STUDY OF FOOD AND FEEDING HABITS OF *CIRRHINUS MRIGALA* FROM KAIGAON TOKA, AURANGABAD

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ABSTRACT

The knowledge of food and feeding is very important for fish biology, fish farming, stock management and fisheries of particular species. Similarly it is also important for biological process such as growth, development, reproduction, migration and other metabolic activities (Ahirrao S, 2015). Present investigation reveals that *Cirrhinus mrigala* mainly feeds on plant material, green algae, phytoplankton, sand and mud Particles, diatoms and crustaceans throughout the study Period.
Keywords: *Cirrhinus mrigala*, food, feeding habits.

INTRODUCTION

Foods is the most important exogenous factors, is essential for the sustainability of every living organism throughout its lifespan and feeding is a continuous process to derive energy for their future activities (Nilkolsky G.V, 1963). Food and feeding habits have a great significance in aquaculture practices (Begum, et al., 2008). According to Oronsaye and Nakpodia,(2005) the study of the food and feeding habits of freshwater fish species is a subject of continuous research because it constitutes the basis for the development of a successful fisheries management program on fish capture and culture. Ipinmorti et al., (2008) reported that the food habits of fish for the purpose of culture should be based on identifying the food most preferred by the fish because the survival of fish species in culture is a function of how close environmental factor in the culture system are two doors of their natural habitat. Gut content analysis gives an overall reflection about the type of food material available to the animals in Food Chain and ultimately it is a representation of food in the ecosystem (Babare and Chavan, 2013).

MATERIALS AND METHODS

A total of 720 fishes of *Cirrhinus mrigala* were collected randomly during October 2013 to November 2015 from Kaigaon Toka, Aurangabad. The fishes were examined and preserved in 10% Formalin solution to avoid post mortem digestion. To obtain gut content samples, the entire digestive tract from the oesophagus to the end of large intestine, was detected and the gut content was removed carefully in a petri dish for the analysis of food components. The food components were observed under the microscope followed by different keys given by Pennak (1953), Ward and Whipple (1959), Prescott (1962) and Needham (1962). The relative importance of food components was calculated by weight percentage method given by Hyslop (1980), frequency of occurrence method by Dewan and Shaha, (1979) and index of preponderance method given by Natrajan and Jhingran, (1962).

RESULTS AND DISCUSSION

Present investigation reveals that *Cirrhinus mrigala* mainly feeds on plant material, green algae, phytoplankton, sand and mud particles. It is found that the gut content of *Cirrhinus mrigala* comprised of high quality of sand and mud particles along with the food items. The diet composition indicated that *Cirrhinus mrigala* feeds on plant material, green algae, phytoplankton, sand and mud particles, diatoms and crustaceans. Various food items consumed by fish varied monthly in their abundance and some seasonal variations preferences to specific food item where also observed in this study.

Similar observations were given by Kumari, et al., (2009) who suggested that *Cirrhinus mrigala* as an herbivorous bottom feeder fish feeding on blue Green algae, diatoms and pieces of higher plants which make up together bulk of food while rest of it consists of decayed vegetable matter ,mud and detritus as well as flagellates, rotifers and small crustaceans are also taken incidentally however recently Kabade, (2015) described *Cirrhinus mrigala* as an omnivorous bottom feeder fish he reported adults feed on algae and vegetable detritus, fingerlings on vegetable debris, unicellular algae, detritus and mud they also feed on rotifers

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insects and their larvae crustaceans bryozoans etc. According to Pandey (2014) *Cirrhinus mrigala* is an omnivorous bottom feeder fish.

Chakraborti and ghosh (2012) observed the feeding habits of *Cirrhinus mrigala* as herbivorous fish. Jhingran and Khan (1979) give an account on synopsis of biological data on *Cirrhinus mrigala* and described it as an illiophagus in its feeding habit and senophagic in food variety. Whereas Khanna and Yadav (2004) reported it as omnivorous fish. In the present study plant material , green algae, phytoplankton dominated the gut content where as the crustaceans where least preferred *by Cirrhinus mrigala* similar conclusions were made by Kamal (1968) who reported *Cirrhinus mrigala* shows dominant proportion of debris 75% and 90%)respectively along with small proportion of phytoplankton and zooplankton. Nath, et al., (2014)found the higher aquatic plants as a dominant food item in *Cirrhinus mrigala* forming 72.5 %.

The seasonal percentage composition of phytoplankton in *Cirrhinus mrigala* was found highest in rainy and winter season these results are in accordance with Kanwal and Pathani, (2012) who noticed that seasonally the average contribution of food items of herbivorous fish remains moderate during winter and low in summer and very high during monsoon.

In the present study seasonal percentage composition of algae in *Cirrhinus mrigala* was found highest in the winter season, according to Khanna (2002) natural food is not available in equal quantity throughout the year and there is a clear fluctuation Kheiralla, et al., (2014) reported his observations and described that the green algae reached highest count number in winter due to the presence of oxidase able organic matter that makes good medium for algae growth.

Table 2.1
Weight percentage (W %) of food items found in *Cirrhinus mirgala* during the months Nov 2013 to Oct 2014.

