

The Forage Component

Establishment &
Management Principles
for Pine Forests
in the Southeastern US

Selection & establishment

All forage species should be adapted to the site conditions, which may change throughout the property. Select forage species that can tolerate the low soil pH that is most amenable to pine production. When possible, choose native, non-invasive forage species.

Establishment of forage in a silvopasture system is not significantly different from accepted establishment practices in an open pasture. The important steps of site preparation, seeding rates, planting depth, and acquiring adapted, high quality seed or sprigs do not change in a silvopasture system. Soil amendments and fertilizer applications need to take into account requirements and limitations of both forage and tree components. In addition, the selection and application of herbicides merits additional caution to avoid damaging the silvopasture crop trees. Newly planted seedlings are particularly susceptible to herbicide drift and stress from broadleaf herbicides.

Some forage species tend to be lower in fiber and more digestible when grown in a tree-protected environment. Nutritional quality varies depending upon parts of the plant selected by livestock.

Characteristics of common forage species

Bermudagrass	Relatively easy to manage
Endophyte friendly/free fescue	High quality desirable winter forage
Orchardgrass	High quality desirable winter forage
Bahiagrass	Brood cow maintenance, fair hay
Hybrid bermudagrass	Versatile
Eastern gamagrass	Moist and fertile site required, highly productive
Small grains	Spring supplement, growing cattle
White clover	pH mid 6+, increase forage quality, nitrogen fixer
Sub clover	Fertile sites, shade tolerant
Crimson clover	Nitrogen fixer
Native warm season grasses	Brood cow maintenance

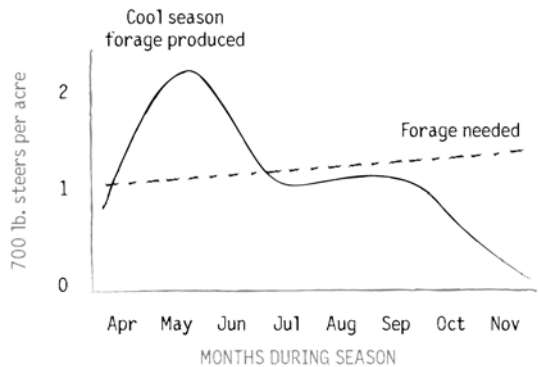
The best way to meet a ruminant animal's nutrient requirements is through the use of a well-managed forage program. The entire concept of silvopasture fits very nicely with the principles of a good forage management program.

In order for this program to be successful, the animals have to be controlled and allowed to graze only in the areas that are appropriate for that specific time. Research conducted at the University of Georgia demonstrated the effectiveness of intensive rotational grazing in improving the efficiency of forage utilization. They showed that stocking rate increased 38 percent, total calf gain per acre increased 37 percent, and rotational grazing required 32 percent less hay. There was not a statistical difference in the calf weaning weight and cow pregnancy rate.

Seasonal acreage allocation

Generally speaking, cool season grasses (during their season of use) are higher in quality but lower in total biomass produced. To maximize grazing, a general guide is to plant about 1 acre of warm season grasses

Livestock demand (animal units) versus forage growth (pounds of dry matter per acre) and availability during the grazing season where livestock were placed on pasture April 1.



Examples of cool and warm season forages

Cool season		Warm season	
ANNUAL	PERENNIAL	ANNUAL	PERENNIAL
Wheat	Tall fescue	Corn	Bermudagrass
Rye	Orchardgrass	Sorghum	Bahiagrass
Oats	Legumes	Pearl millet	Dallisgrass
Ryegrass		Sudangrass	Johnsongrass
Legumes			Switchgrass
Crimson clover			Eastern gamagrass
White clover			Big bluestem
			Indiangrass

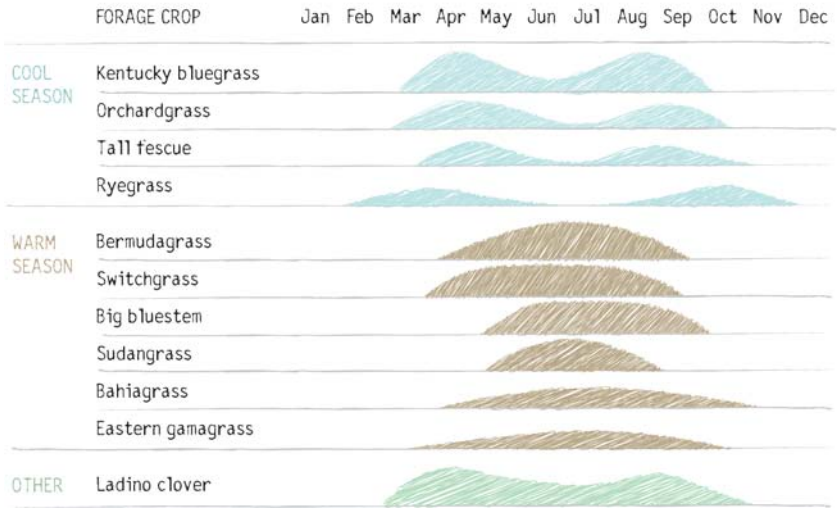
for every 2½ to 3 acres of cool season grasses. Of course, your geographic location also is very important. So, in the Northern United States, cool season grasses would receive much more weight, and in the deep south, warm season forage may make up a larger portion of the grazing system.

