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Original Article

Food and feeding habits of silver carp, *Hypophthalmichthys molitrix* (Val., 1844) in Gobindsagar Reservoir, India.

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Abstract: Investigation on the food and feeding habits of silver carp in Gobindsgar reservoir indicated that the diet of silver carp was dominated by *Cyclotella* spp. (diatom) followed by Chlorophyceae, Cyanophyceae, Crustacea, Dianophyceae and Rotifera. The size range of *Cyclotella* spp. varied between 5-25 µm indicating that silver carp is capable to collect the food particles smaller than distance between its gill rakers. Probably, excretion of mucus plays an important role in collecting such small particles. By applying Costello method, it was concluded that *Cyclotella* spp. is very important food item while the others are general food items in the diet of silver carp in this water body. Study of diet overlap index of different size groups of silver carp revealed that the value of "D" varied between 0.461 (moderate) to 0.972 (high), indicating that the diet of small size groups was significantly different from those of large size groups. The present observations indicated that the diet overlap index between female and male specimens of silver carp was very high (0.915), clearly indicating that the diet of male and females specimens did not differ significantly. Analysis of gut contents of silver carp indicated that zooplankton comprised only 7.7% by number and 19.3% by volume in the foregut contents of this fish, hence, silver carp can be considered as microphytoplankton feeder.

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Introduction

Food types as well as feeding habits of a specific species are significance in relation to their growth and propagation under specific biological conditions. Identification of principal types of food items and their occurrence form basis relating to the studies concerning predation, competition, trophy dynamic, feed webs and the trophic relationships in aquatic ecosystems; therefore play an important role both in culture as well as in wild condition (Murphy and Willis, 1996; Wakjira, 2013; Omondi et al., 2013). In the past numerous studies have described the details of food and feeding habits and digestion processes of different fish species as well as silver carp (dos Santos and Jobling, 1991; Boujard and Leatherland, 1992; Firs and Horn, 1993; Marnane and Bellwood, 1997; Beyst et al., 1999; Pederson, 1999; De Pirro et al., 1999; Morita and Suzuki, 1999; Boyce et al., 2000; Horppila et al., 2000; Vamosi et al., 2000; Domaizon et al., 2000; Wakjira, 2013; Sarkhanizadeh et al., 2014). Silver carp, *Hypophthalmichthys molitrix* (Val., 1844) is known for its culture in confine waters along with native fishes, hence most of the information is available on the culture fishery of this fish. Although the food and feeding habits of silver carp by inspection of its gut contents and gill rakers have been documented in the past (Wilamovski, 1972; Dunseth, 1977; Cremer and Smitherman, 1980; Smith, 1985, 1989; Shei and Liu, 1990; Feng and Zhou, 1995; Gu et al., 1996; Xie, 1999; Domaizon et al., 2000) but still there is ongoing debate on the feeding habits of this important cultivable fish species, especially concerning the digestibility of algae in this

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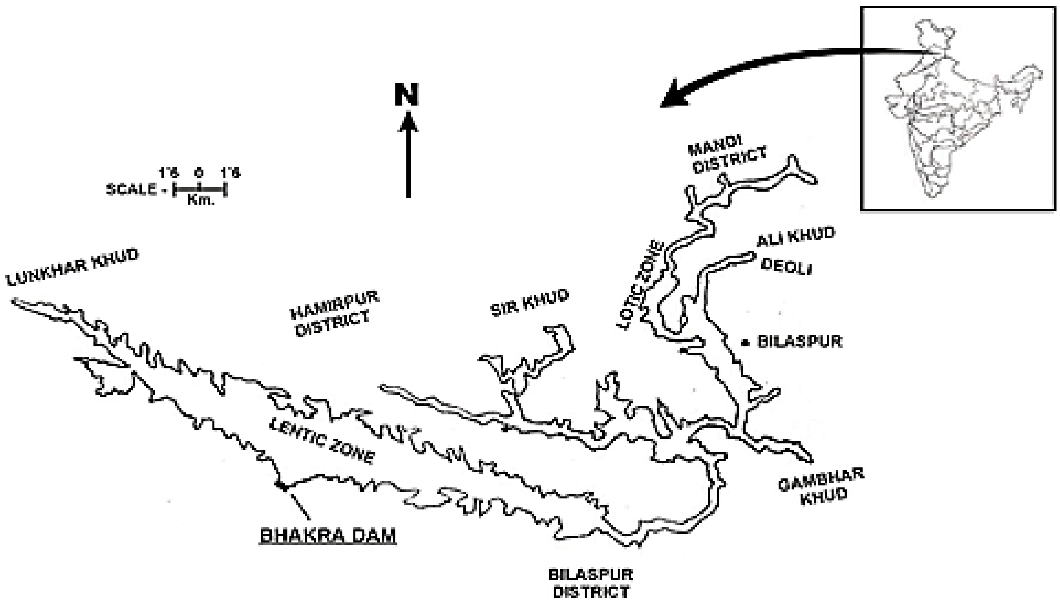

