



# Evaluating Cover Crops and Rhizobacteria on Different Sweet Pepper Varieties to Maximize Fruit Yield in a Semi-Arid Region of Puerto Rico

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## MAIN OBJECTIVE

Integrate sustainable crop management strategies in small scale Solanaceous farming systems to improve yield.

## SIGNIFICANCE OF RESEARCH

- Amended cover crops can improve soil quality, organic matter, and nitrogen content into the soil.
- Rhizobacteria's also known as PGPR can stimulate plant growth and natural defense mechanism, thus inducing resistance against pathogens.

## METHODOLOGY

A split plot arranged as a 2x4x3 factorial was conducted in 2016 and 2017.



Picture 1. Two main plots were: a) mix of *Canavalia ensiformis* L., *Mucuna pruriens* L., and *Crotalaria juncea* L. as green manure and b) untreated soil.



Picture 2. *Bacillus subtilis* QST713 and *B. amyloliquefaciens* D747 and their combination were applied as soil or foliar treatment on cubanelle varieties 'Key West' (F1), 'Grenada' (F1) and 'SPP9301'.

## RESULTS AND DISCUSSION

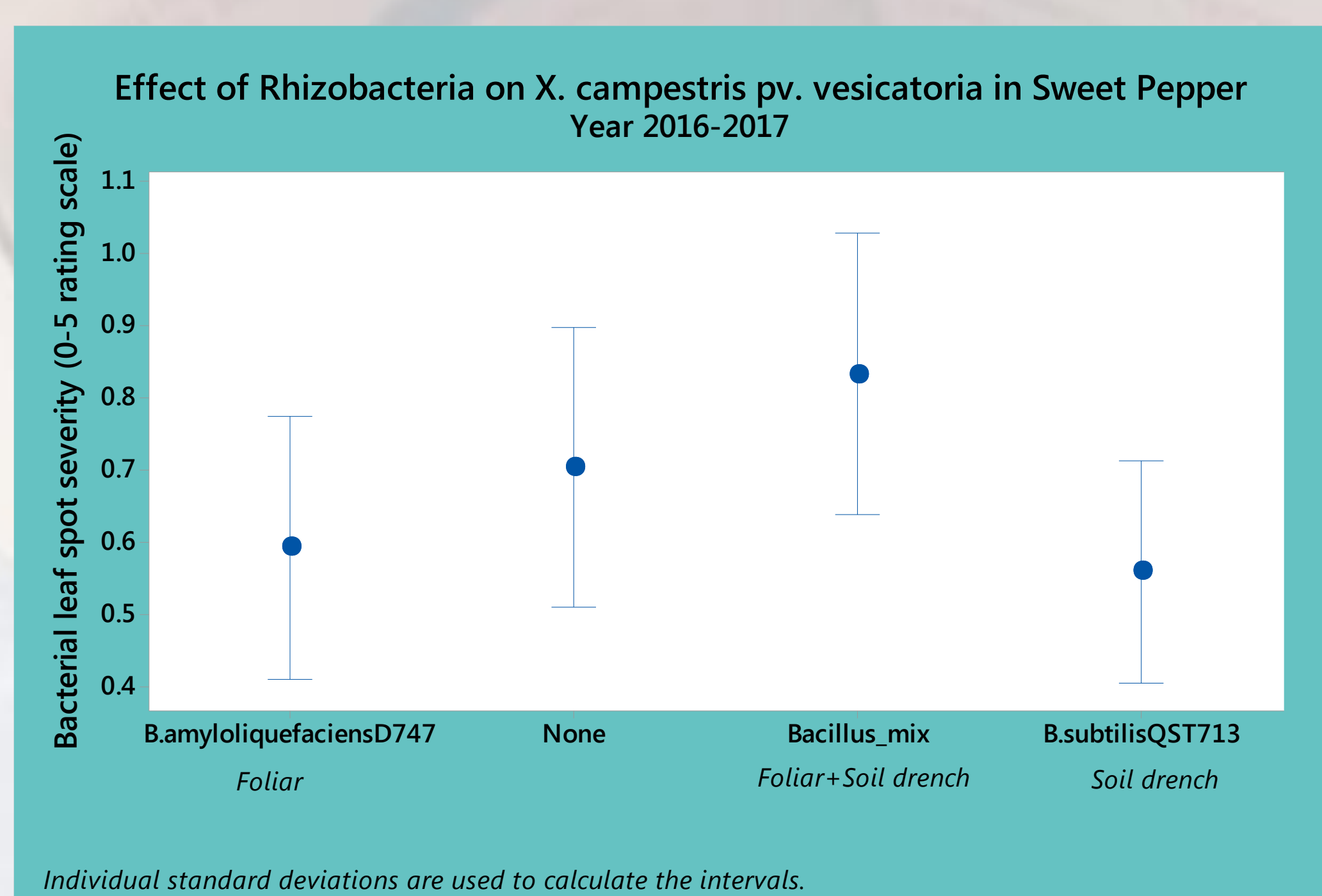


Figure 1. Foliar application of *Bacillus amyloliquefaciens* D747 suppressed bacterial leaf spot on sweet peppers leaves by 6% (not significant). Disease developed during harvest season.

