



## 2024 Climate-Smart Grown in SC Forages for Beef Cattle

### Frequently Asked Questions

#### **What is the ideal soil pH for forage legumes?**

The ideal soil pH range is 6 to 6.5 for most of the commonly used species. Maintaining a soil pH at 6.0 (or higher) is required for stand establishment and persistence. Soil testing should be conducted 6 months prior to the planting date to ensure enough time to incorporate lime, if amendment is needed. If soil pH is too low, plant nutrients may be unavailable and soil bacteria (Rhizobia species) can be negatively affected thus inhibiting Nitrogen (N) fixation.

#### **What legume (s) should I plant into my forage stand?**

There are several options that can be used. **Arrowleaf, ball, crimson, and red clovers** are often overseeded with **ryegrass and small grains** into dormant bermudagrass or bahiagrass stands. **White and/or red clovers** can complement growth during the late spring and early summer of bermudagrass and bahiagrass pastures. They can increase the nutritive value of these perennial warm-season grasses. For tall fescue pastures, **red and/or white clovers** are the recommended clovers. In toxic KY 31 tall fescue pastures, clovers can reduce the severity of fescue toxicosis symptoms in animals. Regardless of the endophyte status, these legumes can reduce the need for commercial N fertilizer and improve animal gains (see table 1 below).

#### **What is the difference between coated seed and pure live seed (PLS)? How can I tell how much more I should plant based on coated seed weight?**

Generally seeding rate recommendations are made based on a Pure Live Seed (PLS) basis. This is the seed with no coating and assuming 100% germination which is uncommon. Most clover seeds come with a coating which contains the inoculant and nutrients to aid the beneficial rhizobium bacteria. This bacterium is essential for the biological nitrogen fixation process in legumes. A seed tag will list the percentage of pure seed, germination and obnoxious weeds. Seed coating and germination rate must be taken into consideration when determining the actual seeding rate to be used. (See Pure Live Seed Calculator below).

#### **What should my legume seeding rate be if I am planting a mixture?**

The recommendation is to reach out to your local Extension agent to get the proper recommendation based on your operation needs and resources available. If you are planting multiple clovers in **mixture** with other forage species, the individual seeding rates decrease.

#### **What is the recommended clover percentage in pastures?**

**Prepared by:** Maggie Miller, Extension Associate; Hannah Malcomson, Extension Associate, Dr. Liliane Silva, Forage-Livestock Systems Specialist. All with Clemson University Cooperative Extension System. Clemson University Cooperative Extension Service offers its programs to people of all ages, regardless of race, color, gender, religion, national origin, disability, political beliefs, sexual orientation, gender identity, marital or family status and is an equal opportunity employer.



The recommended clover percentage is 20 to 30% clover in mixtures. This is not the percentage of seeds to be planted, but the percentage established on a dry matter basis. This allows the clovers to fix and share some N with their grass companions, while also improving animal gains and optimizing the nutrient cycling dynamics in the area.

### What does that look like in a field?



### What is the associated bloat risk and how to avoid it?

The risk of bloat is greatly reduced if the legume makes up less than 40% of the stand (in composition, not seeding rate). Proper seeding rates recommended by the Extension personnel is crucial to consider what the goals and needs of the operation, but also to avoid utilizing mixtures too high in clover percentage. Additionally, several management strategies exist to reduce the risk of bloat:

1. Avoid turning hungry animals out onto lush pastures such as in early spring.
2. Do not turn animals out onto legume pasture with heavy dew or immediately after rainfall.
3. Offer dry hay to animals grazing leguminous pastures to slow consumption and digestion.
4. Offer ad libitum poloxalene or an ionophore (monensin) to reduce the risk of bloat.

### What are the risks and benefits of broadcasting vs drilling?

Typically, legume seeds should be planted at  $\frac{1}{4}$ " depth. When drilling, care must be taken to not plant clover seeds too deep. If equipped, use small seed box for small seeds (clovers) and the large seed box for larger seeds (small grains, ryegrass). Also, make sure to adjust the seeding rate appropriately for each box and calibrate the drill prior to its use.

