

Nitrogen Fertilization of Strawberry Cultivars: Is Preplant Starter Fertilizer Needed?¹

Shinsuke Agehara, Bielinski M. Santos, and Alicia J. Whidden²

Introduction

Nitrogen (N) is the plant nutrient that is most often deficient for crop production, and its optimal fertilization can result in substantial economic return for farmers. Because N is a major component of the green pigment chlorophyll, its deficiency results in the pale yellowing of leaves and inhibits photosynthesis, which is a process to produce sugar molecules. This nutrient plays a key role in many other important plant functions, and its deficiency can severely affect not only plant growth and development but also fruit quality. In soils with low organic matter content, such as the sandy soils throughout Florida, natural N supply is low and supplemental fertilization is required to cover the crop demand of this essential nutrient. In strawberry production, this is achieved in two ways: a) through application during the growing season of all N through drip lines (fertigation) or b) a combination of this practice and the application of dry preplant starter N before bed formation.

Surveys conducted among strawberry growers in west central Florida showed that the fertilization practice used before 2005 by about one half of them was to apply preplant fertilizer formulas that include N. Application rates usually ranged between 20 and 40 lb/acre of N. Most of N is absorbed through plant roots in the form of the ion nitrate (NO_3^-) dissolved in water. Because both NO_3^- and soil particles are negatively charged, NO_3^- does not attach to soil particles, making this ion highly mobile and subjected to

loss via leaching or surface runoff. Environmental concerns over nitrate contamination in Florida water has brought to the forefront the necessity of conducting research on best management practices that could reduce the use of starter fertilizers in production systems where fertigation is available, such as in strawberry fields. Minimizing preplant fertilizer amounts is critical to the prevention of nitrate leaching particularly in strawberry fields, where overhead sprinkler irrigation is commonly run for 10 to 14 days during the establishment period (Clark et al. 1992). Therefore, studies were conducted to determine whether using preplant starter N fertilization increases strawberry early and total yield.

Response to Starter Fertilizer

Field studies were conducted during 2005 and 2006 at the Gulf Coast Research and Education Center (GCREC) of the University of Florida, on a Myakka fine sandy soil with 1.2% of organic matter and pH 7.2. Planting beds were preformed with a standard bedder and were 28 inches wide on the base, 24 inches wide on the top, and 8 inches high. ‘Strawberry Festival’ bare-root transplants from Canadian nurseries were transplanted in the first week in October of each year.

Plant nutrients other than N were applied through drip lines according to IFAS recommendations to ensure non-limiting conditions (Peres et al. 2007). Ammonium nitrate

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2. Shinsuke Agehara, assistant professor, UF/IFAS Extension Gulf Coast Research and Education Center; Bielinski M. Santos, former associate professor, UF/IFAS Extension Gulf Coast REC; and Alicia J. Whidden, Extension agent, UF/IFAS Extension Hillsborough County; UF/IFAS Extension, Gainesville, FL 32611.

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was used as the starter fertilizer at a rate of 40 lb/acre of N. A non-treated control was also included. The fertilizer was broadcast incorporated 4 inches deep on bed tops before final bed pressing. Afterwards, beds were fumigated and covered with black high-density polyethylene mulch immediately after fumigant injection. Simultaneously, a single drip line was buried on bed centers. Strawberries were grown following recommended local practices.

The results showed that applying starter N fertilizer did not improve monthly or total strawberry yield (Figure 1). This indicated that growers can avoid using preplant starter N fertilizer and still obtain the same yields, provided that appropriate fertigation rates are used to ensure satisfactory crop growth and development.

Peres, N.A., J.F. Price, W.M. Stall, C.K. Chandler, S.M. Olson, T.G. Taylor, S.A. Smith, and E.H. Simonne. 2006. "Strawberry production in Florida." In: Olson, S.E. and E. Simonne (eds.). *Vegetable Production Handbook for Florida*, 2005–2006. HS-736. Gainesville: University of Florida Institute of Food and Agricultural Sciences. pp. 375–382.

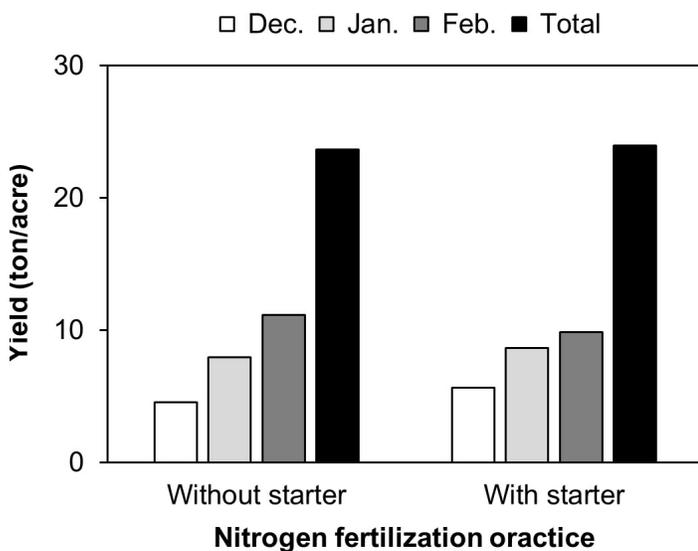


Figure 1. Strawberry marketable yields per month and total in response to the application of starter (preplant) N fertilizer at a rate of 40 lb/acre.

Literature Cited

Clark, G.A., C.D. Stanley, E.E. Albrecht, A.G. Smajstrla, and F.S. Zazueta. 1992. *Water requirements and crop coefficients for strawberry production in S.W. Florida*. 24 Jan. 2017. <http://www15.swfwmd.state.fl.us/LibraryImages/WATER%20REQUIREMENTS%20AND%20CROP%20COEFFICIENTS%20FOR%20STRAWBERRY%20PRODU.PDF>