

Organic Sweet Corn, On-Farm Trial Summary

Evaluation of Sustane All-Natural Fertilizer on Yield of Organically Managed Sweet Corn at Maplestar Farm

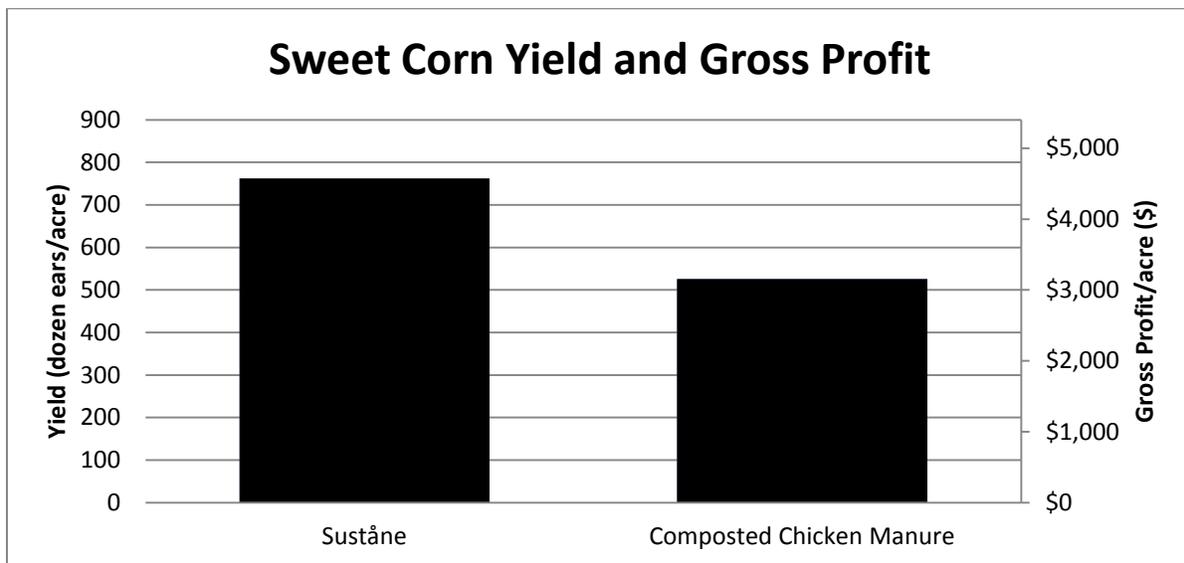
Trial Location: Maplestar Farm LLC, Auburn Township, Ohio

Trial Cooperator: Jake Trethewey, Owner, Maplestar Farm LLC

Trial Summary Prepared by Jon Sammons, PhD, Director of Research, Sustane Natural Fertilizer, Inc.

Trial Summary

During the summer of 2012, an on-farm trial was performed at Maplestar farm located in Geauga County, Auburn Township, Ohio. The purpose of the trial was to evaluate the use of Sustane Natural Fertilizers to supply nutrients for organic managed sweet corn. Sustane was compared to a commercially available Composted Chicken Manure. The results showed a 45% yield increase with Sustane, fertilized sweet corn compared to the Composted Chicken Manure treatment, which corresponds to a \$1,416.00 increase in gross profit per acre.



2 ears (left) were fertilized with Composted Chicken Manure, 2 ears (right) fertilized with Sustane. Photos taken August 14, 2012, 65 days after planting.



Jake Trethewey in two plots for scale, left plot is Composted Chicken Manure and the plot on the right is Sustane. Photos taken August 14, 2012, 65 days after planting. .

Introduction

Organic sources of plant nutrients available to organic certified farms can vary greatly in consistency from batch-to-batch, nitrogen release profile and longevity and nutrient density. Examining the source and stabilization (manufacturing) process of organic forms of plant nutrients quickly reveals that all organic fertilizers are not created equal. With these large variations in performance and composition of organic fertilizers, production of organic sweet corn can be very challenging, especially since achieving optimal yields with sweet corn requires a good deal of nitrogen; widely accepted rates are 150 pounds of nitrogen per acre. The purpose of this on-farm trial is to compare yields of sweet corn, managed organically, when fertility is supplied with two different granular fertilizer regimes; Sustane 3-7-4 applied at pre-plant plus Sustane 8-2-4 applied as a side-dress compared to composted chicken manure (CCM) 5-4-5 applied at pre-plant and CCM 8-3-3 as a side-dress.

