

## Case Study on Strawberry Plants (*Fragaria* spp. Var. Albion) Treated with Release



**Fig. 1 Release-Treated Strawberry Plants at 3 Months**

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### I. OBJECTIVES

1. Evaluate the efficacy of Release root inoculant on stolon development, crop yield, and crop quality for strawberry crop plants (*Fragaria* spp. L.).
2. Compare the efficacy of microbiological inoculant Release with a major inoculant product already on the market and with "Producer management" (untreated control) on strawberry crop plants (*Fragaria* spp. L.).
3. Evaluate the possible phytotoxic effect of the treatments on strawberry crop plants (*Fragaria* spp. L.).

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### II. MATERIALS (Fig. 2)

1. Release: 2.5 liters per hectare (1 liter per acre)
2. Product B: 2.5 liters per hectare (1 liter per acre)
3. pH meter
4. pH buffer product: (adjust to pH 5.5)
5. Application system: Terrestrial Sprayer (Spear without nozzle)
6. Colored ribbons (yellow and red) and wooden stakes.



**Fig. 2 First Release Application**

### III. METHODS (Fig. 2)

1. **Number of Trials:** There was **one trial** on this crop.
2. **Trial Location:** Hacienda Las Cruces, Maravatio, Michoacan, Mexico. The trial was established in newly transplanted strawberry plants.
3. **Number of applications:** There were 2 treatment applications 28 days apart.
4. **Time of application:**
  - a. First application: 1 month after transplant on April 23, 2021.
  - b. Second application: 28 days after first treatment on May 21, 2021
5. **Experimental Design:** Random Blocks with 4 replications.
6. **Treatment Distribution:**

2	3	1
3	1	2
1	2	3

7. **Plot size:** 100 m<sup>2</sup> plots (5x20 m), sample size of 10 strawberry plants per treatment (according to planting density). Yields will be evaluated over total plot size.
8. **Application system:** Terrestrial Sprayer.
9. **Nozzle type:** Spear without nozzle (drench)
10. **Application pressure:** 3.5 Bar
11. **pH of the mixture:** pH 5.5
12. **Total Application volume:** 400 L water/ha.

Table 1. Treatment Description.

<b>Treat.</b>	<b>Product</b>	<b>Active Ingredient</b>	<b>Concentration</b>	<b>Formulation</b>	<b>Dose</b>
1	Release	Microorganism Mixture	1.0 %	Concentrated Liquid	2.5 L/ha
2	Product B	Microorganism Mixture	1.0 %	Concentrated Liquid	2.5 L/ha
3	Untreated Control	—	—	—	—

#### **IV. APPLICATION TECHNIQUE**

##### **1st Application**

Treatment 1: Mix 2.5 liters of Release in 200 liters of clean non-chlorinated water, let stand for 30 minutes and later dilute the mixture in 400 liters of clean non-chlorinated water. Use the mix solution to apply over the newly transplanted strawberry plants (one month after transplant) in drench, using 100 ml of mix solution per plant.

Treatment 2: Mix 2.5 liters of Product B in 200 liters of clean non-chlorinated water, let stand for 30 minutes and later dilute the mixture in 400 liters of clean non-chlorinated water. Use the mix solution to apply over the newly transplanted strawberry plants (one month after transplant) in drench, using 100 ml of mix solution per plant.

Note: Briefly irrigate soil before starting Release and Product B application, so the inoculant products will reach the roots and not be absorbed into dry surface soil.

##### **2nd Application**

28 Days After first Application, repeat steps used for treatments 1 and 2 using the same dosage and technique as in the first application.

Notes:

1. The products must be mixed in a clean non-metal container using non-chlorinated water.
2. During the development of the trial, soil fungicides and bactericides will not be used for treatments 1, 2 and 3.
3. The producer may follow its application program in treatment 4 including soil fungicides and bactericides.
4. The management of nutrition and fertilization is the same for all 4 treatments.

