Asparagus

The level of nitrogen fertility has more influence on the growth and yield of asparagus than any other single plant nutrient because it is the nutrient most often deficient in Arizona soils. With good management, a total of about 300 to 350 lbs. N per acre is usually needed for optimum production on established fields. Fern tissue analysis during the season can be very useful in monitoring the nitrogen status of the crop. Deficiencies of nitrogen at any time in the season are to be avoided, as yields will usually be reduced. Water and nitrogen must be managed carefully, as excessive applications of irrigation water have been shown to reduce the efficiency of nitrogen fertilizers due to leaching of nitrogen below the rooting zone. Adequate nitrogen fertility also contributes to higher spear production early in the harvest season when market prices are often the most favorable.

Fertilizer recommendations given below apply to all adapted varieties grown in Arizona and are based on an initial crown population of 20,000 per acre and a yield potential of 8,000 to 12,000 lbs. per acre. Rates may need to be adjusted for significantly different plant populations or yield goals or if stands are established by direct seeding or using containerized transplants.

- **New plantings**

New asparagus crowns are normally planted in the spring with no harvest taken in the first year and limited cutting in the second season. A total of about 200 to 300 lbs. N per acre is recommended during each of the first two growing seasons. Nitrogen should be applied in four or more equal applications beginning at planting time in the first year or at the end of the harvest period in the second year.

- **Established fields**

Nitrogen should be applied in four or more roughly equal amounts beginning at the end of the harvest period. Analysis of the total nitrogen content of recently mature fern tissue sampled between mid-May through mid-September is a good indicator of the nitrogen status of the crop. The recently matured fern tissue in the top 12 inches of new fern growth should be sampled. This can be accomplished by harvesting the top 12 inches of fern and then removing and discarding the uppermost 4 inches of immature growth (Figure 23). The tissue analyzed consists of the leaflets or "needles" only. These can be easily separated from the stems by drying the sample at 150° F (65°C) for 24 to 48 hours and then shaking or stripping the needles. Samples should be refrigerated if immediate oven-drying is not possible.

The fern sample should then be submitted to a laboratory for total Kjeldahl nitrogen analysis. Do not sample ferns which are diseased, damaged or unrepresentative. About 25 to 50 ferns per sample are adequate for analysis. 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 one month intervals throughout the fern growing season. Applications of nitrogen should be stopped about 4 to 6 weeks before dormancy is induced by termination of irrigation in the fall.

- **Interpretation of fern nitrogen levels**

The nitrogen content of the fern tissue is normally high (with adequate soil fertility) early in the season during the initial flush of vegetative growth. Levels will drop during mid-summer when fruiting and seed production take place. Subsequent flushes of fern growth in the early fall will normally result in a corresponding increase in fern nitrogen content. Desirable levels of total nitrogen in fern tissue are shown in Table 28 and Figure 24.

Table 28.
Desirable levels of total Kjeldahl nitrogen in asparagus fern tissue at various times during the growing season.

Date	Desirable Levels of Fern Total N
	%
May 20	3.5
June 20	3.6
July 20	2.7
August 20	2.6
September 20	3.0

