Sweet Corn

The level of nitrogen fertility has more influence on the growth and yield of sweet corn than any other single plant nutrient because it is the nutrient most often deficient in Arizona soils. With good management, a total of about 175 to 225 lbs. N per acre is usually needed for optimum production. Preplant soil analysis and lower stalk and ear leaf tissue analysis during the season can be very useful in monitoring the nitrogen status of the crop.

Fertilizer recommendations in this guide apply to all sweet corn varieties grown in Arizona and are based on a plant population of 20,000 plants per acre and a yield potential of 7 to 8 tons per acre. Rates may need to be adjusted for significantly different plant populations or yield goals.

- **Early season nitrogen**

A preplant application of 40 to 60 lbs. N per acre on fine-textured soils (clay loams and silty clay loams) and 0 to 40 lbs. N per acre on coarse-textured soils (sands and sandy loams) are generally required. Preplant applications of nitrogen on very sandy soils are usually inefficient because nitrogen is easily leached below the root zone of young plants. Use the lower rates if there is a high residual nitrogen level in the plow layer of soil (i.e. above 15 ppm NO_3-N). Nitrogen can be broadcast on the soil surface and folded into the bed at listing or incorporated by discing prior to listing. With proper equipment N can also be placed in a band two inches below and to the side of the seed. Band applications of N above 60 lbs. per acre increase the risk of salt damage to young seedlings, especially on sandy textured soils.

- **Mid-season nitrogen**

All remaining N should be side dressed or applied in the irrigation water between the 3- to 4-leaf stage and tasseling. Applications of N at the silking stage and beyond should only be made if a N deficiency has been identified by plant tissue analysis or visual symptoms.

Figure 39.
Sample the lower four inches of main stalk tissue as shown above.

At the 3- to 4-leaf stage, collection of lower stalk samples for nitrate (NO_3-N) analysis should begin. The stalk samples consist of the four inches of main stalk tissue immediately above ground level (Figure 39). Do not sample stalks from diseased, damaged, or unrepresentative plants. About 10 to 25 stalks per sample are adequate for analysis, depending upon the size of the plants at the time of collection. The number of samples tested from each field depends on the uniformity of the field. Samples should be collected from randomly selected plants within uniform areas representing portions of a field that can be fertilized separately. Samples should be taken at the 3-leaf, 6-leaf, 9-leaf, 12-leaf, tassel and silking stages of growth. Samples should be place in a paper bag and dried at about 150°F (65°C) or refrigerated as soon as possible and submitted to a laboratory for NO_3-N analysis.

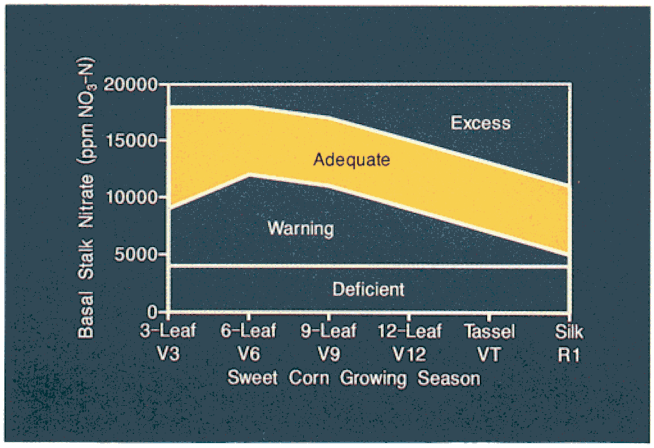

Figure 40.
Interpretation of nitrate-nitrogen levels in sweet corn stalk tissue at different stages of growth.

Table 37.
Desirable levels of nitrate-nitrogen in sweet corn stalk tissue at various stages of growth.

Stage of Sweet Corn Growth	Approximate Days After Planting*	Desirable Levels of Stalk NO_3-N
		ppm
3 Leaves	30 - 35	9,000
6 Leaves	45 - 50	12,000
9 Leaves	55 - 60	11,000
12 Leaves	65 - 70	9,000
Tassel	70 - 75	7,000
Silking	75 - 80	5,000
Pre-Harvest	95 - 100	4,000

**for spring planted crops only*

- **Interpretation of stalk nitrate levels**

The stalk NO_3-N level is normally high (with adequate soil fertility) early in the season during vegetative growth and declines as the season progresses. Desirable levels of nitrate-nitrogen are shown in Table 37 and Figure 40.

