

EXTENDING UTILIZATION OF GEORGIA 5 TALL FESCUE IN THE LOWER SOUTHEASTERN UNITED STATES

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ABSTRACT

In the southeastern United States, warm season perennial grasses such as bermudagrass (*Cynodon dactylon* [L.]Pers.) and bahiagrass (*Paspalum notatum* Flugge) predominate permanent pastures. During dormancy, winter annuals are either over-seeded on permanent pastures or grown on prepared seedbeds for winter pasturing of animals. In addition, cattlemen feed hay cut from warm-season grass production. Cattlemen and hay producers have lacked a dependable perennial cool season grass that could be utilized in addition to or in place of winter annuals or hay. High temperatures, pests, droughty conditions and competition from warm season species undermine the persistence of cool season grasses. A recently developed tall fescue (*Festuca arundinacea* Schreb), 'Georgia-5' was released as the first persistent cultivar for the coastal plains region of the lower southeastern USA. Research studies indicated that Georgia 5 can be interseeded into warm season perennial grasses as far south as north Florida and persist under winter grazing as a permanent winter pasture for at least three years. Grower interest and acceptance has been good. On-farm Cooperative Extension Service demonstrations have shown that when properly managed, Georgia 5 can persist under interseeded and monoculture conditions, provide excellent grazing and reduce winter supplemental feed requirements.

INTRODUCTION

Tall fescue, a perennial cool season grass, is one of the most widely grown forage grasses in the southeastern USA (Sleper and Buckner, 1995). However, adaptation and persistence in the coastal plains region of the lower southeastern USA is restricted due to heat stress, drought stress, pests and competition from aggressive warm season grasses. Warm season perennial grasses such as bermudagrass and bahiagrass predominate forage systems for cattlemen and hay producers. As growth of these grasses slows and winter dormancy begins, cattlemen must use winter annuals (small grains, ryegrass, clovers) for winter pasturing of animals or use hay.

Hay feeding is expensive and most warm-season hay can be deficient in both protein and energy. Prolonged dry periods frequently occur during normal seeding periods for winter annuals (late September to early November), delaying germination, stand establishment and grazing. An alternative to grazing winter annuals or feeding hay is to use a cool season perennial grass such as tall fescue. Until recent years, no tall fescue cultivar was available which would persist and consistently provide forage during the fall through late winter months in the lower southeastern USA.

Georgia 5 tall fescue was developed by the Georgia Agricultural Experiment Station and released jointly with the USDA-SCS in 1992 (Bouton *et al.*, 1993a). It was the first cultivar selected for persistence in the lower southeastern USA and was designed to be used primarily as a perennial winter grazing system to offset the expense of feeding hay, or secondarily when grown with legumes, as a fattening pasture of winter annuals.

History of Georgia 5. Georgia 5 is a five clone synthetic cultivar (Bouton *et al.*, 1993a). These clones originated from twenty-one clones collected by USDA-SCS from areas throughout the eastern

USA. The clones were maintained in a field at a SCS plant material center in Americus, GA for ten years. Selections were made for polycrossing and the best five based on polycross progeny performance were used for cultivar development. Georgia 5, like the widely planted cultivar, Kentucky 31, contains the fungal endophyte (*Acremonium coenophialum* Morgan-Jones and Gams) which is necessary for its persistence.

Georgia 5 has shown excellent persistence and adaptation to a wide range of soil types in the coastal plains region and produces good forage yields in pure stands or when interseeded in warm season perennial grasses (Alison *et al.*, 1992; Bouton *et al.*, 1993b; Mislevy *et al.*, 1994). In grazing studies it has provided very good animal gains when compared to traditional hay feeding systems (Gates *et al.*, 1991). Because it is endophyte-infected, the recommended management practices were developed to offset the detrimental effects of the endophyte (Bouton and Gates, 1993). This includes interseeding into existing warm-season grasses or using clovers as a companion crop. The marketing and production rights of Georgia 5 were granted to Pennington Seed Co., Madison, GA.

Current Research Overview. Grazing studies with Georgia 5 in Georgia indicate that animal gains are acceptable and less costly than hay and concentrate supplements (Roger Gates, 1996, unpublished data). Daily gains of hay/grain-fed heifers were higher than grazing heifers (0.69 vs 0.23 kg/day ;P<0.05) in the first year, but were similar in the second (0.48 and 0.43 kg/day, respectively). While approximately 450 kg/ha of tall fescue dry matter was available during the grazing period, it along with 620 kg/ha of estimated dry matter from the dormant warm-season pasture provided enough forage to replace all hay needs and allow the above mentioned steer gains.