Broadcasting is another planting method that can be used. Plant residue should be removed prior to planting. Cultipacking or grazing immediately following broadcasting can increase soil contact. Seeding rates for broadcasting should be 20 to 30% higher than the recommended rate for drilling.

### Should I add additional N to my pastures when incorporating clovers into them?

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When planting clovers into well-established grass stands, between 30 to 45 lbs N per acre is recommended after planting the seeds. When planting clovers in mixture with grasses, additional commercial N fertilizer applied after the legumes are growing may reduce and compromise their ability to conduct N biological fixation. It is important that clovers are evenly distributed across the forage system to acquire a uniform N input through the biological N fixation and nutrient cycling occurring in the system. There will be some residual N available for bermudagrass and bahiagrass pastures when overseeded with mixtures containing clovers, but, during the summer season, fertilization should be addressed for the perennial grasses.

### **Should I reseed my legumes in year 2?**

**As a rule of thumb, it would be expected that planting annual clovers in the second year would be needed.** There are a lot of factors to be considered to determine this including the species planted in the Year 1, establishment level, and management applied during the production season. Based on the average results of the Year 1 verification process, producers should make plans to plant the fields addressing the issues raised on their operations which include the seeding rate, seeding depth, etc.

### **How can I manage to not have to reseed in the future?**

Most annual clovers will need to be reseeded annually. Exceptions to this are arrowleaf, ball, and balansa clovers that have a higher reseeding capacity. Crimson clover can also be managed for reseeding. They produce hard seed and can be managed for reseeding by removing livestock in late April or early May when the clover starts to flower or bloom. After seed has formed and matured, animals can be turned back in to trample seed in the area.

### **When should I start grazing the pastures with legumes? How low can I graze?**

The target canopy height to start grazing is 8-10" and animals should be removed at 4-5". The stubble height recommended of 4" is an average that should be calculated after taking several height measurements throughout the field.

### **What is frost seeding?**

Frost seeding works on incorporating the broadcasted seeds into the soil through alternating freezing and thawing cycles, along with rainfall. It should be done in mid-February to early March on non-sandy soils in regions. In South Carolina, it should be used in areas where it gets cold enough for the soil to go through freeze-thaw cycles which is only on tall fescue areas. When frost seeding clovers, the seeding rate will range from 6 to 10 and 1 to 3 lbs./acre for red and white clovers, respectively. However, the recommendation is for you to reach out to your local Extension agent or Specialist and discuss your goals in order to get a specific recommendation for your operation. For frost seeding, most farmers will use a spinner type of equipment, and it is essential to check its distribution pattern during planting to ensure it is working well. Obtaining a good seed-soil contact is essential.

