

Salinas Valley Strawberry Trials: 2012 /2013 Season

A Combination treatment of **MYKOS** and **AZOS** increase seasonal yield by **51% (?)**, increased soil temperature and biological activity that suggests the microbes can reduce irrigation and fertilization rates and possibly suppress nematode damage.

OBJECTIVE

Crop managers are currently facing two major issues that are affecting current cultural practices. Growing more with less water become a challenge worldwide, reducing fertilizer runoff is becoming an environmental issue in areas where use of conventional fertilization practices have led to ground and surface water contamination.



Treated & Control

Planted November / Photo taken early January,

Planted on the left was dipped and coated in a biological combination of **MYKOS & AZOS** plus soluble kelp. Despite cooler winter soil temperatures, growth was very significant.

Strawberries are known to respond to treatments of both “Mycorrhizal Fungi” and “Azospirillum”, nitrogen fixing bacteria. Several scientific studies suggest that biological treatments with these two

beneficial microbes may improve the soil structure and potential to retain moisture as well as increase nutrient use efficiency, thereby allowing growers to reduce fertilizer inputs.

The following data and observations were concluded from monitoring a trial conducted on a new strawberry field planted in November of 2012. The plots were analyzed and harvest data recorded during the harvest season beginning in May, 2013 through to September 2013



TREATED

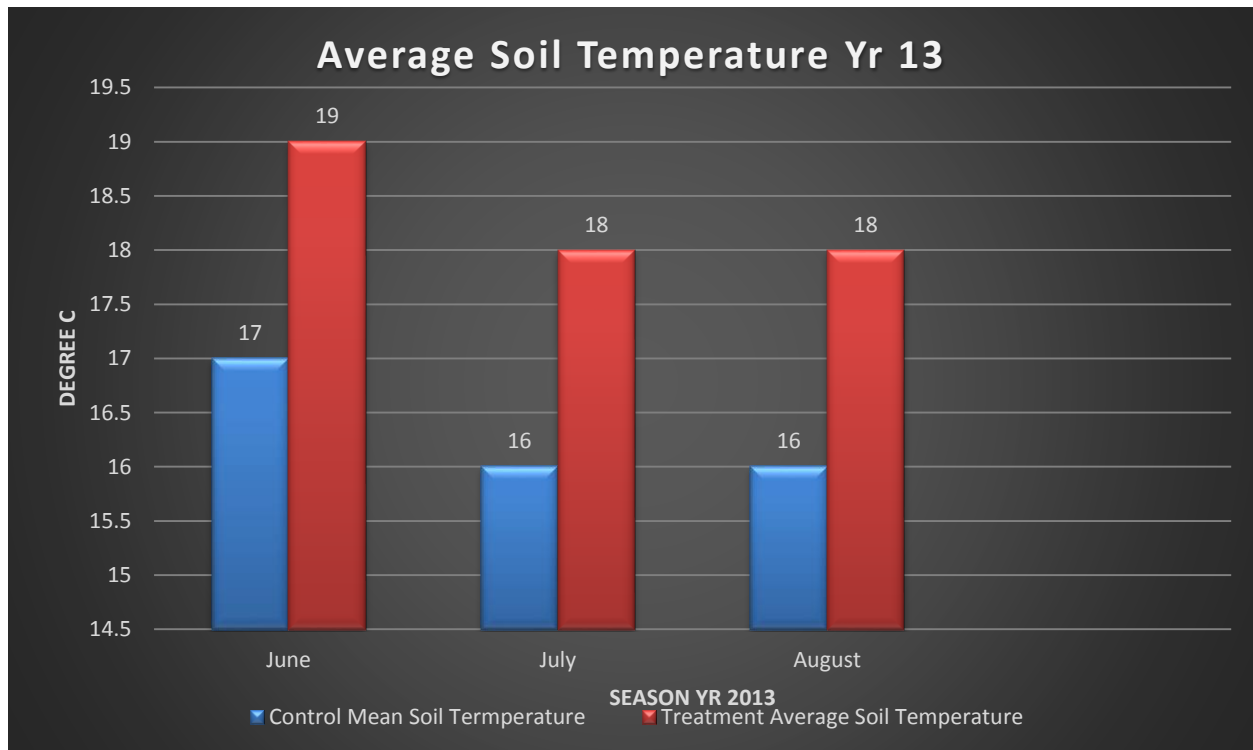
CONTROL

The rows in the treated section consistently produced more flowers and fruit compared to the control area. An unusual period of high winds occurred early in the harvest season and a large number of blossoms were lost as well as foliage damage occurred on the control section, while the treated area suffered significantly less damage. This suggests that the **AZOS / MYKOS** biological treatment improved the cellular structure of the plants leading to much greater durability.