The growth period for warm season grasses is different than cool season. Cool season forages generally produce most of their growth in the spring, with a smaller period of production in the fall. This varies by species, so it is important to know the growth period of the species being managed. Warm season forage growth generally occurs between April and October, but also varies by species, with some species making maximum growth very fast and not producing much later in the summer; others begin their growth later and extend it farther into late summer or early fall.

If a crop other than hay is to be managed between tree rows (alley cropping), appropriate management considerations must be made, such as suitable width of alleys (for planting/harvesting equipment), chemical compatibility of herbicides, pesticides, etc.

There is no "all-season" plant available that can be effective as forage year-round. Producers must recognize the limitations of plant seasonality as well as take advantage of its benefits. Forage systems that incorporate both cool and warm season pastures can provide grazing nearly year-round.

Pasture production patterns



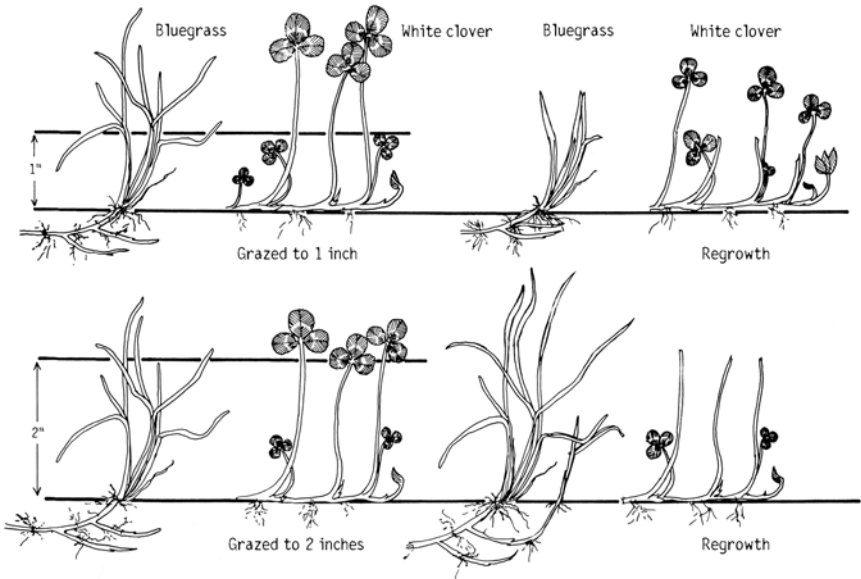
Low growing plants, like common bermudagrass, bahiagrass, or white clover, can withstand close late-season grazing since they hold some leaf area close to the ground and have carbohydrate reserves in their stems and rhizomes. On the other hand, orchardgrass, johnson-grass, and most native grasses have less leaf area after close grazing, and contain most of their carbohydrate reserves in the stem bases.

Forage regrowth

Perennial forage plants must have stored energy to survive the dormant season and begin growth again. The last cutting of forage or pasture should be timed to allow adequate regrowth and carbohydrate storage prior to a killing frost. This ensures forage quality for the following year.

Forage regrowth initiation period as a rule of thumb is generally 3 to 7 days but is highly variable depending upon species, time of year and growth period, temperature, and moisture.

There are a number of options and formulas for determining total number of pasture areas to establish an optimal number of grazing units/pastures. However, most systems will have between 8 to 10 pastures. The



number of grazing units depends on plant recovery time (i.e., the rest period needed for specific vegetation), the livestock species being allowed to graze/browse, the final goal of livestock production (milk vs. meat), and the classes of stock utilizing the vegetation.

Here are some rules of thumb:

Grazing periods

- The faster the growth, the shorter the graze period
- Three to five days maximum for spring
- Five to nine days maximum for early summer
- Nine to 12 days for late summer
- Five to nine days for fall

It is important to recognize that forage species respond differently to grazing pressure. For example, bluegrass and white clover recover differently to grazing heights of 1 inch and 2 inches. White clover recovers more rapidly than bluegrass when grazed to a 1-inch height. The reverse occurs when grazed to a 2-inch height.

Recommended grazing height and recovery periods

FORAGE CROP	TARGET HEIGHT (inches)		USUAL DAYS REST FOR RECOVERY OF LEAF AREA
	BEGIN GRAZING	END GRAZING	
Alfalfa (grazing types)	10-16	2-3	15-30
Bahiagrass *	6-10	1-2	10-20
Bermudagrass	4-8	1-2	7-15
Big bluestem *	15-20	10-12	30-45
Clover, white and sub	6-8	1-3	7-15
Clovers, all others *	8-10	3-5	10-20
Dallisgrass	6-8	3-4	7-15
Eastern gamagrass *	18-22	10-12	30-45
Tall fescue	4-8	2-3	15-30
Indiangrass *	12-16	6-10	30-40
Johnsongrass	16-20	8-12	30-40
Orchardgrass *	8-12	3-6	15-30
Ryegrass, annual	6-12	3-4	7-15
Sericea lespedeza *	8-15	4-6	20-30
Small grains	8-12	4	7-15
Switchgrass *	18-22	8-12	30-45

* Native warm season perennial grasses

Remember that perennial grasses must have stored energy to survive the winter, to begin growth in the spring, and to recover after complete defoliation.

For optimizing animal performance

- Dairy cattle should be moved one to two times per day.
- Stocker cattle should be moved every 1 to 2 days. In some cases, livestock may need to be moved every half day.