Figure 1. Gobindsagar Reservoir, Himachal Pradesh, India.

stomachless filter-feeding carp (Gu et al., 1996; Xie, 1999).

In the present study, the gut contents of silver carp were analyzed both qualitatively and quantitatively in a natural water body to ascertain the food habits and food selectivity in feeding behavior of this exotic carp.

Study area: Gobindsagar reservoir is one of the biggest and the deepest reservoirs of India situated in the foot hills of Shivaliks (western Himalaya) located at latitude 31°25' North and longitude 76°25' East. It lies in Bilaspur and Una districts of Himachal Pradesh, India. Water spread area of Gobindsagar is 16,867 hectares at full storage level, 5063 ha at dead storage level with an average level of 10,965 ha. Mean depth of reservoir is 188.98 meters at full storage level, 117.35 m at dead storage level with an average level of 153. 17 m (Katiha et al., 2000). The reservoir receives a number of rivulets like Lunkhar, Sir, Gambhar, Gamrola and Ali (Fig. 1). Lunkhar and Sir arms of the reservoir are important from the commercial fishing operation point of view.

Materials and Methods

In this study, gut content of 457 specimens of silver carp (between the size range 235-1000 mm total fish length) were analyzed monthly from the commercial catches of Gobindsagar reservoir. For gut analysis, the intestinal tract of individual fish was removed. Contents from anterior end of the intestine to its first loop (in some cases, slightly beyond the curvature) were collected as foregut contents (Shei and Liu, 1990). Foregut contents were immediately preserved in 5% formaldehyde solution in separate plastic vials. The gut contents were analyzed qualitatively and quantitatively by drop method as described by Murphy and Willis (1996). Identification of food items was facilitated by the analysis of water samples taken from Gobindsagar reservoir. Prey was recognized at the genus level, when possible, but for the frequency-abundance analysis, they were grouped in to families or higher other taxa (De Pirro et al. 1999). Percent number, percent biovolume, and frequency of occurrence were used to estimate the dietary importance of each food category. Percent number is the number of individuals of a prey type divided by the total number of individuals have been expressed as a percentage, after pooling the gut contents of all fishes. Percent biovolume is the equivalent measure for biovolume data. Frequency of occurrence is the percentage of guts where a food item was present. In mathematical terms, the percentage abundance (% Ai) and the percentage occurrence (% Fi) of prey i has been described by the following equations:

$$\% \text{ Ai} = \left(\sum Si \Big/ \sum St \right) \times 100$$

$$\% \text{ Fi} = \left(Ni \big/ N \right) \times 100$$

Where, *Si* is the gut content (volume, weight or number) composed by prey i, *St* the total gut content of all intestines in the entire sample, *Ni* is the number of predators with prey i in their intestine, and *N* is the total number of predators with intestine contents (Amundsen et al., 1996). Costello's (1990) graphical method was used to describe prey importance and feeding strategy of this fish. Overlap in the diets of males and females of silver carp was assessed using the Schoener's (1970) index as described by Krebs (1989):

$$\text{Schoener's index, D} = 1\text{-}0.5 \sum_{1}^{n} |Px,i - Py,i|,$$

Where, "D" is overlap index, Px,i is the proportion of food category i in the diet of male, Py,i is the proportion of food category i in the diet of female and n is the number of category. This index gives values from 0 (no overlap) to 1 (complete overlap). According to Zaret and Rand (1971), Wallace (1981) and Vamosi et al. (2000), a "D" value>0.60 is thought to be biologically significant. However Pederson et al. (1999) defined "D" above 0.74 as arbitrarily to mean high overlap, 0.25-0.74 as moderate and "D" less than 0.25 as low overlap.

Results

Based on the qualitative analysis, the following phytoplankton and zooplankton have been observed to be present in the intestine of silver carp during the period of investigations.

