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## Summary

*This report, addressing alternative sources of nitrogen for pasture improvement, is one of a set of seven describing practices supported by the Grasslands Partnership project. Nitrogen (N) increases plant – and root – growth and, therefore, can increase soil carbon levels. However, organic N sources, such as legumes, have a much lower greenhouse gas footprint. Recommendations and sources for adapted legumes are provided for each state within the project area.*

## PRACTICE GUIDELINES – USE OF LEGUMES AS AN ALTERNATIVE NITROGEN SOURCE

This practice description addresses the use of interseeded legumes as an alternative source of N to replace GHG-intensive inorganic N sources. This practice is one of the six supported by the Grasslands Partnership. Organic alternatives to commercial N fertility will be *interseeded legumes*, introduced and native, warm- and cool-season species.

### **Conditions for use of practice by a farm enrolled in Grasslands Partnership:**

1. Cannot have more than 1% legume in stand in control or pasture selected for interseeding;
2. No history of long-term broadleaf herbicide (e.g., GrazonNext) applications for 18 months prior to clover interseeding, or a soil bioassay to indicate it is safe to plant legumes;
3. Already established tall fescue dominated pasture;
4. No nitrogen (commercial fertilizer, growth promoter, poultry litter/biosolids, or other fertility source) can be applied to the pasture during the 5-year duration of the project; and
5. In addition to the organic N pastures, an additional pasture will be designated as a 'Control' and will be fertilized according to 'business as usual' practices of the farm.

### **Practices to be implemented:**

- Legumes chosen to interseed into tall fescue pasture should be regionally adapted species and varieties. These include improved or native species and cool- and warm-season species. Selection of species and varieties will be based on existing Extension publications for each state. Selections can include (but not limited to): red clover, white clover, berseem clover, alfalfa. Note: while annual clovers may be planted under this practice, no additional funding relative to the base rate for perennial clovers will be offered.

- Only named varieties and certified seed should be used.
- Establishment method will be based state Extension service recommendations. This will include seeding rate, use of frost seeding (where applicable), broadcast, or no-till drill recommendations.
- If annual legumes are used, the farmer will only be paid establishment costs for years 1 and 2. Seeding must continue through Years 3-5, but cost will be paid for by the producer.
- The goal for inclusion of legumes is 20-30% of the stand. If at the end of Year 1, the stand is less than 20% legume, the producer can reestablish a perennial. Funds for re-establishment will only be available to the farmer once (in the year following initial seeding). No re-establishment funds will be available in Year 3-5.
- Tillage or prepared seedbed will not be permitted.
- Links to legume recommendations for each state:
  - Alabama
    - Alabama Planting Guide for Legumes <https://www.aces.edu/blog/topics/forages-livestock/alabama-planting-guide-for-forage-legumes>
  - Arkansas
    - Annual and Perennial Forage Clovers for Arkansas <https://www.uaex.uada.edu/publications/pdf/FSA-3137.pdf>
    - Interseeding clover and legumes in grass sod <https://www.uaex.uada.edu/publications/pdf/FSA-3134.pdf>
  - Indiana
    - Selecting the “Right” Legume <https://www.agry.purdue.edu/ext/forages/publications/ay211.htm>
  - Kentucky
    - Forage Identification and Use Guide <http://www2.ca.uky.edu/agc/pubs/AGR/AGR175/AGR175.pdf>
  - Missouri
    - Seeding rates, dates, and depths for common Missouri forages <https://extension.missouri.edu/publications/g4652>
  - North Carolina
    - Planting guide for forage crops in North Carolina <https://content.ces.ncsu.edu/planting-guide-for-forage-crops-in-north-carolina>
  - South Carolina
    - Clemson University Land-Grant Press Forages <https://lgpress.clemson.edu/category/forages/>
  - Tennessee
    - Forage Species Guide <https://utbeef.tennessee.edu/forages-species-guide/>
  - Virginia
    - Establishment guide: [https://www.pubs.ext.vt.edu/content/pubs\\_ext\\_vt\\_edu/en/SPES/spes-92/SPES-92.html](https://www.pubs.ext.vt.edu/content/pubs_ext_vt_edu/en/SPES/spes-92/SPES-92.html)

#### **Grazing Management:**

- Interseeded legume pastures should not be grazed lower than 3 inches in height or based on state recommendations for the forage if it is greater than 3 inches.

- Rotational grazing is the preferred method to maintain clover within the stand.
- Below is a table with recommended grazing heights and rest periods for common legumes used in the Fescue Belt.

**Table 1. Guidelines for rotational grazing of legumes. Adapted from Ball et al. (2015).**

Forage species	Target Height (inches)		Regrowth interval (days)
	Begin Grazing	End Grazing	
<b>Alfalfa</b>	10-16	3-4	28-35
<b>Annual Clovers</b>	8-10	3-5	20-35
<b>White Clover</b>	8-10	3-5	20-35

**Records to be taken:**

- During the initial visit, historical records (last 5 years) of herbicide and fertility of control and interseeded pasture should be provided.
- During regular farm visits, agents will record the average percentage of legume in the pasture. Guidance for making these assessments is available in a West Virginia University Extension publication,<sup>1</sup> [here](#). The guide includes photos of percent legume coverage at various canopy heights.
- Records for fertilizer applications (P and K in legume fields and N, P, and K in control pastures), herbicide applications, and grazing dates will be provided to the agents by the farmers at regular visits. This should include application rates, date of application, grazing initiation date and grazing termination dates, cow/calf numbers, and animal weights (if available).

<sup>1</sup> E.B. Rayburn and J.T. Green. Visual reference guide for estimating legume content in pastures. *Forage and Grazinglands* 2014, 12(1):1-6. Doi:10.2134/FG-2011-0176-DG. Available at West Virginia Extension, <https://extension.wvu.edu/files/d/d89ae6c5-6d29-45b4-8fac-be80150f8616/visual-ref-guide-legume-content.pdf>