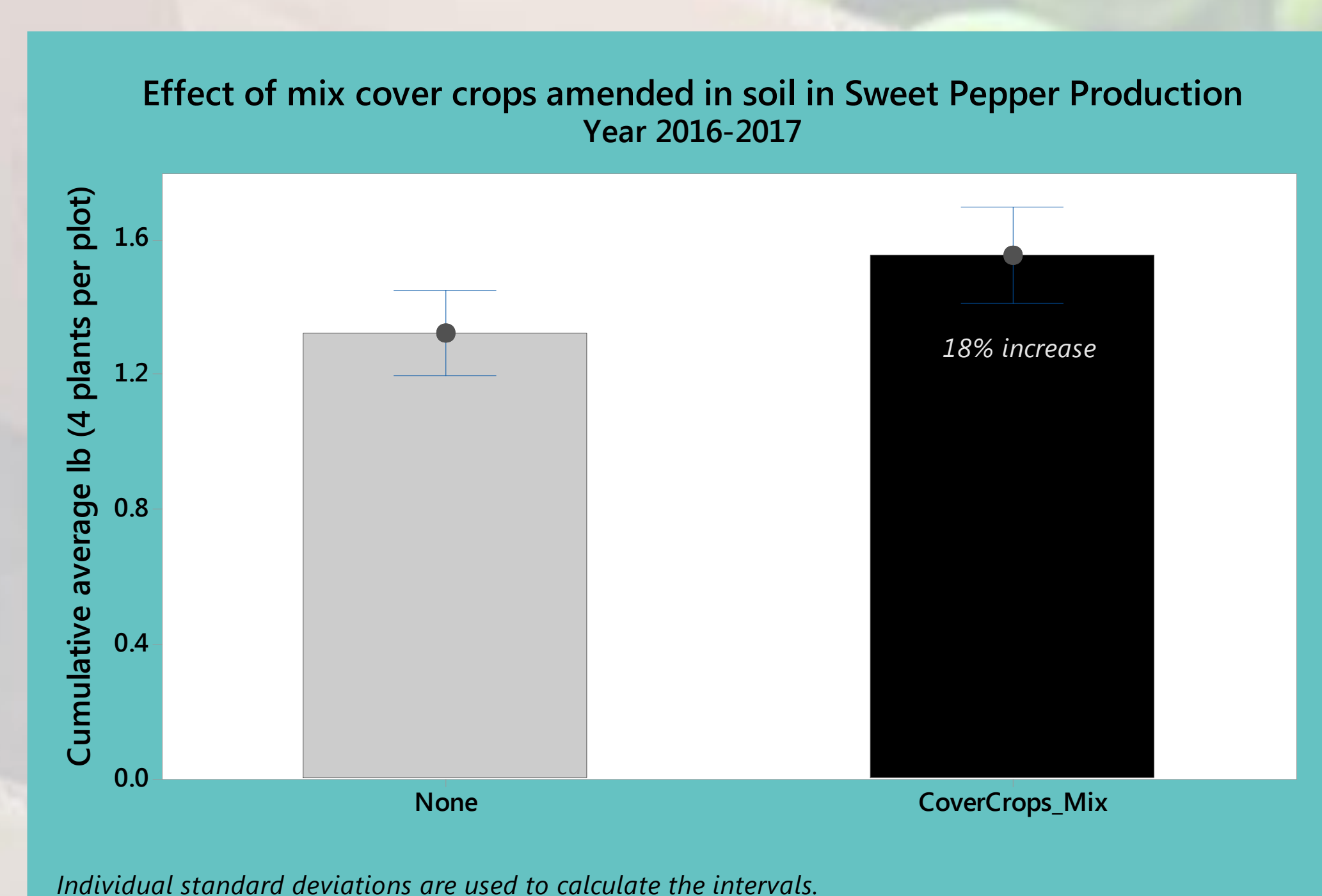


Figure 2. The mix of cover crops incorporated into the soil 65 days prior to transplant maximize sweet peppers yield by 18% compared to no cover crops.

