Alfalfa Stand Assessment

- Spring assessment of alfalfa stands can help determine management decisions to help achieve yield potential and stand establishment.
- Plant counts have the most utility when used to evaluate new stands.
- The most accurate method to assess established alfalfa stands and estimate yield potential is to count stems.

After alfalfa breaks dormancy and begins to grow, assessment of alfalfa stand conditions and yield potential in the spring is important to help determine management actions. Assessment should include three components:

- **Individual plant damage** - Evaluate the turgidity of the taproot. Look for brown, dehydrated, and ropey roots (Figure 1).
- **Plant injury** - Alfalfa buds may be killed during the winter. Consequently, bud regrowth in the spring can be delayed, causing uneven growth and reduced yield potential of the first cut.
- **Areas with thin stands** - A high yield potential field, seeded last year, should have 20 plants/ft². Stands seeded last fall or spring should be destroyed and reseeded if there are less than 12 plants/ft². A healthy, established stand should have 55 stems/ft². As an alfalfa stand ages, the number of plants/ft² declines but the plant compensates by producing multiple stems/plant.

Diagnosing Winter Injury

Winter conditions including cold temperatures, ice sheeting, and heaving can injure or kill alfalfa plants. Planting a variety with a good winter hardiness rating (2.0 or less) can reduce cold temperature damage but does not help prevent ice sheeting damage. If fields are slower to green-up than surrounding fields it’s a signal to evaluate stands for injury. If parts of an alfalfa root are killed along with damaging buds for spring growth, then only the living part of the crown will sprout new shoots (asymmetrical growth). Some buds on a plant may be killed while others remain undamaged. Uninjured buds will initiate early spring growth, while killed buds must be replaced by new buds formed in the spring. Consequently, uneven shoot height on the same plant will likely occur.

The best way to diagnose winter injury is digging up plants, 4 to 6 inches deep, to examine roots. Dig plant samples in multiple random locations in a field. Healthy roots will be firm and white (Figure 1).

Winter injured roots will have a gray, water-soaked appearance, just after thaw. Plants with only minor rot may produce this year, but if more than half the root is damaged it is likely that the plant will die. The most cold-tolerant underground structures of alfalfa are the crown buds. Crowns should be examined for size, symmetry, and the number of shoots present. If these appear gray, water-soaked, or withered, the plant may be dead. Washing roots in a bucket of water can make it easier to better assess root color.

Buds for spring growth are formed in the fall. If a portion of the crown is killed, then only buds from the living section of the plant will give rise to new shoots in the spring. Buds that are killed during the winter may be replaced by new buds in the spring. Growth of these buds will lag behind growth of the uninjured buds. Delayed growth results in shoots of different heights on the same plant with taller shoots from buds formed in the fall.

Figure 1. Healthy alfalfa crown and root (left) and alfalfa roots with symptoms of winter injury and poor root health (center and right). Photo courtesy of Dan Undersander, University of Wisconsin.
Alfalfa Stand Assessment

Shorter shoots from buds formed in the spring can lead to reduced yield potential, especially during the first cutting. Later roots will be brown, dehydrated and stringy. If 50% or more of the root is black from root rot, the plant may die during green-up or later in the season.

Evaluating New Stands

Plant counts have the most utility when used to evaluate new stands. Before stems are visible, a sampling frame of one square foot can be tossed in the field at random to take counts. Plan on taking 10 to 20 samples per 10 acres. The more variability in your field, the more samples you should take. High-yielding alfalfa stands seeded last year should ideally have 20 plants per square foot, but may still yield well with as few as 12 plants. The minimum number of healthy plants per square foot for a desirable alfalfa stand ranges from 5 to 12 (Table 1).

Evaluating Established Stands

Because alfalfa has the ability to yield well over a range of plant stand densities, a more accurate method to assess established alfalfa stands and estimate yield potential is to count stems. This can be done once stems have begun to grow. Older stands tend to have fewer individual plants, but more stems per plant. For this method, use a sampling frame 17 inches by 17 inches or about 2 square feet. Count the stems within the frame at four to five random locations in the field. Divide this number by 2 to get average stems per square foot. Use this number to estimate the yield potential of the stand (Table 2).

Management Considerations

Consider allowing alfalfa plants to mature longer before cutting if stands have symptoms of winter injury. This can help plants restore carbohydrates for future production. Because the first cutting is generally the highest yielding, stands with mild winter injury could be cut at 10 to 25% bloom at the second or third cutting. Increasing cutting height is an important management consideration when plants are allowed to flower before cutting. In order to avoid further weakening plants, it is important not to remove the new shoots forming at the base of plants during this time.

If stands are thin and estimated yield potential is below a desirable level, a decision needs to be made as to whether to keep the stand or not (Figure 2). Autotoxicity can be a problem in alfalfa stands that are two or more years old. Autotoxic compounds produced by alfalfa may reduce the stand or negatively impact future yield potential. In cases where alfalfa stands are thin, but it is not practical to destroy the stand, consider interseeding grasses or clover to meet forage needs.

A damaged stand can be harvested at first cutting, removed followed by planting corn for silage or high moisture corn. This method offers a way to maximize forage quality by utilizing the alfalfa and planting another quality forage crop in the same season.

Sources:
Web sources verified 2/11/15.

For additional agronomic information, please contact your local seed representative.

Individual results may vary. performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible. ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS. DEKALB® and DEKALB and Design® are registered trademarks of Monsanto Technology LLC. Leaf Design® is a registered trademark of Monsanto Company. All other trademarks are the property of their respective owners. ©2015 Monsanto Company.

---

Table 1. Suggested alfalfa plants per square foot.

<table>
<thead>
<tr>
<th>Production Year</th>
<th>Plants/ft²</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&gt;12</td>
</tr>
<tr>
<td>2</td>
<td>&gt;8</td>
</tr>
<tr>
<td>3</td>
<td>&gt;5</td>
</tr>
</tbody>
</table>


Table 2. Average stem count and estimated yield potential per square foot.

<table>
<thead>
<tr>
<th>Stems/ft²</th>
<th>Estimated yield potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;56</td>
<td>100%</td>
</tr>
<tr>
<td>50</td>
<td>90%</td>
</tr>
<tr>
<td>45</td>
<td>81%</td>
</tr>
<tr>
<td>40</td>
<td>72%</td>
</tr>
<tr>
<td>35</td>
<td>62%</td>
</tr>
<tr>
<td>30</td>
<td>53%</td>
</tr>
<tr>
<td>25</td>
<td>44%</td>
</tr>
</tbody>
</table>


---

Figure 2. Poor alfalfa stand (left) and good alfalfa stand (right).