Salt Marsh Sediment Biogeochemical Response to the BP Deepwater Horizon Blowout

High sulfide levels in salt marshes have been linked to plant browning and dieback. Organic matter in marshes may be oxidized through sulfate reduction, which releases sulfide. Crude oil is a source for increased organic matter in salt marshes impacted by the Deepwater Horizon (DWH) oil spill. Oxygen in salt marsh sediments is typically rapidly consumed in the process of degrading organic matter. When oxygen is depleted, anaerobic processes, like sulfate reduction, may be utilized by microbes to break down organic matter.

In a study published in the September–October 2014 issue of the *Journal of Environmental Quality*, researchers reported on salt marsh response to the DWH oil spill. Four locations along the Gulf Coast, which varied in the amount of contamination, are discussed in the study. Sediment cores containing both marsh grass roots and overlying water were collected. Microelectrode profiling of the sediments was completed using hydrogen sulfide, oxygen, pH, and Eh probes. Microbial community profiles were completed, total petroleum hydrocarbons were measured, and grain size analysis was conducted on collected sediment.

Hydrogen sulfide was observed in abundance in contaminated salt marshes; however, there was variation in the marsh response to contamination, which may be attributed to biogeochemical processes, sediment dynamics, and physical processes along the Gulf Coast. For instance, one of the locations included in the study had high total petroleum hydrocarbons, but due to coarser grain size, oxygen penetrated deeper into the sediments, allowing degradation of hydrocarbons aerobically. Another location included in the study had lower total petroleum hydrocarbons, but the finer grain size prevented oxygen penetration into the sediments, resulting in anaerobic degradation of organic matter primarily through sulfate reduction. Although researchers hypothesized that higher amounts of contamination would result in a larger amount of hydrogen sulfide in marshes, researchers found that characteristics specific to each location play a large role in marsh response to hydrocarbon contamination.


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genetic recombination within U.S. breeding germplasm, the study was better able to localize the causative region of the genome and provide the most informative marker for subsequent use in breeding. Perhaps the biggest advantage of the study is that the germplasm used represented elite breeding material, meaning that identified beneficial alleles are already harbored in favorable genetic backgrounds. This has large implications for use in applied breeding because it mitigates some of the effects of transferring alleles from donor to recipient lines. One of the other salient features of the results obtained is that major genes are still segregating within the U.S. barley breeding germplasm, creating useful genetic variation that can be used in cultivar development. In conclusion, this study demonstrates that there is the potential to identify and incorporate useful genetic variation form adapted lines into the development of new U.S. cultivars with superior performance to meet the changing climatic and market demands.


TPG Impact Factor Nearly Doubles

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