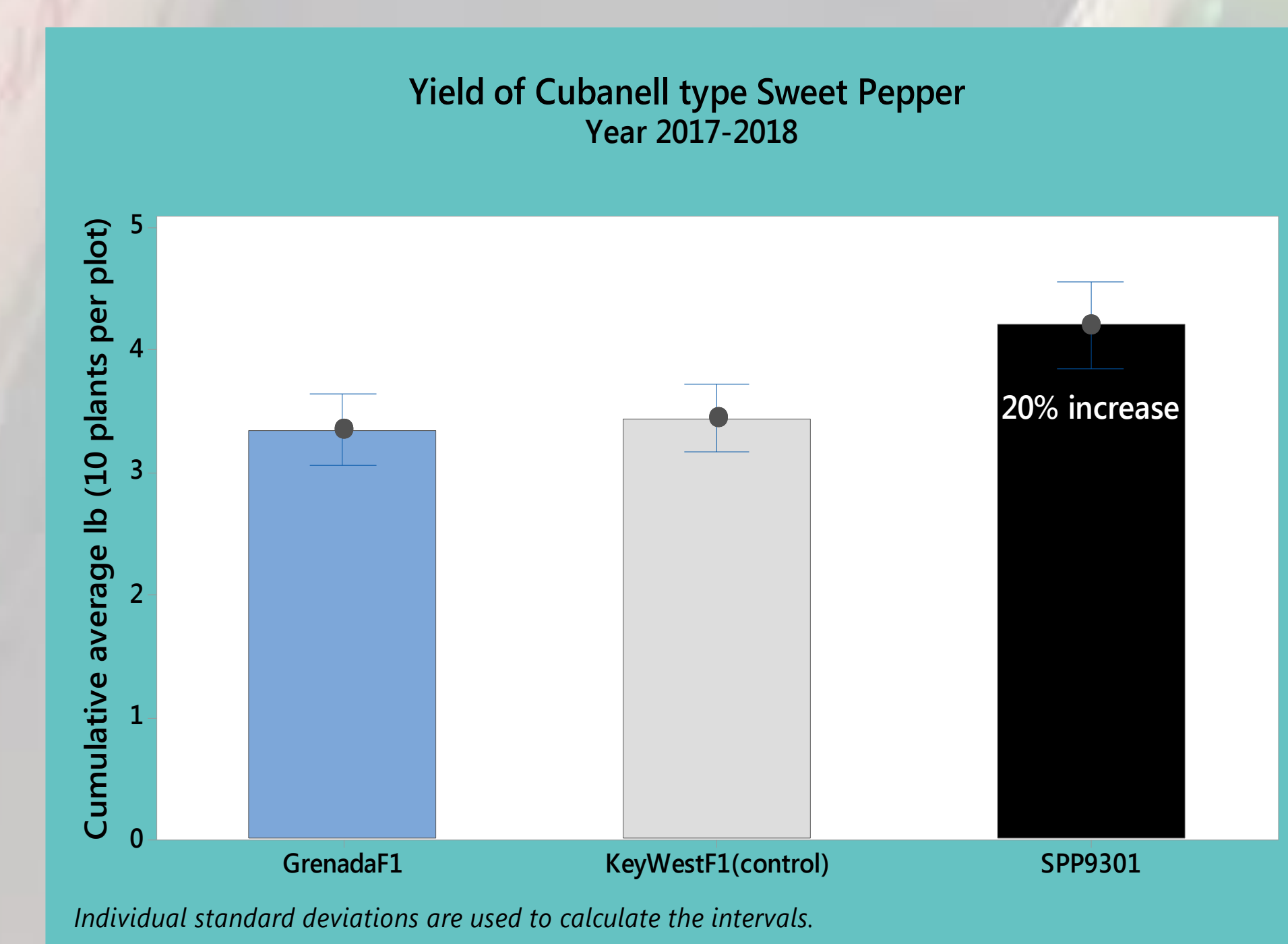


Figure 3. Variety SPP9301 had a 20% more fruit weight compared to 'Key West' F1 (main variety used by growers) and 22% more than 'Grenada' F1.

Cover crops are mainly used as soil amendment to improve soil quality overtime, however depending on the amount of biomass and species used they may elevate soil nitrogen. In tropical regions rapid decomposition of the organic matter provided by legume species may accelerate nitrogen crop uptake. In this 2 year study we were able to observed variability among years perhaps due to changes in the timing of incorporation and climatic factors. Rhizobacteria such as *Bacillus* species are mainly used to suppress fungal or bacterial disease in Solanaceous crops. Even though there were low disease pressure in 2016 bacterial leaf spot was slightly suppressed during the late season by the foliar application of *B. amyloliquefaciens*. On the other hand, the new cubanelle variety 'SPP9301' had higher yield than the standard variety Key West F1.

The overall goal of the research is to develop a sustainable crop management approach that can be used in sweet pepper and tomato crops. The results of this study will help give an alternative approach to be adopted immediately to small scale farmers in the semi arid region of Puerto Rico where they heavily depend in agrochemicals to have competitive yield.