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Original Research Article

Seasonal Studies on Distribution of Micro Algae in Konam Reservoir, Visakhapatnam District, Andhra Pradesh, India

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Abstract

In this present investigation, seasonal distribution of micro algae in Konam reservoir (Visakhapatnam district, Andhra Pradesh) was studied for a period of one year from November 2022 to October 2023. A total of 61 species were reported which belongs to four groups of algae such as Chlorophyceae (26), Bacillariophyceae (15) Cyanophyceae (15) and Euglenophyceae (5). In post monsoon season higher number (57) of micro algal forms were recorded and lower number (41) of microalgae were reported during monsoon season.

Keywords: Micro algae, Seasonal distribution, Konam reservoir, Visakhapatnam district.

INTRODUCTION

Lakes and reservoirs (artificial lakes) are categorized into lentic or lacustrine ecosystem which is a still water to accommodate many biotas. The floral forms present in this aquatic ecosystem belonging to algae and angiosperms. Micro algae play a vital role in the aquatic ecosystem for converting the light energy into chemical energy ultimately for production of food in various tropic levels of the food web. Productivity of phytoplankton influenced by the physico-chemical parameters of the water ecosystem (Narasimha Rao, 2009). Algae used as bio monitors for aquatic pollution (Nandan and Patel, 1992), various commercial applications (Jyothi and Narasimha Rao, 2020) and bioactive compounds for drug discovery in connection with corona virus (Jyothi *et al*., 2022). Studies on lentic water bodies especially artificial lakes in North Coastal Andhra Pradesh (Renuka and Narasimha Rao, 2013; Jyothi and Narasimha Rao, 2013A; 2013B), research studies on lakes (Bhanu Prakash *et al*., 2014; Jyothi and Narasimha Rao, 2015; 2016; Jyothi *et al*., 2016; Jyotsna *et al*., 2014; 2015 and 2016) and studies on temple ponds (Madhava Rao and Narasimha Rao, 2016; 2020 and 2023). In this present investigation an attempt was made on distribution and abundance of micro algae in different seasons of one year at Konam reservoir, Visakhapatnam district, Andhra Pradesh. Initially three study sites were selected for collection of data but after analyzing the samples of pre monsoon season, there was no significant differences reported among the three different study sites of the reservoir. So, samples were collected from center of the reservoir (one study site retained for collection of data) for assessing the composition and density of micro algae in Konam reservoir.

MATERIALS AND METHODS

Konam is located 65 KM away from Visakhapatnam city and the Konam Reservoir was constructed across the Bodderu river at village Konam, Visakhapatnam district, Andhra Pradesh. The geographical coordination is 17º 58' 30" N and 82º50' 50" E. at Konam Reservoir, Andhra Pradesh. In this present study micro algal samples were collected for a period of one year from November 2022 to October 2023 during the pre-monsoon (February, March, April and May), monsoon (June, July, August and September) and post-monsoon (October, November, December and January) seasons. Phyto plankton net (mesh size 25 µm) used to swept on surface waters of the reservoir and Phyto plankton was collected, transferred into 500 ml containers and fixed in 4% formalin. These samples were centrifuged at 1500-2000 rpm for 8 to 10 min. The phytoplankton settled were diluted to a desirable concentration in such a way that they could be easily counted individually using compound micro-scope and phytoplankton were measured with Sedgwick Rafter cell, APHA (2005) and multiplied with the dilution factors was described by Kodarkar *et al*., (1991). The

micro algae were identified by referring the Prescott (1951) and Desikachary (1959).

RESULTS AND DISCUSSION

In this present study, seasonal distribution of micro algae at Konam reservoir revealed that there were four major groups of algae consisting of 61 species (Table 1), in which 26 species belong to class Chlorophyceae, 15 species belong to class Bacillariophyceae and 15 species of class Cyanophyceae and remaining 5 species related to class Euglenophyceae. Maximum number of species (57) were observed during post monsoon season while minimum number of species (41) were reported in monsoon season and 48 species were present during pre-monsoon season.

Species of the class Chlorophyceae reported *were Ankistrodesmus falcatus, Chlamydomonas polypyrenoideum, Chlorella vulgaris, Chlorogonium euchlorium, Coenococcus planctonicus, Closterium acutum, Cosmarium sp., Eudorina elegans, Gloeocystis sp., Hydrodictyon sps, Micractinium sp., Oedogonium princeps, Pandorina elegans, Pediastrum.boryanum., Scenedesmus obliqus, Scenedesmus bijugatus, Spirogyra condensate, Spirozyra daedaleoides, Spirozyra setiformis, Tetraspora sps, Tetraedron trigonum, Ulothrix variabilis, Ulothrix tenerrima, Volvox aureus, Volvox tertius, Zygnema peliosporum*. Members of the Bacillariophyceae reported in this study were *Cyclotella sp., Cymbella affinis, Cymbella cesati, Frustulia rhomboids, Fragillaria sps, Melosira granulate, Navicula confervacea, Navicula sps., Nitzschia sps, Pinnularia acrosphaerica, Rhopalodia gibba, Synedra ulna, Tabellaria flocculosa, Gyrosigma acuminatum, Gyrosigma attenuatum.* Species of the Cyanophyceae were.