(A) Phytoplankton:

(1) Chlorophyceae: *Actinastrum* spp., *Ankistrodesmus* spp., *Botryococous* spp., *Chlamydomonas* spp., *Chlorella* spp., *Chlorococcum* spp., *Coelastrum* spp., *Cosmarium* spp., *Eudorina* spp., *Oocystis* spp., *Pandorina* spp., *Pediastrum* spp., *Rhizoclonium* spp., *Scenedesmus bijugatus*, *Scenedesmus* spp., *Staurastrum* spp. And *Tetraedron* spp.

(2) Bacillariophyceae: *Cocconeis* spp., *Cyclotella* spp., *Cymbella* spp., *Diatoma* spp., *Fragillaria* spp., *Gomphonema* spp., *Gyrosigma* spp., *Melosira* spp., *Meridion* spp., *Navicula* spp., *Nitzschia* spp., *Pinnularia* spp., *Pleurosigma* spp., *Stauroneis* spp., *Stephanodiscus* spp., *Synedra* spp. and *Tabellaria* spp.

3) Dinophyceae: *Ceratium* spp., *Glenodinium* spp. and *Peridinium* spp.

(4) Cyanophyceae: *Aphanocapsa* spp., *Aphanotheca* spp., *Chroococcus* spp., *Gloeocapsa* spp., *Merismopedia* spp., *Microcystis* spp. and *Oscillatoria* spp.

5) Euglenophyceae: *Euglena* spp.

(B) Zooplankton:

(1) Rotifera: *Brachionus* spp., *Keratella* spp. and *Trichocerca* spp.

(2) Cladocera: *Bosmina* spp., *Bosminopsis* spp. and *Daphnia* spp.

(3) Copepoda: *Cyclops* spp.

During the period of investigations the following plankton have been collected from the water samples, but all of them did not occur in the gut contents of fishes., clearly indicating that the silver carp is selective in the selection of food items which are available in the surrounding water.

(1) Chlorophyceae: *Chlorococcum* spp., *Staurastrum* spp., *Cosmirium* sp., *Oocyscis* spp., *Ankistrodesmus* spp., *Tetraedron* spp., *Pediastrum* spp., *Closteriopsis* spp., *Zygnema* spp., *Botryococuus* spp., *Pandorina* spp., *Edorina* spp., *Scenedesmus* spp., *Chlorella* spp., *Chlamidomonas* spp., *Uronema* spp., *Rhizoclonium* spp. and *Coelastrum* spp.

(2) Bacillariophyceae: *Cyclotella* spp., *Navicula* spp., *Synedra* spp., *Diatoma* spp., *Cocconius* spp. and Fragillaria spp.

(3) Dinophyceae: *Ceratium* spp., *Gymnodinium* spp. and *Peridinium* spp.

(4) Cyanophyceae: *Microcystis* spp., *Gloeocapsa* spp., *Anabena* spp., *Gloeotheca* spp. and *Merismopedia* spp.

(5) Rotifera: *Keratella* spp., *Asplanchna* spp., *Splanchnopus* spp., *Polyarthra* spp. and *Brachionus*

Table 1. Percentage biovolume (V), Number (N) and occurrence (O) of the major food items in the foregut of silver carp.

Food items	Female %V	Male %V	Pooled %V	Female %N	Male %N	Pooled %N	Female % O	Male % O	Pooled % O
Green algae	2.98	3.07	3.31	14.01	18.59	17.97	77	84	93
Blue green algae	5.12	3.02	4.06	11.10	4.50	7.89	57	77	83
Rotifera	3.25	4.05	4.9	0.96	2.10	1.89	36	60	76
Crustacea	14.41	14.01	14.39	5.13	7.10	5.81	56	77	82
Diatoms	0.17	0.31	0.23	1.23	1.71	1.48	39	63	80
Dianophyceae	2.23	2.18	2.15	2.59	2.91	2.72	57	78	83
Cyclotella	14.79	11.84	12.97	64.98	63.09	62.25	87	94	93
Digested material	57.06	61.51	58	-	-	-	-	-	-

