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Input

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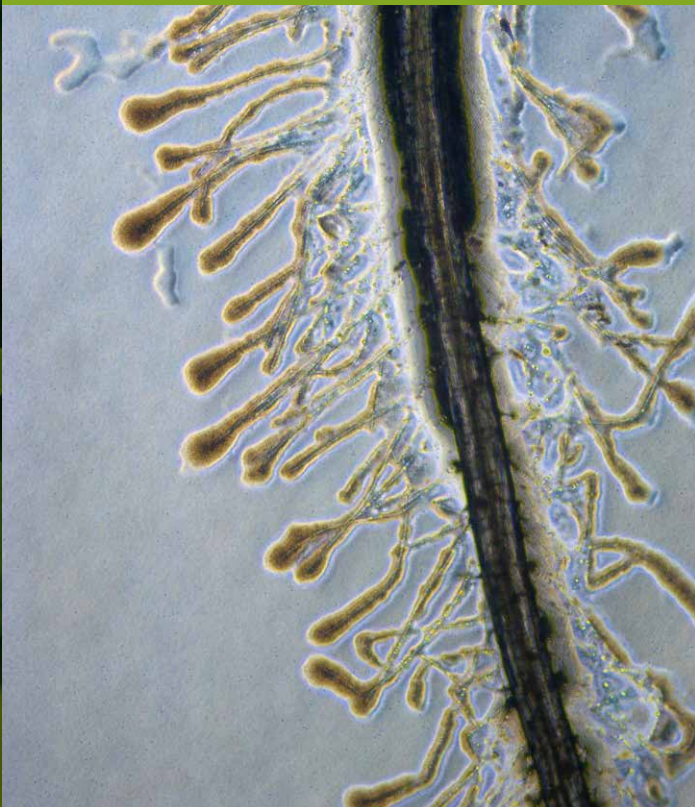
# Managing salt uptake in lettuce with biology.



**SERENADE**<sup>®</sup>  
prime

## 'It all starts here'...

**Serenade<sup>®</sup> Prime** is a beneficial bacteria that colonises lettuce roots. It creates a win-win relationship with the plant at the soil interface, improving nutrient availability. Frequently this results in earlier maturity, increased size and increased yield.



Serenade Prime colonising the root and root hairs.

## Managing salt uptake

Irrigation water quality can have a profound impact on lettuce production. Lettuce yields can decline by 10% with levels as low as 1.4 dS/m, which is approximately 770 ppm depending on types of salts. This would be considered low by many lettuce producers whom have experienced continued drought in many production regions.

Recent research from California has demonstrated the role soil biology can play in managing high salt. Serenade Prime contains *Bacillus amyloliquefaciens* (strain QST 713) which forms a symbiotic relationship with the lettuce roots when used as directed. After colonisation on roots, the QST 713 bacteria acts as a soil ameliorant, releasing compounds into the soil surrounding the roots making soil resources more available. This can result in a more extensive root system and a much larger root surface area with which to explore the surrounding soil resources.

This greenhouse study demonstrated the effect on lettuce grown under drip irrigation with salinity of 1.5 dS/m. Lettuce plants grown in soil treated with Serenade Prime at 7 L/ha, showed a dramatic increase in head weight (53%) and root surface area (21%) compared to the untreated. Leaf analysis showed improved nutrient uptake, especially calcium (83%) and several soil immobile micronutrients which can only be absorbed via direct root contact.

The results of this study are consistent with observations made in other crops around the world, where the use of Serenade Prime as a soil ameliorant mitigates the uptake of sodium. Combined with careful irrigation practice and variety selection, it would appear to offer a valuable addition in profitable lettuce production.



Figure 1. Untreated control (left), Serenade Prime (right), 28 days after application (Bayer Biologics, West Sacramento, CA 2020).



Figure 2. Untreated control (top), Serenade Prime (bottom), 36 days after application (Bayer Biologics, West Sacramento, CA 2020).

## Nutrient uptake (mg/plant) in lettuce (high salt irrigation water)

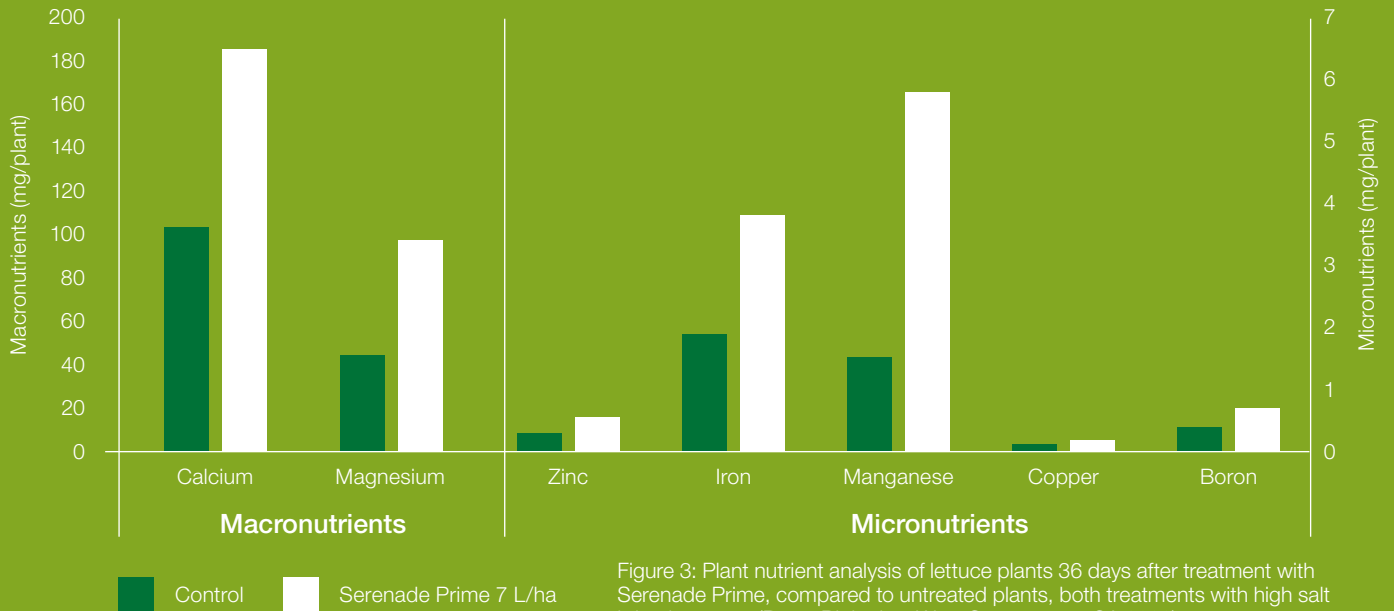


Figure 3: Plant nutrient analysis of lettuce plants 36 days after treatment with Serenade Prime, compared to untreated plants, both treatments with high salt irrigation water (Bayer Biologics, West Sacramento, CA 2020).

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