

## WINTER ANNUAL GRASSES FOR FORAGE

Many South Carolina livestock producers utilize bermudagrass and bahiagrass for summer grazing. However, availability of a dependable cool-season perennial grass like tall fescue to provide winter grazing may be lacking, particularly in southern areas of the state. In these areas, small grains or annual ryegrass are available to help stretch hay stores for mature animals and supply high quality grazing for growing or lactating animals.

### Selecting A Cool-Season Species

Several cool-season annual grass species are available for fall, winter and spring forage production in South Carolina. Of these species, rye and annual ryegrass are the most widely planted; but wheat and oats are also relatively common. Each of these species differs in forage production distribution, disease tolerance, forage quality, and seeding rate (Table 1). For clarity, each species' attributes and detriments will be discussed individually.

Rye is probably the most popular small grain for winter annual pastures in South Carolina. It is the earliest maturing and most cold hardy small grain species. These traits make clean-tilled rye the most dependable winter annual grass for fall and early winter forage production. South of Interstate 20, rye generally matures by late April. This early maturity makes it most suitable when it is to be followed with a row crop in spring. Rye has been severely affected in recent years by *Helminthosporium sativum*, which damages or kills seedling plants. This disease is more prevalent in years with warm, wet fall weather. Oats and wheat are not as severely damaged by this disease, so establishing mixtures of winter annual species is often a useful management tool to minimize risk and decrease the impact of this disease.

Wheat is another popular small grain for winter forage production. Seed can be cheaper than rye, but this varies from year to year. Wheat is also a cold-hardy species and is later maturing than rye. This later maturity provides about three weeks extra

spring grazing when compared to rye; however, wheat produces less fall forage than either rye or oats. Peanut, cotton, or soybean can be planted after wheat.

Oats are also an option for winter grazing and produce highly palatable forage. Seedlings are reportedly more drought- and heat-tolerant than rye or wheat; however, oats are the least cold-tolerant of the winter annuals. Stands can be thinned or lost in severe winters making this a more risky forage crop to grow in monocultures. Oats are similar to wheat in maturity. Barley yellow dwarf is a viral disease spread by insects in the fall months. Oats are particularly susceptible to this disease and growth can be severely stunted in some years. Early planting of oats for grazing increases the risk of barley yellow dwarf infection.

Annual ryegrass is the latest maturing of the winter annual grasses and can be grazed until early June in some areas of the state when adequate moisture is available. Ryegrass may produce a small amount of forage in late fall when planted on clean-tilled land, but this forage production is highly dependent on rainfall and temperature. Ryegrass can also be damaged in severely cold weather and may be susceptible to rust; however, varieties with improved cold hardiness and disease resistance are available. Ryegrass will typically produce higher quality hay than wheat, oats or rye, but can be difficult to cure in wet spring months.

### Stand Establishment

#### *Small Grains (Clean-till)*

Plant adequate amounts of seed per acre in the fall. Appropriate rates for small grains, ryegrass and selected annual legumes are listed in Table 2. Planting dates for clean-till grazing are earlier than if the crop were intended for grain production to allow adequate fall forage production. However, this early planting date increases disease, insect and drought risks. All small grains should be treated with an approved fungicide prior to

planting to minimize the risk of stand losses from *Helminthosporium*, *Rhizoctonia*, and *Pythium*.

Rye, wheat and oats should be planted approximately 3/4" to 1" deep and should not exceed 1 1/2". With optimal moisture and temperature clean-tilled small grain pastures will produce fall grazing by mid to late November. Avoid grazing pastures (either clean or no-tilled) until plants have begun to tiller or reach six inches in height. This allows root systems to develop and prevents plants from being pulled up and thinned by early grazing. Seedling growth is slow before tillers are formed and if early growth is removed, season long plant growth will be suppressed.

*Small Grains (Overseeded into grass sod)*

Overseeded small grains will not supply as much fall grazing as clean-tilled plantings, so forage is not typically available until late January or early February. Research conducted at Tifton Georgia indicates that steer grazing days per acre decrease from 198 on prepared seedbeds to 90 on overseeded sod. This reduction in grazing days decreased stocker

gain per acre from 453 pounds on clean- tilled land to 222 pounds on overseeded sod.

Establishment of winter annuals in dormant sod is also more difficult than on clean-tilled land. Many overseeding failures are due to the presence of excessive residue. Remove residue by grazing bermudagrass or bahiagrass closely before no-tilling the appropriate seeding rate into dormant sod. Failure to adequately remove residue will slow or even prevent winter annual establishment. Good seed-soil contact is critical for establishment of rye, wheat and oats. Broadcast seedings of these species in dormant sod or no-till situations often fail due to inadequate soil contact, so this method is not recommended for species other than ryegrass.

