MISSISSIPPI STATE UNIVERSITY EXTENSION

A Cost-Production Comparison of Common Food Plot Plantings for Deer

Planting food plots for deer is a common practice among land managers and hunters. Food plots provide deer and other wildlife with supplemental forages and hunters with increased viewing and harvest opportunities. Because a lot of work goes into planning, preparing, and planting food plots, landowners and hunters want to see a good return on their investment. In other words, they want the "most bang for their buck." This publication provides a cost-versus-production comparison between clovers and cereal grains commonly planted for deer.

Our colleagues at the Mississippi Department of Wildlife, Fisheries, and Parks have always emphasized four key attributes of forages. The four Ps are:

1. **Production**. A forage needs to produce a reasonable amount of forage mass to justify planting it.
2. **Palatability**. A forage must be strongly desired by the animal consuming it.
3. **Protein**. Many naturally occurring deer forage plants can have very low protein levels during the summer and winter, and protein is a critical nutrient for deer.
4. **Price**. A forage must provide a good return on investment.

Some forages are more productive than others, meaning certain forages will produce greater amounts of forage (pounds per acre) for deer than others. But have you ever considered forage production relative to the cost? Just as forages have different levels of productivity, many forages have very different prices, and we want to show you how to determine which forages are best relative to production and price.

Other factors, such as soil chemistry and conditioning, seedbed preparation, planting rates, and planting depth, are just as important for optimal forage production and must be considered before discussing the cost of different forages.

Soil Testing

- Adjust the soil pH and add the right type of fertilizer based on the crop you want to grow. A soil analysis report will provide soil pH, as well as the availability of phosphorous, potassium, and other micronutrients in the soil.
- Planting food plots without proper liming and fertilization wastes time and money. Forages planted in soils with a pH below 6.0 underperform in growth and production because they are unable to adequately use (uptake) fertilizers and other soil nutrients. As a result, forages are less palatable and are lower in nutritional value.

Refer to Mississippi State University Extension Publication 3102 Getting the Most Bang for Your Buck: A Guide for Liming and Fertilizing Wildlife Food Plots.

Preparing a smooth seedbed using a "do-all" implement.

Tillage, Seedbed Preparation, and Planting Depth

- Before tilling or disking your food plots, spray existing vegetation with glyphosate and follow up with mowing or burning.
- Tilling or disking the soil a few weeks before planting helps aerate the soil and allows ample time for turned-under thatch and root systems to decompose. A second tilling or disking followed by dragging the plot with a harrow to break up dirt clods helps improve soil-to-seed contact for germination and initial growth.
- Prepare a firm seedbed by rolling the plot with a cultipacker. A firm seedbed produces the best results

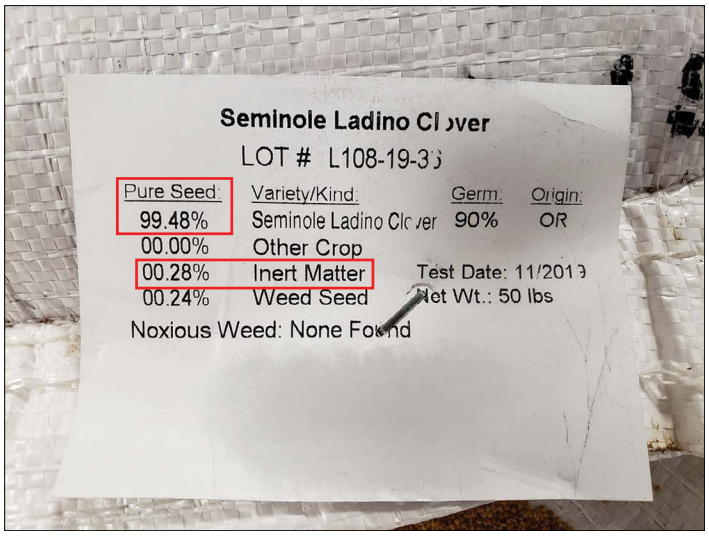
for most forage crops, especially small-seeded crops such as clovers.
- Planting or covering seed too deeply can result in less forage production. Plant clovers no more than ¼ inch deep. Cool-season small grains have better germination and plant survival when planted ½ inch deep.

Planting Rate, Germination Rate, and Pure Live Seed (PLS)

Probably the biggest oversight that limits food plot production is not calculating pure live seed to ensure proper seeding rates. Even if you do everything else just right, calculating pure live seed is crucial for optimal forage production. All seeding rates are given as pure live seed (PLS). PLS is the amount of viable seed in the bag or package that is expected to germinate. Quality seed should have a germination rate of at least 80 percent.

Seed identification tags for clovers typically show 30 to 40 percent less PLS than oats, rye, and wheat. This is because most clover seed comes packaged with a pre-inoculated seed coating, adding weight to the package that is not seed. Clover seed is much smaller than the cool-season small grains, and this will make a greater difference in the PLS when the coating is applied. Also, the added weight helps when broadcasting seed. Seed tags on packages of pre-inoculated clover seed should list the percentage weight of seed coating.

In most cases, a bag of clover will be 50 percent pure seed. Therefore, a 50-pound bag of clover contains only 25 pounds of actual seed; the additional weight is seed coating.



Notice the pure seed and inert matter percentages from this lot of Ladino clover seed. It has not been pre-inoculated and, therefore, would require an inoculant before planting.

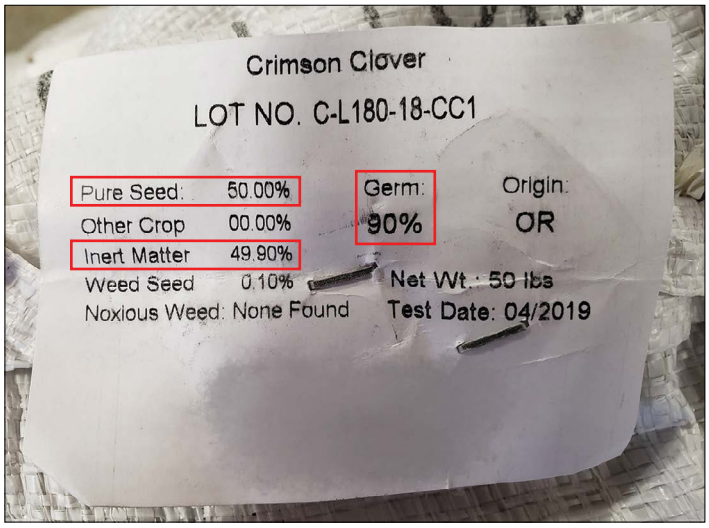
Calculating Pure Live Seed

The recommended broadcast seeding rate for crimson clover is 25 pounds per acre. Referring to the seed tag here, this 50-pound bag of crimson clover seed contains only 50 percent pure seed. The rest of the weight is seed coating and inert matter. The germination rate for this lot of seed is 90 percent.

So, we calculate PLS as follows:

- Pure seed (0.50%) × Germination (0.90%) = 0.45 (45% PLS)
- Recommended planting rate (25 pounds per acre) ÷ PLS (0.45) = 55.5

Based on these calculations, to plant 25 pounds per acre of crimson clover from this lot of seed, you should sow 56 pounds of coated seed from the bag.



A seed tag from a pre-inoculated lot of crimson clover seed.

The forages in this cost-versus-production comparison (Table 1) are species commonly selected for deer food plot forages in the Southeast. In addition, each of these forages satisfies three of the four Ps recommended for selecting a deer food plot forage. Prices per pound of seed are averages based on seed costs per pound from 10 different seed retailers throughout Mississippi. Production values for annual cool-season forages are the averages of total yields from the 2017 forage crop variety trials conducted on the MSU campus and the Coastal Plain Experiment Station in Newton. Production values for perennial cool-season forages are the 2-year averages of total yields from 2016 to 2017 forage crop variety trials at each of the same locations.

