

Nutrient and Irrigation Management Guide

Spring Sweet Corn – 2003

The Soil

Nutrient Holding Ability (Cation Exchange Capacity) – Most of the soil at Suwannee Farms is considered a Blanton Fine Sand or a Penney Fine Sand according to the Suwannee County Soil Survey. Both of these soils are very similar, and for practical purposes can be considered the same for nutrient and irrigation management. The ‘exchange capacity’ of these soils is relatively low due to its very low clay content. Therefore, Nitrogen and Potassium fertilizers are highly prone to leaching. Nutrient management should focus on keeping as much of the nutrients in the root zone as possible throughout the growing season.

Water Holding Capacity - Both of these soils have an average Water Holding Capacity of about 0.66 inches per foot of soil depth.



Compaction Layer – The compaction layer that exists about 9 to 10 inches below the level soil surface was analyzed in Pivot 12 during the Spring 2002 potato crop. The lab results from these samples indicate that this layer prohibits root growth, but does not reduce soil water movement through this zone. Bed excavations during this crop also revealed that root growth stops at the top of the compaction layer. This compaction layer is consistent across the whole farm and is most often found around 9 inches from the soil surface. ***This allows for an effective water holding capacity of about 0.45 inches.***

Determining Soil Moisture – It is important to develop a feel for levels of adequate moisture within the soil, since soil moisture will need to be checked daily during peak growth. From experience during the Spring 2002 crops, three basic levels were used to determine soil moisture by touch and feel: Wet, Adequate and Dry.

Wet – Soil ball taken from 4 to 6 inches below the soil surface and approximately 6 inches beside the stalks will hold together well when squeezed tightly. Ball will also hold together when rolled gently across hand. Hands will be dirty, and will have to be washed to be cleaned.

Adequate – Soil ball taken from 4 to 6 inches below the soil surface and approximately 6 inches beside the stalks will also hold together when squeezed tightly. However, the ball may break-up even when gently rolling across hand. Soil can be brushed off hands, and hands will look fairly clean when finished.

Dry – Soil will not hold ball under any condition, and soil will not stick to hand. Lightly brushing hands together will clean them.

Nutrient Management

Nitrogen Recommendation

The IFAS nitrogen fertilizer recommendation for sweet corn is 200 lbs per acre per crop, allowing for an additional 30 lbs per acre per crop for a leaching rain. The 2003 sweet corn crop in the EPA 319 project will target a total nitrogen application of 270 lbs of nitrogen per acre.

Sweet corn also has a maturity range from 64 to 90 days after planting. The plan outlined below reflects a mid-March planting in North Florida, and estimates an average season of 72 days from planting to maturity. Fields planted before mid-March may take longer to mature, and likewise, fields planted later may mature faster. The outline below should be adjusted accordingly.

Nitrogen Program - targeting 270 lbs nitrogen per acre

Use of liquid nitrogen sources that can be injected through the irrigation system is recommended, and can greatly improve nutrient efficiency of placement and utilization. Applications through the irrigation system should traditionally target 10 to 20 lbs nitrogen per acre, however in this project, we will attempt to maintain applications of approx. 40 lbs nitrogen per fertigation event. Use of dry or liquid nitrogen sources applied as sidedress during the first half of the crop is also recommended. *(During the early stages of the crop, the root system will not have developed enough to utilize nitrogen applications efficiently if applied as broadcast or through the irrigation system.)*

Pre-plant

- Nitrogen based fertilizers should not be broadcast to the soil surface before planting. These will be highly susceptible to leaching.

Planting

- Traditional applications of nitrogen at planting are approximately 15 lbs nitrogen per acre. However applications of 30 lbs nitrogen per acre are acceptable.

