



## Converting pastures to native warm season grasses: Alternative summer forage for cattle in Orange County

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### Introduction

Tall fescue (*Schedonorus arundinaceus*) is so widely utilized in grazing systems within the Southern and Mid-Atlantic US that a swath of land 35 million acres in size has been come to be known as the “Fescue Belt.”

This grass has been utilized by farmers for grazing for less than a century following the release of ‘Kentucky 31’ in 1943. Within a couple decades, tall fescue had been established on millions of acres, and quickly became the most common and abundant forage in the humid areas of the US.

Farmers that have grown tall fescue can easily recognize why this grass was so broadly adopted in the mid-20<sup>th</sup> century. The grass establishes easily and responds positively to fertilizer and management. Tall fescue continues to grow when the growth of most other forage slows down, and tall fescue retains its nutritive value longer through the winter months than most other grass species.

While the agronomic and nutritional benefits of tall fescue were quickly evident, a couple decades following the release of ‘Kentucky 31’ passed before a serious issue with tall fescue became widely apparent.

Farmers and scientists began to notice that cattle grazing tall fescue were losing their tail switches and exhibiting poorer productivity than expected based on forage nutritive value, especially in the summer.

Eventually, scientists identified a fungus (*Neotyphodium coenophialum*) living within the plant, called an endophyte, as responsible for these disorders in livestock grazing tall fescue.

Specifically, the fungus produces chemicals called ergot alkaloids that induce vasoconstriction, among other physiological effects, which impairs thermoregulation in the animal.

### Jordan Farm, Gordonsville, Virginia

Bob Brame, now farming in Gordonsville, Virginia, remembers when tall fescue was established on his father’s cattle farm in Kentucky in the 1950s. As a young man, he remembers the anticipation on the farm for the improved productivity of this new forage species.

Decades later after pursuing an off-farm career, Bob remembers returning to the farm for visits and noticing that something was not quite normal with the cattle. He specifically remembers wondering what had happened to all of the missing tail switches on the cows.



Figure 1. Bob Brame describes his history with tall fescue to other farmers trying to manage the tall fescue problem.

When Bob began operating his current farm in Virginia, this mystery continued to make him uneasy. However, it wasn't long before a neighbor at a local Soil and Water Conservation District meeting described the tall fescue story and the effects of the endophyte on cattle, including the loss of tail switches.

Bob immediately recognized how his family's experience fit into the story and development of 'Kentucky 31' tall fescue in the US. He resolved to attempt to utilize less of this tall fescue cultivar in his own grazing system, with an eventual goal of converting 25% of the farm to an alternative forage species or tall fescue cultivar without the detrimental endophyte.

Native warm season grasses (NWSG) appealed to Bob because of their suitability to Virginia growing conditions and soils and low requirement for fertilizer inputs. These grasses also produce abundant forage in the summertime when cool-season grasses have slowed down in production, and they do not have any negative effects on cattle.

Bob currently farms around 100 acres of grazing land, with 40 fall-calving Angus-Hereford pairs. He raises and develops his own replacement heifers.

Bob identified switchgrass (*Panicum virgatum*) as the NWSG species he would try to establish first because he had a seed drill that could handle the seeds of this particular grass. Switchgrass produces a small, smooth seed, which does not require special seed drill equipment or seed carriers, although it does require a very shallow seeding depth.

A particular field became the obvious starting point for the conversion to NWSG. While this field had good soil and fertility, it had some persistent weed problems, which reduced its productivity. Bob recognized the conversion process as a means of cleaning up the perennial and biennial weeds, while switching to a productive summertime forage.

## Conversion Process: Switchgrass

The pasture conversion process involved several chemical sprays with glyphosate to eliminate the tall fescue and any weeds. Soil phosphorus and potassium levels were adequate for the cover crops and the switchgrass, but Bob applied nitrogen

fertilizer (60 lb/ac of nitrogen as urea ammonium nitrate) with the burn-down herbicide to produce more cover-crop forage in the transition process.

Three cover crops were planted over a 1.5-year process to produce additional forage while successfully eliminating the existing sod and weeds. Cereal rye (*Secale cereale*) in the winter was followed by pearl millet (*Pennisetum glaucum*) in the summer, which in turn was followed by another round of cereal rye. Each of these cover crops were utilized by stocking the fields with the cow herd.