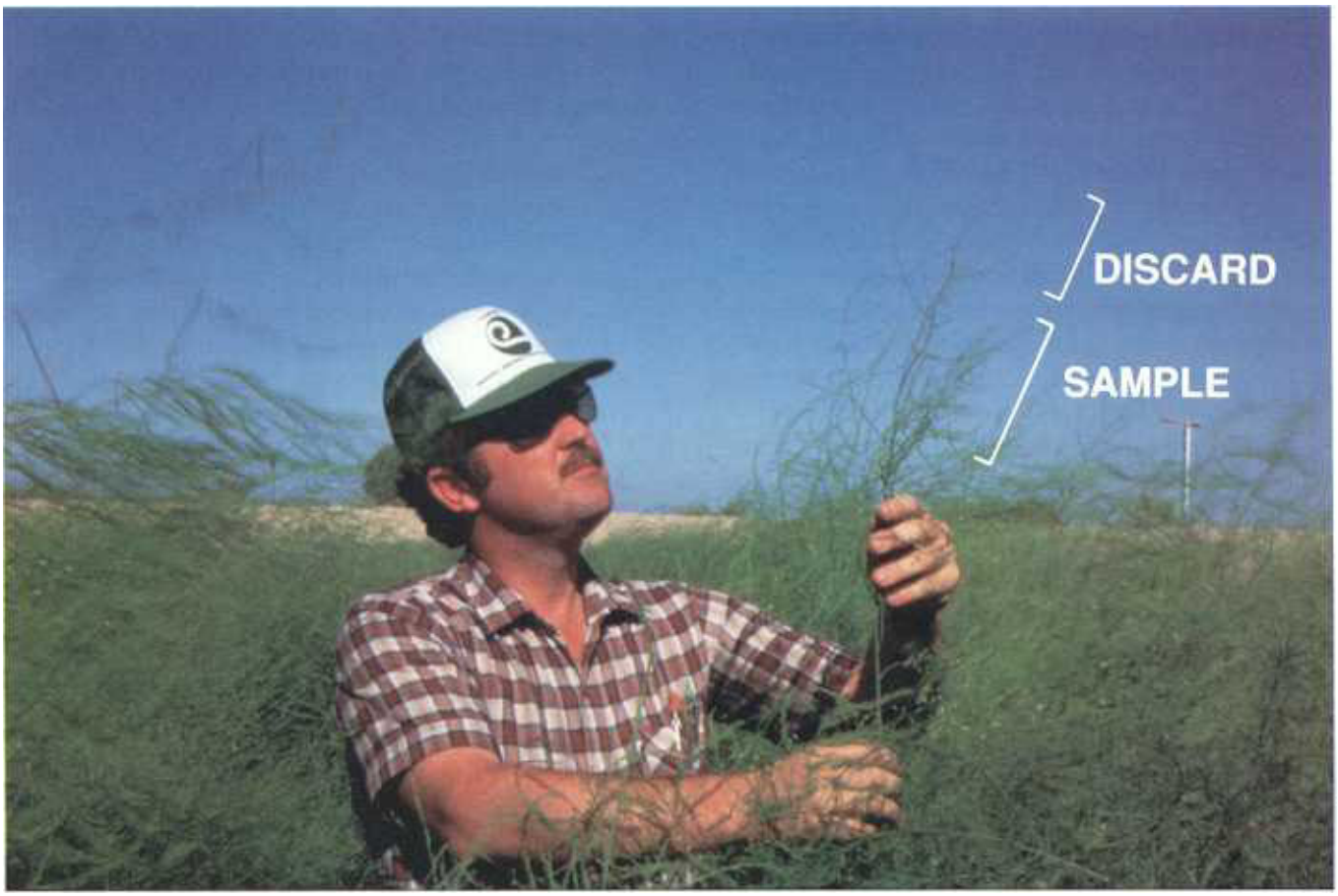

Figure 23.
Sample recently mature fern tissue throughout the fern growing season from the top 12 inches of new fern growth. Then discard the uppermost four inches of immature growth.

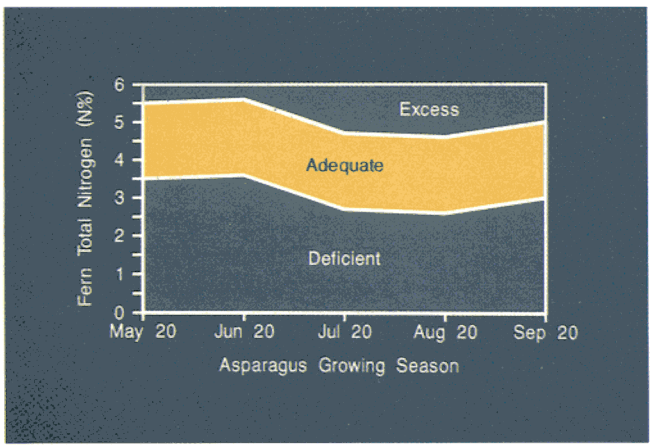

Figure 24.
Interpretation of total nitrogen in asparagus fern tissue at different times during the growing season.

Applications of nitrogen fertilizer should be made to maintain fern nitrogen levels in the "Adequate" portion of the graph. The form of nitrogen fertilizer applied is generally not of great importance as long as a consistent and adequate supply of nitrogen is maintained throughout the growing season. Caution should be used when applying ammonium (NH_4) sources of nitrogen such as anhydrous or aqua ammonia in order to avoid plant injury from ammonia toxicity, especially on very sandy soils.

- **Nutrient removal**

A harvest of 8000 lbs. of asparagus spears per acre will contain about 40 lbs. N.