



## **Occurrence of Diatom-Cyanobacterial symbiotic relationship in the coastal surface waters of Northern Red Sea**

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The phenomenon of Diatom-Cyanobacterial symbiotic association is widely noticed from different marine ecosystems around the world especially in the tropical and subtropical regions. The fixation of atmospheric nitrogen in the oligotrophic ocean is an important source of new nitrogen to surface waters, stimulating phytoplankton productivity and fueling the biological pump. The most common cyanobacterium that carry out the so called nitrogen fixation in marine system is *Trichodesmium*. The other major representative of this diazotrophic group is the heterocystous endosymbiotic cyanobacterium known as *Richelia intracellularis* which always seen in symbiotic relationship with other phytoplankton and is well-known for its capability to fix the atmospheric nitrogen in oligotrophic waters. Planktonic diatom- cyanobacterial symbioses play a significant role in the ecology and biogeochemistry of the surface oceans. Studies suggest that these particular diazotroph communities contribute annually  $4.79 \times 10^{12}$  gm of nitrogen to the water which comes almost one quarter of the total nitrogen input to the sea. The endosymbiont *Richelia* normally occupies the periplasmic space between the plasmalemma and the cell wall of the host and it provides a source of nutrient availability to the host where it is associated. They are expected to release the fixed nitrogen as either ammonium or dissolved organic nitrogen, which is then available to the particular host which lives in nutrient-starved condition. It is mainly known to be associated with the centric diatoms like *Rhizosolenia*, *Hemialus*, and *Guinardia*. The present observation of the *Rhizosolenia*-*Richelia* and *Hemialus*-*Richelia* symbiotic relation from the coastal waters of northern red sea implies much attention to the ecology of the particular area. While considering the oligotrophic nature of the region, the particular association helps the phytoplankton to avoid the limited growth due to the scarcity of nitrogen to a great extent. The phenomena is hardly been observed in red sea waters before and it throws the chances of further research in regard with the particular subject.