Month & Year Prey (i)		Nov 2013	Dec 2013	Jan 2014	Feb 2014	Mar 2014	Apr 2014	May 2014	Jun 2014	Jul 2014	Aug 2014	Sept 2014	Oct 2014
Plant Material	Wi	21.9	21.5	20.8	20.4	20.2	18.3	18.2	22.3	23.4	23.9	24.1	23.2
	WT	62.5	59.7	58.9	57.5	56.4	55.3	54.1	64.9	66.5	67.3	65.4	61.8
	W%	35.04	36.01	35.31	35.47	35.81	33.09	33.64	34.36	35.18	35.51	36.85	37.54
Crustacean	Wi	3.4	3.1	3.3	3.7	3.4	3.2	3.3	3.9	3.8	4.1	3.9	3.4
	WT	62.5	59.7	58.9	57.5	56.4	55.3	54.1	64.9	66.5	67.3	65.4	61.8
	W%	5.44	5.19	5.60	6.43	6.02	5.78	6.09	6.0	5.71	6.09	5.96	5.50
Green algae	Wi	14.5	14.0	13.9	13.4	13.1	12.8	11.4	13.1	14.0	14.2	13.5	12.9
	WT	62.5	59.7	58.9	57.5	56.4	55.3	54.1	64.9	66.5	67.3	65.4	61.8
	W%	23.2	23.45	23.59	23.30	23.22	23.14	21.07	20.33	21.05	21.09	20.64	20.87
Diatoms	Wi	4.5	4.1	3.7	3.2	3.1	2.8	2.9	3.8	4.1	4.3	4.1	3.9
	WT	62.5	59.7	58.9	57.5	56.4	55.3	54.1	64.9	66.5	67.3	65.4	61.8
	W%	7.2	6.86	6.28	5.56	5.49	5.06	5.36	5.85	6.16	6.38	6.26	6.31
Phytoplankton	Wi	11.4	10.9	10.1	10.3	10.5	9.8	9.6	11.6	12.1	13.2	13.5	12.9
	WT	62.5	59.7	58.9	57.5	56.4	55.3	54.1	64.9	66.5	67.3	65.4	61.8
	W%	18.24	18.25	17.14	17.91	18.61	17.72	17.74	17.84	18.19	19.61	20.64	20.87
Sand & Mud Particle	Wi	6.7	6.1	6.9	6.4	6.1	7.9	8.4	8.5	7.9	7.1	6.3	5.4
	WT	62.5	59.7	58.9	57.5	56.4	55.3	54.1	64.9	66.5	67.3	65.4	61.8
	W%	10.72	10.21	11.71	11.13	10.81	14.28	15.52	13.09	11.87	10.54	9.63	8.73
	∑W%	99.84	99.97	99.63	99.80	99.96	99.07	99.42	97.5	98.16	99.22	99.98	99.82

Where 'Wi' is the total weight of a type of a food item 'i' and 'WT' is the weight of all food items; W% = Wi/WT X 100.

Table 2.2
Weight percentage (W %) of food items found in *Cirrhinus mirgala* during the months Nov 2014 to Oct 2015.

Month & Year Prey (i)		Nov 2014	Dec 2014	Jan 2015	Feb 2015	Mar 2015	Apr 2015	May 2015	Jun 2015	Jul 2015	Aug 2015	Sept 2015	Oct 2015
Plant Material	Wi	22.1	20.4	20.9	20.6	20.3	19.2	18.4	20.9	21.5	22.2	22.9	22.3
	WT	63.2	60.1	59.8	58.9	58.1	56.2	55.3	63.1	64.5	65.5	66.3	62.2
	W%	34.96	33.94	34.94	34.97	34.93	34.16	33.27	33.12	33.33	33.89	34.53	35.85
Crustacean	Wi	3.2	3.4	3.5	3.1	3.2	3.1	3.4	3.5	3.4	3.3	3.4	3.0
	WT	63.2	60.1	59.8	58.9	58.1	56.2	55.3	63.1	64.5	65.5	66.3	62.2
	W%	5.06	5.65	5.85	5.26	5.50	5.51	6.14	5.54	5.27	5.03	5.12	4.82

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Green algae	Wi	13.9	13.1	13.8	13.2	12.9	12.5	11.6	12.9	13.4	14.2	15.1	14.8
	WT	63.2	60.1	59.8	58.9	58.1	56.2	55.3	63.1	64.5	65.5	66.3	62.2
	W%	21.99	21.79	23.07	22.41	22.20	22.24	20.97	20.44	20.77	21.67	22.77	23.79
Diatoms	Wi	4.1	3.8	3.4	3.2	3.3	3.1	3.2	3.5	3.7	3.9	3.7	3.2
	WT	63.2	60.1	59.8	58.9	58.1	56.2	55.3	63.1	64.5	65.5	66.3	62.2
	W%	6.48	6.32	5.68	5.43	5.67	5.51	5.78	5.54	5.73	5.95	5.58	5.14
Phytoplankton	Wi	12.9	12.7	11.5	11.6	11.2	10.9	10.1	12.4	13.5	14.1	14.3	13.5
	WT	63.2	60.1	59.8	58.9	58.1	56.2	55.3	63.1	64.5	65.5	66.3	62.2
	W%	20.41	21.13	19.23	19.69	19.27	19.39	18.26	19.65	20.93	21.52	21.56	21.70
Sand & Mud Particle	Wi	6.9	6.3	6.1	6.3	6.9	7.2	7.9	8.2	7.5	6.6	6.1	5.2
	WT	63.2	60.1	59.8	58.9	58.1	56.2	55.3	63.1	64.5	65.5	66.3	62.2
	W%	10.91	10.48	10.20	10.69	11.87	12.81	14.28	12.99	11.62	10.07	9.20	8.36
	∑W%	99.81	99.31	98.97	98.45	99.44	99.62	98.7	97.28	97.65	98.13	98.76	99.66

Where 'Wi' is the total weight of a type of a food item 'i' and 'WT' is the weight of all food items; W% = Wi/WT X 100.

