



# ICPEP-4



# Abstracts

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## SVIII/O-1

**Optimal Nutrient Management through Algal and Macrophyte Interplay in an Urban Lake in Bangalore****Durga Madhab Mahapatra\*, H.N. Chanakya and T.V. Ramachandra**

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Lakes play a crucial role in maintaining the ecological integrity in an urban environment. The algae and macrophytes present in lakes purify water substantially and regulate the nutrient levels. However, increasing urban population and consequent pressure on environment have tremendous detrimental effects on urban ecology including urban lakes. Continuous influx of untreated sewage in the urban lakes carry enormous amount of pollutants, leading to profused growth of invasive macrophytes such as water hyacinth. They are consequently taken over by alligator weed (*Alternanthera*) indicating higher nutrient concentrations. Water hyacinth hinder the aerobic functioning of lakes by restricting sunlight penetration and affecting algal photosynthesis.

This communication evaluates the influence of the algae and macrophytes in the regulating the nutrient status in Varthur lake, Bangalore. The algal community, macrophyte growth and extent with reference to physico-chemical parameters of the lake were monitored from July, 2008-10 in different seasons at selected locations. The analysis of seasonal data revealed that during summer extensive growth of macrophytes hampers the normal treatment ability of the lake due to the blockage of air-water interface influencing oxygen diffusivity. However, during monsoon in the absence of macrophytes, lake functions as aerobic lagoon. The abundant algal growth brings down the nutrient levels favoring higher growth of algal community characterized by small cells ( $<10\mu\text{m}$ ). Euglenophyta ( $>30\mu$ ) were concentrated mostly at stagnant zones. Chlorophyll-a concentrations are among the highest (3.73–13.55  $\mu\text{g/l}$ ) reported for Varthur lake which is an outcome of high proportions of Chlorophyta (*Chlorella* sp. 80%) abundant throughout the year and to some extent Euglenophyta due to eutrophied conditions. Out of 32.7 tN entering everyday 1.17 t/day is transformed into algal biomass and 0.15 t/day is absorbed by macrophytes. The nutrient content in the algae showed higher proportion of N (5.2-7.14 g/100 g dry wt.) compared to the macrophytes [1.23 (*Cyperus* sp.) – 4.11 (*Lemna* sp.) g/100g dry wt.], indicating higher nutrient uptake and accumulation. The lake system behaves as an aerobic-anaerobic lagoon in pre monsoon and anaerobic-aerobic system in post monsoon. Significant seasonal changes persisted in water quality due to change in redox conditions and dissolved oxygen levels at various macrophyte's locations depending on nutrient levels.

**Key words:** Wastewater, Algae, Macrophytes, Nutrients, Pollution