

Section III:

Nitrogen Management Guides for Individual Crops

Alfalfa

Nitrogen applications are rarely needed in alfalfa production in Arizona. Alfalfa is a legume which normally derives most of its nitrogen requirement from Rhizobia bacteria located in nodules on the roots. These bacteria convert atmospheric nitrogen into forms of organic nitrogen, a process known as fixation. The primary problems with nitrogen applications to alfalfa are stimulation of weed growth, reduced nodulation, and reduced effectiveness of nodules in “fixing” of nitrogen.

- **New seedings**

All alfalfa seed can be inoculated immediately before seeding to insure an adequate population of nitrogen-fixing bacteria. A fresh, effective, live culture of Rhizobia should be used. Carefully observe the expiration date marked on the culture as well as all label directions. The most effective way to inoculate seed involves the use of sticking compounds which hold the bacteria culture on the surface of the seed and protect it from desiccation. Hard seed coats may require scarification to enhance the effectiveness of the sticker materials. Preinoculated seed may also be used but can produce poor results depending on seed storage conditions and the length of time between treatment and planting.

There may be enough effective bacteria remaining in the soil of fields where alfalfa has recently been grown for successful inoculation of new seed-

lings. However, the total cost of inoculation is small and can be viewed as cheap insurance against poor crop performance.

If a soil test for $\text{NO}_3\text{-N}$ taken prior to planting is below 15 ppm then an application of up to 15 to 25 lbs. N per acre may be beneficial. Nitrogen should be broadcast and incorporated into the seedbed or applied in the irrigation water immediately after planting.

- **Established stands**

Nitrogen applications to established alfalfa stands in Arizona under experimental conditions have not increased yields when less than 20 tons of dried hay per acre are harvested per year. Applications exceeding 20 to 30 lbs. N per acre may reduce the effectiveness of existing root nodules and increase the dependence of the plant on mineral (fertilizer) nitrogen forms. Application of irrigation water as soon as possible after cutting is probably the most critical factor in achieving rapid regrowth of alfalfa.

- **Plant tissue analysis**

The total nitrogen content in the whole above-ground plant, sampled at 1/10th bloom should exceed 2.5 and preferably 3.0%.

- **Nutrient removal**

A harvest of 10 tons of dry alfalfa hay per acre per year will contain about 500 lbs. nitrogen.