Red Sea Ecosystem: A Novel Study to Determine Phytoplankton Diversity during Mesocosm Blooms

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Phytoplankton can account for 50% of the primary production in the marine ecosystem and their diversity is important for regulating cycles of carbon and other elements in the sea. The purpose of this novel study is to determine ecological projections and the effects of nutrient inputs on phytoplankton in the relatively unexamined Red Sea. Two mesocosms were developed with two different treatments in a Red Sea harbor. One mesocosm consisted of a mixture of 16 micromoles of nitrate, 1 micromole of phosphate, and 39 micromoles of silicate. The other consisted of 1 micromole of phosphate and 16 micromoles of nitrate. A total of 5 samples from each mesocosm was analyzed. In order to identify the phytoplankton, the 18S rRNA was targeted, extracted using a blood and tissue kit, amplified using Polymerase Chain Reaction and then sequenced using Ion Torrent technology. The output was then compared to the BLAST database. Results obtained showed that there was diversity in the species composition of phytoplankton from both mesocosms. Comparison between the two mesocosms indicated that they differed in the type of the dominant species and in diversity, while they're similar in the identified species. After comparing the results to the databases it was found that phytoplankton species identified are not closely related to other known phytoplankton which means that the Red Sea is varied in plankton species. This data can help in the predicting of the effects of environmental changes on phytoplankton in the Red Sea and in the understanding their natural behavior.

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