Soil Temperature

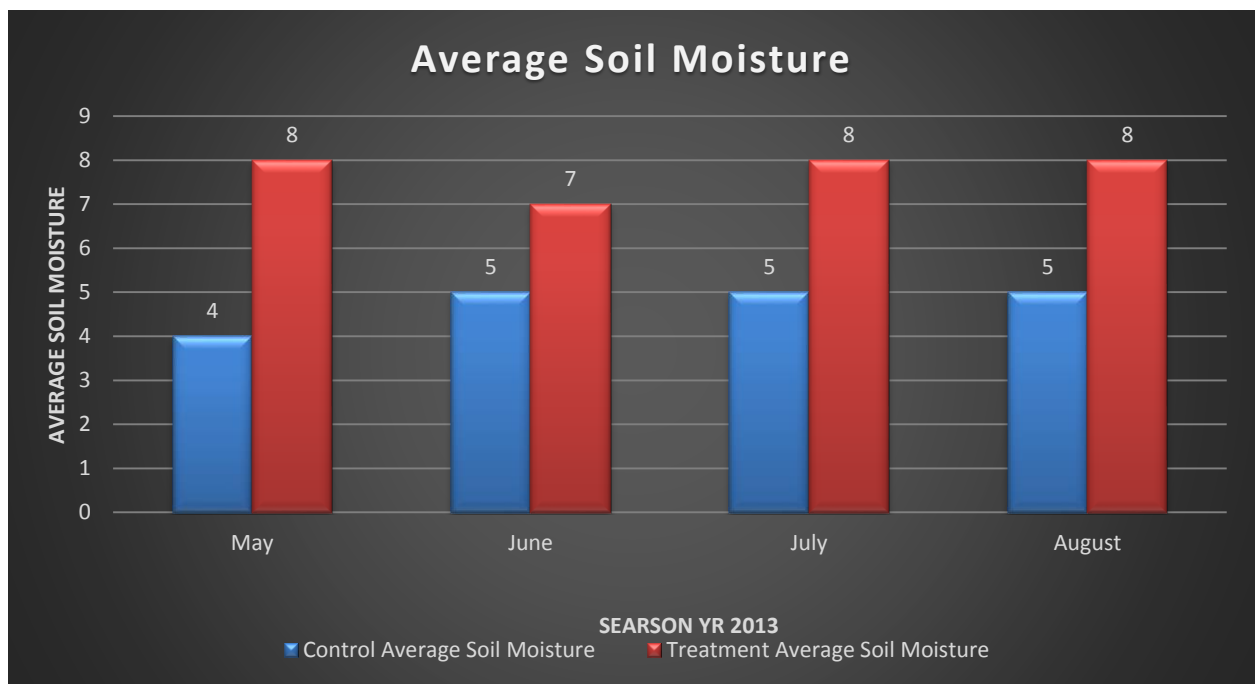
An increase in soil temperature occurred on the treated plot suggesting that one or more of the following conditions was occurring:

- i) An increase in biological populations and activity was taking place. Microbes are known to produce heat as they breakdown organic and mineral deposits as is commonly observed in compost piles.
- ii) The presence of mycorrhizal fungi was improving soil aggregation. Mycorrhizal hyphae distribute a polysaccharide produced by the organism throughout the soil. Known as **“Glomalin”**, it coats soil particles and improves structure, allowing for the flow of more air and moisture. A more open soil structure functions in a similar manner to thermal underwear on “down” jackets.