Approximately 21 Days After Planting (DAP)

- By now the root system is developing rapidly and an application of approximately 40 lbs nitrogen can be banded beside the corn plants. The bands should be applied approx. 2 to 4 inches to the side of the corn row. It is recommended that this application be applied as a dry granular or liquid nitrogen solution. If applying liquid, applying approx. 2 to 4 inches below the soil surface will help reduce volatilization. Nitrogen applications made through irrigation is not recommended, as the small plants do not yet have sufficient roots to utilize broadcast nitrogen efficiently.

Approximately 36 DAP

- Nitrogen applications made through the irrigation system can now improve nitrogen use efficiency if accompanied by appropriate irrigation. Applications of approx. 40 lbs nitrogen per application can be made on a weekly basis. Appropriate nitrogen management should target between 3 and 5 of these applications during the season. **In this project, we are targeting a maximum of 5 applications made through the irrigation system applying approximately 40 lbs nitrogen each.**

Within 1 week from harvest.

- Nitrogen applications made during the final week of ear development and maturity are not beneficial.

Irrigation Management

When reducing total nitrogen rates from a production program, irrigation management becomes critical, and will become the major factor that keeps the nutrient management program on track. Nitrogen is easily leached, and over-irrigation is easy to do, especially when pressed for time. A thorough evaluation of the irrigation system by the Mobile Irrigation Lab will provide tools that will be essential to aggressive irrigation management. This evaluation should be completed prior to planting.

The following irrigation recommendations are designed to provide adequate moisture for the crop while minimizing leaching potential of nitrates. These recommendations are also dependent on a highly efficient irrigation system that can provide specific irrigation amounts. The guide is designed without consideration of rainfall. Any sufficient moisture contribution from rainfall should replace the irrigation recommendation suggested for that day or time period. Actual irrigation amounts should be increased or decreased depending on actual weather conditions and crop growth rate.

Pre-Plant Herbicides

- Herbicides applied pre-plant that have a 'water-in' requirement should receive no more than 0.25 inches, even on a very dry soil. An irrigation of this amount may wet the soil to a depth of at least 4 inches and may penetrate much deeper, depending on current soil moisture levels.

Pre-Plant

- To facilitate planting, the soil should be moist enough to allow proper seed placement. Apply no more than 0.20 inches if rainfall has not provided sufficient moisture.

Post Plant

- A light application of approx. 0.15 inches immediately after planting will allow the soil surface to 'crust.' This will help retain soil moisture as the seeds begin to germinate and grow.

Pre-Emergence

- As the seeds germinate and growth begins, water requirements are very small, and soil moisture levels within the root zone may remain adequate for some time. Soil moisture should be checked 2 or 3 times per week.
- Irrigation during this period usually applies 'surface moisture' to prevent the soil surface from drying out excessively and reducing wind erosion. These applications should apply a minimum amount.

Post Emergence - Approx. 10 to 18 Days After Planting (DAP)

- As the plants emerge, and photosynthesis begins, water use increases gradually with plant size.
- Irrigation during this period should be scheduled every 3 or 4th day, with rates of 0.15 to 0.25 inches per application. (*Example: 0.15 inches at 10 DAP, 0.20 inches at 14 DAP, and 0.25 inches at 18 DAP.*)
- Soil moisture should be checked every other day, if not daily.

19 to 38 DAP

- The sweet corn plants are growing rapidly and water use is increasing accordingly.
- Irrigation events should be scheduled every 2nd or 3rd day, applying 0.25 to 0.30 inches per application.
- Soil moisture should be checked daily.

39 to 48 DAP

- Irrigation should now be applied daily to meet the daily water uptake by the sweet corn.
- During this period, water use is still increasing, but is averaging just below 0.20 inches per day.
- With a highly efficient irrigation system, applications of 0.20 to 0.23 inches per day should be adequate to keep up with the crop requirements.

49 to 58 DAP

- Irrigation should be increased to around 0.25 to 0.27 inches per day.

59 DAP through Harvest

- Irrigation should be approximately 0.30 to 0.33 inches per day.