Dense sod also inhibits seedling establishment. Georgia research indicates that steer grazing days are approximately 25% lower when bahiagrass sod is overseeded versus an overseeded Coastal bermudagrass sod. It is often advantageous to lightly disk dense bahiagrass sods prior to seeding

**Table 1. Characteristics of various winter annual grass species. P= Poor, F=Fair, G=Good and E=Excellent. \*Individual species characteristics are for clean tilled scenarios while overseeded category is to provide information typical of multiple species interseeded into bermudagrass sod.**

	Pasture Type*				
	Rye	Wheat	Oats	Annual Ryegrass	Overseeded
Fall Production	G+	F-G	F-G	P	P
Winter Production	G	G	F	F	F-G
Spring Production	F	G	G	G	E
Late Spring Production	P	P	P	E	G-E
Winter Hardiness	E	F	P	F-G	G
Disease Tolerance	G	F	F	E	E
Grazing Quality	E	E	E	E	E
Hay Quality	P	G	G+	E	P-G

**Table 2. Recommended establishment dates and seeding rates for various winter annual forages in pure stands or mixtures.**

Crop	Planting Date			Seeding Rate per Acre	
	Low Country and Pee Dee	Sandhills and Piedmont	Mountains	Pure Stand	Mixtures*
Rye	Oct 1	Sept 15	Sept 1	2 bu	1-1.5 bu
Wheat	Oct 1	Sept 15	Sept 1	2-2.5 bu	1-1.5 bu
Oat	Oct 1	Sept 15	Sept 1	3-4 bu	2-2.5 bu
Ann Ryegrass	Oct 1	Sept 15	Sept 1	25-30 lbs	20 lbs
Crimson Clover	Oct 1	Sept 15	Sept 1	15-20 lbs	10-12 lbs
Arrowleaf Clover	Oct 1	Sept 15	Sept 1	6-8 lbs	5-6 lbs
Red Clover	Oct 1	Sept 15	Sept 1	8-10 lbs	6 lbs

**\*When planting a mixture including two or more small grains, plant a total of 150 lbs of seed per acre.**

to reduce competition and provide favorable planting conditions. Harrow to disturb approximately 30% of the sod surface.

### *Annual Ryegrass*

Ryegrass can be dependably established by broadcasting 25-30 pounds of seed per acre in closely grazed warm-season pastures. Broadcast seed in mid to late October. Grazing should be available by mid January to early February, depending on winter temperatures and fall moisture conditions. Ryegrass can also be no-till drilled in prepared land either alone or in combination with other small grains, but this species should not be planted deeper than 1/2 inch. If ryegrass is planted in combination with other small grains or annual legumes, seeding rate can be reduced to 20-25 pounds per acre. Ryegrass is a prolific seed producer, so be aware that it can become a weed problem in some cropland situations.

### **Fertilization**

Soils where winter annuals will be established should have a minimum pH of 5.8 and phosphorus and potash should test in the medium range. These levels are particularly critical when winter annual legumes will be included in the seed mixture.

Winter annual grasses are highly responsive to nitrogen fertilizer. On overseeded perennial pastures, apply 40-60 pounds of nitrogen per acre in the fall after emergence. An additional 60-80 pounds can be added in late winter if fall growth was good and additional spring growth is needed. A third application may also be useful in late spring, particularly when annual ryegrass is grown.

If annual legumes like crimson or arrowleaf clover are included in the seed mixture, nitrogen application at planting should be reduced to approximately 40 pounds per acre to minimize grass competition with legume seedlings. Properly inoculated annual legumes can fix atmospheric nitrogen, so the clovers do not require inorganic nitrogen sources for good forage growth. However, nitrogen fixed by annual legumes will not be readily available to companion small grains or annual ryegrass. It may still be necessary to apply spring nitrogen to produce adequate winter annual growth for spring grazing. If a large proportion of legume is present, this application may not be needed. (Figure 1). Nitrogen fixed by the annual clovers will become available slowly over the late spring and early summer as root nodules decompose and become mineralized.

