

Mango Responses to Applications of a Biostimulant Based on Amino Acids and Nutrients

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Mango

- * Mango is a very important fruit crop in several islands of the Caribbean
- * The tree exhibits low flower and fruit retention
- * Increasing harvestable fruit number may enhance yield and income for growers

Amino acid biostimulants

- * Biostimulants with amino acids may be used to increase fruit retention and yield
- * Exogenous amino acids are absorbed by the leaves and transported into cells
- * Stimulate enzymatic systems such as nitrate reductase, malate dehydrogenase, phosphorilase, phosphatase, peptidase

Amino acid biostimulants

- * Increased levels of proline and hydroxiproline → biotic and abiotic stress
- * Promote flower and fruit set
- * Promote chelation and transport of mineral nutrients

Amino acid biostimulants

Amino acid application may result in:

- * Increased chlorophyll concentration and photosynthetic output
- * Accelerated growth and increased biomass accumulation
- * Increased fruit yield

Potassium

- * K is one of the nutrients mango absorbs the most
- * Involved in:

- Fruit sugars
- Water stress
- Disease tolerance
- Productivity

❖ There is little information regarding effects of amino acid biostimulants on mango yield and quality, more so when combined with nutrients

Objective

- * To determine the effects of a biostimulant formulation containing free amino acids and potassium on fruit number, size, and sweetness of 'Banilejo 3' mango

Materials & Methods

- * Agricultural Experiment Station of the University of Puerto Rico-Mayagüez, Lajas, southwestern Puerto Rico.
- * $18^{\circ} 01'$ North latitude, $67^{\circ} 04'$ W longitude, 26 m above sea level



Materials & Methods



- * The region is similar to Baní in the Dominican Republic
- * Average minimum is 22°C in February, and maximum 33°C in July
- * Average yearly rainfall about 1200mm , mostly in June and October
- * The soil was a Typic Hapluster (fine clay loam)with pH 6 (NRCS, 2012)

Materials & Methods



- * ‘Banilejo 3’, germplasm from the DR
- * Considered by many the best Dominican mango
- * Small, sweet, with much juice and little fiber.
- * Currently used as fresh fruit and processed in the DR (Goya, Tropijugos, Rica)
- * Exported to USA and Europe, ethnic and gourmet



“Mango slices ,Banilejo variety from Dominican Republic , syrup and pulp”

Materials & Methods

- * The biostimulant was a commercially available blend of amino acids and potassium
- * 5% w/w biologically active free L-alpha amino acids from hydrolized organic tissues (asparagine, serine, glutamine, glycine, histidine, arginine, tyrosine, alanine, proline, cysteine, tyrosine, valine, methionine, lysine, isoleucine, leucine, phenylalanine, and tryptophan) with 30% K_2O

Materials & Methods

- * AminoQuelant K™
- * Mention of specific brand name should not be viewed as an endorsement and is intended to specify the commercially available formulation used in the research



Materials & Methods

- * Aqueous solutions: 0, 2, 4, and 6 ml per liter of water
- * Sprayed to run-off on the canopy
- * Beginning at flowering, once every three weeks, 4 times



Materials & Methods

- * Randomized block design, 6 replications



Materials & Methods

- * Evaluations:

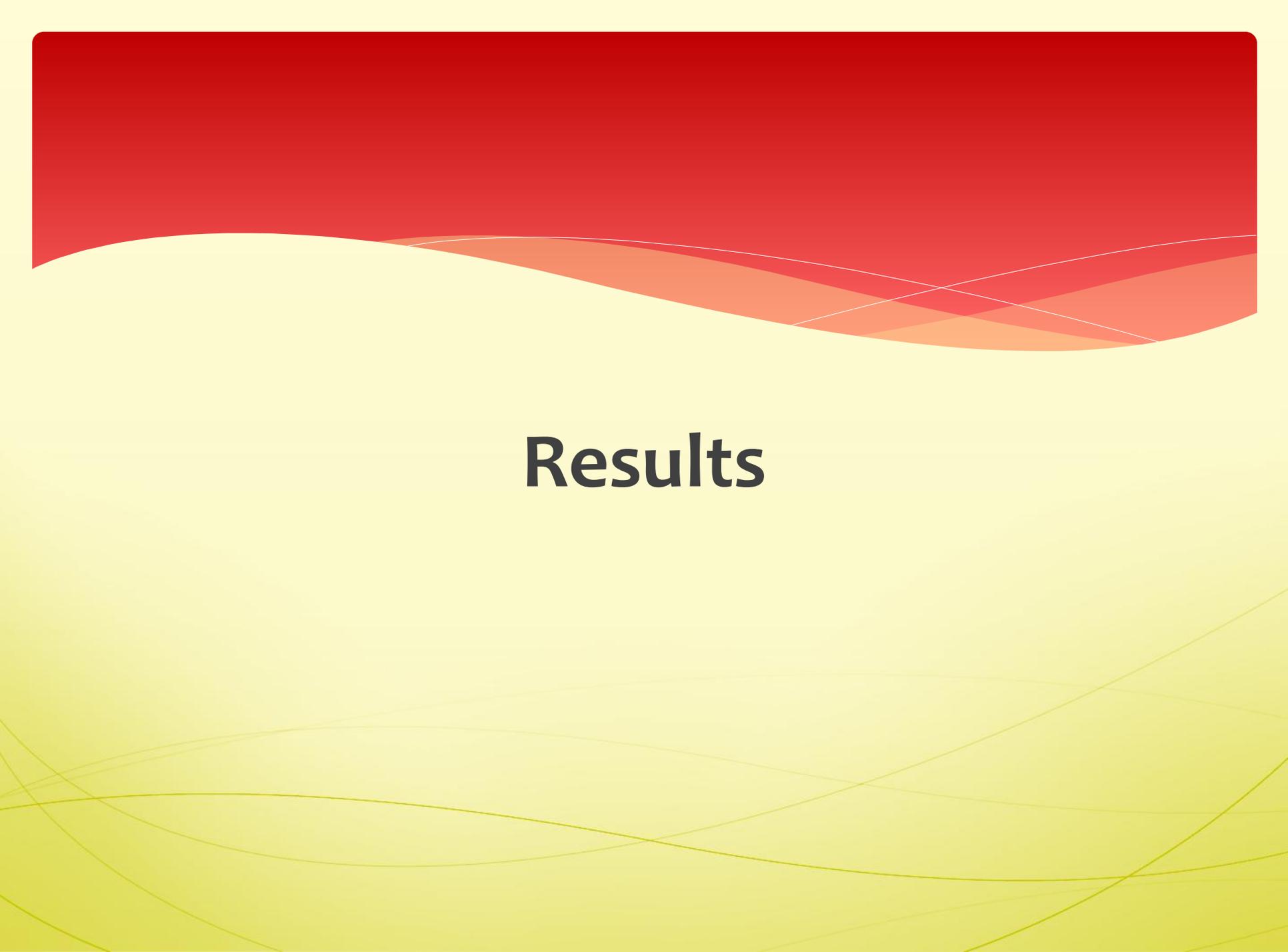
- Fruit number

- Fruit weight

- Content of soluble solids in the pulp juice

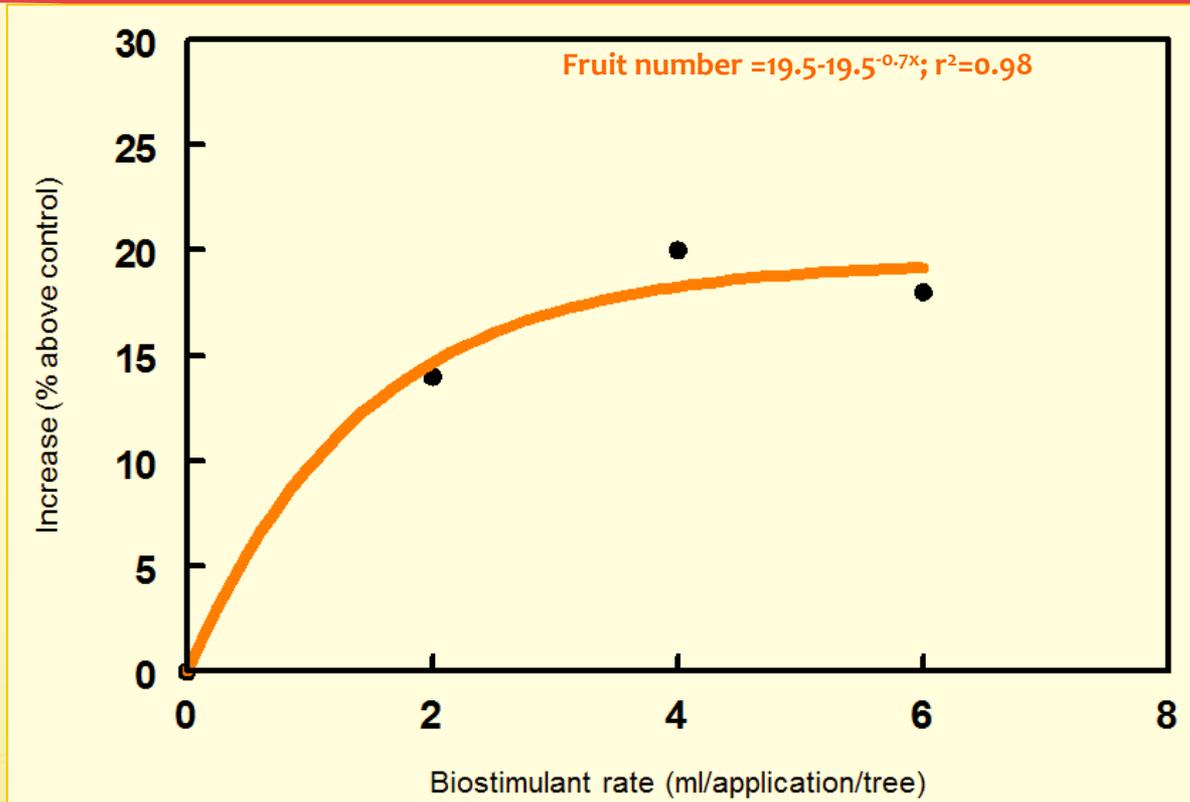
- * Regression analysis



The background features a vertical gradient from red at the top to yellow at the bottom. A large, solid red rectangular shape is positioned at the top left, extending across the top. Below it, several overlapping, wavy, semi-transparent shapes in shades of red and orange create a layered, wave-like effect. The lower portion of the page is a light yellow gradient with faint, thin, wavy lines in a slightly darker yellow color.