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## V. EVALUATION

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The use of root inoculant products can result in various benefits to crops including:

- Increased root growth, resulting in increased soil volume the plant can reach for nutrients and water.
- Healthier plants resulting in increased tolerance to diseases, which could also save on the cost of fungicide use to the soil.
- Increased tolerance to various stressors by competing / inhibiting soil pathogen growth and various other compounds.
- Having a better nourished, stress-free, and healthy crop favors the conditions to increase the yield and quality of the strawberry crop.

Variables to be evaluated in strawberry plants after the application of treatments include:

**Parameters evaluated:**

- Plant development (as determined by stolon development and early plant growth)
- Days to flowering
- Crop Yield
- Fruit quality (including brix grades)
- Crop Uniformity
- Phytotoxicity

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## VI. RESULT

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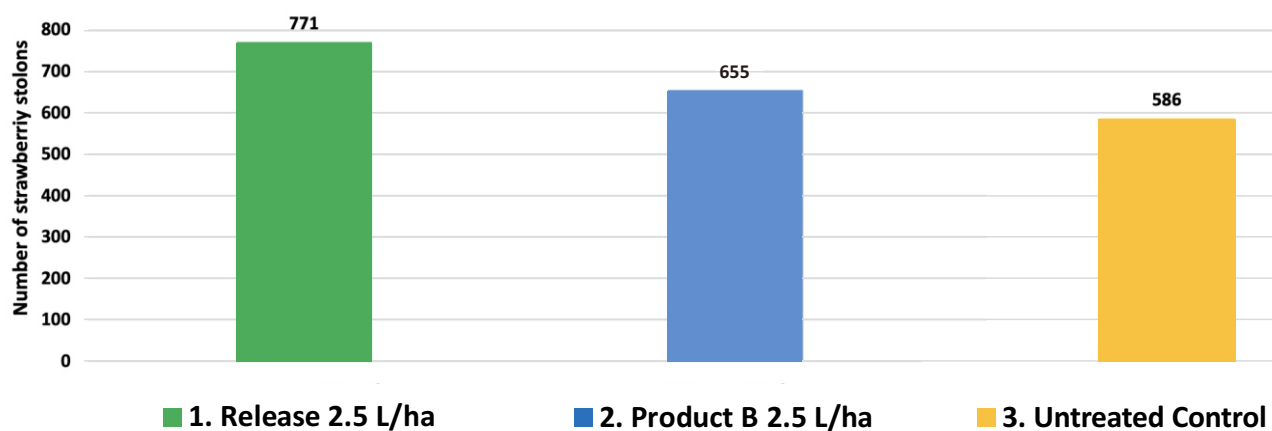
**Fig. 3 Strawberry Plants Prior to First Treatment Application**

- A total of 292 plants were evaluated for each treatment

## Plant development



**Fig. 4 Second Application and Strawberry Stolon Numbers 28 Days After First Application (May 21, 2021)**



**Fig. 5 Strawberry Plant Development 27 Days After 2nd Application (June 18, 2021)**



**Release Treatment**



**Product B Treatment**



**Untreated Control**

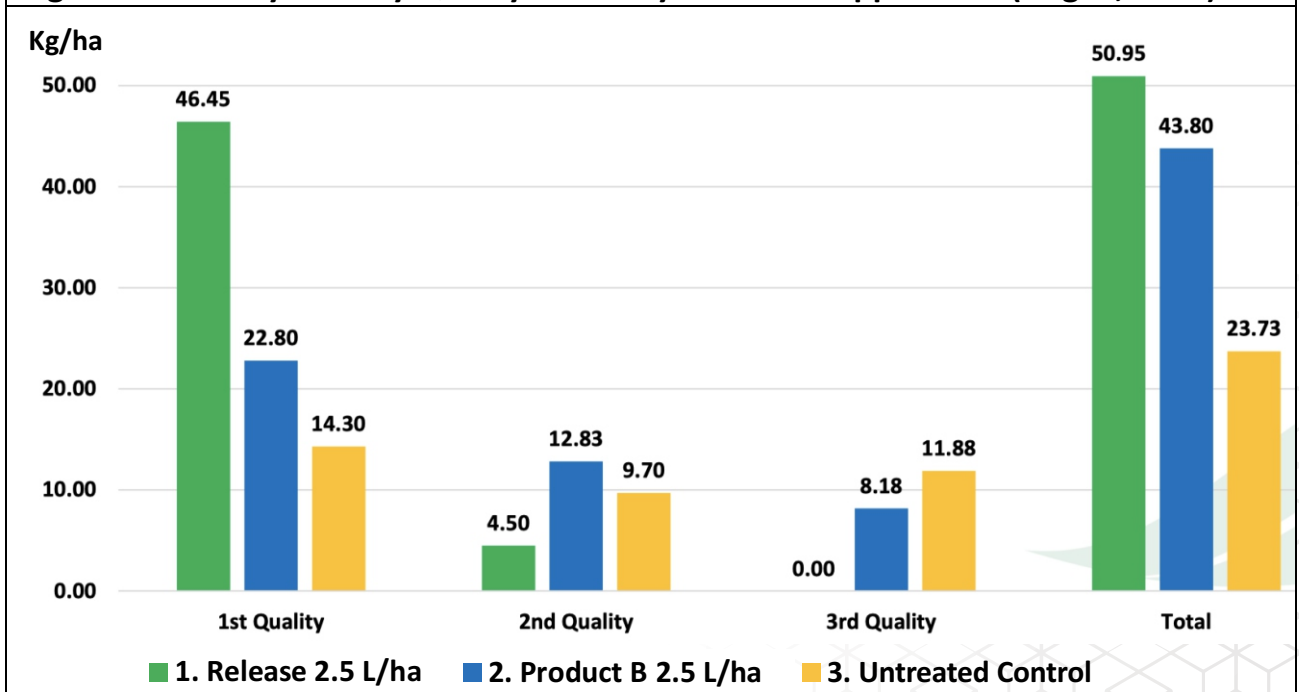
**Fig. 6 Strawberry Plant Development 61 Days After 2<sup>nd</sup> Application (July 22, 2021)**



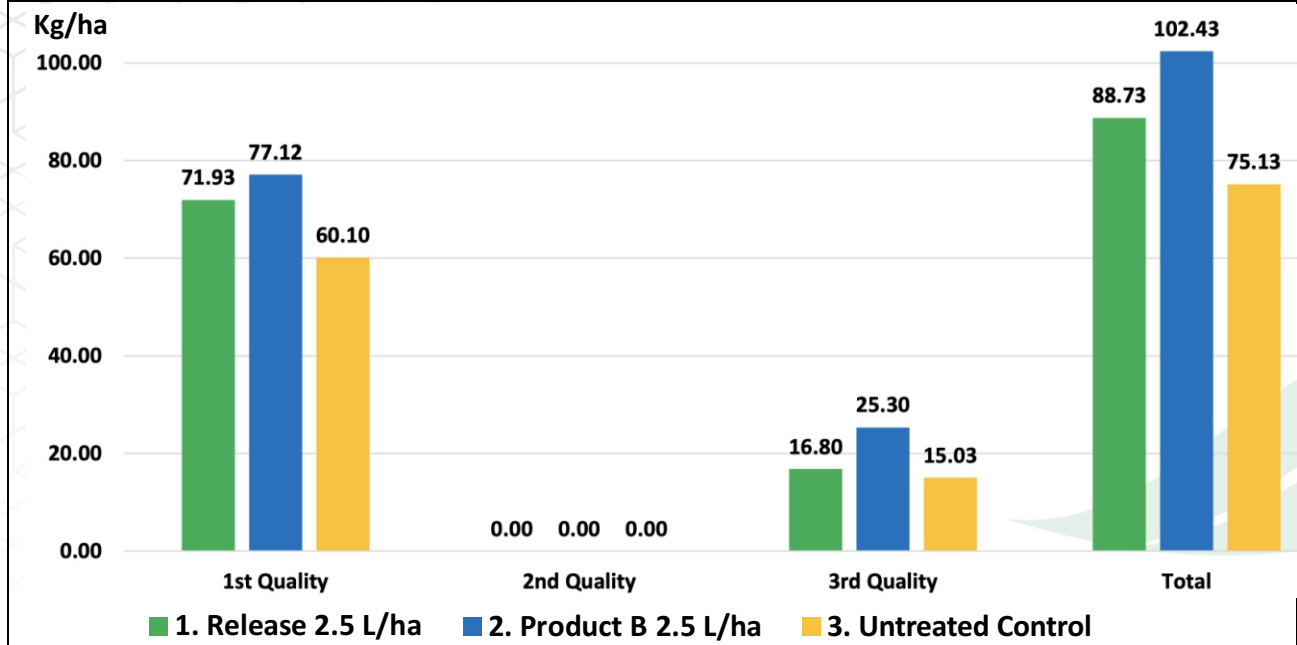
- According to the farmer, Release-treated strawberry plants had earlier and healthier development than Product B and the Untreated Control plants, including parameters such as stolon development, leaf diameter, and leaf color intensity.
- Due to Release-treated plants rapid development, the farmer decided to begin harvesting early (Aug. 6th). Once harvest started, the farmer continued to harvest once per week.