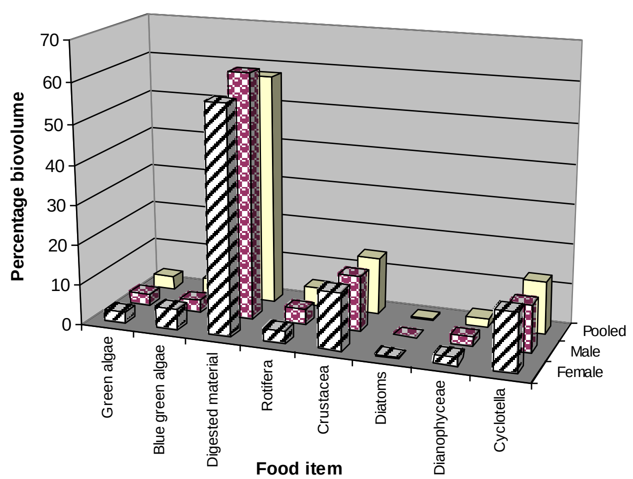

Figure 2. Percentage biovolume of different food items in the forgut of silver carp.

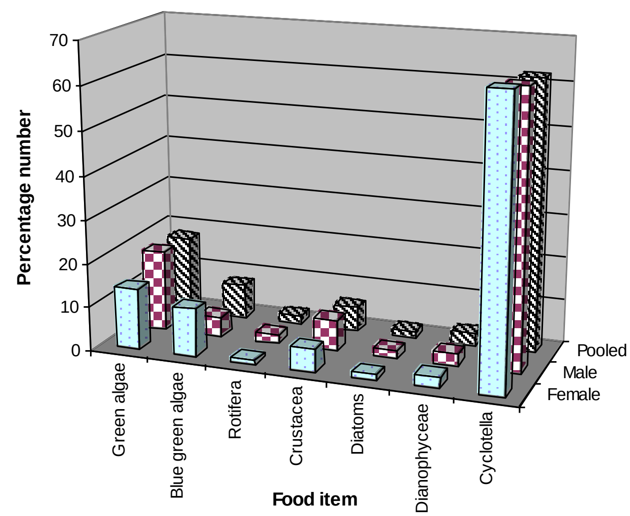

Figure 3. Percentage number of different food items in the foregut of silver carp.

spp.

(6) Cladocera: *Daphnia* spp., *Diaptomus* spp. and *Bosmina* spp.

(7) Copepoda: *Cyclops* spp.

(8) Euglenophyceae: *Euglena* spp.

The results showed that the food components of silver carp can be divided into categories, viz., digested and undigested. The undigested phytoplankton include green algae, blue-green algae, rotifera, crustacea (cladocera and copepoda), diatoms (except *Cyclotella* spp.), Dinophyceae and Cyclotella. The digested material were mainly consisted of the unidentified matters in decayed and semi-digested state. It formed 58% by volume in the foregut of silver carp (pooled data). It ranked first in term of volume (Table 1, Fig. 2). Of the identifiable planktonic items, *Cyclotella* spp. was the most abundant organism. This diatom formed 62.25% by number (Fig. 3), 12.97% by volume (Fig. 2) and 93% by frequency occurrence (Fig. 4) in the foregut. Thus *Cyclotella* spp. was the most dominant plankton in terms of number and abundance and the second item in terms of volume in foregut contents of *H. molitrix* (Table 1). Next important food component in the gut contents of silver carp was green algae represented by different genera. This category was represented by 17.97% by number, 3.31% by volume and 93% by frequency occurrence in the forgut of this fish (Table 1). Blue green algae constituted amongst the food items as 7.89% by number, 4.06% by volume and 83% by abundance in the foregut. It ranked third in term of number in the gut contents. *Microcystis* spp. was the most dominant Cyanophyceae found in the gut contents of *H. molitrix*. Crustaceans which included cladocera and copepoda constituted 5.18% by number, 14.39% by volume and 82% by frequency occurrence of the foregut contents (Figs. 2-4). *Daphnia* spp. and *Cyclops* spp. were most dominant crustaceans

Table 2. Percentage biovolume of the major food items in the foregut of different size groups of silver carp in Gobindsagar reservoir.