To determine cost versus production between forages, we used PLS percentages to calculate the actual amounts of seed needed to be sown on a per-acre basis for each species (refer to the above example). We used 1,000 pounds per acre as a "measuring stick" to compare productivity among the forages

because all food plot forages will produce at least 1,000 pounds on a per-acre basis. We then calculated cost per acre and cost per 1000-pound yield as follows:

- Seed sown × Average cost per pound = Cost per acre
- Cost per acre ÷ Average yield per acre × 1000 = Cost per 1,000 lb yield

Annual Small Grains

Notice in Table 1B that the average annual yields (pounds per acre) for all three cereal grains are very similar. Oats tend to favor warmer temperatures and rye can withstand colder temperatures, but seasonal production can be very similar. The average cost per pound and cost per acre of seed for oats and cereal rye are considerably more than wheat (almost double). While cereal rye produced the most pounds per acre of forage, the differences in production are 342 pounds versus oats and 383 pounds versus wheat. For 1,000 pounds of deer forage, oats would cost $37.76, rye would cost $31.46, and wheat would cost $22.50, resulting in a $15 difference between the most and least expensive cereal grain. If you are only planting a few acres, the difference in price won't break the bank. However, if you are planting larger acreage, these costs can add up, and the savings you gain from planting wheat versus oats or rye could be redirected to pay for lime and fertilizer.

Annual Clovers

Looking at the annual clovers on a basis of average cost per pound of seed, crimson clover ($1.39/lb) is considerably less expensive than balansa clover ($2.57/lb) and berseem clover ($3.57/lb). However, you must factor in the PLS planting rate and forage mass to determine which forage is providing

Table 1A. Cost-versus-production comparison of annual small grains and clovers.

Forage	% PLS	Planting rate	Seed sown	Avg. cost/lb	Cost per acre	Avg. yield (lb/A)	Cost/lb yield	Cost/1,000 lb yield
oats	83.3	125 lb/A	150 lb	$0.43	$64.50	1,708	$0.04	$37.76
cereal rye	83.3	125 lb/A	150 lb	$0.43	$64.50	2,050	$0.03	$31.46
wheat	83.3	125 lb/A	150 lb	$0.25	$37.50	1,667	$0.02	$22.50
crimson	39.58	25 lb/A	63 lb	$1.39	$87.57	2,028	$0.04	$43.18
balansa	42.98	8 lb/A	19 lb	$2.57	$48.83	2,240	$0.02	$21.80
berseem	51.17	20 lb/A	39 lb	$3.57	$139.23	2,185	$0.06	$63.72

Table 1B. Cost-versus-production comparison of perennial clovers (2-year average).

Forage	% PLS	Planting rate	Seed sown	Avg. cost/lb	Cost per acre	Avg. yield (lb/A)	Cost/lb yield	Cost/1,000 lb yield
red*	42.39	15 lb/A	35 lb	$1.81	$63.35	4,822	$0.01	$13.14
Durana	51.92	8 lb/A	15.5 lb	$6.54	$101.37	3,400	$0.03	$29.81
white (Ladino)	38.4	8 lb/A	21 lb	$3.47	$72.87	3,492	$0.02	$20.87

*Red clover is technically a biennial in most of Mississippi.

Sources: Mississippi Forestry and Agricultural Experiment Station (MAFES) Information Bulletin 530. June 2018; Mississippi Forestry and Agricultural Experiment Station (MAFES) Information Bulletin 532. October 2018.

the best value. Based on cost per acre of seed, balansa is considerably less expensive than crimson and berseem clovers because the amount of seed required to plant 1 acre is much less. There is not a tremendous difference in the average yield per acre between these clovers, but you would need to sow more than three times the amount of crimson clover seed and more than double the amount of berseem clover seed to produce about the same amount of forage per acre to match the yield of balansa clover. Based on cost per 1,000 pounds of forage, crimson clover is almost double the cost of balansa, and berseem is nearly three times the cost of balansa.

