

Do Seeding Rates Increase Yield & Quality in the Seeding Year?

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Many alfalfa farmers in the North Central Region are encouraged to increase alfalfa seeding rates to obtain higher forage yield in the seeding year to benefit from high hay prices. Studies in multiple states indicate rates above 10 lbs of pure live seed (PLS) per acre do not increase seeding year yield, nor have an impact in plant density, stand persistence, or quality. Additional seed cost is greater than the incremental increase in yield. Farmers' justification to use rates greater than 20 lbs PLS/ac are usually to account for establishment losses due to deficient soil preparation, seedbed, and excess or lack of soil moisture.

Seedlings compete for soil and light during development, known as self-thinning. Once established in the seeding year, stands naturally decrease with age due to diseases or winter injury.

Hall et al. (2004) determined seeding rate effect on glyphosate-tolerant alfalfa stand longevity. Seeding rates of 5-24 lbs PLS/ac increased plant density; stand loss with the highest seeding rate was 8x greater than with the low density rates in the first 12 months. Thereafter, thinning rates were the same for all seeding rates. Plant density on average declined from 10 to 3 plants/ft² in 4 years. Seeding rates below 15 lbs PLS/ac had lower stands after 4 years, but yield was not significantly different. Stem density decreased the first 2 years but was stable at 35 stems/ft² thereafter.

Wisconsin Forage Council trials in 1989-1990 were done in 19 counties using farmer's equipment to seed at 3, 6, 9, 12, 15, and 18 lbs PLS/ac. Only one trial yielded an increase above 6 lbs PLS/ac.

Hall et al. (2010, 2012) reported glyphosate-tolerant alfalfa plant density decreased as the stand aged for all seeding rates. In the study's last 3 years, density decreased an average of 10 plants/ft² for the 18 lbs PLS/ac and 4 plants/ft² for the 6 lbs seeding rates. No yield increase was observed with rates above 10 lbs PLS/ac.

A 2013-2016 North Dakota study reached similar conclusions. Seeding rates of 1-24 lbs PLS/ac were evaluated at 3 locations. Data across locations and years indicated as seeding rates increased, yield and plant/stem density increased up to 9 lbs PLS/ac. Maximum plant/stem density was 7-8 plants/ft² or 50-60 stems/ft². Increasing rates to 24 lbs PLS/ac did not increase yield, density, or quality. Economic analysis indicated little justification for seeding rates above 9 lbs PLS/ac since additional seed cost is greater than the incremental increase in yield in the seeding year.

A few reports indicate a higher seeding rate combined with an increase in fertilization will increase productivity in the seeding year, but this is yet to be confirmed by replicated research.

With higher seeding rates, more plants die during the seeding year so the final stand is about the same, 30 plants/ft² or less, depending on environment (e.g., 18 lbs PLS/ac is planted - 108 seeds/ft²; >70% will die in the seeding year, thinning to 30 plants/ft² or less).

The recommendation is to put your time and effort into preparing a good seedbed rather than increasing the seeding rate to compensate for a poor seedbed. What is a good seedbed for alfalfa? A key to plant growth rests in a good seed-to-soil contact. Two essential requirements for good stand establishment are a clean and firm seedbed. Soil should be free of soil clods, weeds, and crop residues. Packing during seeding and afterwards will improve seed-to-soil contact. This is important for good seed germination and vigorous seedling growth. A uniformly firm seedbed decreases the possibility of planting too deep and holds the moisture closer to the soil surface. In a firm seedbed, your shoe footprint has to be less than ¼" deep.

There is a seeding rate calculator at fyi.uwex.edu/forage to allow you to calculate the seeds/ft² and the cost of various seeding rates. All seeding rates reported in this article are calculated as PLS. Seeding rates must be increased to correct for seed germination and purity (seed coating weight).

In conclusion, increasing the seeding rate above 9 lbs PLS/ac does not increase forage yield or quality in the seeding year or thereafter. Increasing the seeding rate will not improve stand establishment and forage yield if the seedbed is poor. A firm clean seedbed is the key factor to obtain a good stand.

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