Size group (mm)/ Food items	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000
Green algae	10.52	7.34	11.56	2.80	2.90	2.11	1.94	0.96
Blue green algae	0.00	6.38	0.53	4.69	7.13	2.21	2.44	4.97
Digested material	43.55	37.13	58.30	59.92	59.54	38.29	64.40	71.26
Rotifera	38.81	11.08	9.06	4.80	1.74	4.89	2.95	1.64
Crustacea	0.00	34.36	8.55	11.05	18.26	23.20	12.81	12.30
Diatoms	0.00	0.42	0.93	0.13	0.14	0.28	0.10	0.45
Dianoflagelata	0.91	1.33	1.10	2.34	1.77	2.10	2.26	3.83
Cyclotella	6.21	1.95	9.97	14.26	8.51	26.91	13.09	4.61

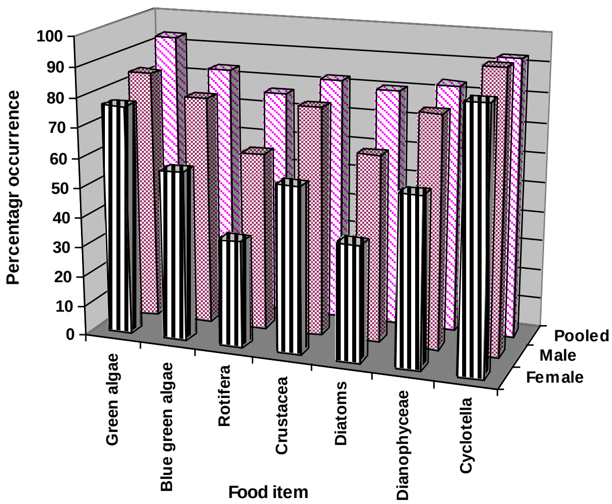

Figure 4. Percentage occurrence of different food items in the foregut of silver carp.

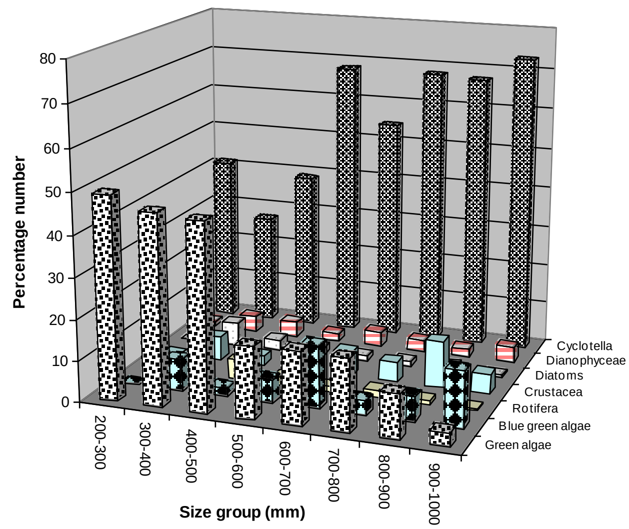

Figure 5. Percentage number of the major food items in the foregut of different size groups of silver carp.

consumed by the fish. The members of Rotifera group were another group of zooplankton found in the gut and they represented themselves as 1.89% by number, 4.9% by volume and 76% by frequency occurrence in the foregut. Amongst Rotiferan zooplankton *Keratella* spp. was the most abundant genus in the gut contents (Table 1, Figs. 2-4). Another important food item in the gut contents of this fish was the members of Bacillariophyceae (diatoms). This group of plankton included all the diatoms mentioned earlier except *Cyclotella* spp. These diatoms were present in the forgut content as 1.48% by number, 0.23% by volume and 80% by frequency occurrence silver carp. Amongst this group of diatoms, *Navicula* spp. appeared as the major contributor to the diet of this carp. Another group of phytoplankton, Dianophyceae represented 2.72% by number, 2.15% by volume and 83% by frequency occurrence in the foregut contents. Amongst Dianophyceae, *Ceratium* spp. was most dominant in the gut contents followed by *Peridinium* spp.

Percentage number and biovolume of the major food items of different size groups are given in Figure 5 and Table 2, respectively. Study of food items of various size groups (at 100 mm interval) showed that the percentage number of green algae decreased with increase in the size of the fish (Fig. 5), while the percentage number of *Cyclotella* spp. almost showed increasing trend with size of the fish except size group 200-300 mm and size group 600-700 mm (Fig. 5). The present investigations on food overlap between size groups showed that significantly high overlap values were observed between large size groups or between small size groups. The moderate overlap values were observed between small and large size groups. The observations showed that the

Table 3. Diet overlap index (foregut) between different size groups of *H. molitrix*.

