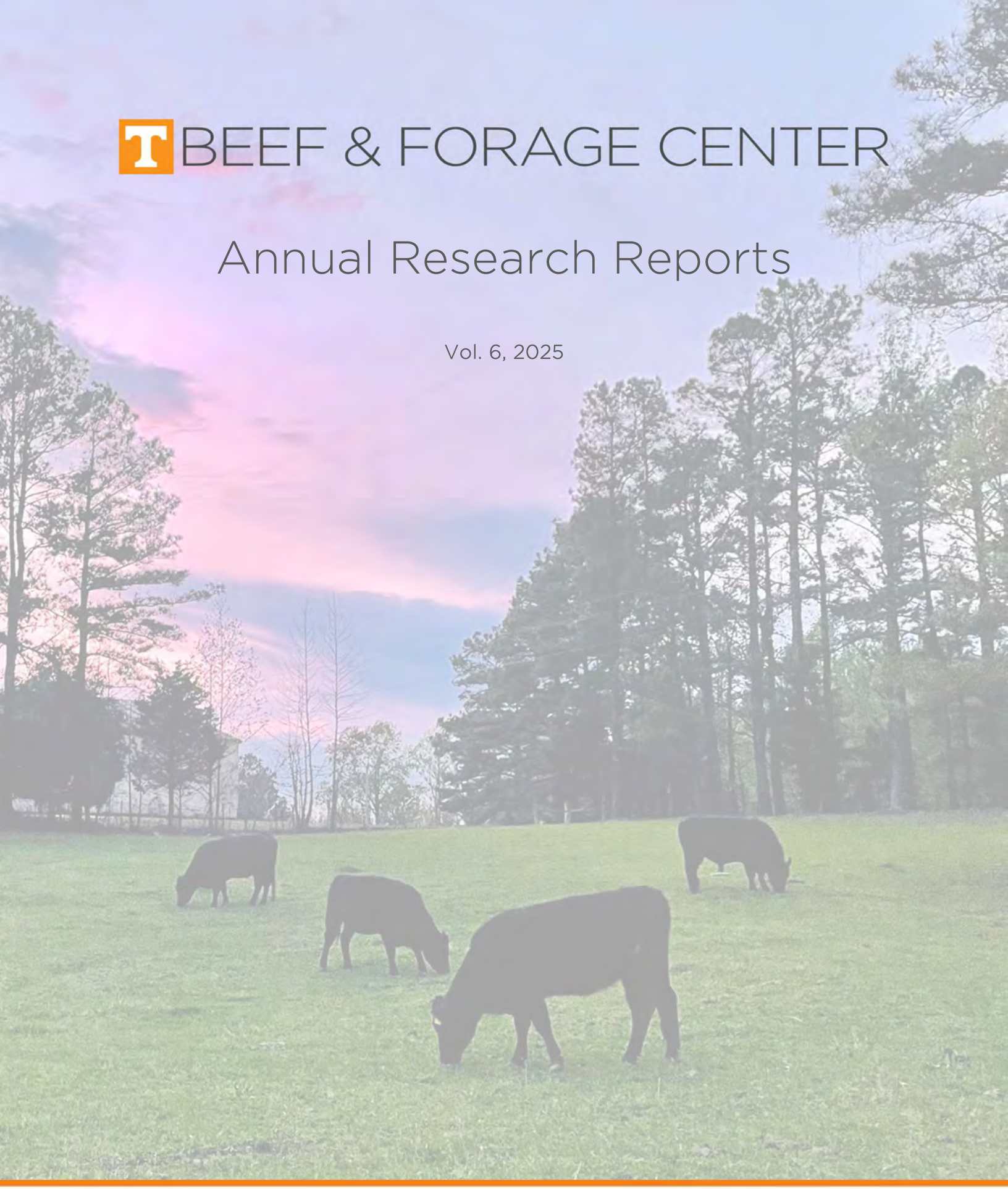
TBEEF & FORAGE CENTER

Annual Research Reports

Vol. 6, 2025



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Editor: Kyle McLean, Associate Professor