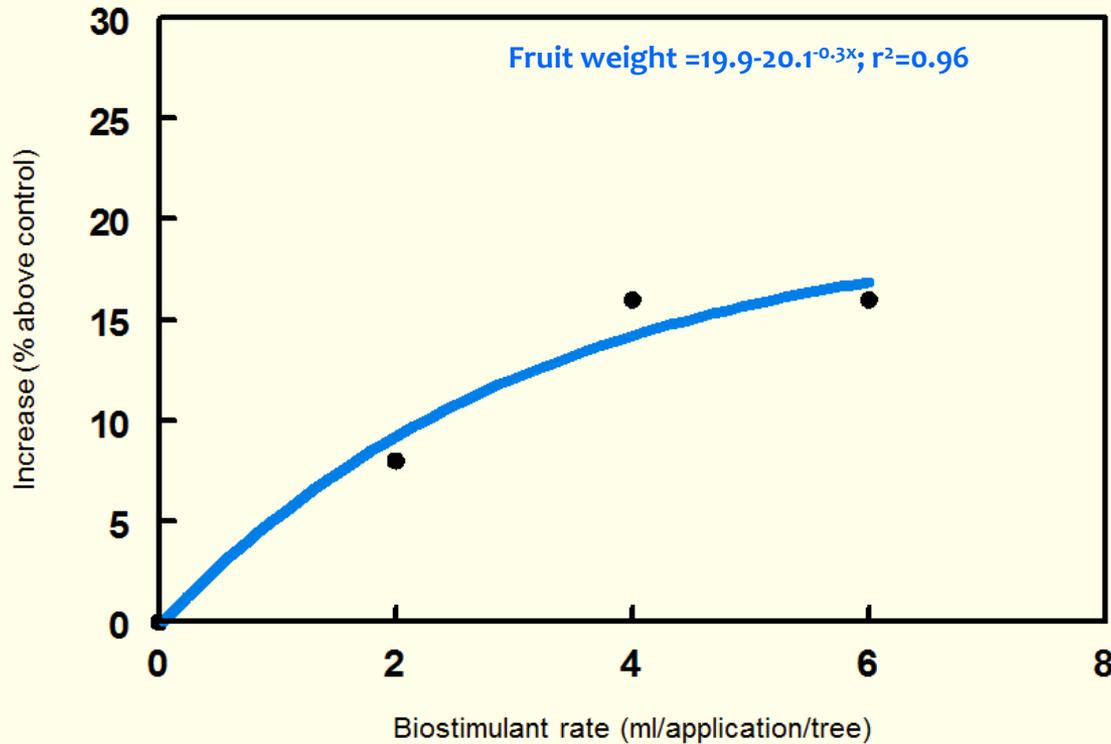
Results

Fruit number



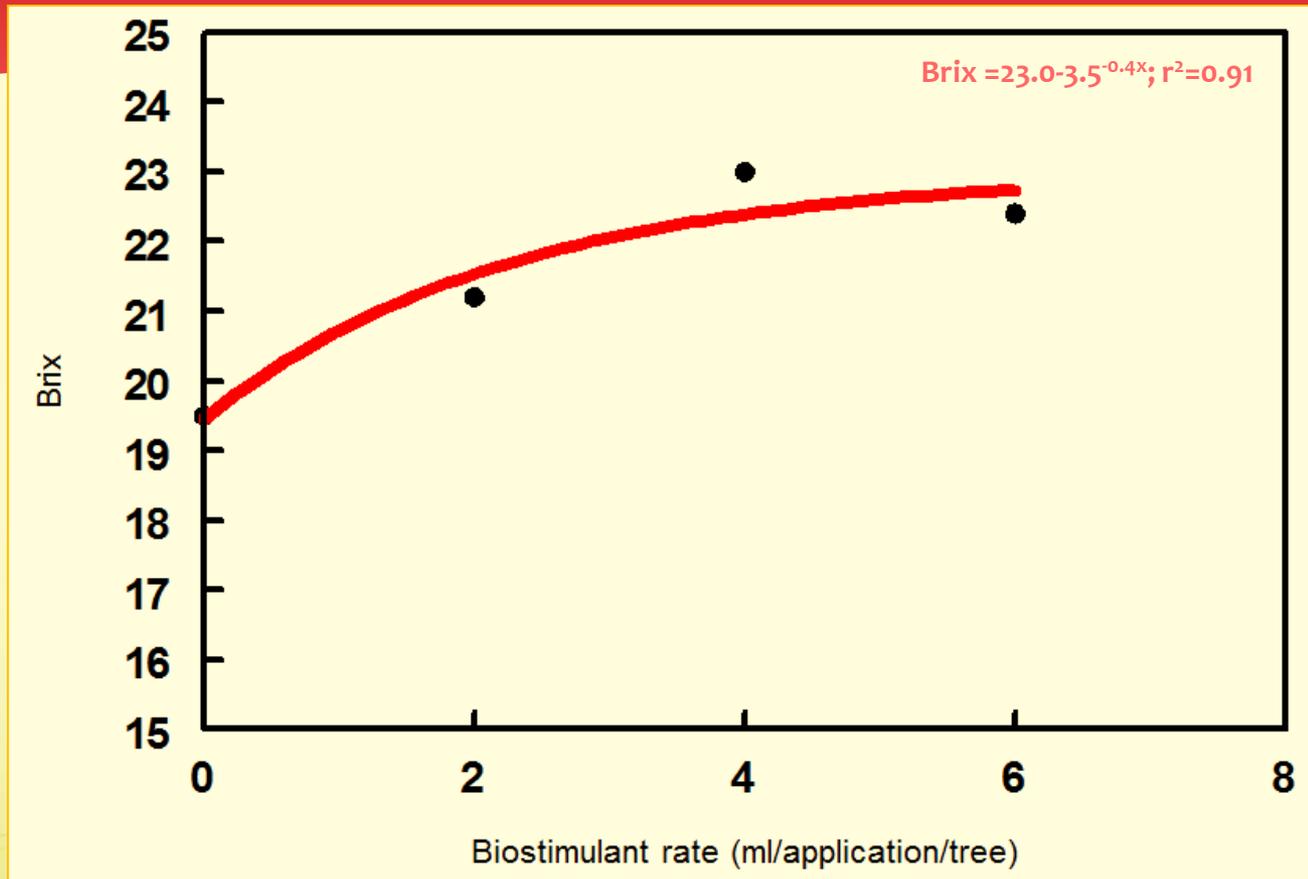
- * Fruit number increased as spray concentrations increased from 0 to 4 ml/L

Average fruit size



- * Fruit weight for the control averaged nearly 200 g, and increased as biostimulant concentrations increased from 0 to 4 ml/L

Soluble solids



- * The concentration of soluble solids in the fruit juice increased as concentrations of the biostimulant were increased up to 4 ml/L

Preliminary conclusion and future research

- * These results indicate that, at least under the conditions of this research, this biostimulant may be useful to enhance mango fruit yield and sweetness
- * This is the first in a series of experiments
- * Future experiments will try these treatments in other mango cultivars, as well as other biostimulants

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Thanks and enjoy the country



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Dominican Republic

