Evaluating Seeding Success for Forage and Biomass Planting (Code 512) and Range Planting (Code 550)

Rangeland and pasture seeding success can be assessed quantitatively by measuring the density of emerged live seedlings. Numbers of desired plants per unit area or number of desired seedlings per linear foot of seeded row are common measurements to determine success. While quantitative measurements allow for a standardized measure of seeding success, evaluation of seedlings should also be based on local experience and site condition. Productive sites such as moist lowlands are expected to produce much denser stands than drier upland site types. Some important considerations when evaluating the success or failure of a seeding are:

- Dryland seedings should be evaluated no sooner than the end of the first growing season.
- Irrigated seedings should be evaluated no sooner than 90 days after spring seeding or after six weeks of growing season the following spring for late summer or dormant seedings.
- If a seeding contains few annual weedy species and seedlings are uniformly distributed, the seeding is probably successful.
- Seedings should be evaluated for 1-3 years before determining success or failure.

QUANTITATIVE METHODS FOR EVALUATING SEEDINGS

Seeding success can be determined by measuring seedling density:

Take some time prior to sampling to assess germination and degree of success of the seeding on a majority of the field and get your eye adjusted to the plant community and the ground cover—perennial vs. annual grasses vs. annual weeds, etc. This would also be a good time to evaluate any damage to the seeded plants by insects and/or pathogens and the degree of competition from annual weeds in the stand. It may be more efficient to sample areas within a field that appear to have less perennial plant densities than other areas of the same field.

Two sampling methods that may be used include:

1. Begin the sampling by walking in a straight line perpendicular to the drill rows (for drilled seedings) stopping every 10 paces to count the number of live seedlings within a 1 sq. ft. area. At least 10 readings per field are recommended. The samples need to be stratified according to topography, soils and other obvious field variables. Seedling counts are best accomplished by using a 1 sq. ft. frame or other measurement reference. When all 10 samples have been completed, simply divide the total number of plants by 10 to determine the plants/square foot.

OR
2. Walking perpendicular or diagonally to the drill rows (for drilled seedings) place a 4.8 square-foot hoop at regular intervals across a seeded field (10 locations should be sufficient) and record the total number of seedlings in each hoop. Then total the number of plants in all 10 hoops and divide by 48 to estimate the plants/square foot in the field.

ONLY HEALTHY SEEDLINGS (THREE GREEN LEAVES OR MORE), MOST LIKELY TO SURVIVE THE GROWING SEASON, SHOULD BE COUNTED DURING THE SAMPLING.

More intensive sampling methods may be necessary for program appeals.

EVALUATION GUIDELINES

Seedling densities in Montana usually range from 1.0 to 3.0 plants per square foot, depending on the seeding, management and site type. Drilled seedings are planned to have about 20 seeds per linear foot (pure live seed) while broadcast seeding rates are double the drilled seeding rate. Forage Suitability Groups and Ecological Site Descriptions should be used in the planning process to choose appropriate plant species as well as to determine expected ground cover and plant productivity on specific site types. The following table should be used as a guide for assessing seedling densities on various sites in Montana.

<table>
<thead>
<tr>
<th>PRECIPITATION</th>
<th>ECOLOGICAL SITE/FORAGE SUITABILITY GROUP</th>
<th>PLANTS/SQ. FT.</th>
</tr>
</thead>
<tbody>
<tr>
<td>22+</td>
<td>Sandy to Loamy to Clayey Shallow or Gravelly, etc.</td>
<td>3.0 -5.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.0 -4.0</td>
</tr>
<tr>
<td>16 - 22</td>
<td>Sandy to Loamy to Clayey Shallow, Gravelly, Eroded, etc.</td>
<td>2.0- 4.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.0-3.0</td>
</tr>
<tr>
<td>&lt;10 - &lt;16</td>
<td>Sandy to Loamy to Clayey Shallow, Gravelly, Eroded, etc.</td>
<td>1.0-3.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.0-2.0</td>
</tr>
</tbody>
</table>

REFERENCES


If you have any questions, call or email Jon Siddoway, State Rangeland Management Specialist, at 406-587-6790 or jon.siddoway@mt.usda.gov, or Jim Jacobs, Plant Materials Specialist, 406-587-6995 or jim.jacobs@mt.usda.gov.