**Strawberry Yield and Quality**

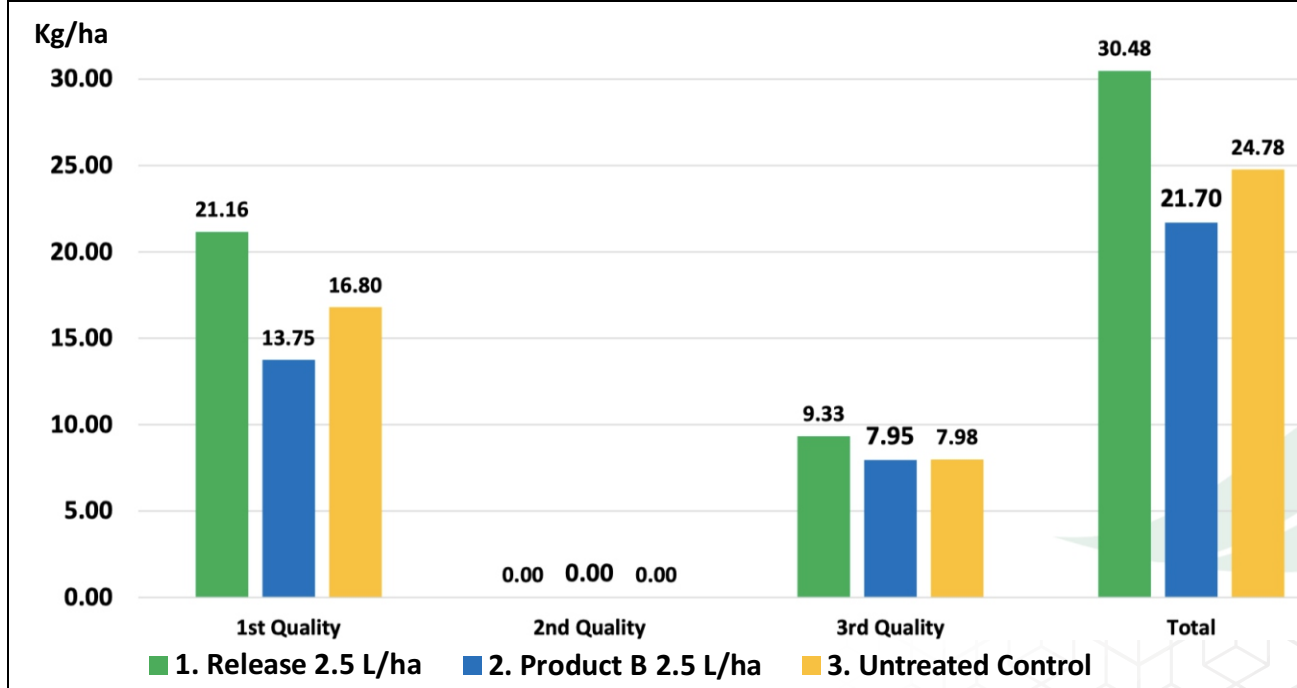
**Fig. 7 Strawberry Yield by Quality at 76 Days After 2<sup>nd</sup> Application (Aug. 6, 2021)**



