



# Guide for soil use in blueberries.

## Introduction to Serenade® Prime

Serenade Prime contains *Bacillus amyloliquefaciens*, a bacteria that forms a symbiotic relationship with the blueberry roots. The roots provide the food (exudate) for the bacteria and in return, they unlock access to soil nutrients and other resources to improve nutrient uptake, potentially leading to improved fruit quality and size at harvest.

### KEY BENEFITS MAY INCLUDE:

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IMPROVED NUTRIENT UPTAKE

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GREATER ROOT SURFACE AREA

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IMPROVED POST-HARVEST QUALITY

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EASY APPLICATION VIA IRRIGATION

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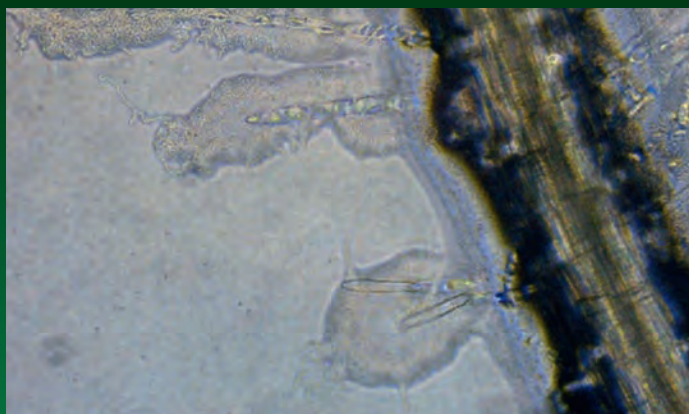


Figure 1. Serenade Prime builds a beneficial film around the root tips.

## Root Colonisation

Serenade® Prime is a suspension of the dormant spores of the QST 713 strain of *Bacillus amyloliquefaciens*. The spores rapidly colonise new root surfaces during periods of active root growth. The trigger for colonisation is the release of exudates from roots. The bacterium use exudates as their energy source, allowing the modification of soil resources to make them more accessible to the plant as well as a bridge between roots and the soil to improve nutrient uptake (Figure 1).

## Nutrient Uptake

After colonisation with Serenade Prime, soil immobile nutrients such as zinc, iron and phosphorus can be changed to plant-available forms. For instance, when iron is not in a plant-available form, the QST 713 bacteria can release bacillibactin, which is an iron-chelating compound. Colonisation also results in the release of organic acids, which mobilises 'fixed' phosphorus to assist rapid root development. Releases of enzymes also break down organic material to plant-available forms, which are more easily taken up by plant roots.



## Greenhouse Results: Blueberry, California 2018

Serenade Prime provided boosted shoot and root growth of *Summer Sunset*. (Figures 2, 3 ). It was applied as a soil drench at transplanting at rates of either 2 or 5 mL/plant and measured 3 months after application (Figure 4). The greatest increase resulted from application at 5 mL/plant, which increase the leaf surface area (47%) and root surface area (126%) above the control plants. Visual observations suggest that Serenade Prime may have increased early phosphorous uptake when compared to the control plants, which were showing symptoms of phosphorous deficiency (Figure 2).



Figure 2. Shoot growth of two Serenade Prime rates and the control at 3 months after application.





Figure 3. Root growth of two Serenade Prime rates and the control at 3 months after application.