Table 2.3
Frequency of occurrence (Fc %) of food items found in *Cirrhinus mirgala* during the months Nov 2013 to Oct 2014.

Month & Year / Prey (i)		Nov 2013	Dec 2013	Jan 2014	Feb 2014	Mar 2014	Apr 2014	May 2014	Jun 2014	Jul 2014	Aug 2014	Sep 2014	Oct 2014
Plant Material	Ni	23	22	24	21	20	18	16	20	22	24	23	24
	NT	29	28	29	27	26	24	23	25	27	29	28	29
	Fi	0.79	0.78	0.82	0.77	0.76	0.75	0.69	0.8	0.81	0.82	0.82	0.82
	Fc%	19.84	20.36	21.18	20	19.48	19.48	17.6	19.41	19.9	21.69	20.24	21.63
Crustacean	Ni	18	16	14	13	12	10	11	12	14	13	15	14
	NT	29	28	29	27	26	24	23	25	27	29	28	29
	Fi	0.62	0.57	0.48	0.48	0.46	0.41	0.47	0.48	0.51	0.44	0.53	0.48
	Fc%	15.27	14.88	12.4	12.46	11.91	10.64	11.98	11.65	12.53	11.64	13.08	12.66
Green algae	Ni	21	20	23	22	20	18	16	19	21	22	24	23
	NT	29	28	29	27	26	24	23	25	27	29	28	29
	Fi	0.72	0.71	0.79	0.81	0.76	0.75	0.69	0.76	0.77	0.75	0.85	0.79
	Fc%	18.09	18.53	20.41	21.03	19.68	19.48	17.6	18.44	18.91	19.84	20.98	20.84
Diatoms	Ni	16	15	17	14	13	11	11	13	14	13	14	13
	NT	29	28	29	27	26	24	23	25	27	29	28	29
	Fi	0.55	0.53	0.58	0.51	0.5	0.45	0.47	0.52	0.51	0.44	0.5	0.44
	Fc%	13.81	13.83	14.98	13.24	12.95	11.68	11.98	12.62	12.53	11.64	12.34	11.6
Phytoplankton	Ni	20	18	19	18	17	16	15	19	21	22	23	24
	NT	29	28	29	27	26	24	23	25	27	29	28	29
	Fi	0.68	0.64	0.65	0.66	0.65	0.66	0.65	0.76	0.77	0.75	0.82	0.82
	Fc%	17.08	16.71	16.79	17.14	16.83	17.14	16.58	18.44	18.91	19.84	20.24	21.63
Sand & Mud Particle	Ni	18	17	16	17	19	20	22	20	19	17	15	13
	NT	29	28	29	27	26	24	23	25	27	29	28	29
	Fi	0.62	0.6	0.55	0.62	0.73	0.83	0.95	0.8	0.7	0.58	0.53	0.44
	Fc%	15.57	15.66	14.21	16.1	18.91	21.55	24.23	19.41	17.19	15.34	13.08	11.6
	∑Fi%	3.98	3.83	3.87	3.85	3.86	3.85	3.92	4.12	4.07	3.78	4.05	3.79
	∑Fc%	99.96	99.97	99.97	99.97	99.96	99.97	99.97	99.97	99.97	99.99	99.96	99.96

Where 'ni' = No. of stomachs containing a type of a food item 'i' and NT = is No. not empty stomachs examined; Fi = ni/NT and Fc = Fi/∑Fi x 100.

Table 2.4

Frequency of occurrence (Fc %) of food items found in *Cirrhinus mirgala* during the months Nov 2014 to Oct 2015.