A timely application of nitrogen fertilizer can prevent or slow the decline of stalk nitrate. If the nitrate-N level is below 5,000 ppm NO_3-N prior to the tasseling stage, then application of a nitrate or urea source is recommended. These forms of N move readily in soil solution and are immediately available to the plant roots with the first irrigation after the fertilizer has been applied. This decreases the time necessary for recovery from a nitrogen deficiency. At higher levels of stalk N, the nitrogen source is of less importance because nitrification of ammonium (NH_4) sources can take place rapidly enough to permit the resulting NO_3 to be moved into the root zone to supply the needs of the plants. Caution should be used when applying ammonium sources of nitrogen such as anhydrous or aqua ammonia in order to avoid plant injury from ammonia toxicity, especially on very sandy soils.

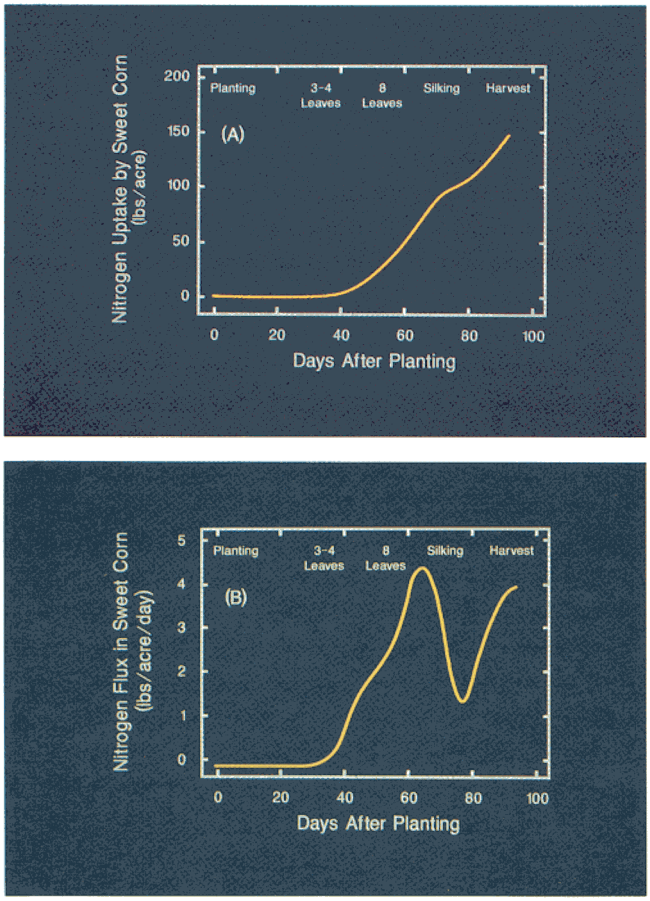

Figure 41.
Cumulative seasonal nitrogen uptake (A) and daily nitrogen flux (B) patterns for Sweetie '82 sweet corn at a yield level of 7.0 tons per acre.

Ear leaf samples can also be taken at the early silking stage to evaluate the nitrogen status of the crop. Follow the same sampling and handling criteria listed above for stalks. The leaf blade to be collected is from the leaf immediately below and opposite the primary ear. A total N concentration between 2.5 and 2.7% in the ear leaves at silking indicates that N supply is adequate for optimum ear yield.

- **Nutrient removal**

A harvest of 8 tons of marketable sweet corn ears per acre will contain about 60 lbs. N. The entire crop will contain about 150 to 170 lbs. N per acre.

- **Nitrogen uptake patterns**

The seasonal uptake of nitrogen by sweet corn includes three distinct phases. The first is characterized by a low but increasing N flux between the seedling through the 6 leaf stage. Nitrogen flux rises rapidly to a maximum, approaching 5 lbs. N per acre per day at the 12 leaf stage, followed by an equally sharp decline until silking. Nitrogen flux during the formation of the corn ear is moderately low at first but can exceed 3 lbs. per acre per day by harvest.