Forage Research Update

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NORTH DAKOTA - Alfalfa Seeding Rates:
Eight is Enough in a Good Seedbed

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Released in June 2005, Roundup Ready Alfalfa's primary advantage will be vastly improved annual and perennial weed control in both seedling and established stands and more consistent stand establishment, especially in drier areas. A significant factor in moving to the Roundup Ready technology is the increased cost of seed, which runs about $6.50/lb. With the excellent weed control supplied by Roundup, what kind of seeding rate is necessary to establish productive stands?

Experiment 1. NDSU established an experiment in 2001 at Fargo, ND, to evaluate the optimum seeding rate for establishing alfalfa without a companion crop. Nine seeding rates were tested including 1, 2, 4, 6, 8, 10, 12, 16, and 32 lb/ac. The variety used was Garst 645-II. All plots were broadcast seeded and rolled once with a corrugated roller (an old Brillion seeder) on May 2, 2001. Environmental conditions following seeding were very good. Weeds were controlled with a single application of Pursuit at 3 fl oz/ac with MSO. Weed control was excellent.

Two harvests were taken in the seeding year with the first on July 24 at 20% bloom and the second on August 24 at 10% bloom. Four harvests were taken each year thereafter with the first taken at very early bud, the second at late bud, the third at 30% bloom, and the fourth at 50% bloom, generally in early October. A similar experiment was seeded in 2002, except the first harvest in the seeding year was lost.

Seeding-year forage yields in 2001 ranged from 3.78 tons/ac at the 10 lb/ac seeding rate to 3.72 tons/ac at the 6 lb/ac seeding rate. All forage yields for seeding rates above 6 lb/ac fell within this range. Even the 4 lb/ac seeding rate yielded 3.59 tons/ac.

Forage yields following the seeding year averaged over the four years of the 2001 seeding and three years of the 2002 seeding showed yields increased with increasing seeding rate up to the 6 lb/ac rate. Yields with higher seeding rates were very similar to the 6 lb/ac rate. Therefore, increasing seeding rate above the 8 lb/ac seeding rate had no effect on forage yield on 1-4 year-old established stands under a high-yield environment.

Experiment 2. In 2006, DKA34-17RR alfalfa was seeded at 5, 7.5, 10, 15, and 20 lb/ac using the same techniques as the 2001 experiment. The environmental conditions in 2006 have been very dry, less than an inch of rain from the seeding date until harvest. First-harvest forage yields were not significantly different among seeding rates and ranged from 0.59 tons/ac for the 5 lb/ac seeding rate to 0.74 tons/ac for the 15 lb/ac seeding rate. The additional $65/ac seed cost for the higher seeding rate has not been recovered by greater yield in any of the three experiments.

Alfalfa plant density increased with increasing seeding rate. The 5, 7.5, 10, 15, and 20 lb/ac seeding rates established 19, 22, 25, 30, and 38 seedlings per square foot, respectively. The objective in seeding a new stand is to establish about 20 seedlings per square foot; therefore, all seeding rates were successful.

Experiment 3. Roundup Ready Alfalfa seeded with an oat or barley companion crop and removed as forage at the late milk stage in 2006 did not establish an adequate stand due to the drought conditions. This suggests that producers should use clear seedings in drier areas to improve the rate of successful stand establishment. If a companion crop is needed to reduce wind erosion on sandy soils or water erosion on hilly land, and it is a drought year, spray the field with Roundup when the cereal is 6-10 inches tall to ensure alfalfa stand establishment. In good rainfall years, the cereal can be harvested for forage and a good alfalfa stand established.

Experiment 4. Some producers argue that they need to seed 15-18 lb/ac to produce finer stems and increase forage quality. Forage quality in the 2001 or 2002 seeding rate experiments was not evaluated. However, in a previous experiment the influence of plant density on forage quality was evaluated. Alfalfa stands were established at 1, 2, 3, 4, 5, 9, 34, and 45 seedlings per square foot. Forage quality in the first and third harvest years was unaffected by plant density! If differences in forage quality with stands as low as 1 plant per square foot could not be shown, there is no way forage quality difference will be shown when 19-38 seedlings per square foot were established in the 2006 experiment.

In conclusion, there is little justification for seeding rates above 8 lb/ac when seeding alfalfa without a companion crop. Put time and effort into preparing a good seedbed rather than increasing the seeding rate to compensate for a poor seedbed. Consider seeding Roundup Ready Alfalfa to improve weed control, but use modest seeding rates to help hold down the establishment cost.