Month & Year Prey (i)		Nov 2014	Dec 2014	Jan 2015	Feb 2015	Mar 2015	Apr 2015	May 2015	Jun 2015	Jul 2015	Aug 2015	Sept 2015	Oct 2015
Plant Material	Ni	21	24	23	21	20	17	18	20	21	23	22	23
	NT	27	29	28	26	25	23	24	26	27	28	27	28
	Fi	0.77	0.82	0.82	0.80	0.80	0.73	0.75	0.76	0.77	0.82	0.81	0.82
	Fc%	19.59	20.14	20.04	20.99	20.40	18.29	19.14	19.10	19.10	20.60	20.55	20.55
Crustacean	Ni	13	15	15	12	10	11	10	13	14	15	14	15
	NT	27	29	28	26	25	23	24	26	27	28	27	28
	Fi	0.48	0.51	0.53	0.46	0.40	0.47	0.41	0.50	0.51	0.53	0.51	0.53
	Fc%	12.21	12.53	12.95	12.07	10.20	11.77	10.53	12.59	12.65	13.31	12.94	13.28
Green algae	Ni	22	24	25	20	19	17	16	18	22	24	23	25
	NT	27	29	28	26	25	23	24	26	27	28	27	28
	Fi	0.81	0.82	0.89	0.76	0.76	0.73	0.66	0.69	0.81	0.85	0.85	0.89
	Fc%	20.61	20.14	21.76	19.94	19.38	18.29	16.96	17.38	20.09	21.35	21.57	22.30
Diatoms	Ni	14	16	15	13	13	11	10	13	14	13	13	14
	NT	27	29	28	26	25	23	24	26	27	28	27	28
	Fi	0.51	0.55	0.53	0.50	0.52	0.47	0.41	0.50	0.51	0.46	0.48	0.50
	Fc%	12.97	13.51	12.95	13.12	13.26	11.77	10.53	12.59	12.65	11.55	12.18	12.53
Phytoplankton	Ni	20	22	21	20	18	17	19	21	21	21	20	21
	NT	27	29	28	26	25	23	24	26	27	28	27	28
	Fi	0.74	0.75	0.75	0.76	0.72	0.73	0.79	0.76	0.77	0.75	0.74	0.75
	Fc%	18.82	18.42	18.33	19.94	18.36	18.29	20.30	19.14	19.10	18.84	18.78	18.79
Sand & Mud Particle	Ni	17	18	16	14	18	20	21	20	18	16	15	14
	NT	27	29	28	26	25	23	24	26	27	28	27	28
	Fi	0.62	0.62	0.57	0.53	0.72	0.86	0.87	0.76	0.66	0.57	0.55	0.50
	Fc%	15.77	15.23	13.93	13.91	18.36	21.55	22.36	19.14	16.37	14.32	13.95	12.53
	∑Fi %	3.93	4.07	4.09	3.81	3.92	3.99	3.89	3.97	4.03	3.98	3.94	3.99
	∑Fc %	99.97	99.97	99.96	99.97	99.96	99.96	99.96	99.98	99.96	99.97	99.97	99.98

Where 'ni' = No. of stomachs containing a type of a food item 'i' and NT = is No. not empty stomachs examined; Fi = ni/NT and Fc = Fi/∑Fi x 100.

Table 2.5 Preponderal Index (Ip %) of food items found in *Cirrhinus mirgala* during the months Nov 2013 to Oct 2014.

Month & Year Prey (i)		Nov 2013	Dec 2013	Jan 2014	Feb 2014	Mar 2014	Apr 2014	May 2014	Jun 2014	Jul 2014	Aug 2014	Sept 2014	Oct 2014
Plant Material	Fc%	19.84	20.36	21.18	20	19.48	19.48	17.60	19.41	19.90	21.69	20.24	21.63
	W%	35.04	36.01	35.31	35.47	35.81	33.09	33.64	34.36	35.18	35.51	36.85	37.54
	Ip%	6.96	7.33	7.50	7.11	7.05	6.50	5.95	6.84	7.13	7.76	7.46	8.13
Crustacean	Fc%	15.27	14.88	12.40	12.46	11.91	10.64	11.98	11.65	12.53	11.64	13.08	12.66
	W%	5.44	5.19	5.60	6.43	6.02	5.78	6.09	6.0	5.71	6.09	5.96	5.50
	Ip%	0.84	0.77	0.69	0.80	0.71	0.62	0.73	0.71	0.72	0.71	0.78	0.69
Green algae	Fc%	18.09	18.53	20.41	21.03	19.68	19.48	17.60	18.44	18.91	19.84	20.98	20.84
	W%	23.2	23.45	23.59	23.30	23.22	23.14	21.07	20.33	21.05	21.09	20.64	20.87
	Ip%	4.20	4.34	4.83	4.91	4.57	4.55	3.73	3.84	4.05	4.21	4.33	4.35
Diatoms	Fc%	13.81	13.83	14.98	13.24	12.95	11.68	11.98	12.62	12.53	11.64	12.34	11.60
	W%	7.2	6.86	6.28	5.56	5.49	5.06	5.36	5.85	6.16	6.38	6.26	6.31
	Ip%	0.99	0.94	0.94	0.73	0.71	0.59	0.64	0.75	0.78	0.74	0.77	0.73
Phytoplankton	Fc%	17.08	16.71	16.79	17.14	16.83	17.14	16.58	18.44	18.91	19.84	20.24	21.63
	W%	18.24	18.25	17.14	17.91	18.61	17.72	17.74	17.84	18.19	19.61	20.64	20.87
	Ip%	3.12	3.05	2.88	3.07	3.13	3.06	2.95	3.38	3.50	3.92	4.18	4.52
Sand & Mud Particle	Fc%	15.57	15.66	14.21	16.10	18.91	21.55	24.23	19.41	17.19	15.34	13.08	11.60
	W%	10.72	10.21	11.71	11.13	10.81	14.28	15.52	13.09	11.87	10.54	9.63	8.73
	Ip%	1.67	1.59	1.67	1.79	2.04	3.10	3.78	2.60	2.15	1.62	1.26	1.01
	∑Fc%	99.96	99.97	99.97	99.97	99.96	99.97	99.97	99.97	99.97	99.99	99.96	99.96
	∑W%	99.84	99.97	99.63	99.80	99.96	99.07	99.42	97.5	98.16	99.22	99.98	99.82

Where, Index of Preponderance Ip% = Fc% x W% /∑(Fc% x W%) X 100.

