake



Experimental set up for productivity estimation



Discussion with Sri Jamuna Chaudhary of Tumkaria



Prof. R. K. Sinha with Locals of Saraiyaman



DFO, Bettiah discussing management of lake with Prof. R. K. Sinha of Patna University

(Photographs by G. P. Purushartha)