

# **Assessment of Bioluminescence in off South coast and Puttalam lagoon of Sri Lanka**

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## **Abstract**

Marine bioluminescence is a unique phenomenon and a widely studied area in the world. However, no /limited information on bioluminescence is available in the Indian ocean. Current research on distribution and abundance of planktonic bioluminescence in the south coast and Puttalam lagoon of Sri Lanka were carried out to fulfill this knowledge gap. The study was conducted 4 months interval from January to December 2016. Sampling was carried out at five sampling sites off the south coast and six sites in the Puttalam lagoon. To study the diurnal variation in planktonic bioluminescence, a fixed station sampling was done in the off south coast of Sri Lanka during monsoon and non-monsoon period. Bioluminescence intensity and oceanographic parameters of each sampling site were measured using a Recoverable bathyphotometer (RBPM) and Conductivity Temperature Depth (CTD) profiler. Vertical hauls of zooplankton samples were also collected from surface of the ocean to 10 m depth using WP-2 net with 180 µm mesh size and samples were immediately preserved in 5% buffered formalin and bioluminescent zooplankton were identified using existing guides. Lagoon zooplankton samples were collected by horizontal towing and similar procedures were followed. Water samples were collected from surface layer and UV-spectroscopic method was applied to identify nutrient levels in all locations. Zooplankton abundance was estimated (ind./m<sup>3</sup>) and statistically compared with nutrient levels to identify relationship. The results revealed that most of the bioluminescent intensity peaks were concentrated to the mixed layer and limited peaks were below thermocline. In ocean bioluminescence intensity values vary during the course of the year. Lagoon profiles show partial variations of bioluminescent distribution. When analyzed both bioluminescence and fluorescence profiles that indicate presence of both heterotrophic and autotrophic planktonic bioluminescence in the study area. Fixed station analysis (FSA) shows that highest and lowest bioluminescent intensities were at mid night and dusk and dawn respectively. Furthermore FSA shows

monsoonal effect in bioluminescent intensities. Nineteen bioluminescent zooplankton in ocean which belong to three phyla and 3 bioluminescent zooplankton in the lagoon were identified. Most abundant bioluminescent zooplankton in the ocean is *Oncaea conifera* followed by *Acrocalanus longicornis*. Their average abundance respectively 34.8 ind./m<sup>3</sup> and 14.5 ind./m<sup>3</sup>. In the lagoon *Cypridina sp* (30 ind/m<sup>3</sup>) shows the highest abundance. Statistical analysis of nutrients levels with bioluminescent zooplankton abundance indicated no significant correlations though bioluminescent zooplankton abundance shows seasonal migrations. Current study confers encouraging results leading to further identification of platonic distribution near Sri Lanka and key bioluminescent zooplankton in the region.

Keywords: Bioluminescence, RBPM, Sri Lanka, Oceanography,