The planting of the switchgrass occurred in the middle of summer after the first flush of warm season annual grasses had germinated and could be controlled with spraying.

Table 1. Timeline for converting pastures to switchgrass, according to Bob Brame. Glyphosate (2 qt/acre) plus urea ammonium nitrate (60 lb N/ac) was used as the herbicide for all sprays.

Category	Task	Date
Seed bed preparation	Spray cool season grasses	Fall 2018
	Establish rye smother crop	Fall 2018
	Graze rye smother crop	Spring 2019
	Spray rye smother crop	Summer 2019
	Establish millet smother crop	Summer 2019
	Graze millet smother crop	June – July, 2019
	Spray millet cover crop	Fall 2019
	Establish rye smother crop	Fall 2019
	Graze rye smother crop	Winter 2019

Establishment	Spray again	Summer 2020
	Plant switchgrass (10 lb. of pure live seed per acre)	July 14, 2020
	Evaluate stand	August, 2020
	Clip grassy weeds high to let sunlight through canopy	September, 2020
Utilization: Year 1	Rest field	September, 2020 – April, 2021
	Evaluate stand	May, 2021
	Stock field with cattle twice	June – July, 2021
Utilization: Year 2	Stock field with cattle three times	June – August, 2022

mechanical clipping or some other means of removing the weedy biomass.

In this case, Bob noticed a significant presence of goosegrass. This weed was so abundant that Bob had to rake through the weeds to identify where small switchgrass seedlings were present. It should be noted that it is not typically recommended to apply nitrogen fertilizer when seeding native grasses as this added fertility largely benefits annual grasses at the expense of the native, perennial species.



Figure 2. A thick stand of goosegrass and other summer annual weeds was evident in the summer months following planting.

## Germination and Weeds: Switchgrass

As with many of the native warm season grasses, germination of the seed often takes over a week even with good conditions. But the longer and more critical process for the future survival of the stand is the initial development of the grass root system.

In the first season when these perennial grasses are planted, the primary threat to their survival in most cases in Virginia is the growth of annual summer grasses, such as crabgrass (*Digitaria* spp.), foxtail (*Setaria* spp.), and goosegrass (*Eleusine* spp.). These annual grasses germinate quickly with warm soil temperatures and adequate soil moisture, and before long, these weeds can outgrow the aboveground tillers of the native grasses, eventually smothering them and shading them out. Unfortunately, there are no herbicides labelled for the control of these weeds in young switchgrass stands so the only option for minimizing damage to the young seedlings is



Figure 3. Parting the grassy weeds revealed small switchgrass seedlings present in the stand.

To ensure that the goosegrass did not shade out the switchgrass, Bob clipped the pasture high (around 12 inches). This ensured that some of the goosegrass herbage was removed, allowing light through the

canopy to the switchgrass seedlings, while not clipping so low that the switchgrass leaves were cut.

Once the clipping took place, the goosegrass began to grow back, but also started setting seed. At this point, no other control was helpful except waiting to see how the switchgrass did the following year.

## Utilization: Switchgrass

The vigor of the switchgrass was readily evident the following spring. The switchgrass began to green-up before the summer annual weeds had sprouted, and with an established root system from the first season of growth, the switchgrass began really producing aboveground forage.



Figure 4. The switchgrass seedlings were very vigorous in the early summer after breaking dormancy.



Figure 5. This switchgrass was ready for stocking with the cow herd early in the summer following the establishment year.

Cattle were stocked on the new switchgrass field nine months following planting for two grazing periods. In the third year, the cow herd grazed the field three times throughout the summer.



Figure 6. The cow herd grazing the new switchgrass field for the first time in 2021.



Figure 7. The cow herd finishing a grazing period on the switchgrass stand in 2022 with plenty of residual for regrowth.

## Conversion Process: Three-Way Mixture

While field preparation is similar for all native warm season grass establishment projects, the timing of establishment can vary according to two different recommendations.

