

## Post cyclone changes in community structure of plankton in Chilika Lagoon

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### ABSTRACT

Phailin, a 'severe cyclonic storm' crossed Odisha coast on 12<sup>th</sup> October 2013 causing heavy rainfall leading to floods (IMD, 2013) and widespread devastation (Froberg, 2013). Chilika, Asia's largest lagoon, spread over Puri, Khurda and Ganjam districts of Odisha, between Lat. 19° 28'- 19° 54' N and Long. 85° 06'- 85° 35' E had to face the consequences of cyclone Phailin (Mohanty, 2013). In a related study the lagoon was investigated for plankton dynamics before the cyclone during 22-27 September 2013. To investigate the post cyclone changes, a study was conducted after the cyclone during 11-16 November 2013. The information collected was also compared with the same period of 2012.

The study examined post cyclone changes in the taxonomic diversity, abundance and community structure of plankton along 13 stations in Chilika Lagoon. Due to the heavy rainfall and floods, followed by the cyclone, the average salinity range of the lagoon dropped from 4.7 ppt (September 2013) to 1.9 ppt (November 2013); that is otherwise unusual for this period. This change in salinity was reflected in both the diversity as well the abundance of plankton in the lagoon. The plankton diversity showed significant difference ( $p=0.01$ ) between the pre and post cyclone samplings. The total number of phytoplankton and zooplankton recorded in September 2013 was 61 and 30 respectively, which decreased to 48 and 26 species in November 2013. The corresponding period of 2012 had recorded 66 and 28 species of phytoplankton and zooplankton respectively, indicating a decline in the plankton diversity post Phailin. The average phytoplankton abundance (units/m<sup>3</sup>) of the lagoon was 4624123 and 568078 in September and November 2013 respectively. The average zooplankton abundance (no./m<sup>3</sup>) stood around 10563 and 150225 in September and November 2013 respectively. Although the total abundance of plankton across the stations in November 2013 did not vary significantly ( $p=0.17$ ) with that of September 2013, the abundance of the same period in the previous year showed a significant difference ( $p=0.004$ ). The plankton community structure of the lagoon showed considerable change between the sampled months. Among phytoplankton Bacillariophyceae dominated the Northern sector (40- 60%) and Southern sector (30- 95%) both in September 2013 and in the corresponding period of 2012. The trend changed in November 2013, wherein the group was restricted mostly to the Central sector and Outer Channel (45- 70%) of the lagoon. The dominance of Cyanophyceae in Northern, Southern and Central sector in November, 2013 (60- 80%) can be attributed to abundance of *Microcystis aeruginus* (222263 unit/m<sup>3</sup>), which were considerably low in September 2013 (971.38 unit/m<sup>3</sup>) and not encountered in the corresponding period of 2012. The abundance of dinoflagellates remained relatively low post Phailin but

the occurrence of resting dinocysts of species like *Gonyaulax* sp. and *Protoberidinium* sp. (2641unit/m<sup>3</sup>) were recorded for the first time from the lagoon. The abundance of copepods increased to 87634 no./m<sup>3</sup> in November 2013 from 41499 no./m<sup>3</sup> in September 2013 and 4543 no./m<sup>3</sup> in the corresponding period of previous year.

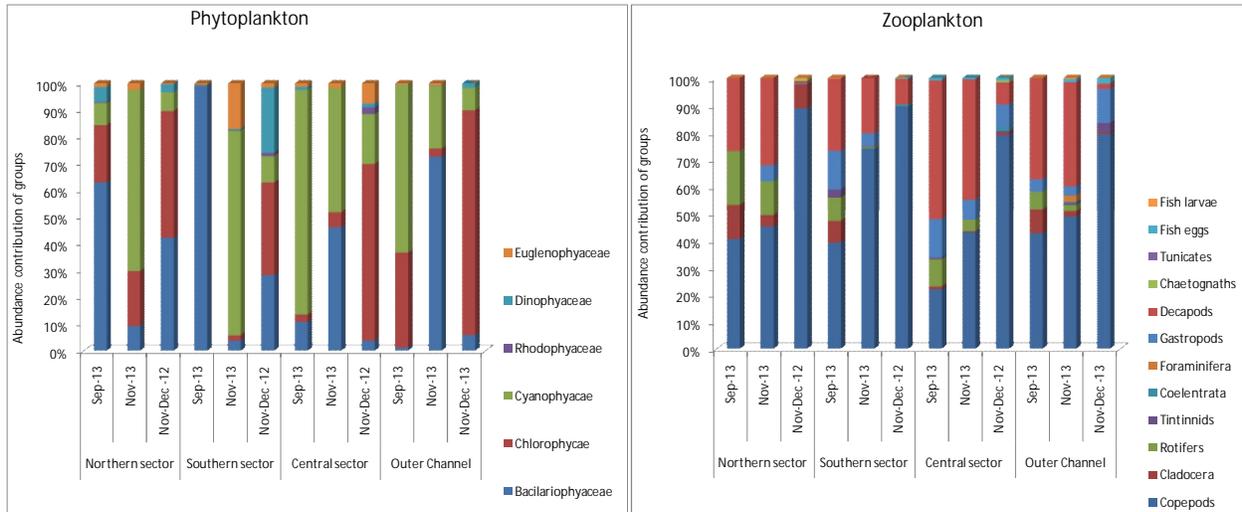


Fig. 1. Percentage composition of phytoplankton and zooplankton during November- December 2012, September, 2013 and November 2013 of Chilika lagoon.

Their contribution to the total zooplankton during post Phailin period (45%- 75%) was higher than September 2013 (20- 50%) but lower than previous year (80-90%) as shown in Fig. 1. The cyclopoida to calanoida ratio remained 1: 0.5 in September, whereas 1: 1.8 post phailin. The zooplankton community of the lagoon also showed decrease in marine species of rotifers, cladocans and veliger larvae. The outer channel that otherwise used to be dominated by marine species showed presence of freshwater species like *Pediastrum simplex*, *Closterium setaceum*, *Pandorina* sp., freshwater polychaetes and nematodes. Thus the study indicated changes in the diversity, abundance and community structure of the plankton in the Lagoon after the cyclone, which probably will soon regain to its original state.

## REFERENCE

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