Table 2.6 Preponderal Index (Ip %) of food items found in *Cirrhinus mirgala* during the months Nov 2014 to Oct 2015.

Month & Year Prey (i)		Nov 2014	Dec 2014	Jan 2015	Feb 2015	Mar 2015	Apr 2015	May 2015	Jun 2015	Jul 2015	Aug 2015	Sept 2015	Oct 2015
Plant Material	Fc%	19.59	20.14	20.04	20.99	20.40	18.29	19.14	19.10	19.10	20.60	20.55	20.55
	W%	34.96	33.94	34.94	34.97	34.93	34.16	33.27	33.12	33.33	33.89	34.53	35.85
	Ip%	6.86	6.88	7.07	7.45	7.16	6.27	6.50	6.51	6.52	7.11	7.18	7.39
Crustacean	Fc%	12.21	12.53	12.95	12.07	10.20	11.77	10.53	12.59	12.65	13.31	12.94	13.28
	W%	5.06	5.65	5.85	5.26	5.50	5.51	6.14	5.54	5.27	5.03	5.12	4.82
	Ip%	0.61	0.71	0.76	0.64	0.56	0.65	0.65	0.71	0.68	0.68	0.67	0.64
Green algae	Fc%	20.61	20.14	21.76	19.94	19.38	18.29	16.96	17.38	20.09	21.35	21.57	22.30
	W%	21.99	21.79	23.07	22.41	22.20	22.24	20.97	20.44	20.77	21.67	22.77	23.79
	Ip%	4.54	4.47	5.07	4.54	4.32	4.08	3.60	3.65	4.27	4.71	4.97	5.32
Diatoms	Fc%	12.97	13.51	12.95	13.12	13.26	11.77	10.53	12.59	12.65	11.55	12.18	12.53
	W%	6.48	6.32	5.68	5.43	5.67	5.51	5.78	5.54	5.73	5.95	5.58	5.14
	Ip%	0.84	0.86	0.74	0.72	0.75	0.65	0.61	0.71	0.74	0.70	0.68	0.64
Phytoplankton	Fc%	18.82	18.42	18.33	19.94	18.36	18.29	20.30	19.14	19.10	18.84	18.78	18.79
	W%	20.41	21.13	19.23	19.69	19.27	19.39	18.26	19.65	20.93	21.52	21.56	21.70
	Ip%	3.84	3.92	3.56	3.98	3.55	3.56	3.75	3.86	4.09	4.13	4.10	4.09
Sand & Mud Particle	Fc%	15.77	15.23	13.93	13.91	18.36	21.55	22.36	19.14	16.37	14.32	13.95	12.53
	W%	10.91	10.48	10.20	10.69	11.87	12.81	14.28	12.99	11.62	10.07	9.20	8.36
	Ip%	1.72	1.60	1.43	1.51	2.19	2.77	3.23	2.55	1.94	1.46	1.29	1.05
	∑Fc%	99.97	99.97	99.96	99.97	99.96	99.96	99.96	99.98	99.96	99.97	99.97	99.98
	∑W%	99.81	99.31	98.97	98.45	99.44	99.62	98.7	97.28	97.65	98.13	98.76	99.66

Where, Index of Preponderance Ip% = Fc% x W% / ∑(Fc% x W%) X 100.

Table 2.7:
Average percentage food composition of *Cirrhinus mirgala* during the year 2013-14.

Prey (i)	Percentage
Plant Material	38.20
Crustacean	5.81
Green algae	22.07
Diatoms	6.06
Phytoplankton	18.56
Sand & Mud Particle	11.52

Table 2.8:
Average percentage food composition of *Cirrhinus mirgala* during the year 2014-15.

Prey (i)	Percentage
Plant Material	34.32
Crustacean	5.39
Green algae	22.00
Diatoms	5.73
Phytoplankton	20.22
Sand & Mud Particle	11.12

Table 2.9:
Seasonal percentage food composition of *Cirrhinus mirgala* during the year 2013-14.

Prey (i)	Rainy	Winter	Summer
Plant Material	35.47	35.97	34.50
Crustacean	5.94	5.43	6.08
Green algae	20.77	22.77	22.68
Diatoms	6.16	6.66	5.36
Phytoplankton	19.07	18.62	13.56
Sand & Mud Particle	11.28	10.34	12.93

Table 2.10:
Seasonal percentage food composition of *Cirrhinus mirgala* during the year 2014-15.

Prey (i)	Rainy	Winter	Summer
Plant Material	33.71	34.92	34.33
Crustacean	5.24	5.34	5.60
Green algae	21.41	22.66	21.95
Diatoms	5.7	5.90	5.59
Phytoplankton	20.91	20.61	19.15
Sand & Mud Particle	10.97	9.98	12.41