Contributors: Bruno Pedreira, Director and Associate Professor; David McIntosh, Coordinator and Researcher; and Malerie Fancher, Research Specialist and Program Assistant

Contents

Welcome from the UT Beef and Forage Center

Welcome to the sixth volume of the UT Beef and Forage Center Annual Research Report. The mission of the Center is to facilitate research and communication of science-based information to advance the Tennessee beef and forage industry. The Center functions as an "information hub" serving all in the Tennessee beef and forage industries. The Center also serves as a focal point and catalyst for research, Extension, and teaching efforts related to issues facing beef and forage systems in Tennessee. The report aims to build on this vision by providing an opportunity to highlight the current work related to the Center to producers and stakeholders across the state. Although abbreviated this year, future volumes of the report will provide comprehensive material to convey new knowledge and technology to improve the management, efficiency and production of high-quality beef cattle.

The UT Beef and Forage Center would like to thank the contributors to the report and to the staff and students who help with the research, teaching and Extension activities on beef cattle and forages. Finally, thanks to the funders of the grants that help fund the research projects and students/staff working on the projects. We truly appreciate your contributions to our research programs because without this support, the research would not be possible.

Should have any questions about the work reported in this report, please do not hesitate to contact the UT Beef and Forage Center or any of the authors of the individual reports. Thank you for your encouragement and support of beef and forage research in Tennessee.

Sincerely,

Bruno C. Pedreira

Director, UT Beef & Forage Center

Welcome from the Deans

On behalf of UT AgResearch and UT Extension, we are pleased to welcome you to the sixth volume of the UT Beef and Forage Center Annual Research Report. This Center exists to facilitate research and communication of science-based information that advances Tennessee's beef and forage industry, serving as an information hub for producers and allied industry stakeholders across the state and beyond.

What makes the UT Beef and Forage Center especially valuable is how intentionally it integrates discovery and delivery. The Center serves as a focal point and catalyst for research, Extension, and teaching; bringing together faculty, staff, students, county-based Extension educators, and industry partners to identify real-world challenges, test practical solutions, and implement proven practices on farms and ranches. In other words, the questions coming from the field help shape the work in the lab and on the farm, and the results come back to the field as recommendations producers can act on.

This report is designed to reflect that very pathway, from completed and in-progress research to Extension updates and applied outreach. Readers can see not only what we are learning, but how that knowledge is being translated into stronger management decisions and improved productivity. We are also grateful for the listening and feedback that guide this work, including the Beef and Forage Center's Research and Recommendations Annual Meeting and advisory engagement with producers and industry leaders.

Thank you for your partnership, your questions, and your continued investment in this shared mission.

Justin Rhinehart
Dean, UT Extension

Hongwei Xin
Dean and Director, UT AgResearch

Research and Recommendations Annual Meeting Agenda

December 15, 2025: Listening Session and Advisory Council Meeting

Location: Agriculture and Natural Resources Building Room 102

2:00–2:15 pm ET Welcome and Introductions

Bruno Pedreira, Director, UT Beef and Forage Center

2:15–2:45 pm ET Keynote speaker: Shaping the Future of Tennessee Livestock

Richard Brown, Livestock Industry Partnerships, Tennessee Farm Bureau

2:45–3:05 pm ET Center for Protein Innovation

Kelly Vierck, Assistant Professor, Dept of Animal Sciences

3:05–3:25 pm ET Research and Extension Needs from a Producer's Perspective

Kim Black, Producer

3:25–4:15 pm ET Discussion and Listening Session

Bruno Pedreira, Director, UT Beef and Forage Center

David McIntosh, Coordinator and Researcher, UT Beef and Forage Center

4:15–4:35 pm ET UTBFC Update Session (Lab and Outreach)

