RESEARCH ARTICLE

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Micro-Biological Analysis of Water Taken from Wetland (Sapan mori and Hans Sarover) of Keoladeo National Park Bharatpur (Rajasthan)

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ABSTRACT

The ground water quality is determined in Sapanmori and Hans Sarover wetland that lays in Keoladeo national park Bharatpur Rajasthan, where from each two sites water samples are under studied for Micro Biological Analysis of water. The Phyto and Zoo Plankton density was determined by sieving 50 liters of the surface water from two sites through plankton net. This net is made up of nylon bolting silk of 25 standard grades or 77 meshs\cm. It is truncated cine shaped with upper part of 20 cm and lower with 3 cm and a specimen tube fixwd at the tail end. It was recorded that the Phytoplankton dendity maximum (234875 unit\litre) in summer season, and minimum (64562 unit\litre) in winter season. On the other hand Chorophyceae was recorded maximum (73000 unit\litre) in summer season and minimum (38791 unit\litre) and almost (33955 unit\litre) productivity was noted in the monsoon season. Also all parameters compared with ICIvIR standards of water quality.

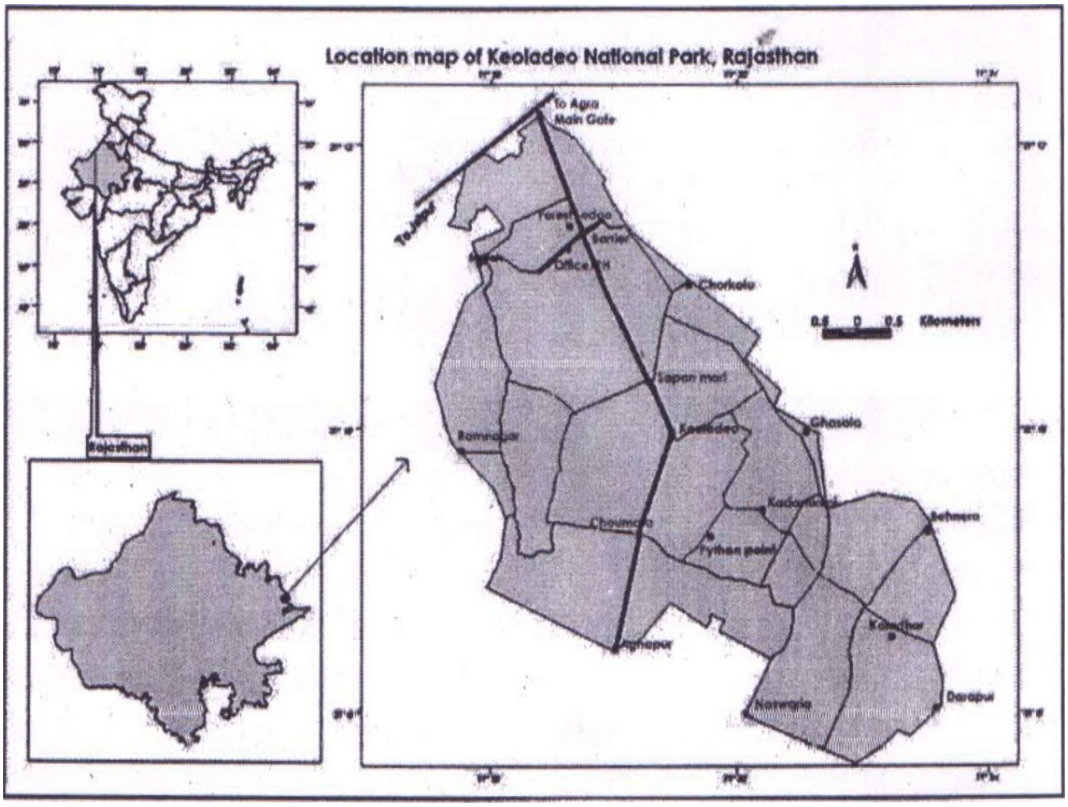
Key words: *Sapanmori, Hans Sarover, Micro-Biological Analysis*

INTRODUCTION:

Keoladeo National Park, bharatpur district is located on the north eastern part of the Rajasthan state in the undulating flat Yamuna river flood plains. The district because of its topography is eroded with many natural depressions holding a large volume of rain water. However being flat in nature, the water does stored overflows into flatters surroundings areas. The natural depression wetlands however are short lived as the water gets evaporated in the extreme hot and arid climate. The wetland compartments are surrounded by terrestrial habitats of about 2000ha except in a small area on the northwest, which is contiguous with the agricultural fields of nearby villages (Ali 1953).

