

Water and Nitrogen BMPs for Tomato and Watermelon: Water Quality and Economics¹

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Introduction

Rapid movement of nitrogen from vegetable fields into Florida's shallow water table environments is a cause of concern for both production and environmental aspects. Excessive leaching from Florida's sandy soils combined with the short distance between the soil surface and ground water creates a challenge for vegetable growers to keep water and nutrients in the root zone within the plant sufficiency range. Water management involves controlling the water table depth for seepage irrigation, which is the most common irrigation method for vegetables in south and northeast Florida, to keep optimal soil moisture in the root zone. A major component of nutrient management is applying fertilizer at recommended fertilizer rates.

Growers apply both water and N fertilizer to maximize fruit production. However, applying fertilizer rates beyond crop needs can result in excessive nutrient. This practice is a cause for concern for Florida's water resources because N is mobile in the environment, and is associated with negative impacts on ecosystems caused by eutrophication. To help mitigate the water quality impacts of vegetable production, state agencies in coordination with producers and UF/IFAS have developed water and fertilizer best management practices (BMPs). The vegetable industry, however, has often questioned the efficacy of these BMPs and questioned

whether these BMPs can be implemented without reducing yields.

BMP Study

A field study was designed to evaluate the effect of nutrient and water BMPs on crop yield and N leached from vegetable fields in south Florida. The study was conducted on a research farm located at the UF/IFAS Southwest Florida Research and Education Center in Immokalee. The study evaluated two production systems composed of two levels of water and nutrient inputs for tomato and watermelon production with seepage irrigation (Figure 1). The average water and N fertilizer rates used by growers (grower-average) in south Florida were compared with the recommended BMP rates (Table 1). Tomatoes were produced for four seasons (spring and fall) (Table 1), while watermelon was produced for two seasons (spring only). The grower-average N rates for tomato (373 lb./ac.) and watermelon (265 lb./ac.) were determined from a survey of south Florida vegetable growers. The *Vegetable Production Handbook for Florida*, on which nutrient BMPs are based, recommends 200 lb./ac. and 150 lb./ac. for tomato and watermelon, respectively.

The water table depth that was artificially raised using seepage irrigation was shallower (closer to the surface) for the grower-average system compared with the BMP system.

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