A Field Study: Sustaining Crop Growth in a Flooded Area with the Application of Oscillatoria

Martin, Jacob (School: Northwestern High School)

The purpose of this project is to test if Glycine max, Zea mays, and Pisum sativum can withstand a flood for a longer duration with the addition of Oscillatoria in a field test experiment. If Glycine max, Zea mays, and Pisum sativum are disturbed by flooding with the addition of Oscillatoria, then the crops will stay alive longer under the circumstances of field flooding. Field flooding can be devastating to farmers throughout the world. A negative control group was used for each crop type with normal watering and growing while a positive control group was used to place crops under flooded conditions. The experimental groups for the crops went under the same procedure as the positive control, but then a type of Cyanobacteria called Oscillatoria was added to each tank with different amounts and application dates. The flooded crops that received Oscillatoria quantitatively and qualitatively survived better than the plants that did not receive Oscillatoria. The Oscillatoria applied groups held a green and healthy appearance. Dissolved oxygen levels raised after the application of Oscillatoria and the pH of the soil was maintained between 7.8-8.2. The 350 soybeans increased in height by 25%, 330 soybeans by 35%, and 5828 PQ corn by 20%. Soybean t-Tests came back highly significant for experimental groups with low concentration and low delay of application. Oscillatoria releases butylated hydroxytoluene as a natural nitrogen fixator and produces oxygen that allows soybean and corn crops to survive under the circumstances of field flooding. The hypothesis is supported.

Awards Won: