Pecans

Mature pecan trees are heavy users of nitrogen. Under most Arizona conditions 150 to 200 lbs. N per acre are required annually for optimum nut production.

Observations of annual shoot growth, size and color of leaves and nut set are helpful in monitoring the N needs of an orchard. Soil analysis before orchard establishment can be useful in determining the suitability of a particular site for pecan production, as well as indicate the need for nitrogen in the first years after planting.

- **Young trees**

Adequate supplies of N are needed to promote rapid growth and development of young nonbearing trees. Supplying the N needs of new orchards should be based on a soil test for NO_3-N and on subsequent tree vigor (Table 44). Excessive applications of N to younger trees can delay the initiation of nut production.

- **Mature orchards**

Pecan trees require a constant supply of N throughout the growing season. Approximately 10 lbs. N is required for each 100 lbs. of expected nut yield. For example, 200 lbs. N would be required for an expected yield of one ton of nuts per acre.

In orchards with pronounced alternate bearing cycles, reduce N applications in years with low nut yields if excessive shoot growth is a problem. Higher rates of N may be required in high yielding years to promote adequate shoot growth. Mature pecan trees should put on three to four feet of top growth each year and about one foot of annual growth on the side branches.

Table 45.
Interpretation of pecan leaf tissue samples for varying total nitrogen concentrations.

Leaf Tissue Nitrogen	Nitrogen Status
%	
below 2.5	Deficient
2.5 - 3.5	Adequate
above 3.5	Excessive

Determination of the N concentration in leaves from the current season growth can also be useful in estimating tree N status (Table 45). Samples should be collected in August from leaves which are free of insect, disease or mechanical damage. Collect the middle pair of leaflets from leaves from the middle of the current season growth (Figure 49). Sample about 100 pairs of leaflets from randomly selected trees within the block to be tested. Samples should be placed in a paper bag and dried at about 150°F (65°C) or refrigerated as soon as possible and submitted to a laboratory for total N analysis.

- **Timing of N applications**

Apply N in 4 to 6 roughly equal amounts beginning in the spring when shoot growth resumes. Make the last application on about August 1 when the nuts begin to fill. More frequent, lighter applications are recommended on very sandy soils.

- **Importance of forms of N**

Ammonium (NH_4) forms of N such as anhydrous and aqua ammonia, or ammonium sulfate will be-

Table 44.
Suggested nitrogen fertilizer rates for pecan trees in the first five years after planting based on soil nitrate-nitrogen levels.

NO3-N Soil Test	Apply This Amount of N (lbs./acre)*		
ppm	1st yr.	2nd - 3rd yr.	4th - 5th yr.
0 - 4	0 - 40	25 - 50	50 - 100
4 - 20	0	0 - 25	30 - 60
above 20	0	0	20 - 30