The only the largest bird sanctuary in World and is reserved for its high level of biodiversity. The main source of water to fill the various lakes, ponds of this park, is Ajan Bandh which is fed by the river Gambhir. Due to the large production of flora and fauna, some migratory birds especially Siberia etc habitual to feed upon them thus it become a centre for attraction (Anon 1981, Ali and Ripley 1983). In spite of micro invertebrates (worms, insects, molluscs, etc) some vertebrates (fishes, birds, reptiles and some mammalian species) were also found in this park (Bhupathy 1991).

Water is life. All living beings depend on water to carry out complex biochemical processes which aid in the sustenance of life on earth. In the many blocks of park, two blocks were select; first- Sapanmori which is famous for birds Heron, second- Hans Sarover contains a large variety of microphysics- Ipomea, Potamogeton and Hydrilla. Some biotic and abiotic factors (like- alkalinity, acidity, B.O.D., C.O.D., etc) influencing this wetland ecosystem (Holffmann 1977). So, the present investigation was carried out to study the alkalinity of water at selected sites; Sapanmori and Hans Sarover in the wetland area of Keoladeo National Park (Map 1).



Map 1: Keoladeo National Park (Bharatpur) study site being showing in Map

MATERIAL AND METHOD:

The present study was carried out for Sapanmori and Hans Sarover wetland Keoledeo National Park bharatpur Rajasthan In the present study the sampling was done during morning hour. The water samples were collected in the polyethylene bottles. The closed bottle was dipped in the lake at the depth of 0.9 to 1.0 m, and then a hottle was opened inside and was closed again to bring it out at the surface. The samples were collected from five different points and were mixed together to prepare an integrated sample. From the time ol sample collection to the time of actually analyses, many physical and chemical reaction would change the quality of the water sample; therefore to minimize this change the sample were preserved soon after the collection. The water samples were preserved by addinf-4 chemical preservatives and by lowering the temperature. The water temperature, pH, DO, and TDS were analyzed immediately on the spot after the collection, whereas the analyses ol remaining parameters were done in the Environmental Research laboratory, Zoology Department, Agra College Agra. The study was carried for a period of 2 year (Jan. 2000 to Dec. 2001). Monthly data was collected, but results were represented season wise. Four month make one season (March to June summer season, July to October monsoon season, and November to February winter season). The concentrate of water sieved though net in tube was preserved in 10% formaldehyde in a plastic tube. Both phyto and zooplankton were identified after shaking thoroughly the plastic tube in the laboratory. One drop of water was taken with the help of ordinary dropper on Sedgwick rafter (graduated) and plankton counting was done with the help of microscope in high power. The formula (Welch, 1948) applied for counting of plankton is:

$$n = (a\ 1000)\ c/l$$

Where,
n= Number of plankton/ litre of original.
a = Mean number of plankton all count in counting cell.
c= Volume of concentrated plankton in ml.
I = volume of original water filtered in it.
Sincere, in the present case, the counting cell of one cubic cm capacity was used, hence the formula change to-

$$n = a \times c/l$$

Table 1: Monthly variations in total phytoplankton (unil/lit) at site-B inwetland area of Keoladeo National Park (2000)