Bruno Pedreira, Director, UT Beef and Forage Center

David McIntosh, Coordinator, UT Beef and Forage Center

4:35–5:00 pm ET Advisory Council Input

5:00 pm ET Adjourned

December 16, 2025 Research and Recommendation Meeting

Location: Agriculture and Natural Resources Building Room 123

9:30 am ET Welcome and Introductions

Bruno Pedreira, Director, UT Beef and Forage Center

9:35–10:00 am ET Updates in Beef and Forage

Justin Rhinehart, Dean, UT Extension

Hongwei Xin, Dean, UT AgResearch

Paul Plummer, Dean, UT College of Veterinary Medicine

Neal Schrick, Head, Department of Animal Science

Gary Bates, Head, Department of Plant Sciences

Chris Boyer, Head, Department of Agricultural and Resource Economics

Keity Carver, Senior Vice Chancellor and Senior Vice President

10:00–10:30 am ET Bridging Vision and Practice: Extension's Role in Livestock Industry Progress

Richard Brown, Livestock Industry Partnerships, Tennessee Farm Bureau

10:30–10:50 am ET Bovine Respiratory Disease – keeping calves on the right path

Marc Caldwell, Associate *Professor, Department of Veterinary Medicine*

10:50–11:10 am ET The impacts of bull management on reproductive efficiency of the beef herd

Kyle McLean, Associate Professor, Department of Animal Science

11:10–11:30 am ET I Herd You! Let's Talk Drones in Livestock Management

Yanqiu Yang, Assistant Professor, Department of Animal Science

11:30–11:50 am ET Crabgrass as a Forage: Expanding Options for Tennessee Producers

Renata Oakes, Assistant Professor, CVM Large Animal Clinical Sciences

12:00–1:00 pm ET Lunch and Poster Session

1:00–1:20 pm ET New World Screw Worm, Should we be Concerned?

Lew Strickland, Associate Professor, Department of Plant Sciences

1:20–1:40 pm ET Livestock Market

Charley Martinez, Director, Center for Farm Management

1:40–2:00 pm ET Research and Extension Opportunities in Forage Weed Science

Hannah Wright-Smith, Assistant Professor, Department of Plant Science

2:00–2:20 pm ET Center Update

Bruno Pedreira, Director, UT Beef and Forage Center

2:30–3:30 pm ET Open Discussion for Extension Agent and Researcher Input

Bruno Pedreira, Director, UT Beef and Forage Center

3:30 pm ET Adjourned

2025 UT Beef and Forage Center Summary:

Dr. Bruno Pedreira,
Director of the UT Beef and Forage Center

It has been an honor to lead the UT Beef and Forage Center (UTBFC) for over two years, with the invaluable support of a great team with David McIntosh as the Coordinator and Researcher, Malerie Fancher as Research Specialist and Program Assistant, and with our new addition of Linus Parrish a Research Specialist. The more I learn about Tennessee's forage and livestock industries and connect with agents and farmers, the more it helps me continuously grow the Center's activities and visibility.

Our mission remains focused on advancing Tennessee's beef and forage industries by facilitating research and communicating science-based information. Over the past two years, we have consolidated the Live.Stock Platform, with our monthly podcast and newsletter, available at https://utbeef.tennessee.edu/live-stock/. In 2025, our Beef and Forage Center YouTube channel reached 18.8K views and over 820 hours of watch time. The channel also grew in subscribers, from 664 to 838. The UTBEEF.COM website received 161K views from 156K unique users. Our social media presence on Facebook, Instagram, and "X" continues to be used actively to inform producers about timely topics. Our Facebook page alone reached 366K. Additionally, our faculty maintained a strong presence in Tennessee Cattle Business magazine, which reaches more than 7,000 producers across the state.

At the Forage Laboratory, we analyzed more than 2,100 samples from producers, as well as over 11,000 samples from research projects and the NIRS Consortium. Using NIRS methodology, we generated nearly $420,000 in cost savings compared to wet-chemistry analysis for research samples.

