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A REPORT ON THE POLLUTION ALGAE FROM THE THRISSUR KOL WETLANDS (PART OF VEMBANAD KOL, RAMSAR SITE), KERALA

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ABSTRACT

The present survey of algae was undertaken at four sites in the Kol wetlands of Thrissur district, Kerala. The study area lies between 10°20' and 10°30' N lat. and 76°5' and 76°15' E long. The analysis of algae in the study area shows eighteen pollution tolerant algal species, which were indicators of pollution. Out of the 64 genera found in the study area, 30 genera were pollution tolerant.

INTRODUCTION

The Kol wetlands perform a wide range of functions that are essential for supporting plant, animal and human life, and for maintaining the quality of environment. This wetland area is exploited for products such as rice, vegetables, livestock and fish and all these activities are depending upon the annual rise and fall of the floods. The extensive water surface in Kol lands provides a rich favourable environment for breeding and multiplication of fish species.

The Kol lands of Kerala lies between 10°20' and 10°30' N lat. and 76°5' and 76°15' E long. (Johnkutty & Venugopal 1993). The Kol wetlands form a unique aquatic ecosystem and are the rice granary of Thrissur and Malappuram districts of Kerala. The Thrissur Kol lands lie between Kecheri river in the north and Chalakudy river in the south.

Kol wetland is one of the important flood plain wetlands of Kerala. Karuvannur and Kechery are the two major rivers in Thrissur Kol region. These rivers discharge the flood waters into the low lying Kol area and raise water level to more than three meters. The Kol lands constitute a significant part of one of the largest wetland systems on the southwest cost of India, namely Vembanad-Kol land system.

Freshwater habitats are among the most threatened and valuable ecosystems (De Meester & Declerck 2005). They are the fragile ecosystems that are susceptible to damage even with only a little change in the composition of biotic and abiotic factors. All over the world, significantly large areas of wetlands have been lost or are degraded to different degrees due to various anthropogenic activities, which primarily cause hydrological changes (Gopal 2003, Junk 2002). There are no global estimates for rates of change in the extent of freshwater habitats or for the overall changes in their condition (Dudgeon 2003).

The wetlands are under extreme threat in Kerala than in any other part of India due to very high population density and the homestead mode of habitation (Nayar & Nayar 1998). Most of the wastes of the human activities are released into the nearby water reservoirs, thereby polluting the water bodies and threatening the biota.

Palmer (1969) made the first major attempt to identify and prepared a list of genera and species of algae most tolerant to organic pollution. He prepared a list of sixty genera and eighty species tolerant to organic pollution.

Various scientists used algae for assessing the degree of pollution or as indicator of water pollution or for eutrophication studies of water bodies (APHA 1998, Munshi & Munshi 1995, Hynes 1978, Palmer 1969, Khan 1991, Biswas & Konar 2000).

MATERIALS AND METHODS

The surface water samples were collected at monthly intervals from the four sites of the study area for a period of one year. The work was conducted during 2005 to 2006. The collected samples were preserved immediately in 4% formalin and brought to the laboratory (APHA 1998).

The identification of different algal species was based on the keys given in the taxonomic publications (Anand 1989, 1998, Prasad & Misra 1992, Prasad & Srivastava 1992, Prescott 1982, Sarode & Kamat 1984, Smith 1920,1924, Venkataraman 1939, Turner 1978, West & West 1907) and ICAR monographs (Desikachary 1959, Iyengar & Desikachary 1981, Philipose 1967) on algae.

Table 1: List of algal genera reported from the study area.