Size group (mm)	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000
200-300	1.000	0.781	0.904	0.616	0.612	0.615	0.540	0.461
300-400	0.781	1.000	0.869	0.589	0.645	0.589	0.539	0.479
400-500	0.904	0.869	1.000	0.664	0.673	0.667	0.584	0.515
500-600	0.616	0.589	0.664	1.000	0.852	0.972	0.912	0.833
600-700	0.612	0.645	0.673	0.852	1.000	0.858	0.817	0.813
700-800	0.615	0.589	0.667	0.972	0.858	1.000	0.909	0.839
800-900	0.540	0.539	0.584	0.912	0.817	0.909	1.000	0.848
900-1000	0.461	0.479	0.515	0.833	0.813	0.839	0.848	1.000

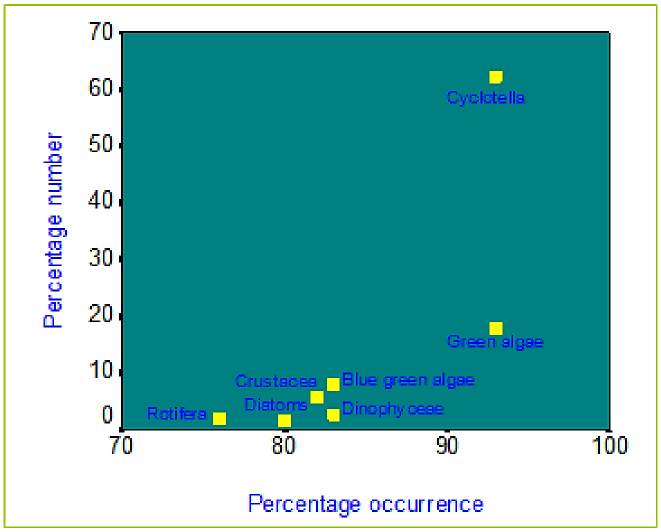

Figure 6. Relationship between percentage number and frequency occurrence of the food categories in the foregut of silver carp based on the Costello's (1990) method.

overlap index varied between 0.461-0.972. The minimum value (0.461) was observed between size groups 200-300 mm and 900-1000 mm. The highest value was observed between size groups 500-600 and 700-800 mm. The results revealed that the diet overlap index between females and males was very high (0.915 and 0.951 for food items found in foregut and hind gut, respectively), showed that the diet of female and male specimens did not differ significantly (Table 3). Relationship between percentage number and frequency occurrence of the food items in the foregut of silver carp (pooled data) based on the Costello's (1990) method is given in Figure 6. Data showed that *Cyclotella* spp. with high percentage number and frequency of occurrence represented the dominant prey taxon and thus was very important item in the diet of *H. molitrix*. Green algae with high frequency of occurrence and less percentage number could be considered to be indicative of generalized diet. As the frequency of occurrences of the other food categories were high and their percentage number were low, hence, these items could be considered as general diet of this fish. However, the results showed that there was no preference for certain specialized taxa by silver carp. Estimation of relative gut length of 45 specimens of silver carp (size range 399-985 mm) showed that gut length of this fish was 3.41-8.61 times greater than total length, with a mean of 5.59 and there was no significant difference between relative gut length of different size groups (ANOVA, n = 45, df. = 6, F = 1.057, P = 0.405).

Discussion

The results of the present study are in conformity with the earlier findings on the diet composition of silver carp. Plankton identified in the gut contents of *H. molitirx* have been found to be similar in the report of Cremer and Smitherman (1980). Plankton genera in water samples, with the exception of a few genera, have been observed in samples from intestine of silver carp, indicating no selectivity of specific types of plankton by this species from Gobindsagar. Lin (1969) and Cremer and Smitherman (1980) also reported no selectivity for specific types of plankton by silver carp, although Chiang (1971) reported that silver carp selectively fed on Cyanophyceae and Chlorophyceae.

The presence of few zooplankton genera e.g. *Polyarthra* spp. and *Splanchnopus* spp. in the water sample collected from Gobindsagar and their absence in the gut contents may be attributed to the fact that these zooplankton appeared only for a limited time period of the year (April-May) or may there may be other possibility that these might have been digested in the intestine. The possibility of the later is very remote.