Months	Chlorophyceae	Bacillariophyceae	Myxophyceae	Total PhytoPlankton
January	40,120	30,260	60,000	1,30,380
February	36,000	38,000	68,000	1,42,000
March	56,030	42,800	80,062	1,78,892
April	56,500	58,400	71,625	1,86,525
May	86,050	60,600	72,850	2,19,500
June	52,604	54,800	80,120	1,87,524
July	49,500	40,875	28,600	1,18,975
August	23,300	28,750	20,260	72,310
September	26,080	26,120	28,858	81,058
October	35,580	28,608	60,800	1,24,988
November	36,604	28,000	65,000	1,29,604
December	38,360	30,620	80,640	1,49,620

Table 2: Monthly variations in total phytoplankton (unil/lit) at site-A inwetland area of Keoladeo National Park (2000)

Months	Chlorophyceae	Bacillariophyceae	Myxophyceae	Total PhytoPlankton
January	38,125	31,250	70,150	1,39,525
February	39,625	36,000	69,000	1,44,625
March	58,625	51,600	99,062	2,09,287
April	58,750	52,500	71,625	1,82,875
May	94,250	61,875	78,750	2,34,875
June	50,875	40,875	86,125	1,77,875
July	48,750	20,875	27,500	97,125
August	22,562	23,750	18,250	64,562
September	28,000	21,125	26,875	76,000
October	33,350	25,625	59,500	1,18,475
November	34,875	25,000	63,500	1,23,375
December	36,250	26,625	68,750	1,31,825

Table 3: Monthly variations in total phytoplankton (unil/lit) at site-B inwetland area of Keoladeo National Park (2001)

Months	Chlorophyceae	Bacillariophyceae	Myxophyceae	Total PhytoPlankton
January	38,000	38,000	63,060	1,39,060
February	44,200	38,360	68,620	1,51,180
March	68,000	60,120	81,300	2,09,420
April	68,600	58,120	68,460	1,95,180
May	86,620	56,000	67,000	2,09,620
June	60,600	45,000	76,860	1,82,460
July	46,000	36,000	30,220	1,12,220
August	29,000	26,125	18,268	73,393
September	26,866	26,600	24,280	77,746
October	38,000	20,050	60,400	1,18,450
November	38,600	25,600	68,200	1,32,400
December	40,120	32,400	81,080	1,53,600

Table 4: Monthly variations in total phytoplankton (unil/lit) at site-A inwetland area of Keoladeo National Park (2001)

Months	Chlorophyceae	Bacillariophyceae	Myxophyceae	Total PhytoPlankton
January	37,000	36,000	83,250	1,56,250
February	41,250	37,375	65,625	1,44,250
March	69,000	62,125	70,375	2,01,500
April	64,875	59,125	78,375	2,02,375
May	95,625	67,000	71,000	2,33,625
June	62,500	50,500	81,875	1,94,875
July	48,000	26,000	28,125	1,02,125
August	30,000	21,125	16,250	67,375
September	24,875	10,687	21,250	56,812
October	36,000	19,750	60,375	1,16,125
November	39,500	58,500	65,250	1,63,250
December	38,125	62,500	71,000	1,71,625

RESULT AND DISCUSSION:

The Phytoplankton in Keoladeo National Park lakes is represented by three major groups Chlorophyceae, Bacillariophyceae and Myxophyceae. These groups are identified in four categories in descending order (Table 1). (i) Dominant forms, (ii) Abundant forms, (iii) Frequent forms the largest and abundant group represented by 73 species followed by Bacillariophycae containing 24 forms and myxophyceae having 18 species. In the entire period of investigation the total phytoplankton density varied from a minimum of (64,562 unit/litre) in the month of August 2000 to a maximum of (2,34,875 unit/litre) May 2000. Almost

similar conditions were found in the year 2001 but having highest number of phytoplankton (2,33,625 unit/ litre) in May, and a minimum of (56,812 unit/litre) in the month of September 2001 was recorded.

Chlorophycea:

The density of chlorophyceae varied from a minimum of (22,562 unit/litre) in the month of August 2000 to a maximum of (94,250 unit/litre) in the month of May 2000. Similar condition was observed in the next investigation period in 2001. The highest productivity (95,625 unit/litre) was noted in the month of May and lowest (30,000 unit/litre) in the month of August. During both the years second peak were recorded in the month of February.