Graph 2.1: *Cirrhinus mrigala* (W %) 2013-2014.
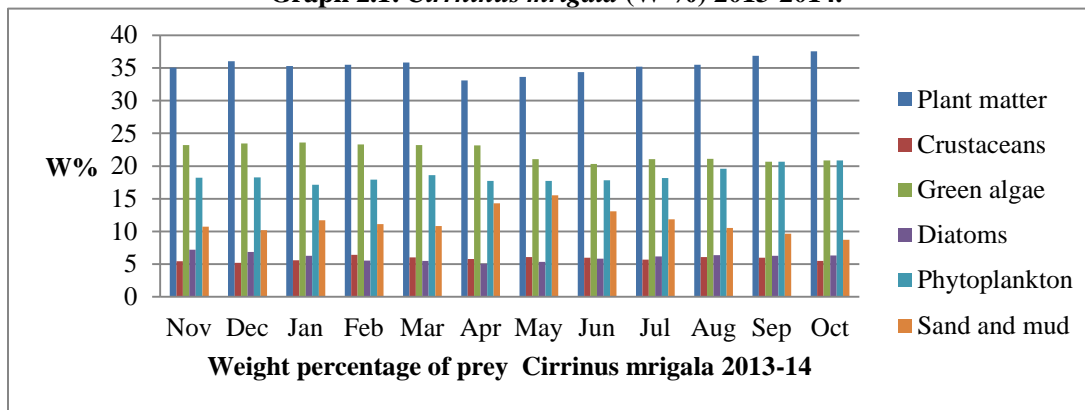
Graph 2.2: *Cirrhinus mrigala* (W%) 2014-2015.
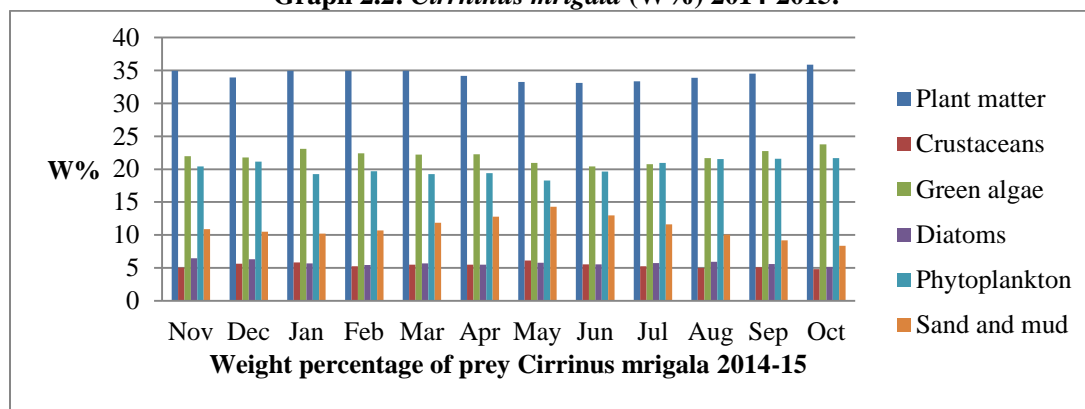
Graph 2.3: *Cirrhinus mrigala* (Fc %) 2013-2014.
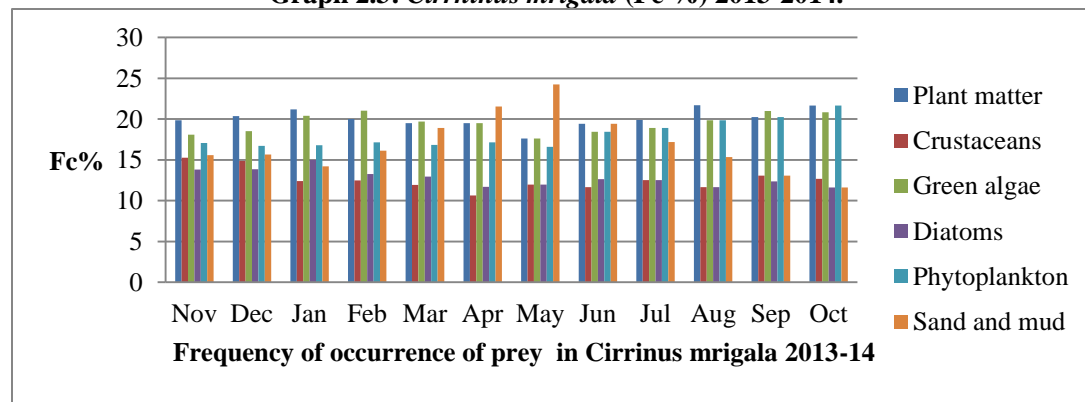
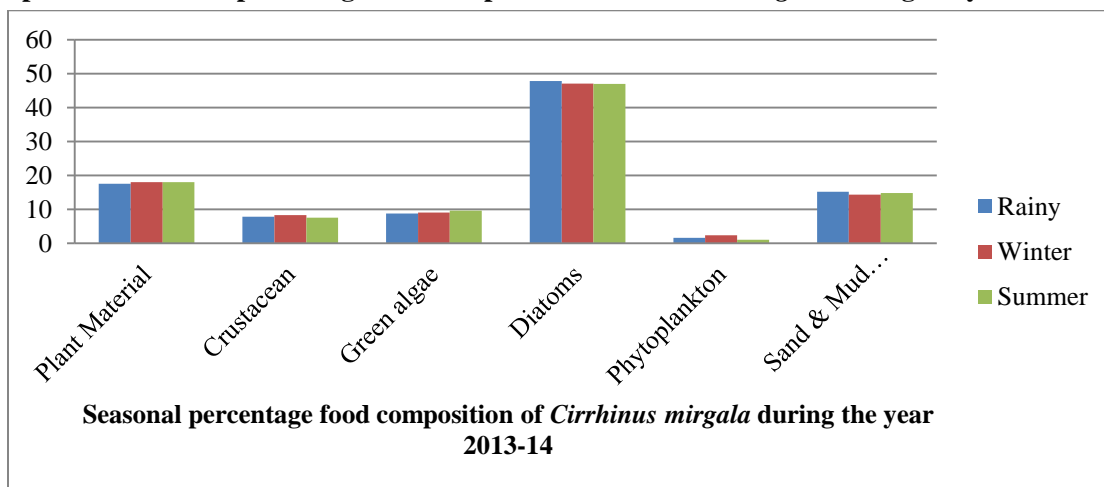**Graph 2.4:** *Cirrhinus mrigala* (Fc%) 2014-2015.

