Agronomic Spotlight

Seminis grow forward

Sweet Corn Stand Establishment

- Establishing a desired sweet corn stand is essential to maximizing yield potential and profitability.
- Factors such as soil conditions, soil fertility, weather, pests, and planting parameters can play a role in stand establishment.
- Decisions made prior to and at planting in regards to equipment maintenance, weather and soil conditions, and checking planting accuracy can influence yield potential for the season.

Many management considerations apply to optimum sweet corn stand establishment: use of recommended seed products for the geography, appropriate soils, adequate fertility, weed, disease and insect control, good seedbed preparation, and proper seeding methods.

Soil Conditions

Soil conditions at planting play an important role in stand establishment. Sweet corn should be planted into well-drained soils that have ample water-holding capability. Fields should be leveled if possible to reduce low wet areas that can influence plant establishment.[1] Soil should be sufficiently dry for equipment passage to reduce compaction. When soil is compacted the soil particles have little pore space between them, resulting in poor root, moisture, and nutrient penetration. Deep compaction can cause issues later in the season as roots grow deeper into the soil profile.

To help establish uniform emergence, seeds should be planted at a consistent depth into adequate moisture with good seed-to-soil contact. Normally, sweet corn planting depth should be 1 to 1 ¼ inches. Planting depth and spacing should be checked regularly during planting to ensure proper placement. Variable soil moisture and temperature in the seed zone can make a big difference in the amount of time it takes coleoptiles to emerge. When seeds have absorbed about 30% of their weight in water, germination begins. If soil conditions are dry, seeding depth should be deep enough to meet soil moisture. Under very dry conditions in coarse-textured soils, it may be necessary to irrigate before planting in order to plant into moisture at an appropriate depth.

Role of Fertility

An important part of determining and meeting fertility needs is conducting soil-testing. Follow recommended soil sampling methods prior to planting to permit time to correct pH and determine a foundation on which to base fertilizer needs. The desired pH level for sweet corn planting ranges from 5.8 to 7.0.[1,2]

Sweet corn requires considerable nitrogen (N) input. On coarse, irrigated soils, split applications may be used, with the first being applied just before planting or banded at planting. Subsequent applications may then be made at the 4-6 leaf and 10-12 leaf stages.[2] On finer, non-irrigated soils, timing of N application may not be as crucial; N may be applied prior to or at planting or split after planting.

Phosphorus (P) and potassium (K) should be applied as recommended by soil test results. Applying P at planting is efficient and makes P readily available to developing seedlings, especially in cooler weather. On a normal soil test, K can be banded at planting only. However, with a low test, K may be split and a second application made with N after emergence.[2,3] Other macro and micronutrients should be applied as deemed necessary by soil test results.

Precautions should be taken to avoid injury to seedling roots from applied fertilizers. It is generally recommended that starter fertilizer be banded 2-3 inches to the side of and 2-3 inches below the seed to help avoid seed injury.[2] Fertilizer applications made too close in proximity or at too high of rate can cause seedling injury.

Role of Weather

Sweet corn seed requires a soil temperature of at least 50° F for germination and uniform emergence, but optimum growth occurs from 75 to 86° F.[1] Utilizing a 4-inch long temperature probe around midday should provide a good idea of the temperature the soil will achieve for the day. In addition, short term weather forecasts can provide clues toward soil warmth and planting conditions. A forecast with warm air temperatures and sunny days can be favorable for planting. Windy conditions can dry out the soil around planted seed. Without moisture, the roots may not be able to continue growing, and seedlings may die or become stunted.

Sweet corn water use may range from 18-28 inches of water to produce a crop. Seed can germinate in soil containing moisture ranging from slightly above wilting point through field capacity. The most important growth stages for ensuring adequate moisture availability include: germination and stand establishment, tasseling and silking, and ear fill. To protect pollination and ear fill, 1 to 1.5 inches of water per week or more may be needed.[1] Growing sweet corn on sandy soil will likely require the use of irrigation for optimum growth and development.

Growing early sweet corn should be done on sandy soils that warm quickly. Some growers in northern areas use plastic mulch to increase soil temperatures, therefore helping to improve stand establishment in early season conditions.[4]

There are several techniques to do this.

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1. One method involves planting seed in double rows about 14 inches apart with 6-12 inches in-row spacing. The double rows are planted on 6 foot centers and covered with clear perforated plastic. The plastic should remain for about 30 days before removal. After 30 days when the plants are 6-12 inches tall, the plastic is removed.[3,5]
2. Another method involves seeding sweet corn directly through clear plastic mulch. Several different types of planters are available that can plant sweet corn seed through plastic mulch. Ideally, the clear plastic should be laid a few days before the seeding operation, to allow the soil to warm up before the seeds start to germinate.

