Microbe Research Report
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Date: June 18, 2021
Location Name: Staheli Community Garden
Location: St. George Utah
Description: Staheli Garden plot is watered by the St. George and Washington Canal Company diverted water from the Virgin River. It is the last property to take water from the canal and is the lowest point of the canal. Water at this time of year is heavily concentrated with TDS due to salts from Pah Tempe Hot Spring.These springs release roughly 109,000 tons of salt(6,813 semi-truckloads of salt) every year and is one of the top three pollutants of the Colorado River(Source: Washington County Water Conservancy District).High levels of TDS make it difficult for plants to extract water from the soil and can stunt growth in plants and reduce crop yield and quality. In the early part of the growth season, these salts are not as concentrated and are more diluted in spring run off. With the drought in full force, the canal is experiencing higher amounts of salt earlier in the season than usual. Salts are visible on the soil surface after each watering turn.

Scope of Operation: Community Garden plot that grows corn, squash, peppers, tomatoes, and pumpkins. Corn was planted as seed while all other plant varieties were planted as “starts” ranging from 3-8” in height.

Scope of Experiment: From April 24th to June 5th, 1 ounce of product was diluted in 5 gallons of water and applied every other week. The entire farm received 3 ounces of microbes over the course of the experiment. Microbes were applied to 50% of the corn, 50% of the peppers, and 50% of the tomatoes. Observations taken June 17th were after the first harvest of squash and tomatoes.

Review of Initial Discoveries: In all crops observed, microbe treated plants displayed advanced development in crop maturity. Microbe treated plants displayed better veggitative health in the leaf structures and higher fruiting body production.

Corn: Plants are maturing faster with microbes and attracting more bees at the pollination stage. Within the (4) 200’ rows of corn, Microbes were applied to every other row at a spacing of 4’ between rows. Bees are avoiding rows that do not have Microbes.
Initial Discoveries: Bees were observed to be attracted to microbes treated corn 275% more than corn without Microbes.

Corn	Average Number of Bees per 20’ length
Treated	11
Untreated	4

Tomatoes: Plants are maturing faster with Microbes and are growing better in high TDS conditions. Tomato plant leaves are “curling”, or their leaves are folding from the outside edges to the center of the leaf, due to the absorption of the salts as they mature. Plants were observed to be producing leaves based upon the impact of TDS salts causing the leaves to curl. Numbers were based on the average of every 20 feet of tomato plants along (4) 200’ rows of tomatoes. Observations were taken 2 hours after the first harvest and tomatoes were removed from the property before we could measure harvest counts and weights. Harvest counts and weights will be taken on the next harvest later this week. Though it is not measured in this observation, it is believed that more tomatoes were harvested on the microbe treated plants.
Initial Discoveries: Microbes plants grew 35% fewer leaves. Of those leaves, microbe treated plants were observed to have 234% more open leaves than the untreated side. Microbe treated plants displayed 236% more flowering clusters. Plants appear to be maturing faster with Microbes.

Tomato	Total Leaf Clusters	Full Leaf Clusters	Curled Leaf Clusters	Tomato Count	New Flowering Hands
Microbes	22.4	10.8	11.6	21.3	5.9
Untreated	30.6	4.6	24	27.8	2.5

Peppers: Plants are maturing faster with microbes and are producing more flowers and buds. Plants were also observed to range more in size from plant to plant. Pest damage was observed throughout the crop as well.
Initial Discoveries: Plants are maturing faster with microbes and are producing 195% more fruiting bodies on average. Untreated plants are displaying more pest damage to leaves, ranging from 225% in plants smaller than 10” to 900% in plants taller than 10”

Pepper	Average Number of Leaves with insect damage	Average Number of fruit and flowers per plant
Microbes(plants 6-10”)	3.5	111
Untreated(plants 6-10”)	31.5	21
Microbes(plants 11-24”)	12	57
Untreated(plants 11-24”)	27	19.5