Frequency of occurrence of prey in Cirrinus mrigala 2014-15
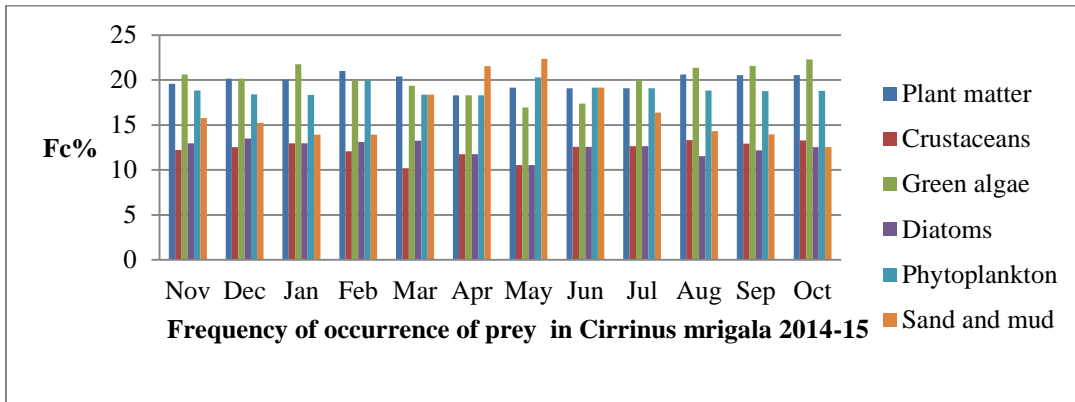
Graph 2.5: *Cirrhinus mrigala* (Ip %) 2013-2014.

Index Preponderal of prey found in Cirrinus mrigala 2013-14
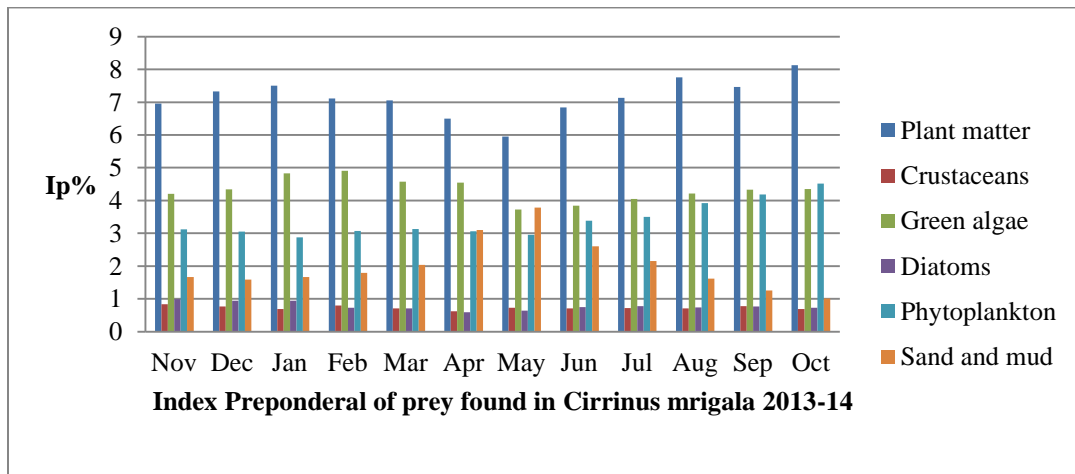
Graph 2.6: *Cirrhinus mrigala* (Ip%) 2014-2015.