Aphanocapsa biformis, Aphanocapsa pulchra, Aphanothece clathrata, Chroococcus macrococcus, Chroococcus minutus, Dactylococcopsis fascicularis, Gloeocapsa decorticans, Lyngbya majuscule, Merismopedia glauca, Microcystis aeruginosa, Microcystis robusta, Nostoc commune, Pelogloea bacillifera, Peridinium anglicum, Snechocystis aeruginosa. And 5 species of Euglenophyceae such as *Euglena acus, E.gracillus, Phacus acuminatus, Phacus moniliatus, Trachelomonas hispida* were reported in this present investigation. This study on micro algae of Konam reservoir showed that class Chlorophyceeae was dominant followed by class Bacillariophyceae, Cyanophyceae and Euglenophyceae. These results are agrees with the earlier investigations of Balasingh and Shamal (2007), Laskar and Gupta (2009) and Adesalu (2010).

In this present investigation on micro algal distribution of Konam reservoir shows that maximum number of micro algae was observed in post monsoon season and minimum number in monsoon season (Table 1) as observed by Liu *et al*., (2010) and Brraich and Kaur (2015). Environmental parameters promote the growth and abundance of phytoplankton in post monsoon season (Agale *et al*., 2013; Madhava Rao and Narasimha Rao, 2016). Senthil Kumar and Siva Kumar (2008) observed that abundance of phytoplankton was declined slowly during pre-monsoon season and the lowest values were observed in monsoon as agrees with present trends of distribution of micro algae in Konam reservoir. During the post monsoon season turbidity of waters decreased gradually, increased transparency and abundant nutrient enrichment in waters promoted the growth of micro algae in ponds (Tarakeswar *et al*., 2011). In this study phytoplankton fluctuates seasonally due to cloudy weather, low transparency and high water in put in monsoon decline the abundance of phytoplankton agrees with earlier observations of Devika *et al*., (2006); Krishnamoorthy *et al*., (2007) and Hasan *et al*., (2010) while in summer season increased temperature enhance the nutrient concentration as observed by Santhanam and Perumal (2003).

Table 1: Seasonal distribution of micro algae in Konam reservoir, Visakhapatnam district, AP

	Name of the species	Pre monsoon	Monsoon	Post monsoon
1	*Ankistrodesmus falcatus*	+	--	+
2	*Aphanocapsa biformis*	--	+	+
3	*Aphanocapsa pulchra*	+	+	--
4	*Aphanothece clathrata*	--	+	+
5	*Asterococus palmella*	+	--	+
6	Chlorella vulgaris,	+	+	+
7	*Chlamydomonas polypyrenoideum,*	+	--	+
8	*Closterium acutum*	+	+	+
9	*Chlorogonium euchlorium,*	+	--	+
10	*Chroococcus macrococcus*	--	+	--
11	*Chroococcus minutus*	+	--	+
12	*Coenococcus planctonicus*	--	+	+
13	Cosmarium sp.,	+	--	+
14	*Cymbella affinis*	+	--	+
15	*Cymbella cesati*	--	+	--
16	*Dactylococcopsis fascicularis,*	+	+	+

	Name of the species	Pre monsoon	Monsoon	Post monsoon
17	*Eudorina elegans,*	+	--	+
18	*Euglena acus*	--	+	+
19	*Euglena gracillus*	+	+	--
20	*Frustulia rhomboids*	+	+	+
21	*Fragillaria* sps	+	--	+
22	*Gloeocystis* sps	--	+	+
23	*Hydrodictyon* sp.,	+	+	+
24	*Gloeocapsa decorticans*	+	+	+
25	*Gyrosigma acuminatum,*	+	--	+
26	*Gyrosigma attenuatum*	--	+	+
27	*Lyngbya majuscule*	+	+	+
28	*Melosira granulate*	+	+	+
29	*Merismopedia glauca*	+	--	+
30	Micractinium sp.,	--	+	+
31	*Microcystis aeruginosa,*	+	--	+
32	*Microcystis robusta*	+	+	+
33	*Navicula confervacea*	+	+	+
34	*Navicula sps.*	+	--	+
35	*Nitzschia sp*	+	--	--
36	*Nostoc commune*	+	+	+
37	*Oedogonium princeps*	+	+	+
38	*Pandorina elegans,*	+	+	+
39	*Pediastrum boryanum*	+	+	+
40	Peridinium anglicum,	+	--	+
41	*Pelogloea bacillifera*	--	+	+
42	*Phacus acuminatus*	+	+	+
43	*Phacus moniliatus*	+	--	+
44	*Pinnularia acrosphaerica*	+	+	+
45	*Rhopalodia gibba*	+	+	+
46	*Snechocystis aeruginosa*	+	--	+
47	*Scenedesmus obliqus,*	+	+	+
48	*Scenedesmus bijugatus*	--	+	+
49	*Spirogyra condensate*	+	+	+
50	*Spirozyra daedaleoides*	+	--	+
51	*Spirozyra setiformis*	+	+	+
52	*Synedra ulna,*	--	+	+
53	*Tabellaria flocculosa*	+	--	+
54	*Tetraedron trigonum*	+	+	+
55	*Tetraspora* sp.,	+	+	+
56	*Trachelomonas hispida*	+	+	+
57	*Ulothrix variabilis*	+	--	+
58	*Ulothrix tenerrima*	--	+	+
59	*Volvox aureus*	+	+	+
60	*Volvox tertius*	+	+	+
61	*Zygnema peliosporum*	+	+	+
		48	41	57

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