Role of Insect Pests and Diseases

As with all crops, pest and disease management is another important consideration at planting time. Seed treated with the appropriate insecticides and fungicides should be used for optimum germination and stand establishment. The use of treated seed is especially important when planting supersweet types due to their slower, less vigorous growth patterns.[1] Soil insects such as wireworm, seedcorn maggot, white grub, and grape colaspis can feed on seed kernels and destroy germinating seeds. Soil insects can especially be a problem in weedy fields previously fallowed or previously in turf. In these fields, in addition to seed treatment, insecticide applications may be needed pre-plant, at planting or at seedling stage.[3]

Seed treatments can not only help provide protection against soil insects, but can also help protect seed from soil and seed-borne diseases. More than 20 years of multi-location sweet corn seed treatment trials have demonstrated that treatments including three primary components generally provided the most reliable control of seed rot and seedling diseases: 1) broad spectrum fungicides, 2) systemic fungicides with activity against seedborne Penicillium and Fusarium, and 3) a fungicide to control Pythium.[6]

Role of Weed Control

Weeds reduce the yield and quality of crop, compete for light, nutrients, and soil moisture, and can harbor insects and diseases detrimental to the sweet corn crop. Be sure to start with a clean seedbed and follow with appropriate herbicides and/or mechanical weed removal as necessary for weed types and pressures.

Planting Parameters

Seeding precision is important to reach desired plant spacing, uniform stand establishment, and plant growth. Uniform emergence is also important to sweet corn ear uniformity at harvest. Basic seeding guidelines can be found in Table 1.

Some planting parameters will vary depending on sweet corn type and desired market. For example, stands tend to be on the higher end of the range for processing sweet corn versus the lower end of the range for fresh market corn where large ear size and good husk appearance are important.[2]

TABLE 1. SEEDING INFORMATION FOR SWEET CORN

Distance between rows (in)	**28-36**
Distance between plants (in)	6-8*
Seeding depth (in)	1.0-1.5
Seed per acre (lb)	6-15
Days to maturity from seed	64-90
Plant population (acre)	24,000-32,000

*Wider rows and between plant spacings will yield larger ears.
Source: Ozores-Hampton, M., Dittmar, P.J., McAvoy, E.J., Raid, R.N., and Webb, S.E. 2014. Sweet corn production. HS737 Vegetable Production Handbook for Florida 2014-2015. University of Florida.

Sweet corn is wind pollinated; therefore, isolation of the different genetic types of sweet corn product can be important to maintaining the integrity of their desired characteristics. Isolation can be done in terms of physical distance or time difference in pollination. Specifically, the supersweet products must be isolated at least 300 ft or 12-14 days from other types to maintain their 'supersweet' characteristics.[3] Kernel color is another factor that can be affected by a sweet corn product's proximity to a differing type. Because colored kernels in white corn can be very obvious, an isolation distance of 500 feet or more from colored products may be necessary to maintain the purity of the white corn.[2]

Role of Grower

The decisions of when to plant, when and how to apply fertilizer, herbicides, and insecticides, planting depth and speed, and other decisions are ultimately determined by the grower. Establishing the desired stand is a factor of many interactions that can, to some extent, be regulated through management. Overseeing equipment maintenance, checking weather forecasts, determining soil conditions, and ensuring timely checks of planting accuracy are a few of the elements that growers can influence.

Sources: [1] Stall, W.M., Waters, Jr., L., Davis, D.W., Rosen, C., and Clough, G.H. 1989. Sweet corn production. NCH-43. National Corn Handbook. [2] Fritz, V.A., Tong, C.B., Rosen, C.A., and Wright, J.A. 2010. Sweet corn (vegetable crop management). University of Minnesota Extension.
[3] Li, C., Boyhan, G., Sumner, P. et al. 2011. Commercial sweet corn production in Georgia. Bulletin 1388. University of Georgia Cooperative Extension. [4] Orzolek, M.D., Kime, L.F., and Harper, J.K. 2011. Sweet corn production. Agricultural Alternatives UA278. Penn State Extension. [5] Jett, L.W. 2006. Growing sweet corn in Missouri. MU Guide G6390. University of Missouri Extension. [6] Wohleb, C.H. 2014. Evaluation of fungicide seed treatments for sweet corn. Journal of the NACAA. ISSN 2158-9429. Vol 7, Issue 2. Mossler, M.A. 2014. Crop profile for sweet corn in Florida. CIR1233. IFAS Extension, University of Florida. Nielsen, R.L. 2000. Corn growth and development. What goes on from planting to harvest? Purdue University. AGRY-97-07. ww.agry.purdue.edu. Web sources verified 04/16/15.

For additional agronomic information, please contact your local seed representative.

Performance may vary from location to location and from year to year, as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower's fields. The recommendations in this article are based upon information obtained from the cited sources and should be used as a quick reference for information about sweet corn production. The content of this article should not be substituted for the professional opinion of a producer, grower, agronomist, pathologist and similar professional dealing with this specific crop.