Index Preponderal of prey found in Cirrinus mrigala 2014-15
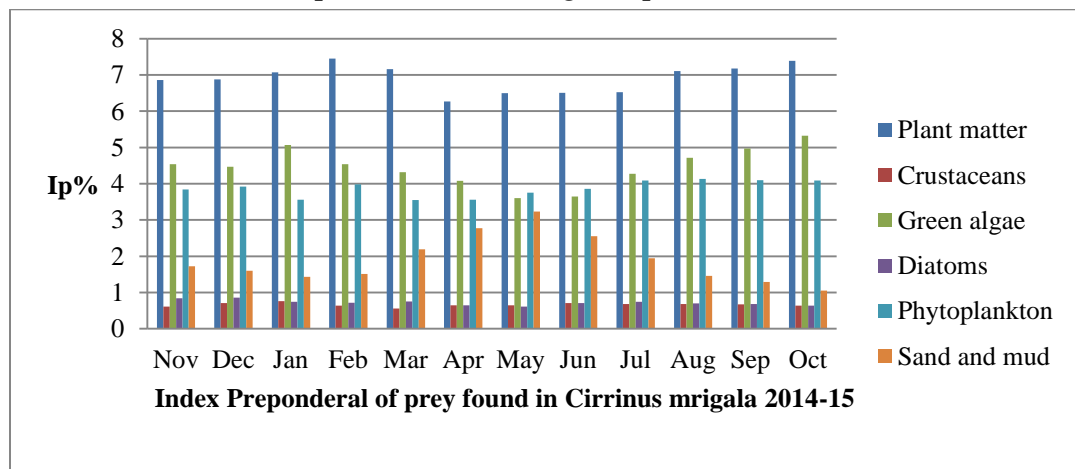
**Graph 2.7: Average percentage food composition of *Cirrhinus mrigala* during the year 2013-2014.**
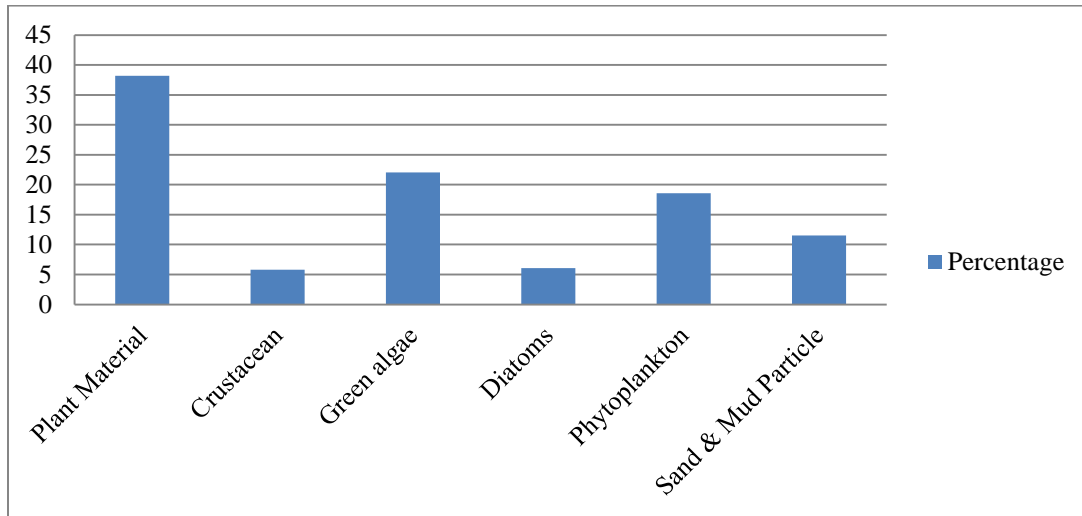
Graph 2.8: Average percentage food composition of *Cirrhinus mrigala* during the year 2014-2015.

Graph 2. 9 : Seasonal percentage food composition of *Cirrhinus mrigala* during the year 2013-2014.

Seasonal percentage food composition of *Cirrhinus mirgala* during the year 2013-14

Graph 2.10: Seasonal percentage food composition of *Cirrhinus mrigala* during the year 2014-2015.

Seasonal percentage food composition of *Cirrhinus mirgala* during the year 2014-15
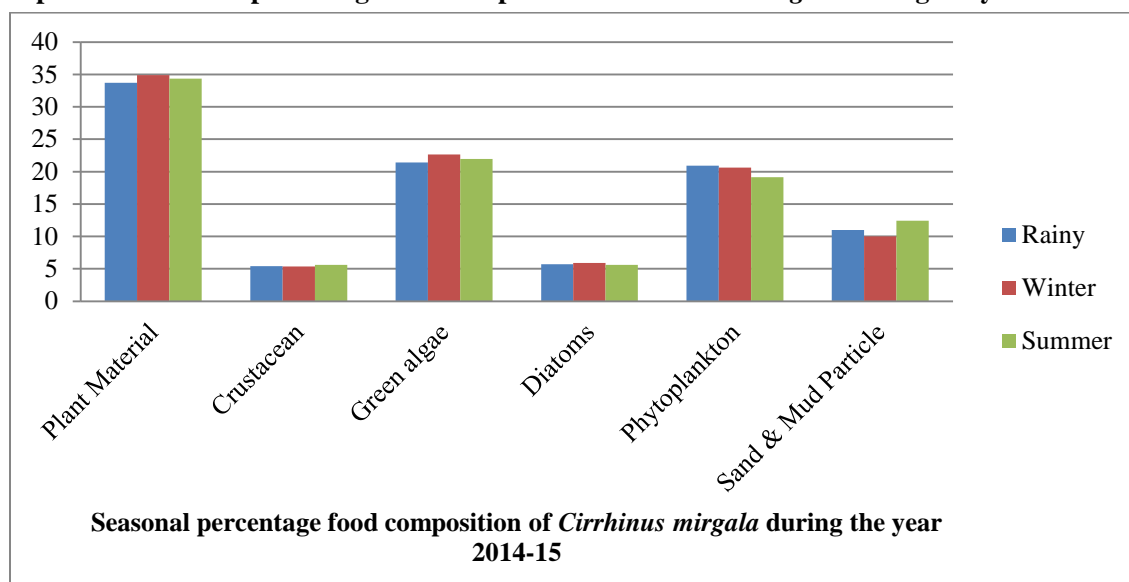
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