The Reversal of Harms Done by the Drought: How the Carbon and Nitrogen Levels Affect Fusarium oxysporum f.sp. Lycopersici Race 3 in Soils to Impact Solanum lycopersicum (Tomato) Plant Growth

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Food scarcity is a prevalent problem facing our world today, and in fact the UN Food and Agricultural Organization finds that 795 million people are suffering from hunger. In addition, one of the major causes of food shortage is Fusarium Oxysporum, which is not only impacting Californian farmers, but farmers worldwide are facing extreme crop loss and are losing their farms which has totaled a loss per farm from $50,000 to $5 million. My prior research found that Fusarium can be kept at bay with varying soil properties, however, research needed to be done on the elemental quantities, especially Carbon and Nitrogen levels because of their role on the soil rhizobacterial climate. With the heat rising at an all-time high of 136 years and Carbon content rising in the atmosphere, I researched if there is a change between each varying soil and its effect on the plant. Experiments were conducted on 6 soils used in farming throughout California with particulate similar in ratio to those around the world. Since, the current usage of chemical fertilizers have worsened the ecosystem, I decided to study the Carbon and Nitrogen ratio in common goods which are accessible to all countries, Sugar Water and Coffee. The amount of C&N were measured to find which are present in each of these soils and in what quantities. Then, the data was analyzed to understand if each of there were connected through correlation and the biological system of the guard cells and stomata in the plant. Overall, I discovered there is a positive correlation through the decrease of harm through the pathogenic strain (CFU) which was further expanded in my R-Programming and defends this novel method of adding C&N to plants to prevent crop loss and boost the agricultural economy worldwide.

Awards Won:
Fourth Award of $500