

Plant Combinations for Extended Dairy Pasture Production

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Stable, dependable production of high quality forage is one of the highest priorities and greatest challenges in managing pasture for dairy cows. Not only does enough pasture growth have to be present to ensure adequate intake, but that pasturage must be of adequate nutritional value to meet the needs of lactating cows.

Virginia is blessed with a broad diversity of adapted forage species that grow best under a wide range of environments. Proper selection and mixing of these species within and among pastures can ensure a dependable, high quality forage supply from pasture.

Perennial Cool-Season Grasses: The Foundation Species

Perennial cool-season grass species are the foundation of pasture systems in Virginia. While tall fescue dominates much of Virginia's pastureland, it is not a desirable species for lactating dairy cow pasture because of the affect of its low palatability on intake. Well-managed tall fescue pasture is excellent though for dry cows and heifers, especially when stockpiled for fall and winter grazing and used as a wintering site for feeding hay and calving.

Orchardgrass is probably the most desirable perennial cool-season grass for pasture because of its high palatability, quality, and persistence. It is the most reliable choice of grasses to use in grass-legume mixtures that are being seeded for pasture in most of the state.

Kentucky bluegrass is excellent for pasture in the mountain areas that have relatively cool, moist summers, but lacks drought and heat tolerance to be offer much production value in other areas of the state. Kentucky bluegrass does, however, work well in most areas of the state as the sod component with a bunch grass like orchardgrass. As a sod-forming species, it reduces the potential for soil compaction and crown damage and heaving of crown-forming species when soils are wet.

Although timothy produces consistently good quality spring hay and pasture, it should not be depended on as a dominant pasture species in Virginia because it lacks the heat and drought tolerance to be productive after June and it has a bunchy growth habit.

Despite its reputation for adaptation to wet sites, reed canarygrass has greater heat and

drought tolerance than any of the above-mentioned cool-season perennial grasses. A sod-forming grass, it might offer a good option for summer pasture production if it is kept in a vegetative state. Reed canarygrass becomes quite coarse with maturity. Dave Forgey, a seasonal pasture-based dairyman in Indiana, grazes his dairy cows on solid stands of low-alkaloid reed canarygrass on the muck soils on his farm during the summer months when his other cool-season pastures are not producing well.

Matua and more recently Gala are varieties of a short-lived perennial Brome species that have been promoted fairly recently in Virginia. These Brome varieties are highly palatable, bunchy grasses that have good early spring and fall growth. Stands must be allowed to reseed annually to ensure a perennial stand and have some problems with mildew if allowed to accumulate too much growth during cool, wet conditions.

Cool-season grass pastures are reliable for providing abundant high-quality forage during the spring and fall, but generally lack productivity in late winter-early spring and mid-summer. Reduced productivity of these grasses during these periods forces greater dependence on conserved forages if other pasture species are not present. Properly managed legumes, cool-season annual grasses, and warm-season grasses can be used to fill these gaps in perennial cool-season grass production.

Use Legume-Grass Mixtures

The major legumes that can extend pasture production of perennial cool-season grass pastures are alfalfa, red clover, and Ladino white clover. Pastures with Ladino white clover or another legume will produce more milk than pure grass pastures because of greater intake potential and forage quality. However, Ladino white clover is shallow-rooted and thus lacks the drought tolerance needed to offer any benefit to summer production in a grass-legume mixture. Red clover and alfalfa especially are more deeply rooted than white clover, and thus offer better drought tolerance to a cool-season grass pasture, while boosting forage quality and reducing N fertilizer needs. Alfalfa-orchardgrass and red clover-orchardgrass pastures demonstrated their drought insurance capability during the dry summer of 1997. Alfalfa should only be used on ground that is well-drained, has a pH of at least 6.5, and has medium to high levels of P and K. Red clover and white clover are more tolerant of slow drainage and lower levels of fertility.

Grass-legume pastures must be rotationally grazed to ensure legume vigor and persistence. While cool-season species do have a finite range of environmental conditions under which they will be productive, attention to soil fertility and defoliation management can go a long way toward extending their production beyond the ranges that are often observed and thus assumed. Overgrazing is one of the major limitations to cool-season pasture productivity. Overgrazing weakens the plants and makes them more susceptible to other stresses including heat and drought. It is critical that adequate residual heights and rest periods are allowed for cool-season species to be vigorous.