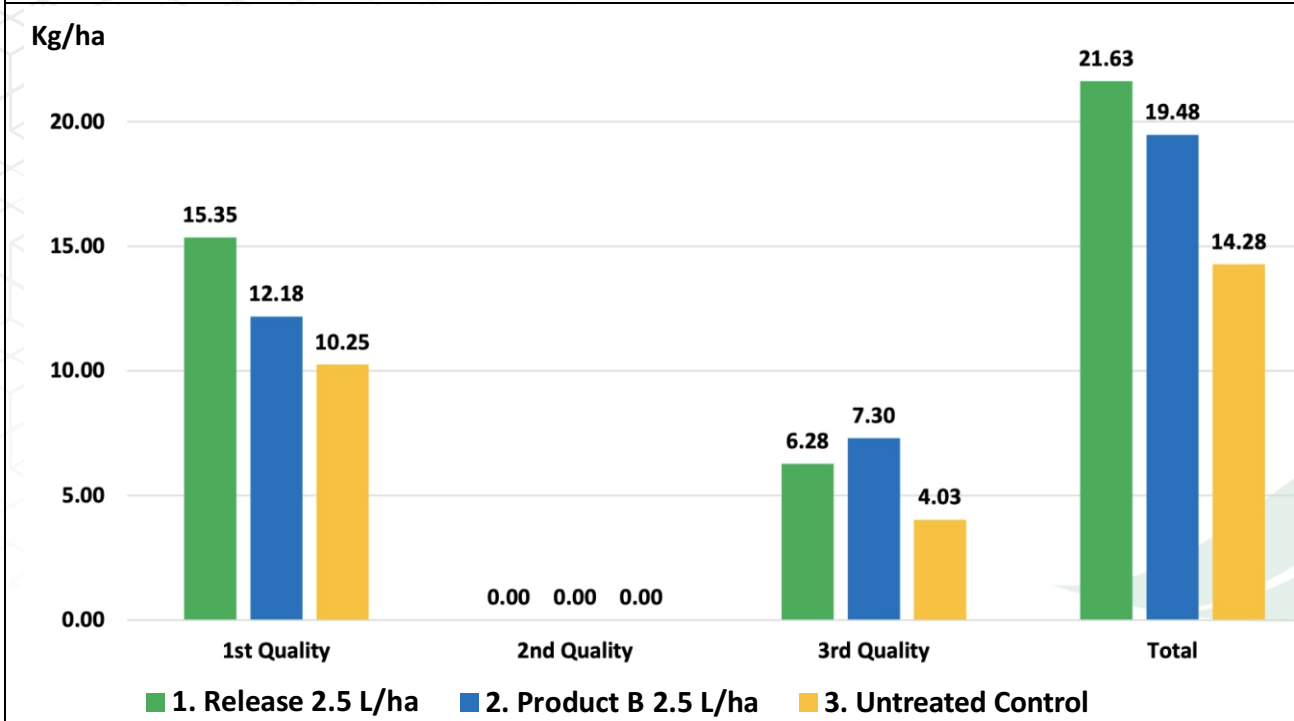
**Fig. 8 Strawberry Yield by Quality at 83 Days After 2<sup>nd</sup> Application (Aug. 13, 2021)**