### **Grazing Management**

*Clean-tilled pastures.* Delay grazing until plants are 6-8" tall and are beginning to tiller or produce shoots. This allows the plant to produce a vigorous root

system and prevents plants from being pulled up by grazing cattle. Although plants can tolerate close grazing, greater forage production will be realized by maintaining 4-5" stubble heights. Heavier



**Figure 1.** Bermudagrass pasture in mid spring that has been overseeded with wheat and crimson clover. The clover will fix atmospheric N, but this is not available to other plants until late spring or early summer.

stocking rates will be required in spring months to utilize rapid forage growth. Alternatively, a portion of the winter annual pasture can be fenced off and harvested for high quality hay at the boot to early head stage. Oats, wheat and ryegrass can provide acceptable quality hay, but rye is normally poor quality. Clean-tilled pastures are extremely susceptible to "pugging" or trampling damage from grazing animals during wet periods (Figure 2). Pugging reduces forage production and can be minimized by limit grazing (see description below) or completely restricting animal access to pasture in wet conditions.

*Overseeded pastures.* Plants established in dormant warm-season sods can be grazed slightly earlier than those in clean-tilled pastures because losses from uprooting, trampling, and overgrazing are decreased. Ideally, forages should be allowed to reach 4" in height and 6" would be preferred. Removing excess winter annual forage growth by grazing or haying in spring is more critical in overseeded situations because excess accumulation of winter annuals can inhibit spring greenup and vigor of bermudagrass.

*Limit grazing.* Winter annual forages have high nutrient concentrations (15-30% crude protein and 60-75% digestibility) and are well suited to animals with high nutrient requirements such as beef stockers or lactating cattle. However, much of this nutritive value is wasted when mature dry cows are allowed to graze free choice. Fortunately, small grains can be economically and efficiently



**Figure 2. “Pugging” or trampling damage to rye and clover from grazing in wet conditions.**

utilized by mature beef cows when managed as a high quality supplement to low quality hay. Limit grazing simply allows cattle access to pastures for two to five hours per day. Cattle can also be allowed access to small grain pastures on alternate days, but more forage is wasted from soiling, trampling and bedding. When cattle are not grazing winter annuals they can be fed low to medium quality grass hay. Limit grazing helps balance nutrients from high quality small grain pastures with lower quality grass hay and minimizes forage trampling and soiling.

*Creep grazing.* A practice that is underutilized by many cattle producers is creep grazing. This grazing method allows nursing calves access to high quality winter pasture while excluding lactating cows. This can be accomplished by installing a creep gate in the fence between the hay feeding area and the small grains pasture. This gate should have inside openings of 16-18 inches and a vertical height of 40-42 inches to allow calves up to about 7 months of age to pass through. Research indicates that allowing calves access to winter annual pasture can increase daily gains by 0.5-0.75 pounds per day compared to calves raised with lactating cows fed hay on dormant pastures. This practice is most useful for fall calving beef herds.

## Potential Animal Problems

*Bloat.* Winter annual pastures are rapidly digested in the rumen and can occasionally cause bloat. To minimize the chance of animals bloating on wheat, oats or annual ryegrass; they should be introduced to pastures with a full stomach. Including hay in the

pasture decreases bloat risk and provides a source of dry matter for animals. Supplements containing monensin (Rumensin™) and mineral mixtures containing lasalocid (Bovatec™) are also effective in reducing the incidence and severity of bloat. Bloat rarely occurs, but risks are highest when animals are grazing lush fall and early spring growth.

*Nitrates.* Small grain pastures can occasionally accumulate nitrates, but this condition occurs infrequently. Fields fertilized with high rates of nitrogen immediately preceding long periods of cool cloudy weather are most prone to this problem. Cool weather slows forage growth and allows nitrates to accumulate in the plant. These nitrates are then ingested by cattle and ultimately prevent oxygen from being absorbed and carried to animal tissues in the bloodstream. If an extended period of cool and cloudy weather occurs following nitrogen fertilization, consider testing the forage for high levels of nitrate.

*Grass tetany* occasionally occurs when grazing winter annual pastures. Small grains contain high levels of potassium which interferes with calcium and magnesium absorption. Grass tetany is most common when lactating cows graze small grains because their calcium requirements are higher than dry cows or growing calves. Tetany is most prevalent in early spring when small grains are lush and rapidly growing. Problems decrease later in spring. When cattle graze winter annual pastures, a palatable mineral high in calcium (15%) and/or magnesium (6-8%) should be provided to minimize risk of grass tetany. This is critical when lactating cows are grazing winter annual forages.

## Summary

Balancing nutrients and forage supplies throughout the year is important in maintaining beef cattle productivity. Establishing winter annuals and practicing effective grazing management will improve overall forage distribution and decrease dependence on hay and other stored feedstuffs. Select forage species carefully and manage appropriately for efficient utilization.

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