Annual Cool-Season Grasses

Annual ryegrass and winter cereal rye are two annual cool-season grasses that provide extended grazing in late winter-early spring and sometimes in late fall if planted in late summer. The ryegrasses are highly palatable grasses that provide excellent grazing and thus good milk production. Cereal rye will generally provide more grazing in late winter than annual ryegrass, but ryegrass will last longer into late spring to early summer. The primary disadvantage of these species is their annual life cycle and the associated establishment cost. However, ryegrass is a prolific reseeder and thus often volunteers back to result in nearly a perennial stand. Both species do not produce from summer through early fall.

Annual Warm-Season Grasses

The most commonly used warm season annual grasses that can be used to provide good quality summer forage are dwarf pearl millet, sorghum-sudans, and more recently crabgrass. Sorghum-sudans are usually the highest yielders but have the prussic acid poisoning danger. Dwarf pearl millet does not have the prussic acid problem and thus is less risky to manage.

Red River crabgrass and native crabgrasses have gained a lot of attention recently for their pasture potential. Crabgrass can form a thick stand that when fertilized with nitrogen will produce good yields of good quality grazing. In addition, since crabgrass is such a prolific reseeder, it will volunteer to form a thick stand year after year when grown in a rotation with a winter annual grass such as rye or ryegrass.

Sorghum-sudans and millets do not reseed well and thus require annual establishment costs. Although these species are adapted to grow best under warm summer temperatures, they still require favorable moisture to get established and to be productive. Thus, annual warm-season grasses are a somewhat costly and risky option.

Perennial Warm-Season Grasses

Caucasian bluestem, eastern gamagrass, switchgrass, and bermudagrass are the primary perennial warm-season grass options in Virginia. These species can be used to essentially guarantee a supply of pasture forage during the summer months. Eastern gamagrass and switchgrass are both tall-growing native grasses that have tremendous rooting depths and thus excellent drought tolerance. Caucasian bluestem is a somewhat shorter-growing grass that is not native to the US. Bermudagrass is a much lower growing grass that forms a dense sod via a network of rhizomes and stolons.

Caucasian bluestem and switchgrass have been used mostly in beef operations in Virginia. However, they may have a place for dairymen as well. These grasses often do not appear to be of very high quality based upon laboratory measures of crude protein and fiber. However, animal performance on these grasses often exceeds what would be predicted from the analyses.

A grazing trial was conducted during the summer of 1997 with dairy heifers grazing either Caucasian bluestem or switchgrass at Virginia Tech's Kentland Farm at Whitethorne, VA. Heifers averaging about 530 lbs at the start of the trial in early June gained 2.1 lb/day during 3 months on Caucasian bluestem when rotationally stocked using a 2-day rotation. Supplementation during the trial included just 1 lb/day of a mix of corn, mineral, salt, and Bovatec. The heifer group managed similarly on switchgrass gained 1.5 lb/day over a 3.5 month period. Probably more impressive than the individual animal performance was the high carrying capacities of both species which resulted in about 580 lb gain per acre on both grasses.

Eastern gamagrass has received less attention in Virginia but may have some potential based upon some preliminary results of small-plot trials.

The advantages of these species over annual warm-season grasses are a one-time establishment cost, broader windows of production, and better drought tolerance. However, establishment is expensive and slow and the land produces forage for at most 4 months of the year. Interseeding winter annual grasses into perennial warm-season grass sods might be a way to extend the grazing season of land where these grasses are grown. This option is currently being investigated.

Recommendations

1. Perennial cool-season grass-legume mixtures should be the foundation of a dairy pasture system in Virginia. These mixtures should provide the majority of grazing for the dairy herd.
2. Use rotational stocking on whatever species you graze. Rotational stocking offers a host of benefits including improved vigor and harvest efficiency and better control of pasture forage quality.
3. Avoid using tall fescue in pasture mixtures grazed by the milking herd. Focus management of fescue dominant pastures on grazing and especially stockpiling for dry cows and heifers.
4. Use annual species only during transition years and on a minority of the pasture acreage. Annuals do help to fill in gaps in production of cool-season perennials; but are more risky, have annual establishment costs, and do not provide the sod cover or production stability that perennials have.
5. Consider establishing a few acres of pasture with a perennial warm-season grass. At this point, Caucasian bluestem appears to offer the greatest potential for the dairyman. Although the milk production potential of a warm-season grass will never be as high as a cool-season grass, it will provide more pasture for milk production than no grass at all in July and August!