The results of the present study showed that the diet of silver carp was dominated by *Cyclotella* spp. (diatom) followed by Chlorophyceae, Cyanophyceae, Crustacea, Dianophyceae and Rotifera. Dominance of diatoms in the gut of silver carp has also been reported by Ruzicka and Ruzickova (1987) and Xie (1999). According to Xie (1999), the share of *Cyclotella* spp. to the total phytoplankton biomass in the foregut contents of silver carp cultured in the net cage in the Donghu Lake (Yangtze River) was 58-92% (mean 73%), which confirm the present investigations on the food of silver carp. However, Ruzicka and Ruzickova (1987) reported the abundance of different genera of diatoms (*Melosira* spp, *Asterionella* spp. and *Fragillaria* spp.) in the gut of silver carp from Podhora water reservoir. Analysis of gut contents of silver carp from Gobindsagar (pooled data) indicated that zooplankton comprised only 7.7% by number and 19.3% by volume of the foregut contents of this fish, hence, silver carp could be considered almost as phytoplankton feeder. Tang (1970) also reported the similar results and classified silver carp as phyto–and microzooplankton feeder, with zooplankton at less than 7% of the total plankton organism. According to Ruzicka and Ruzickova (1987) zooplankton comprised less than 10% of food biomass of this fish which is in agreement with the present study. According to Cremer and Smitherman (1980), phytoplankton was the major contributor of intestine as food of silver carp and zooplankton were rarely present.

The present studies showed that the majority of the plankton found in the intestine of silver carp was *Cyclotella* spp. (62.25%) having the size range of 5-25 µm. Almost similar results have been reported by Xie (1999). They reported that *Cyclotella* spp. and *Cryptomonas* spp. (Dinoflagellate) were dominant phytoplankton in the gut of silver carp, and the size of *Cyclotella* spp. was usually smaller than 20 µm (mostly varied between 6-15 µm), while that of *Cryptomonas* spp. was usually smaller than 30 µm (mostly ranged between 10-20 µm). The present results, together with those of Smith (1989), Li and Dong (1996) and Xie (1999) clearly pointed out that silver carp is able to collect food particles smaller than the distance between its gill rakers. The distance between gill rakers (DGR) of silver carp has been recorded by earlier workers. Hampl et al. (1983) reported that DGR of silver carp was 12 µm at the narrowest part and 26 µm at the widest part, which do not change with age. Liu (1981) reported DGR of silver carp to be 15-25 µm when the total fish length was 1.5-10 cm and 34-41 µm when the total fish length was 34-47 cm. Spataru et al. (1983) found that DGR of silver carp was 36 µm (ranging between 33.9-37.2 µm). These observations indicate that the distances between gill rakers of silver carp are larger than 15 µm, hence, it can be concluded that *H. molitrix* is able to collect food particles smaller than its filtering net meshes and these observations confirm the present observations. The exact mechanism is still not understood. Probably, excretion of mucus plays an important role in collecting such small food particles. According to Li and Dong (1996) silver carp can feed on *Cyclotella* spp. (3.2 µm in diameter) efficiently through the dogging effect in conjunction with mucus.

As described earlier *Cyclotella* spp. was found to be the major food item in the gut of silver carp from Gobindsagar Reservoir and by applying Costello method, it can be concluded that *Cyclotella* spp.is important food item while the others are general food items in the diet of silver carp from Gobindsagar. Costello's (1990) analysis is based on a two dimensional representation, where each point represents the frequency of occurrence and the abundance of a prey taxon.

Study of diet overlap index of different size groups showed that the value of "D" varied between 0.461 (moderate) to 0.972 (high). Moderate overlap values were found between small size groups and large size groups but high overlap values were observed between large size groups and between small size groups, indicating that the diet of small size groups was significantly different from those of large size groups. In general, a high value of overlap index means that the groups under comparison shared a number of abundant prey, therefore, competition for food was possible. However, according to Pedersen (1999) diet overlap indices do not show the actual competition, as these values depend on how the food categories are defined and therefore must be used with caution (Hurlbert, 1971; Horppila et al., 2000). The present observations indicated that the diet overlap index between female and male silver carp was very high (0.915), indicating that the diet of male and females specimens did not differ significantly.