We've also made significant progress with our forage variety trials. We published new reports for annual ryegrass, teff, and brachiaria, available at https://utbeef.tennessee.edu/forages-tennessee-variety-trials/. Our variety trials expanded to include 22 seed companies and breeding programs, and 96 varieties or mixes.

Several Extension publications were updated and new ones were developed including: Forage Analysis Definitions; Managing Broomsedge in Tall Fescue Pastures and Hayfields; Maximizing Grazing Days with Seasonal Forage Planning; The Dangers of Poison Hemlock on Pastures and Hayfields; Johnsongrass in Forage Systems; Repairing Hay Feeding Areas; Nitrate Toxicity in Forages; and the 2025 Pasture, Hay, and Baleage Budgets.

In addition, following the impacts of Hurricane Helene in September 2024, the Flood Recovery Initiative Team worked extremely hard in 2025 to help livestock producers in East Tennessee overcome the many challenges. Much was learned, as there is no playbook for a scenario like that, but day by day the team has been developing new strategies to restore pastures and riverbanks. Our team also welcomed several undergraduate students and visiting scholars throughout the year. We look forward to seeing you at next year's Annual Meeting!

Current Research Reports

IN PROGRESS: Hurricane Helene Flood Recovery Initiative- On-Farm Hayfield and Pasture Renovation

L. Parrish[1], M. Fancher[1], D. McIntosh[2], F. Walker[3], and B. Pedreira[4].

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[2]Coordinator and Researcher
[3]Professor
[4]Director and Associate Professor
[1,2,4]The University of Tennessee, Department of Plant Sciences, Knoxville, TN, USA
[3]The University of Tennessee, Department of Biosystems Engineering and Soil Science, Knoxville, TN, USA

Take Home Message: *In September 2024, farmers and producers were devastated from the effects of Hurricane Helene in East Tennessee and Western North Carolina. Four on-farm demonstration plots have been planted to study forage variety combinations to develop post-flooding pasture renovation recommendations geared toward producers.*

Summary: After Hurricane Helene heavily damaged pastures and hayfields, specialists have come together to develop information to prioritize recovery efforts for East Tennessee Farmers. To determine how to best recover affected hay and pasturelands, a four on-farm demonstration plots were established to evaluate the potential of forage variety mixtures on pasture recovery in hurricane-affected areas. Results from this demonstration will be used to develop Extension recommendations to not only benefit those who were impacted by Hurricane Helene, but to expedite recovery in flood-impacted areas.

Introduction

In September of 2024, Hurricane Helene caused extensive damage and devastating impacts to East Tennessee agricultural systems as a category 4 storm. Specifically, Hurricane Helene aftermath brought thickened soil sediment layers from flooding that disrupted vegetation status in hay and pasturelands. Introduced soil sediments posed potential challenges to economic stability and productivity in East Tennessee farmlands. Currently, there are limited evidence-based recommendations available for producers affected by extreme weather events of this magnitude that demonstrate measurable benefits for fast recovery and to build more resilient forage systems. Thus, our objective is to recover pasture and hayfields on four farms affected by Hurricane Helene, using perennial and annual cool-season grasses commonly grown by Tennessee farmers.

Materials and Methods

This experiment is being conducted at four private-owned farms, with one demonstration site in Greene County (Site 1: Ottinger Farm) and three demonstration sites Washington County (Site 2: Thompson Farm, Site 3: Hilemon Farm, Site 4: Runion Farm). Preliminary soil tests were taken in each of the demonstration plots prior to planting, allowing the ability for future comparison post-treatment for soil composition and characteristic comparisons. At planting, demonstration plots received one of three fertilization strategies (FS) (FS1: 30-60-90; FS2: 30-00-90; FS3 30-00-90) with 5% sulfur added at Site 1 according to soil test reports (Table 1).