Sl. No:	Name of Genera	Algal Group	No: of Species	Sl. No	Name of Genera	Algal Group	No: of Species
1	*Cocconeis**	BA	1	33	*Anabaena**	CN	2
2	*Cymbella**	BA	1	34	*Chroococcus*	CN	2
3	*Eunotia*	BA	2	35	*Lyngbya**	CN	3
4	*Fragilaria**	BA	1	36	*Merismopedia*	CN	1
5	*Gomphoneis*	BA	1	37	*Microcystis**	CN	1
6	*Melosira**	BA	2	38	*Myxosarcina*	CN	1
7	*Navicula**	BA	1	39	*Oscillatoria**	CN	8
8	*Pinnularia**	BA	1	40	*Spirulina**	CN	3
9	*Stauroneis**	BA	1	41	*Tolypothrix*	CN	1
10	*Surirella**	BA	1	42	*Cylindrocystis*	DE	3
11	*Synedra**	BA	1	43	*Gonatozygon*	DE	4
12	*Chlorella**	CH	1	44	*Netrium*	DE	2
13	*Chlorococcum**	CH	1	45	*Arthrodesmus*	DE	4
14	*Coelastrum**	CH	2	46	*Closterium**	DE	16
15	*Dimorphococcus*	CH	1	47	*Cosmarium**	DE	7
16	*Eudorina**	CH	1	48	*Desmidium*	DE	4
17	*Kirchneriella*	CH	1	49	*Docidium*	DE	1
18	*Mougeotia*	CH	1	50	*Euastrum*	DE	10
19	*Nephrocytium*	CH	1	51	*Gymnozyga*	DE	1
20	*Oedogonium*	CH	1	52	*Hyalotheca*	DE	1
21	*Pandorina**	CH	2	53	*Micrasterias*	DE	7
22	*Pediastrum**	CH	4	54	*Onyconema*	DE	1
23	*Pleodorina*	CH	1	55	*Penium*	DE	2
24	*Scenedesmus**	CH	8	56	*Pleurotaenium*	DE	6
25	*Schroederia*	CH	1	57	*Spondylosium*	DE	2
26	*Selenastrum**	CH	2	58	*Staurastrum*	DE	6
27	*Spirogyra**	CH	7	59	*Triploceras*	DE	1
28	*Tetraedron*	CH	3	60	*Xanthidium*	DE	5
29	*Tetrallantos*	CH	1	61	*Euglena**	EU	7
30	*Ulothrix**	CH	1	62	*Lepocinclis**	EU	1
31	*Volvox*	CH	1	63	*Phacus**	EU	11
32	*Uroglenopsis*	CR	1	64	*Trachelomonas**	EU	9

* - Pollution tolerant genera (Palmer 1969)

CH - Chlorophyceae; CR - Chrysophyceae; CN - Cyanophyceae; EU - Euglenophyceae, DE - Desmidiaceae and BA - Bacillariophyceae

RESULTS AND DISCUSSION

During the present study one 188 species of algae under 64 genera were identified belonging to six taxonomic groups. The Desmidiaceae was the dominant group with 83 species under 19 genera followed by Chlorophyceae with 41 species belonging to 20 genera (Tessy 2007). The Bacillariophyceae was less dominant throughout the period of the study in all the sites, which represents only 13 species under 11 genera.

The Euglenophyceae with 28 species belonging to four genera and Cyanophyceae with 22 species under nine genera were found in the study area. The Chrysophyceae was represented by only one species.

The desmids are indicators of good water quality, which was the dominant group during the period of study. This indicates the good water quality of the study area. Desmids occur principally in soft or slightly acidic water habitats with rich organic and low calcium content (Prescott 1982).

Out of the 64 genera found in the study area, 30 genera were pollution tolerant (Table 1). The analysis of algae in the study area shows 18 pollution tolerant algal species (Table 2), which were indicators of pollution (Palmer 1969).

Presence of pollution tolerant algae like *Melosira*, *Oscillatoria*, *Pandorina*, *Pediastrum*, *Closterium, Navicula, Microcystis* and *Scenedesmus* has been considered indicative of enriched waters, thus, providing evidence of pollution (Biswas & Konar 2000).

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Table 2: Pollution tolerant algal species found in the study area (Palmer 1969).

Sl. No:	Name of Species	Taxonomic Group	Site No.
1	*Chlorella vulgaris*	Chlorophyceae	I
2	*Coelastrum microporum*	Chlorophyceae	I, III
3	*Eudorina elegans*	Chlorophyceae	II, III
4	*Pandorina morum*	Chlorophyceae	I, II, III, IV
5	*Pediastrum boryanum*	Chlorophyceae	I
6	*Pediastrum duplex*	Chlorophyceae	II, IV
7	*Scenedesmus dimorphus*	Chlorophyceae	I, III
8	*Scenedesmus obliquus*	Chlorophyceae	I
9	*Scenedesmus quadricauda*	Chlorophyceae	I, II
10	*Closterium acerosum*	Desmidiaceae	I
11	*Cocconeis placentula*	Bacillariophyceae	I, II
12	*Melosira granulata*	Bacillariophyceae	I, II, III
13	*Synedra ulna*	Bacillariophyceae	II, III, IV
14	*Euglena acus*	Euglenophyceae	I, II
15	*Phacus pleuronectus*	Euglenophyceae	IV
16	*Trachelomonas volvocina*	Euglenophyceae	I, III, IV
17	*Oscillatoria limosa*	Cyanophyceae	II
18	*Oscillatoria princeps*	Cyanophyceae	II

Site I - Pullur, Site II - Chemmanda, Site III - Palakkal, Site IV - Enamavu

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