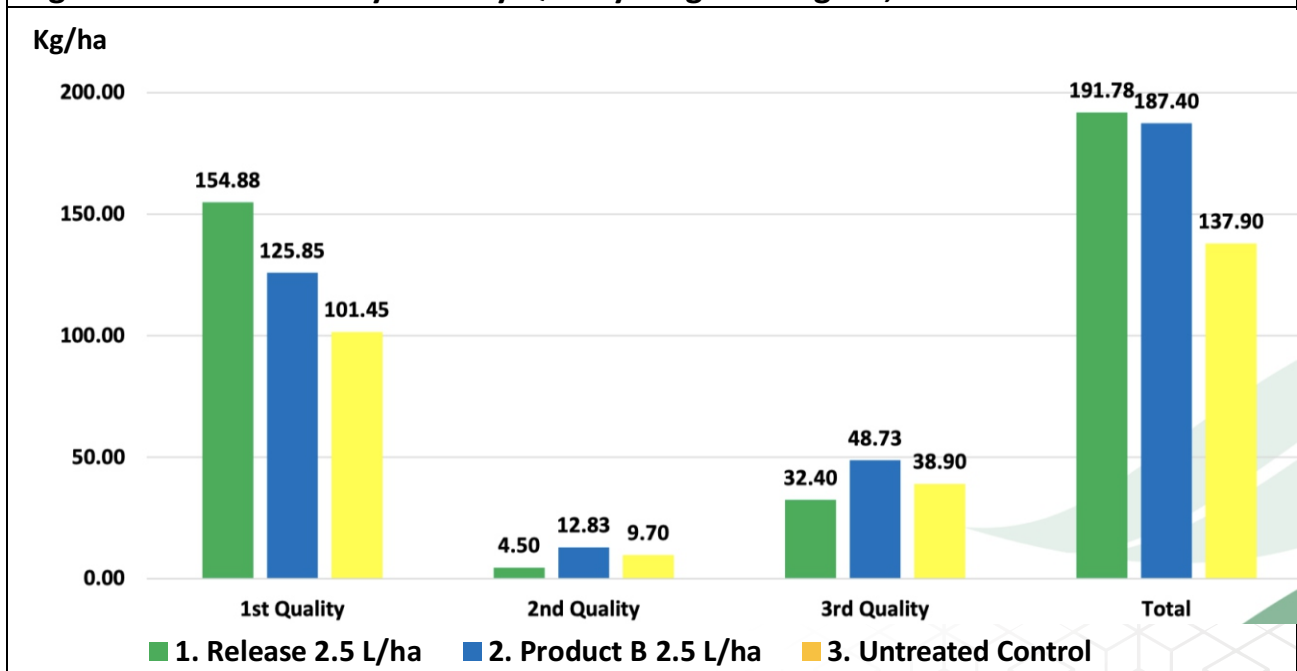
**Fig. 9 Strawberry Yield by Quality at 90 Days After 2<sup>nd</sup> Application (Aug. 20, 2021)**



