

The Development of *Noctiluca scintillans* Algal Bloom in Coastal Waters of Muscat, Sultanate of Oman

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Abstract : Algal blooms of the dinoflagellate species *Noctiluca scintillans* became frequent events in Omani waters. The current study aims at elucidating the abundance, size variation and observations on the feeding mechanism performed by this species during the winter bloom. An attempt was made, to relate observed biological parameters of the *Noctiluca* population to environmental factors. Field studies spanned the period from December 2014 to April 2015. Samples were collected from Bandar Rawdah (Muscat region) by Bongo nets, twice per week, from the surface and the integrated upper mixed layer. The measured environmental variables were: temperature, salinity, dissolved oxygen, chlorophyll a, turbidity, nitrite, phosphate, wind speed and rainfall. During the winter bloom (from December 2014 through February 2015), the abundance exhibited the highest concentration on 17 February (640.24×10^6 cell.L⁻¹) in oblique samples and 83.9×10^3 cell.L⁻¹ in surface samples, with a subsequent decline up to the end of April. The average number of food vacuoles inside *Noctiluca* cells was 1.5 per cell; the percentage of feeding *Noctiluca* compared to the entire population varied from 0.01% to 0.03%. Both the surface area of the *Noctiluca* symbionts (*Pedinomonas noctilucae*) and cell diameter were maximal in December. In oblique samples the highest average cell diameter and the surface area of symbiont algae were 751.7 μm and $179.2 \times 10^3 \mu\text{m}^2$ respectively. In surface samples, highest average cell diameter and the surface area of symbionts were 760 μm and $284.05 \times 10^3 \mu\text{m}^2$ respectively. No significant correlations were detected between *Noctiluca*'s biological parameters and environmental variables except for the correlation between cell diameter and chlorophyll a, also between symbiotic algae surface area and chlorophyll a. The high correlation of chlorophyll a was as a reason of endosymbiotic algae *Pedinomonas noctilucae* and green *Noctiluca* enhanced chlorophyll during bloom. All correlations among biological parameters were significant; they are perhaps one of major factors that mediating high growth rates, generating millions of cell per liter in a short time range. The results gained from this study will provide a beneficial background for understanding deeply the development of coastal algal blooms of *Noctiluca scintillans*. Moreover, results could be used in different applications related to marine environment.

Keywords : abundance, feeding activities, *Noctiluca scintillans*, Oman

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