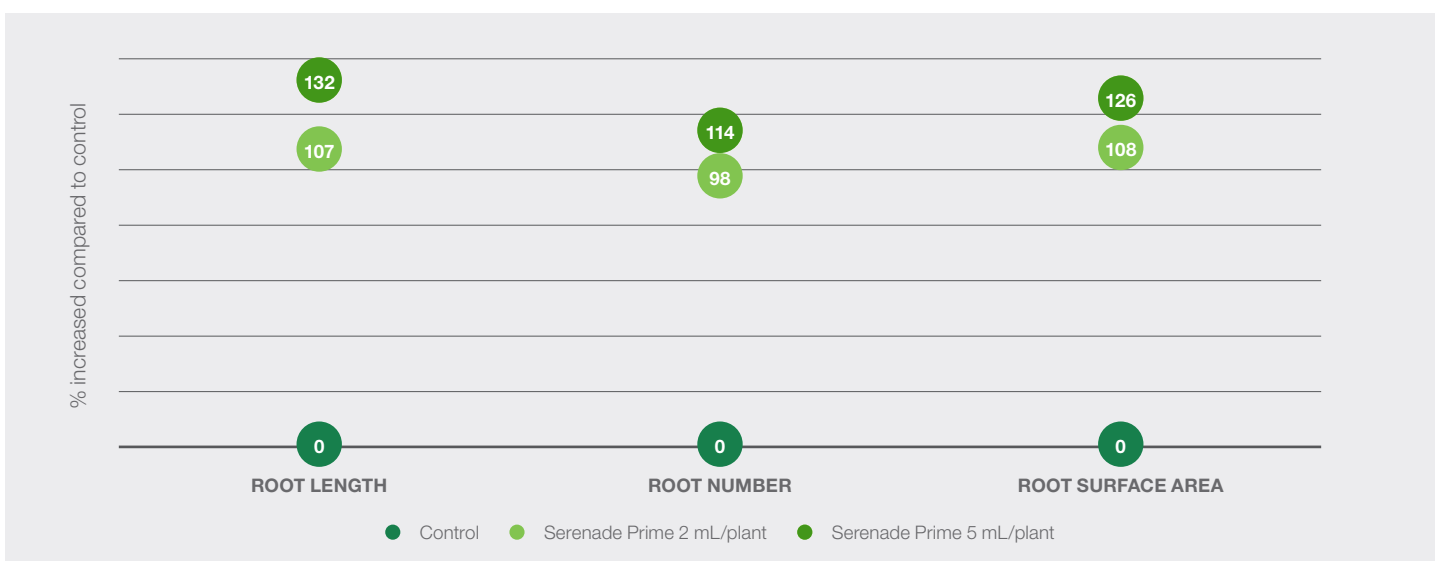


Figure 4. Root growth: % increase compared to control

Greater root surface area shown in Figure 4, in turn, may assist in the uptake of immobile micronutrients, like zinc and iron, which are only obtained from soil in very close proximity to the root surface. It's also important in forming new root tips where uptake of calcium and boron occurs.



## Field Results: Blueberry, Northern NSW 2018 FD18AUSHXXQC99

Serenade Prime improved the firmness of berries under cold storage up to 28 days after harvest (Figure 5). Berry firmness was measured weekly for a total of 16 punnets (125 g each) using a penetrometer. In this trial Serenade Prime was applied at rate of 8 L/ha (approximately 2.4 mL/plant) on two occasions, root flush following harvest in September 2017 and post-pruning in January 2018 and compared to the grower standard.

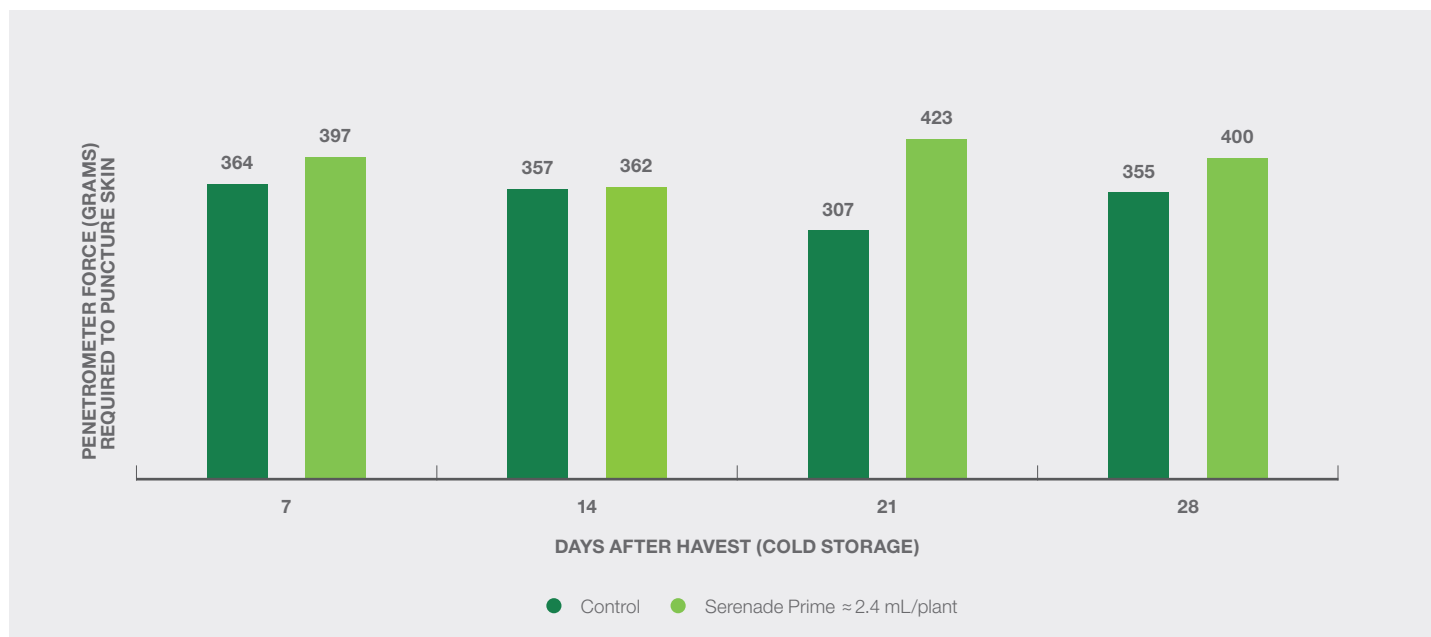


Figure 5. Berry firmness (g): 7, 14, 21 and 28 days after harvest.

## Root Flush Application & Rate

Serenade Prime should be applied at the start of the active root growth cycle. Accelerated root exudation after harvest or pruning allows the opportunity for the beneficial bacteria to rapidly colonise and dominate the rhizosphere. Pre-emptively colonising young feeder roots provides the opportunity to build a supply of plant-available nutrients in the rhizosphere ahead of critical periods of nutrient demand.

Serenade Prime should be applied at a rate of 2 to 5 mL/plant using a maximum of 10 L/ha at each peak root flush period. Serenade Prime is highly compatible and can be applied through the irrigation at the same time as commonly used fertilisers, insecticides and organic amendments without compromising the ability to colonise roots.

**Apply at the start of each major root flush cycle.**



\* Please refer to the Serenade Prime product label for the Restraints associated with the use of Serenade Prime. Always refer to the product label before use.

Bayer CropScience Pty Ltd, ABN 87 000 226 022, Level 1, 8 Redfern Road, Hawthorn East, Victoria 3123. Technical Enquiries 1800 804 479. [crop.bayer.com.au](http://crop.bayer.com.au)

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