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Legume	Arrowleaf Clover	Balansa Clover	Ball Clover	Berseem Clover	Crimson Clover	Red Clover	White Clover
minimum pH	6	5.2	6	7	5.6	6	6
Soil Type	Well-Drained, sandy is best	tolerates poor drainage	tolerates poor drainage	Loam	Well-drained	Well Drained Loamy	Well-drained
Planting Window <b>Piedmont</b>	Late Sept.- Early Nov.	Sept.-Oct.	Sept.-Oct.	September	Late August- Oct	Late Sept- Mid Oct or Frost Seeding Feb- 1st week of March	Late Sept- Mid Oct or Frost Seeding Feb- 1st week of March
Planting Window <b>Midlands and Lowcountry</b>	October- Early Nov.	Sept.-Oct.	Sept-Oct	Mid Sept- Mid November	Sept-Oct	Sept-Oct	Sept.- Mid Oct.
Seeding Rate (PLS) Drilled One Clover*	6 lbs/Acre	5 lbs/Acre	2-3 lbs/Acre	15 lbs/Acre	12 lbs/Acre	8 lbs/Acre	2-3 lbs/Acre
Seeding Rate (PLS) Drilled Multiple Clovers*	5 lbs/Acre	3 lbs/Acre	1-2 lbs/Acre	10 lbs/Acre	10 lbs/Acre	6 lbs/Acre	1-2 lbs/Acre
Seeding Rate (PLS) Broadcast One Clover*	7-8 lbs/Acre	6-7 lbs/Acre	3-4 lbs/Acre	18-20 lbs/Acre	14-16 lbs/Acre	9-11 lbs/Acre	3-4 lbs/Acre
Seeding Rate (PLS) Broadcast Multiple Clovers*	6-7 lbs/Acre	4 lbs/Acre	2-3 lbs/Acre	12-13 lbs/Acre	12-13 lbs/Acre	7-8 lbs/Acre	2-3 lbs/Acre
Planting Depth	1/4"	1/4"	1/4"	1/4-1/2"	1/4-1/2"	1/4-1/2"	1/4"
Mix	cool season annuals or in bahiagrass or bermudagrass pasture	tall fescue, bermudagrass or bahiagrass pastures	bermudagrass or bahiagrass pastures	cool season pastures	cool season annuals, bahiagrass and bermudagrass pastures	cool-season annual grass, tall fescue, bermudagrass or bahiagrass pastures	tall fescue, bermudagrass or bahiagrass pastures
Peak Production	Early April-May	Late Spring to Early Summer	Late March-May	March-June	Early Spring	Late March- June	Fall through Spring
Stubble Height	4"	4"	4"	4"	4"	4"	4"
Annual or Perennial	Annual	Annual	Annual	Annual	Annual	Biennial	Perennial
Bloat Potential	Low	Low	High	Low	Moderate	Moderate	Moderate
Reseeding	Excellent	Excellent	Excellent	Poor	Good	Poor	Depends on strain
Notes		better broadcast, upright growth	Can be managed for reseeding, better broadcast	Can winterkill		Tall Fescue	

\* Rates given are for one or multiple clovers grown in conjunction with annual or perennial grasses.

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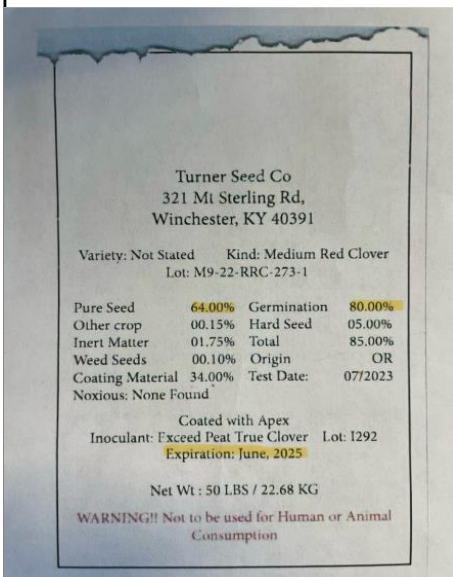
### Pure Live Seed Calculator

Seeding rate recommendations are made based on Pure Live Seed (PLS) due to variations in coating and germination rates.

Use this calculator to adjust for seed coating and germination rate.

This will calculate **seeding rate** and seed **straight out of the bag**.

$$\begin{aligned} \text{\% Pure Live Seed} &= \text{\% Purity} \times \text{\% Germination} / 100 = \text{\% PLS} \\ \text{lbs of seed to plant per Acre} &= \frac{\text{PLS Seeding Rate}}{\text{\%PLS/100}} = \text{Actual Seeding Rate} \text{ lbs/Acre} \end{aligned}$$



On the left is a seed bag tag which comes with all certified seed. It includes Seed type, date by which the seed should be used, type of coating and type of inoculant. The seed tag also contains **Pure Seed** percentage and **Germination** percentage which are used in calculating Actual Seed needed.

For Example:

$$\begin{aligned} \text{\% Pure Live Seed} &= \text{\% Purity} \times \text{\% Germination} / 100 = \text{\% PLS} \\ \text{lbs of seed to plant per Acre} &= \frac{\text{PLS Seeding Rate}}{\text{\%PLS/100}} = \text{Actual Seeding Rate} \text{ lbs/Acre} \end{aligned}$$

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