**somewhat higher rates may be required on very sandy soils.*

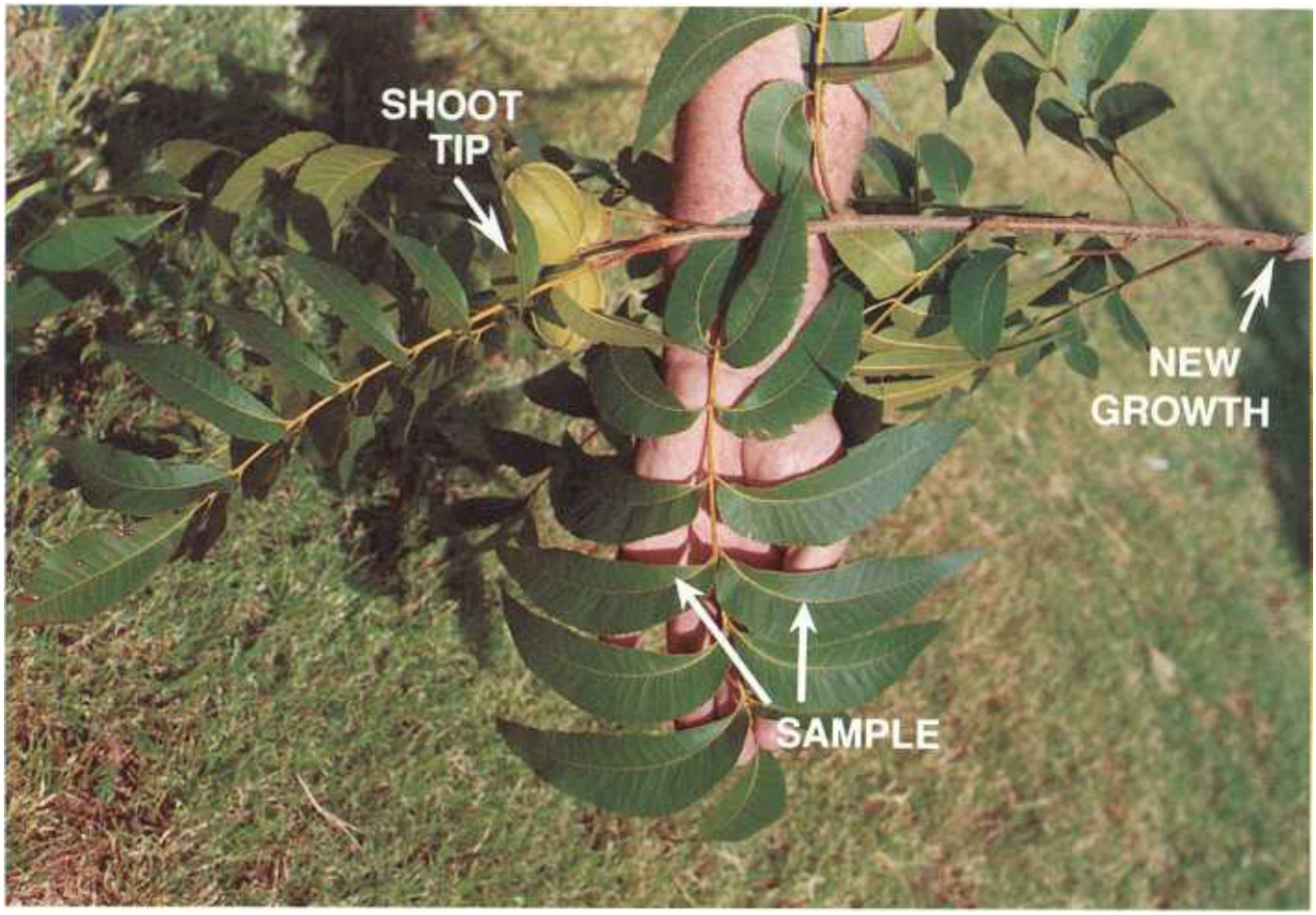

Figure 49.
Collect leaf tissue samples in August for nutrient analysis. Sample the middle pair of leaflets from leaves from the middle of the current season growth (above).

come available for plant uptake with the second irrigation following application. Nitrate and urea forms of N are available after the first irrigation. Caution should be used when applying anhydrous and aqua ammonia to avoid plant injury from ammonia toxicity, especially on very sandy soils.

- **Methods of application**

Nitrogen should be applied directly in the irrigation water or else placed such that water movement will carry soluble N into the root zone. Solutions of ammonium sulfate, ammonium nitrate, calcium nitrate, and urea can be injected into both surface and pressurized irrigation systems. Anhydrous ammonia or aqua ammonia should be used with non-pressurized, surface irrigation systems only. The uniformity of N applied in the irrigation water will only be as good as the uniformity of water applications.

Dry N fertilizers can be applied in spots or bands at the drip line of the trees and incorporated below the soil surface either mechanically or with a surface irrigation. Incorporation is especially important to reduce volatilization of ammonium forms of N.

- **Nutrient removal**

A harvest of 2000 lbs. of pecan nuts per acre will contain about 50 lbs. N.