

# Compost: Long Term Organic Amendments Application to Vegetable Production Systems

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## Introduction

The vegetable growers in Florida rely completely on methyl bromide fumigant to manage soil pathogens, nematodes, and weeds. This production system, which generally includes raised beds, fertilizer, polyethylene mulch and drip irrigation, has been very effective in producing high vegetable yields. Non-chemical alternatives such as organic amendments are as yet largely unproven, but do offer promise of more sustainable solutions free of government regulation. The objective of this study is to continue evaluating the long-term effects of organic amendments on pepper (*Capsicum annuum* L.) and watermelon (*Citrullus lanatus* [Thunb.] Manst.) growth, yield, soil chemical, and physical properties. This research study is very unique, since is the "only" experiment in the U.S and Canada that had been receiving a continuous yearly organic amendment application since 1993 (10 years). Results from the passed 10 years suggest that regular organic amendment applications to a sandy Florida soil can increase plant growth and produce similar yields with less inorganic nutrients than standard fertilization programs. Grower input costs could be reduced through water and fertilizer conservation, which would also decrease negative environmental effects.

The field experiments were conducted at the Univ. of Florida, [Southwest Florida Research and Education Center](#), Immokalee, FL. The soil was [Immokalee fine sand](#) (sandy, siliceous, hyperthermic Arenic Haplaquods). The experiment used a split-split experimental design with four replications of each treatment. Main plots consisted of [organic or non-organic amendment application](#), sub-plots of fumigated (i.e. methyl bromide) and non-fumigated.

Organic amendments were applied prior to the bed formation at different rates each year. Methyl bromide was applied at the rate of 300 lb.acre<sup>-1</sup>. The pepper/watermelon rotations were planted each year on raised bed 2.7 ft wide, 0.3 ft high, and 4.9 ft between centers and 50 ft long. Beds were covered with white-faced black polyethylene mulch. Peppers plants were planted at 45-cm spacing in double rows with 10 inches between plants giving plant populations of 17,454 plants.acre<sup>-1</sup>. Watermelons were planted in a single row with 7 feet between plants giving plant populations of 1,251 plants.acre<sup>-1</sup>. All fertilizer was injected by the drip irrigation tubing and positioned in the center of the bed prior to mulch application. Nitrogen was reduced by 50% in the organic amendment areas to compensate the N mineralized from the organic amendment. No granular fertilizer application at planting was used. The

plants were monitored for insects and diseases and pesticide were applied as needed according to Univ. of Florida Extension guidelines

### Vegetable Nutritional Program

#### **Research Results**

- Plant Growth
- Weeds
  - Pepper Season 1998-1999
  - Pepper Season 1999-2000
  - Pepper Season 2001-2002
  - Watermelon Season 1999-2000
  - Watermelon Season 2001-2002
- Petiole SAP Testing
- Vegetable Yields
  - Pepper Yield
  - Watermelon Yield
- Soil Chemicals and Biological Properties
  - Soil Chemical Properties
  - Microorganisms
  - Nematodes
- Heavy Metals

#### **Current Research**

- Cover Crops
  - Cover Crops Information
  - Yield
  - Nitrogen
- Field Day Presentations
  - December 1999
  - May 2000
  - December 2000
  - December 2001
  - May 2002
  - December 2002