Bacillariophyceae:

Throughout the investigation year 2000, Diatoms were found to vary from a minimum of (21,125 unit/litre) in the month of September, to a maximum of (61,875 unit/litre) in the month of May. During next investigating year 2001, Bacillariophyceae showed the maximum production of (67,000 unit/litre) in the month of May to a least production of (10,687 unit/litre) in the month of September.

The Zooplankton are the immediate consumers of phytoplankton as such, they form the next higher trophic level in the energy flow after the phytoplankton. These micro-organism form a major food component for fishes and other herbivores in the aquatic resources. Therefore, observations were also made to study the quantity and quality of zooplankton.

Rhizopoda:

The population of Rhizopoda varied from a maximum of 16,650 unit/litre in the month of May followed by July (15,300 unit/litre). A minimum of (1,722 unit/litre) was noted in the month of September 2000. In next investigation period, a highest population (17,982 unit/litre) was detected in the month of May followed by July (16,524 unit/litre) and a least population was observed (1,860 unit/litre) in the month of September).

The highest population of Copepoda was recorded at site B due to decreasing concentration of phytoplankton and organic substances. These are responsible for faily high growth of Copepoda. According to Antony, *et al.* (179) the predominance of Copepoda indicate organic pollution. The conchostraca were found only in eight months, highest (15,554/litre) in February and minimum (825/litre) in June. As regards the seasons, it was observed only in two seasons summer and monsoon, due to the high temperature suitable for its growth along with concentration of organic matter. It shows direct relationship with BOD and COD and total solids. These parameters were high during summer and faily high in monsoon. Zononi (1986), Haque and Khan (1994) suggested that high value of BOD and COD indicate the high concentration of organic matter. Its population was maximum at site A due to the maximum density of conchostraca indicating the higher concentration of organic substances.

Anostraca density was observed maximum (17,172/litre) in the month of February. As far as the seasons are concerned, their highest density was found in winter season, fairly high in autumn and totally absent during summer season. The high concentration of Anostraca during these seasons is due to the high dissolved oxygen, low water temperature, and fairly low pH value. These chemical factors are suitable for its fair growth. Anostraca show the inverse relationship with Conchostraca, when if maximum density was observed the population of former was totally absent.

Table 1 reveal that the carbonates vary from a minimum of (15.0 mg/lit) to a maximum of (28.0 mg/lit) during February and June 2000. In year 2001, the

minimum was (21.0 mg/lit) in March and maximum (31.0 mg/lit) in the month of June. Seasonally, it was detected only in two season in 2000, the lowest (5.0 mg/litre) in winter season and highest (25.75 mg/lit) in summer season, while in the year 2001, it was detected only in summer season (lowest 25.25 mg/lit and highest 28.5 mg/lit) as present in Table.

Considering the sites, the minimum concentration (15.0 mg/lit) were observed at site A followed by site B (18.0 mg/lit) in the month of February and maximum (28.0 mg/lit) at site B followed by site A (26.0 mg/lit) in the month of June 2000, respectively; while in year 2001, the minimum concentration was recorded (21.0 mg/lit) at site A followed by site B (27.0 mg/lit) in the month of March and the maximum value was noted to (31.0 mg/lit) at site B followed by site A (30.0 mg/lit) in the month of June respectively. Table 3 show that bicarbonates were detected only in five months, the minimum was recorded (170 mg/lit) during May and maximum (270 mg/lit) during March 2000. In year 2001, the highest concentration was observed (285 mg/lit) in the month of March and lowest was noted (150 mg/lit) during May (Table 3, 4).

Bicarbonates were fluctuating from a maximum of (270 mg/lit) at site B followed by site A (260 mg/lit) during March to a minimum of (170 mg/lit) at site A followed site B (190 mg/lit) in the month of May 2001. In year 2001, the fluctuations were recorded to be minimum of (150 mg/lit) at site A followed by site B (200 mg/lit) during May to a maximum.

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