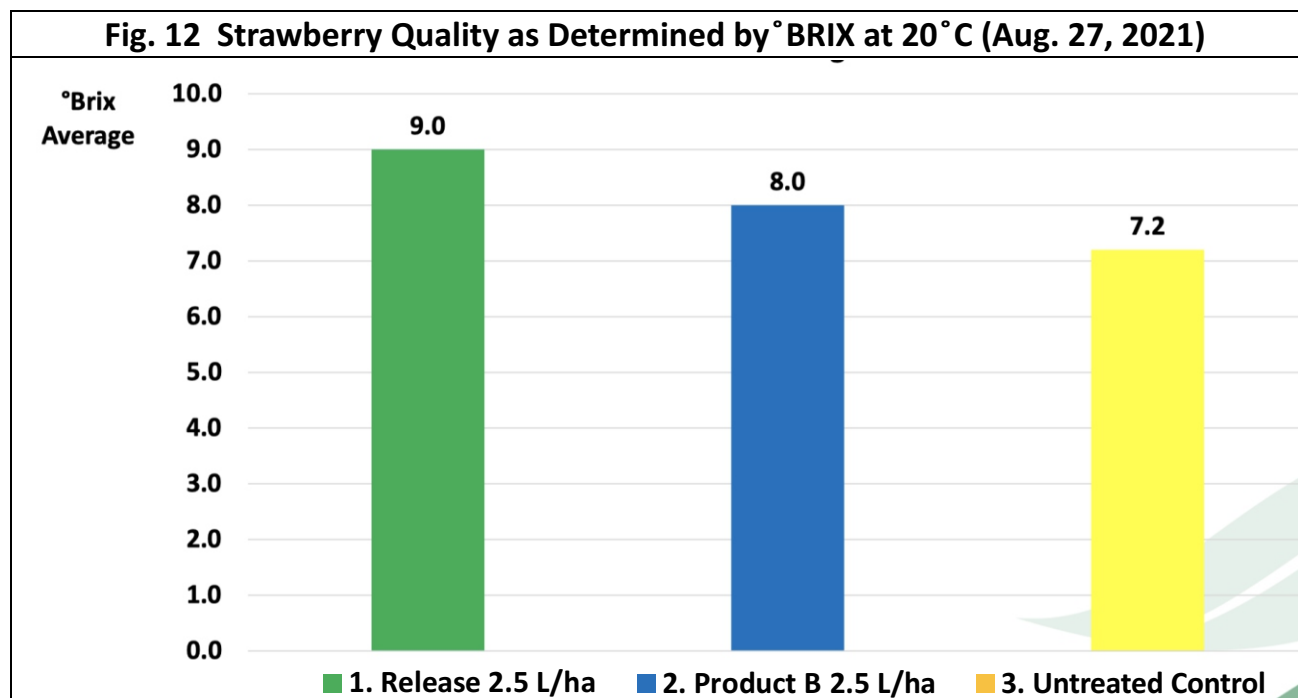
**Fig. 10 Strawberry Yield by Quality at 97 Days After 2<sup>nd</sup> Application (Aug. 27, 2021)**



**Fig. 11 Total Strawberry Yield by Quality Aug. 6 – Aug. 27, 2021**



- **Strawberry quality was determined by the farmer**
  - 1st Quality strawberries fetch the highest prices from buyers and can be exported out of country
  - 2nd Quality has lower price
  - 3rd Quality has the lowest price
- **Earlier harvests also fetch higher prices than later harvests**
- **Release-treated areas not only had the highest yields, they also had the earliest harvest.**
  - Release treatment resulted in 23% more 1st Quality strawberries than Product B over the 4-week time period evaluated
  - Release treatment resulted in 53% more 1st Quality strawberries than the untreated control over the 4-week time period evaluated
  - Release treatment resulted in 104% more 1st Quality strawberries in the first week of harvest than Product B
  - Release treatment resulted in 225% more 1st Quality strawberries in the first week of harvest than the untreated control
  - Release treatment resulted in 2.3% more strawberries than Product B over the 4-week time period evaluated
  - Release treatment resulted in 39% more strawberries than the untreated control over the 4-week time period evaluated



- Higher BRIX indicates higher quality strawberries, with higher solids/sugars content
  - Higher BRIX indicates better strawberry shelf life, important for exported strawberries
  - Release-treated strawberries had 12.5% higher BRIX than Product B-treated strawberries
  - Release-treated strawberries had 25% higher BRIX than untreated control strawberries
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## **VII. CONCLUSIONS AS PRESENTED BY THE FARMER**

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- Release-treated areas show a better performance and advantage over Product B and the untreated control
- We observe a satisfactory response of strawberry plants to Release treatment including stolon development, leaf diameter and color compared to Product B and the untreated control
- 97 days after 2nd application, Release-treated areas presented higher yields and better quality than Product B and the untreated control
- Release treatment resulted in a higher % of soluble solids (°BRIX average) than Product B and the untreated control at 97 days after the 2nd application
- No phytotoxicity was observed in strawberry plants for any of the treatments.