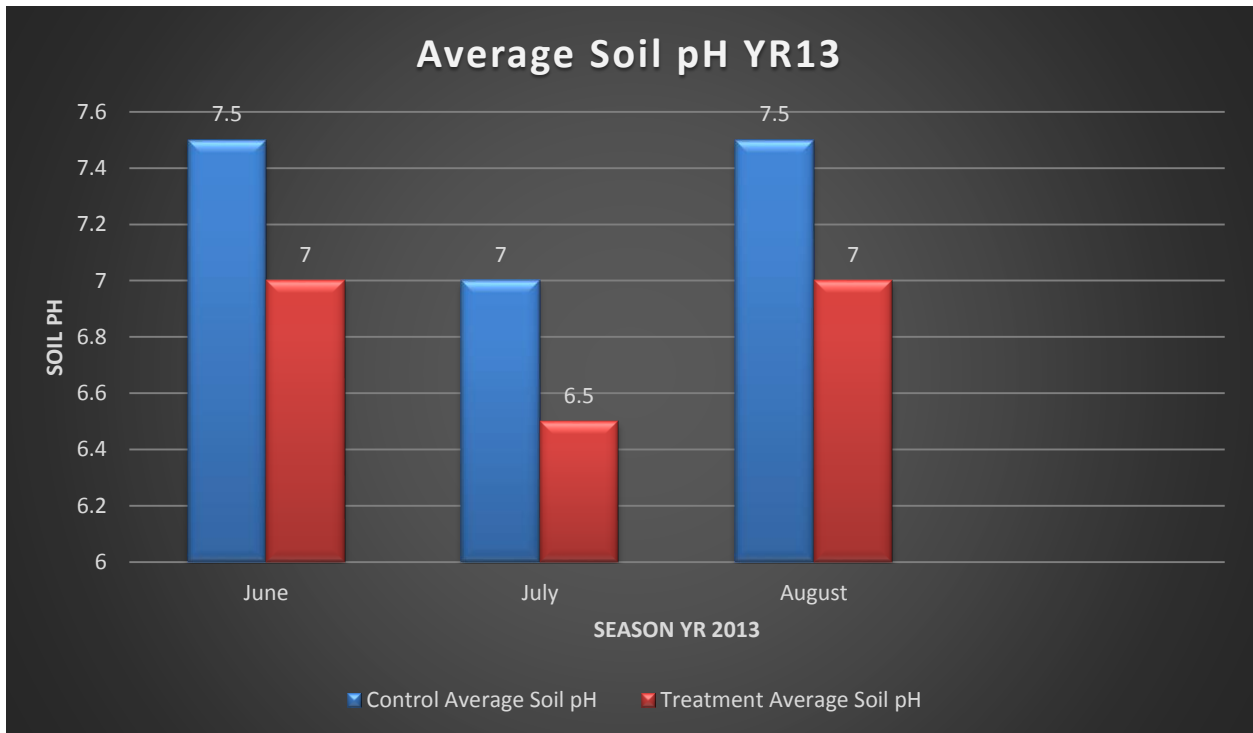
Soil Moisture

A significant difference in soil moisture retention was observed. Both the control and treated plots were measured regularly with a soil moisture meter. The instrument was calibrated on a scale of 0 to 10 with “0” being dry and “10” as totally saturated. The increased moisture presence in the treated plot was likely due to an improvement in soil structure created by the mycorrhizal network and the presence of “*Glomalin*”.