The first recommendation is to wait until summer annual grassy weeds have germinated before making the final burn-down spray and planting the native grass seed. This ensures a reset of weedy grass

germination and removes some, but all, of the summer annual grass weed seed present in the soil.

The second recommendation is to plant the native grasses before soil temperatures have reached the point where summer annual grasses have begun to germinate. The desirable native grasses may begin to germinate before or at the same time as the summer annual weeds, giving them a chance for sunlight and water resources before the summer annual grasses begin to grow rapidly.

While the switchgrass was established using the first approach, Bob utilized the second strategy to establish a mixture of big bluestem (*Andropogon gerardi*), little bluestem (*Schizachyrium scoparium*), and indiagrass (*Sorghastrum nutans*).

In this case, these three native grasses are tolerant of the active ingredient in the herbicide, Plateau. This particular herbicide is labelled for use in the establishment of these three native grasses for the control of summer annual grass weeds. When sprayed at planting, the herbicide provides residual control of weeds for several weeks, depending on the weather and soil conditions.

Following glyphosate application, the native grass was seeded in late April, before the summer annual weeds had begun to germinate. Plateau was sprayed at a rate of 4-5 oz/acre four days following planting. The cooler soil temperatures this time of year meant that the germination of the native grass seeds would also be slower than what might be experienced in the middle of summer.



Figure 8. The young seedlings of big bluestem and indiagrass slowly germinated as the soil temperatures warmed.

Table 2. Timeline for converting pastures to big bluestem, little bluestem, and indiagrass, according to Bob Brame. Glyphosate (2 qt/acre) plus urea ammonium nitrate (60 lb N/ac) was used as the herbicide for all sprays except for the pre-emergent application (Plateau at 4-5 oz/ac).

Category	Task	Date
Seed bed preparation	Spray cool season grasses (glyphosate)	Fall 2021
	Establish rye smother crop	Fall 2021
	Graze rye smother crop	Spring 2021
	Leave fallow	Spring 2021 – April, 2022
Establishment	Spray again	April, 2022
	Plant three-way mixture (9 lb. of Pure Live Seed per acre)	April 25, 2022
	Spray Plateau herbicide (4-5 oz/ac)	April 29, 2022
	Evaluate stand	May, 2022
	Clip grassy weeds high	Midsummer, 2020
Utilization: Year 1	Rest field	May, 2022 – May, 2023
	Evaluate stand	May, 2023
	Stock field with cattle lightly	June-July, 2023

It took almost a month for the seedlings to be evident in the field following planting. While this would be concerning for many farmers experienced with establishing cool season grasses or annual forages, Bob was reassured that the native grasses

would begin to germinate and grow when the weather was warm enough. In June, successful germination was evident, and the drill rows were clearly delineated.

## Germination and Weeds: Three-Way Mixture

The Plateau herbicide provided good residual weed control through the beginning of the first summer following establishment of the native grass mixture.

However, by mid-summer, warm season annual grasses were starting to grow over the native grasses. Bob mowed the stand at about a 12-inch height to release the desirable species from the smothering annual grasses. By the end of the summer, the indiangrass and big bluestem had fully headed out and matured before the first frost.



Figure 9. Bob standing in the field with the three-way mixture of native grasses at the end of the establishment year.

In the year after the establishment year, more broadleaf weeds were evident in this field than had been experienced in the first conversion to switchgrass. Bob's plan is to follow-up with selective broadleaf herbicide sprays, and with light stocking events and adequate rest times, he expects the stand to thicken over the next few years.

## Utilization: Three-Way Mixture

Similar to the switchgrass field, Bob plans to graze the mixed grass field with the cow herd in the summer while resting his tall fescue fields. He

anticipates this field yielding two stocking events in the summer following the establishment year and three stocking events thereafter.



Figure 10. Abundant, nutritious forage was available in the three-way mixture of native grasses in early summer one year after seeding.

The goal each summer will be to stock the field with livestock on the native grass pastures one final time at least thirty days prior to a killing frost, which usually arrives in the middle of October.

In July of 2023 following a moderate drought, Bob noted that the warm season grass fields carried the cow herd for a month, allowing them to rest their cool season pastures during the dry spell. Instead of becoming dried out and dormant, the cool season grasses continued to flourish due to the extra rest.

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