The question of the digestibility of plankton consumed by silver carp is also an important aspect of feeding ecology of this species. Presence of some undigested plankton e.g. *Scenedesmus* spp., *Staurastrum* spp. and *Microcysis* spp. in the hindgut of silver carp showed that these food items could not be digested completely, while most parts of the body of cladoceran and copepods are digested. The present observations confirm the observations of earlier workers such as Bitterlich and Gaigner (1984) who reported that zooplankton and cladocerans are digested in 20 min after their intake as foods, but the same is not true in the case for the members of certain phytoplankton genera like Cyanobacteria and certain Chlorophyceae. These authors reported that the digestive efficiency of *Microcystis aeruginosa* in the silver carp was 32.6% and the conversion efficiency was low at 4.6%. The findings of Beveridge et al. (1993) indicated that the same species of Cyanobacteria which constituted the food of silver carp in the present studies were digested poorly by the silver carp. Similarly some genera e.g., *Scenedesmus*, *Tetraedron*, *Pediastrum* and *Coelastrum* belonging to Chlorophyceae seem to be digested poorly (Voros et al., 1997). On the contrary, the same authors reported an excellent digestibility for Cryptophyceae, diatoms and the Cyanobacterian *Aphanizomenon flosaquae*, which accounted for more than 70% of the phytoplankton biomass ingested by silver carp, was assimilated poorly. According to them, from a qualitative point of view, Cryptophycea, diatoms, and especially zooplankton were much more valuable food for the silver carp than Cyanobacteria and desmid Chlorophycea which were poor in long-chain polyunsaturated fatty acids. As far as the relative gut length is concerned, it has been observed that the value of relative gut length varied 3.41-8.61 with a mean of 5.59 and there was no significant difference between relative gut lengths of different size groups. However, due to lack of small specimens in the commercial netting, it is difficult to arrive to an exact conclusion about the change in diet of different size groups of silver carp in Gobindsagar Reservoir. According to Cremer and Smitherman (1980) gut length of silver carp was 3.5-7.3 times greater than total length, with a mean of 5.0, which is in agreement with the results of the present study, and this confirms phytoplanktivorus habits of silver carp. Generally, change in gut length is believed to be related to change in the quality of food consumed (Al-Shamma, 1986; Hofer, 1991) but, according to Fuentes and Cancino (1990) and Xie et al. (2000) change in gut length can be affected by the quantity of food carried rather than food quality.

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چکیده فارسی

غذا و عادات غذایی ماهی کپورنقره‌ای *Hypophthalmichthys molitrix* (Val., 1844) در دریاچه سد گوبیندساغر هند

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چکیده:
بررسی غذا و عادات غذایی ماهی کپورنقره ای در دریاچه سد گوبیندساغر هند نشان داد که دیاتومه *Cyclotella* spp. رژیم غذای غالب این ماهی را تشکیل داده و کلروفیسه ها، سیانوفیسه ها، سخت‌پوستان، دینوفیسه ها و روتیفرها (گردانتنان) به ترتیب در رتبه‌های بعدی قرار می‌گیرند. دامنه اندازه *Cyclotella* spp. بین ۵ تا ۲۵ میکرون متغیر بوده که بیانگر این موضوع است که ماهی کپورنقره‌ای قادر است ذرات غذایی کوچک‌تر از فاصله بین پالاینده‌های آبششی خود را جمع‌آوری نماید. به نظر می‌رسد که ترشح موکوس در جمع‌آوری این ذرات ریز نقش مهمی داشته باشد. با بکارگیری روش کاستلو چنین نتیجه‌گیری شد که *Cyclotella* spp. یک رقم غذایی بسیار مهم بوده در حالی که سایر مواد غذایی، ارقام غذایی عمومی برای این ماهی در دریاچه محسوب می‌شوند. مطالعه شاخص همپوشانی رژیم غذایی ماهی کپورنقره‌ای در اندازه‌های مختلف نشان داد که مقدار D بین ۰/۴۶۱ (متوسط) تا ۰/۹۷۲ (زیاد) متغیر بوده که بیانگر اختلاف معنی‌دار رژیم غذایی ماهیان کپورنقره‌ای کوچک و بزرگ است. نتایج همچنین نشان داد که شاخص همپوشانی رژیم غذایی کپورنقره‌ای نر و ماده بالا بوده (۰/۹۱۵) و اختلاف معنی‌داری بین دو جنس وجود ندارد. آنالیز محتوای لوله گوارش کپورنقره‌ای نشان داد که پلانکتون‌های جانوری تنها ۷/۷ درصد از نظر تعداد و ۱۹/۳ درصد از حجم محتوای لوله گوارش جلویی این ماهی را تشکیل می‌دهند، بنابراین می‌توان کپورنقره ای را یک ریزپلانکتون‌خوار گیاهی در نظر گرفت.
کلمات کلیدی: پلانکتون گیاهی، شاخص همپوشانی رژیم غذایی، روش کاستلو، کپورنقره‌ای.