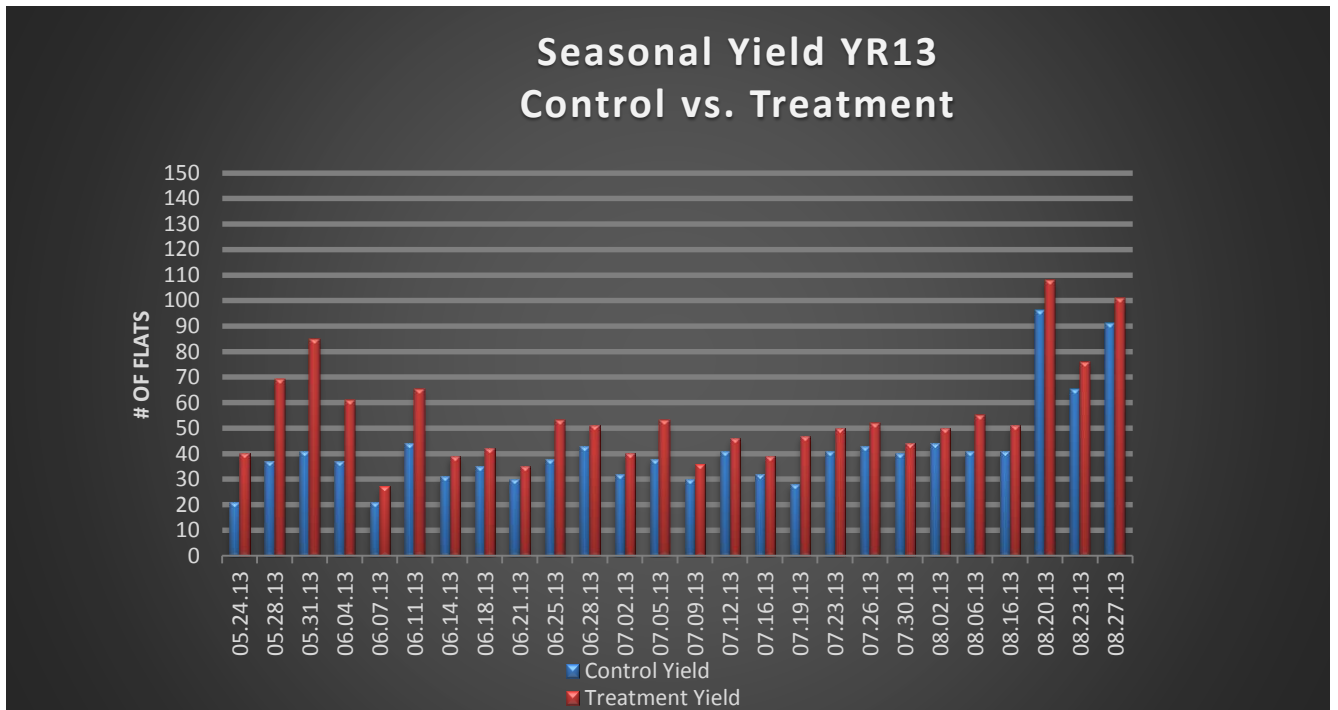
Soil pH

Soil pH was affected by the **AZOS / MYKOS** treatment, dropping levels by 0.5 to a full point. The acidification that occurred is likely due to nutrient solubilizing bacteria such as those that break the bonds between calcium and phosphate. The process by which this occurs is a result of acidic compounds produced by the organisms that function as catalysts in a similar manner as conventional fertilizer production facilities. This biological activity could be of great importance in better utilizing phosphorus applications.