Dry matter yield and persistence of Georgia 5 under continuous grazing, rotational grazing or hay cutting was significantly higher than other fescue cultivars in Louisiana (Montgomery Alison, 1996, personal comm). Continuous stocking of animals during the summer resulted in the best stand maintenance when compared to rotational grazing or accumulating forage for hay production (Alison *et al.*, 1992). The study indicated that allowing the interseeded summer grass to accumulate was detrimental to tall fescue persistence. Similarly, data from the Coastal Plains Experiment Station in Tifton, Georgia currently indicates that deferring grazing from mid October to mid to late December is important to maintaining stands of 50% or more tall fescue cover with Georgia 5 interseeded into warm-season grasses (Roger Gates, 1996, personal comm.).

Yield and persistence studies in Florida (Mislevy *et al.*, 1995) have shown that Georgia 5 persists at least two years and is less costly than establishing ryegrass yearly if forage production is needed in late spring and early summer. During the establishment year (1993), Georgia 5 averaged 6.2 Mg ha⁻¹ dry matter production vs 4.8 Mg ha⁻¹ for Kentucky 31. Kentucky 31 did not survive the summer. Regrowth yield for Georgia 5 the following season was 5.3 Mg ha⁻¹. Dry matter yield in a similar study conducted at the same location was 8.5 Mg ha⁻¹ and 7.1 Mg ha⁻¹ in 1994 and 1995, respectively.

Endophyte infection is important in persistence of tall fescue in the lower southeastern USA. Bouton, *et al.*, 1993b showed endophyte-free Georgia 5 will not persist as well as endophyte-infected Georgia 5 on coastal plain soils. Currently, cultivar development of endophyte-infected and endophyte-free tall fescues for the lower southeastern U.S. is underway at The University of Georgia and the University of Florida.

On-Farm Experiences. Industry and Cooperative Extension Service seminars and farmer meetings have been conducted to encourage the adoption of the Georgia 5. An accurate estimate of planted hectareage is unavailable, however, industry seed sales indicate approximately 6000 to 7000 hectares have been planted as pasture in the region as of 1996 (Pennington Seeds, 1996). Most of this commercial seed has been interseeded into existing warm-season grass pastures with generally excellent performance for producers. Of the few failures noted, most can be traced to improper management during establishment (mainly an inability to reduce warm-season grass competition before seeding). On-farm demonstrations in Georgia, Florida, and Alabama have also shown that Georgia 5 will not persist well on upland sites, particularly those with poor water-holding capacity.

Recent reports of the excellent performance of Georgia 5 when planted in pure stands with various clovers (*Trifolium* spp.) indicates the grass has a future as an integral part of a management system to achieve year-round grazing (Mills, 1996). This same report also demonstrates Georgia 5 could assume a role as a perennial, cool season fattening pasture and thereby be planted in pure stands with legumes rather than in the stressful interseeded conditions.

Observations and Summary. Extending the utilization of a tall fescue into the lower southeastern USA requires a very persistent cultivar and specific management strategies to obtain successful stands and productivity. Experience indicates that Georgia 5 is persistent enough to be interseeded into warm-season grasses and as well as planted in pure stands. Observations of farmer fields and research plots planted with Georgia 5 indicate the following suggestions help in utilizing the cultivar successfully.

- Interseed Georgia 5 after closely mowing or grazing warm-season grasses after growth of grasses slow and enter dormancy (late summer to early autumn). Use a disk harrow or plow to break the sod to reduce competition. Slowing the competition from warm-season species is essential. Use a grassland drill to obtain good seed to soil contact.
- Do not plant on sandy soils with poor moisture-holding capacity.
- Delay grazing in establishment year until six to eight inches of growth of fescue has accumulated in the spring.
- Graze continuously at a moderate grazing pressure. Maintain grazing throughout the summer. Do not allow the companion warm-season grass to grow to a hay stage during the summer.
- In subsequent years, fertilize in early autumn and do not graze from October to late November. Resume grazing in early December and maintain grazing height at three to four inches.
- Summer grazing of pure stands is not recommended unless weeds begin to accumulate and shade fescue. Graze or mow to reduce competition.

- Georgia 5 is an endophyte-infected fescue which is best used for winter and early spring grazing with warm-season grasses. However, it can be used in pure stands with adapted legumes as a fattening pasture during winter to early summer.

General observations from research and demonstration plots have shown that Georgia 5 will persist at least three years when interseeded into warm-season grasses with proper management and longer in pure stands. While it may not replace winter annuals in the lower southeastern USA, it will reduce needs of supplemental feed and/or hay for stockering animals and may provide good winter and spring grazing for cow-calf herds. However, positive farmer experience with pure stands of Georgia 5 grown with clovers does indicate a potential use as a perennial fattening pasture. Success for extending the utilization of tall fescue on coastal plain soil hinges on proper management and the continued development of persistent cultivars in the deep south.

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