

## Limnology and Cyanobacterial Species Composition of the Padawiya Tank during the Dry Season

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Cyanobacteria is an important group of phytoplankton in fresh, brackish and marine waters and shows a cosmopolitan distribution. Under favorable conditions, this group tends to form blooms, which cause environmental problems as well as human and animal health problems. Elevated levels of temperature in aquatic systems are known to promote the growth of these organisms. According to literature, over a 100 species of cyanobacteria produce toxins. However, *Anabaena*, *Aphanizomenon*, *Cylindrospermopsis*, *Lyngbya*, *Microcystis*, *Nostoc*, *Nodularia* and *Oscillatoria* are recognized as the most important genera having toxigenic species. Aquatic systems, especially lentic systems in the tropical region are known to provide favorable conditions to such toxin producing algae. As 4% of land in Sri Lanka is covered by ancient and recent reservoirs, in which the temperature and nutrient levels provide optimum environmental conditions to primary producers, it is becoming important to explore the prevalence of cyanobacteria in those systems to assure the well-being of human, animals and the ecosystem. The current study explores the species composition of cyanobacteria in Padawiya tank (an ancient reservoir of the northern region of Sri Lanka) during its driest period and assesses the quality of its water.

As the dry season provides optimum environmental conditions for cyanobacteria, the survey was carried out during May – August 2011. Monthly sampling was done from three sites (one located in the northern shore, near the tank bund, another two at the entry points of the Makunu oya and Mora oya, in the southern shore). Plankton sampling was done using 10  $\mu\text{m}$  net and Lugol's iodine solution was used to preserve cyanobacteria. Limnological variables were also measured at each sampling interval using portable field instruments and laboratory analysis. Measurements of the limnological variables also indicate that the Padawiya tank has extreme environmental conditions. The total phosphorus level reached 230  $\mu\text{g/l}$  during high drought period, which is well above even hypereutrophic condition. In addition, dissolved phosphorus was about 10  $\mu\text{g/l}$ . Nitrate-nitrogen, nitrite-nitrogen and ammonia-nitrogen were 0.09 mg/l, 0.03 mg/l and 0.49 mg/l, respectively. The chlorophyll-a value was also relatively high reaching 159.02 mg/l. Turbidity was 66.2 NTU which is also an above average value. However, dissolved oxygen was 8.43 mg/l at the surface of the water column during the daytime showing high photosynthetic activity. Water temperature (average = 32°C) was also conducive for growth of cyanobacteria.

Ten species of cyanobacteria belonging to three orders, Nostocales, Oscillatoriales and Chroococcales were identified. *Cylindrospermopsis raciborskii* was the dominant species. *Pseudoanabaena* sp. was the sub-dominant species, while *Planktolyngbya* sp. was the third dominant species. Other phytoplankton and zooplankton diversity was low showing the low maturity of the ecological pyramid, which is one of the best indicators of the dominance of toxin producing species in the system. Among the recorded cyanobacteria species, *C. raciborskii*, *Microcystis flosaquae* and *M. aeruginosa* produce toxins. In Padawiya tank, *C. raciborskii* was the dominant during the sampling period. As *C. raciborskii* is a hepatotoxic species, water in this tank may contain hepatotoxins, which could affect the organs of animals including liver and kidney of mammals.