Materials and Methods

The trial was conducted at MapleStar Farm, an organic certified farm, in Geauga County, Auburn Township, Ohio, located in the northeast Ohio, during the summer of 2012. Sweet Corn 'Delectable' (SE) seed was planted at a depth of 0.75 inches with 8 inch within row spacing on June 10, 2012. Just prior to planting the plots were prepared with a pre-plant application, subsequent fertilizer was applied as a side-dress at the 5- and 8-leaf stage, treatment combinations, application method and application timing are summarized in table 1. An irrigation event delivering one inch per acre was applied to the plots immediately after seeding through drip tape. Throughout the trial adequate soil moisture was maintained through drip tape. In addition to the fertility supplied by the treatments, the equivalent of 3 gallons per acre of a liquid fish fertilizer (analysis 3-3-0.3) was applied weekly through drip tape. Seedling emergence was estimated at 10% on June 15, 2012 and greater than 90% by June 19, 2012. Plot size for each treatment was 3 feet by 400 feet (0.028 acres). Individual ears were harvested by hand on August 19, 2012; total number of marketable, mature ears was tabulated for each treatment combination.

Table 1. Fertility treatments, application method, application rate (pounds fertilizer) and application timing.

Treatments	Pre-plant ^x		Side-dress (5-leaf stage) ^y		Side-Dress ^z (8-leaf stage) ^z	
	Analysis	Rate(lb.)	Analysis	Rate(lb.)	Analysis	Rate(lb.)
Sustane	3-7-4	500	8-2-4	250	8-2-4	250
Composted Chicken Manure (CCM)	5-4-5	500	8-3-3	250	8-3-3	250

^xPre-plant was broadcast applied and lightly scratched into soil just prior to planting on June 10, 2012, both treatments received 500 pounds to the acre of either Sustane 3-7-4 or CCM 5-4-5.

^yAt the 5-leaf stage (June 29, 2012) a side-dress, placed in a band 2-inches from the stalks, was applied at 250 pounds to the acre of either Sustane 8-2-4 or CCM 8-3-3.

^zAt the 8-leaf stage (July 9, 2012) a side-dress, placed in a band 2-inches from the stalks, was applied at 250 pounds to the acre of either Sustane 8-2-4 or CCM 8-3-3.

Results and Discussion

The Sustâne treatment resulted in about a 45% increase in yield while supplying 18% less actual nitrogen per acre, compared to the CCM treatment (Table 2). This result suggests that the sweet corn fertilized with Sustâne had greater nitrogen uptake efficiency. While nitrogen uptake efficiency was not directly measured in this on-farm trial, this conclusion is supported by a yield per pound of nitrogen applied of 13.85 compared to 8.09 for the Sustâne and CCM treatments, respectively (Table 2).

Improved nutrient uptake efficiency is most likely the result of differences in nitrogen release profile and longevity. The CCM fertilizers used, both the 5-4-5 and 8-3-3, have water soluble nitrogen fractions of 40% (obtained from product labels), while the Sustâne 3-7-4 and 8-2-4 have water soluble nitrogen fractions of 10%. The water soluble nitrogen fraction directly corresponds to the amount of nitrogen that is quickly available. The higher the fraction of water soluble nitrogen results in less slow-release nitrogen to be mineralized and available for plant-uptake over time.

Table 2 shows the cost to supply the Sustâne treatment was \$387.50/acre compared to \$361.00/acre to apply the CCM treatment; a difference of \$26.50 per acre. However, gross profit per acre under the Sustâne managed plot resulted in an increase of \$1,416.00 compared to the CCM managed plot.

Table 2. Effects of Sustâne fertilizer and composted chicken manure on yield, actual nitrogen delivered, yield per pound of nitrogen delivered, fertilizer input costs and the potential, gross profit per acre.

Treatments	Yield (dozen/acre) ^y	Nitrogen Applied by Treatment (lb./acre) ^w	Yield/Pound Nitrogen Applied ^x	Fertilizer Input Cost/Acre ^y	Gross Profit/Acre ^z
Sustane	762	55	13.85	\$387.50	\$4,572.00
Composted Chicken Manure (CCM)	526	65	8.09	\$361.00	\$3,156.00

^yYield is expressed in dozen (12) ears harvested per acre.

^wNitrogen Applied by Treatment is calculated as the sum of nitrogen contribution of the pre-plant and two, side-dress applications where nitrogen contribution is calculated as, (actual amount fertilizer applied in pounds X percent Nitrogen content of each fertilizer).

^xYield /Pound Nitrogen Applied corresponds to dozen of harvested ears per pound of nitrogen applied and is calculated as, (Yield (dozen/acre)÷Nitrogen Applied by Treatment (lb./acre)).

^yFertilizer Input Cost per Acre is the sum of fertilizer costs applied, where fertilizer cost is based on a landed cost to Maplestar Farm using 2012 published prices for each fertilizer.

^zGross Profit/Acre is calculated using the sale price for a dozen organic sweet corn ears at Maplestar Farm Market. \$6.00/dozen multiplied by the Yield (dozen/acre).