Seeding Rate in Alfalfa Establishment

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Introduction

In the July issue of Alfalfa Market News it was mentioned that 15 to 25 lbs/A is the alfalfa (Medicago sativa L.) seeding rate recommendation for Lubbock, TX, and that recommendation likely also applies for most of New Mexico. In this issue we want to emphasize from where that recommendation comes from, not just for New Mexico and Texas, but also for other States. As it was mentioned in the July issue, seeding rate is one of the important steps involved in achieving a healthy and productive alfalfa establishment. There are two features that need to be considered when thinking about how much seed we are going to buy and plant in our field: 1) seed characteristics and 2) soil conditions and method of planting.
1) Seed characteristics are basically: how many seeds we have per pound, percent of germination, and pure live seed (PLS). There are approximately 220,000 alfalfa raw seeds per pound, when not coated. Percentage of germination is the number of seeds that we expect to germinate, and percent of pure live seed (PLS) is the number of seeds that we expect to germinate including dormant and non-dormant seeds (see example below).

2) Regarding soil conditions and method of planting, seedbed conditions, seeding depth control, broadcasting vs. drill, moisture control, seedling diseases, and weed control are going to have an effect on alfalfa establishment and productivity over time.

Let’s assume that seedbed conditions are fine and the seed will be drilled. Now the question is:

What is the alfalfa seeding rate that I need to use?

Most of the seeding rate research studies express alfalfa seeding rate in terms of pure live seed (PLS). So what is PLS? As it was mentioned above, PLS is the percentage of potential alfalfa seeds that are going to germinate and establish. Here is an example (this information was taken from a commercial alfalfa bag seed):

1. Bulk pounds of seed: 50
2. Purity % of seed: 65.9
3. Germination % seed: 75.0
4. Dormant of hard % of seed: 15.0
5. Total germination and hard seed: 90.0%
6. Percent of pure live seed: 65.9*90/100=59.31%
7. Number of PLS pounds of seed: 50 lbs*59.31/100=29.66 Lbs PLS/bulk


In addition, it is considered that 5 plants/ft² (43 plants/m²) is the threshold for an economically sustainable stand of alfalfa; below this point there is a significant decrease in yield (Hall et al., 2004).

Alfalfa seeding rate effect on dry matter yield (Ton/A) and plant density.

Seeding rates ranging from 2.0 to 31.3 lbs PLS/A were tested in several studies shown in Table 1. These studies were conducted each one for at least three years at Nebraska, South Dakota, Missouri, Spain, and California. Interestingly, the seeding rate suggested from all five studies was very similar, ranging from 8.0 to 15.2 lb PLS/A.

In the California study, Mueller, et al. (2007) found that increasing alfalfa seeding rate from 6.0 (10 lb/A) to 24 (40 lb/A) lb PLS/A did not significantly increase dry matter yield in the first two years (Fig. 1), but it had more than a 100% increase in plant density (Fig. 2) the first month after planting, with minimal difference at the end of the first year (Fig. 2). In contrast, survival plants percentage decreased more than 100% with the highest seeding rate at the end of the two years (Fig. 3).

<table>
<thead>
<tr>
<th>Research study</th>
<th>Seeding rates tested (Lb PLS/acre)</th>
<th>Seeding rate suggested (Lb PLS/acre)</th>
<th>Seeding rate suggested1 (Lb/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moline and Robison (1971)</td>
<td>2.7 to 21.4</td>
<td>15.2</td>
<td>25.6</td>
</tr>
<tr>
<td>Kephart et al. (1992)</td>
<td>2.0 to 30</td>
<td>10 to 12.0</td>
<td>17 to 20</td>
</tr>
<tr>
<td>Hall, et al. (2004)</td>
<td>2.7 to 21</td>
<td>15.2</td>
<td>25.6</td>
</tr>
<tr>
<td>Lloveras, et al. (2008)</td>
<td>7.9 to 31.3</td>
<td>8.0</td>
<td>13.5</td>
</tr>
</tbody>
</table>

1Value calculated by dividing lb PLS/acre by 0.5931 (value from number 6 in the example above=59.31%).
In summary:

Even though soil characteristics, seedbed conditions, planting method, irrigation, and weed control are going to have an effect on alfalfa establishment, this information indicates that with 20 to 25 lb/acre (12-15 lb PLS/acre), we can expect a plant density greater than 5 plants/ft² and a good dry matter yield. If we have an excellent seedbed and soil conditions, we decrease the seeding rate to 14 or 15 lb/acre (8 to 9 lb PLS/acre). Higher seeding rates will naturally thin within the first year to have a similar or fewer numbers of plants per square foot as lower seeding rates and there will be no yield difference (Figs 1 to 3).

For more information about seeding rates or other aspects of alfalfa establishment and management, contact your local county Cooperative Extension Service Office.

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**Fig 1.** Alfalfa dry matter yield in first and second year at four different seeding rates. Values in parenthesis are lb PLS/acre (Mueller, et al., 2007).

**Fig 2.** Alfalfa plant density (plants/square foot) at four different seeding rates (Mueller, et al., 2007).

**Fig 3.** Alfalfa survival after the second year at four seeding rates (Mueller, et al., 2007).

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**References:**


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