Perennial Clovers

The cost-production comparisons of the perennial/biennial clovers in Table 1B clearly show red clover outperformed the Durana and Ladino white clovers. The average cost per pound of seed for red clover ($1.81) is considerably less than of Durana clover ($6.54) and nearly half the cost of Ladino white clover ($3.47). Also, red clover had a 2-year average yield (pounds per acre) of more than 1,300 pounds greater than Durana and Ladino white clovers. While the PLS planting rate is much greater for red clover, the average yield and cost per 1,000 pounds of forage make it the best value.

Small Grains

Oats

- A cool-season, annual small grain that provides preferred early fall forage; less cold tolerant than wheat and rye
- Well-drained, light textured soils; excellent planting choice for sandy soil
- Planting dates: August 5–October 15
- Optimum pH: 6.0–6.5
- Seeding rate: 100–150 lb/acre

Cereal Rye

- The most cold-tolerant and cool-season, annual small grain; rye grows very fast and loses its protein levels early.
- Well-drained, sandy loam to clay soils
- Planting dates: August 15–October 15
- Optimum pH: 5.8–6.5
- Seeding rate: 100–150 lb/acre

Wheat (grazing varieties)

- A cool-season, annual small grain that produces forage all winter and has good cold tolerance
- Well-drained sandy loam and light clay soils to moist, heavy clay soils; tolerates poor drainage better than other annual small grains
- Planting dates: August 15–October 15
- Optimum pH: 6.0–7.0
- Seeding rate: 100–150 lb/acre

Clovers

Balansa Clover

- A cool-season, annual legume that is very cold tolerant, highly productive; can grow as high as 2 to 3 feet
- Well-drained sandy loam to moist, heavy clay soils; tolerant of periodic dry conditions as well as periodic standing water
- Planting dates: September 1–October 15
- Optimum pH: 5.8–7.5
- Seeding rate: 8 lb/acre

Berseem Clover

- A cool-season, annual legume that is not as cold tolerant as other annual clovers
- Well-drained sandy loam to moist, heavy clay soils; high fertility requirements; tolerates poor drainage
- Planting dates: September 1–October 15
- Optimum pH: 6.0–7.5
- Seeding rate: 20 lb/acre

Crimson Clover

- A cool-season, annual legume that can grow as high as 2 feet; grows quicker and seeds out earlier than most clovers; good re-seeder
- Well-drained sandy loam to heavy clay soils; moderately shade tolerant; tolerant of acidic soils
- Planting dates: September 1–October 15
- Optimum pH: 5.8–7.0
- Seeding rate: 25 lb/acre

Red Clover

- A cool-season, biennial legume that produces from March into July
- Sandy loam to clay soils; moderately drought tolerant
- Planting dates: September 1–October 15; February 15–May 1
- Optimum pH: 6.0–7.0
- Seeding rate: 15 lb/acre

Ladino White Clover

- A cool-season, perennial legume that is highly productive and fairly low-maintenance; produces from October through June
- Silty loam to fertile clay soils; mildly shade tolerant; tolerates poor drainage
- Planting dates: September 1–October 15; February 15–May 1
- Optimum pH: 6.0–6.5
- Seeding rate: 8 lb/acre

Durana Clover

- A variety of Ladino white clover that is more tolerant of heavy grazing and moderately drought tolerant; produces from October through June
- Silty loam to fertile clay soils; mildly shade tolerant; tolerates poor drainage
- Planting dates: September 1–October 15; February 15–May 1
- Optimum pH: 6.0–6.5
- Seeding rate: 8 lb/acre

Summary

Understanding which food plot forages are most cost-effective will help you get the most bang for your buck on your property. To compare forage and crops variety trials from your region, visit the Mississippi Agricultural and Forestry Experiment Station website.

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