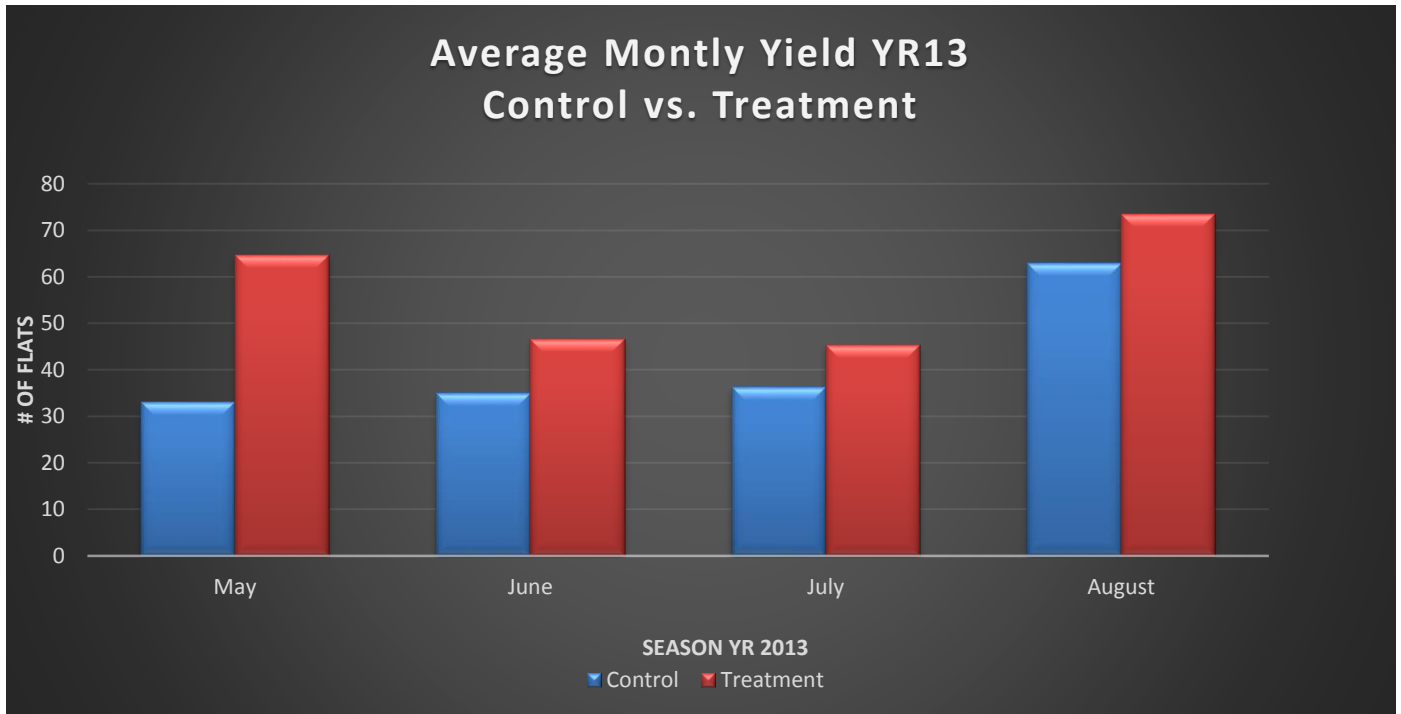
Yield Data

Of greatest importance to growers, the combination AZOS / MYKOS treatment lead to consistent and significantly higher yield throughout the season. This would indicate that the addition of the two organisms to the planting increased the crops access to nutrients and moisture. In addition to greater yield, the fruit quality appeared to be better. Mycorrhizal fungi are known to increase root mass and Azospirillum triggers plants to increase production of "Indole 3 acetic acid", a known root growth promoting stimulant.



Yield Data by Month

The greatest difference occurred in the early harvest period. While the treatment produced higher yields in all months, the reduction in the difference may have been the result of high fertilization rates that were probably applied during throughout the season. Because the fertilizers contain a significant amount of salt which can act as a sterilant at higher levels, the continuous use of and subsequent salt build up may have reduced the biological activity. This theory needs to be examined more thoroughly. Potentially, a reduction in fertilizer application could result in higher yields due to an elevated level of microbial activity. This could reduce fertilizer runoff concerns, save growers money and maintain higher yields.



Observations & Conclusion

This study suggests that the addition of **MYKOS**, mycorrhizal inoculant, in combination with **AZOS**, nitrogen fixing azospirillum bacteria can positively affect strawberry production in the Salinas Valley. In addition to higher yields by an average of 50%, the treatment may improve soil structure, moisture retention, increase soil temperatures and improve nutrient management.

Control			Treatment		
<i>Date</i>	<i>Pickers/Rows</i>	<i>Boxes</i>	<i>Date</i>	<i>Pickers/Rows</i>	<i>Boxes</i>
05.24.13	10	21	05.24.13	10	40
05.28.13	14	37	05.28.13	14	69
05.31.13	14	41	05.31.13	14	85
06.04.13	10	37	06.04.13	10	61
06.07.13	10	21	06.07.13	10	27
06.11.13	14	44	06.11.13	14	65
06.14.13	10	31	06.14.13	10	39
06.18.13	14	35	06.18.13	14	42
06.21.13	13	30	06.21.13	12	35
06.25.13	10	38	06.25.13	10	53
06.28.13	14	43	06.28.13	14	51
07.02.13	10	32	07.02.13	10	40
07.05.13	14	38	07.05.13	14	53
07.09.13	10	30	07.09.13	10	36
07.12.13	14	41	07.12.13	14	46
07.16.13	14	32	07.16.13	14	39
07.19.13	10	28	07.19.13	10	47
07.23.13	14	41	07.23.13	14	50
07.26.13	14	43	07.26.13	14	52
07.30.13	10	40	07.30.13	10	44
08.02.13	10	44	08.02.13	10	50
08.06.13	14	41	08.06.13	14	55
08.16.13	10	41	08.16.13	10	51
08.20.13	14	96	08.20.13	14	108
08.23.13	10	65	08.23.13	10	76
08.27.13	14	91	08.27.13	14	101
Average	12.11	33.00	Average	12.00	51.44