Demonstration plot seeding treatments were planted using a no-till drill planter, manufacturer varied by location. The seeding treatments were: Tall Fescue

Table 1: Soil Test Report Results by Site

Site	pH	P	K	Ca	Mg	Zn	Fe	Mn	B	Na
1 Ottinger	6.46	21	75	1834	395	10.4	74	52	0.7	15
2 Thompson	6.37	57	88	1357	260	10.1	224	72	0.3	11
3 Hilemon	6.74	52	97	1570	190	13.2	193	64	0.3	10
4 Runion	6.14	44	129	910	144	7.6	100	40	0.3	10

Phosphorus (P), Potassium (K), Calcium (Ca), Magnesium (Mg), Zinc (Zn), Iron (Fe), Manganese (Mn), Boron (B), Sodium (Na)

(*Schedonorus arundinaceus* cv. KY-31) seeded at a rate of 20 lbs/acre (TF); combination planting of Tall Fescue cv. KY-31 seeded at a rate of 20 lbs/acre and Pembroke Wheat (*Triticum aestivum* cv. Pembroke 21*)* seeded at a rate of 60 lbs/ac (TF + W); Orchardgrass (*Dactylis glomerata* cv. Persist II) seeded at a rate of 15 lbs/acre (OG); combination planting of Orchardgrass cv. Persist II seeded at a rate of 15 lbs/acre and Oats (*Avena sativa* cv. Bob) at a seeding rate of 80 lbs/acre (OG + O).

The four seeding treatments were randomly assigned to the demonstration sites with Site 1 (Ottinger Farm) planting treatments TF, OG, and OG+O and receiving FS3, Site 2 (Thompson Farm) planting treatments OG and OG+O and receiving FS1, Site 3 (Hilemon Farm) planting treatments TF and TF+W and receiving FS2, and Site 4 (Runion Farm) planting treatments TF and TF+PW and receiving FS2, respectively (Table 2).

Results and Discussion

Forage samples will be collected throughout the growing season to measure nutritive value and forage mass. Other parameters that will be collected include species composition, weed presence, and changes in soil composition over time. The results collected will be used to make recommendations for producers that have been affected by flooding events. Generally, affected areas are expected to recover over time, with sandy areas taking longer to recovery due to the lack of water and nutrient holding capacity.

Table 2. Demonstration Site Treatments

Site	Treatment(s)	FS	Total Acreage (ac)
1 (Ottinger Farm)	TF, OG, and OG+O	3	14.35
2 (Thompson Farm)	OG and OG+O	1	15.00
3 (Hilemon Farm)	TF and TF+W	2	16.00
4 (Runion Farm)	TF and TW+W	2	24.00

Performance of Legume Living Mulches in Organic Corn Production

Vanessa H. Martinez, Renata N. Oakes, Virginia R. Sykes, Bruno C. Pedreira, and Chris N. Boyer

Take Home Message: *The goal of this project was to evaluate whether legume living mulches could support the growth of organic corn by contributing nitrogen to the system and suppressing weeds. Although corn yield did not differ within individual years, there were significant differences in yield between years. These findings suggest that there is potential for legume living mulches to supply nitrogen to the system over time.*

Summary: There has been a growing discussion on adopting more sustainable practices in agriculture alongside increasing consumer demand for organic products. Although organic production is not the only pathway to sustainability, it remains a viable option. Growing corn, whether conventionally or organically, can be difficult due to corn's high nutrient needs. In organic systems, the issue of limited options for weed control further complicates the difficulty. This is where legume living mulches come in, because they can serve as both a fertilizer and herbicide in these organic corn systems. Living mulches (LM) are plants that are grown concurrently with a cash crop, instead of being terminated before planting (e.g., cover crops), for purposes other than harvest. Legumes can add nitrogen to the system through the process of biological nitrogen fixation. Additionally, they can aid in weed suppression by competing with them for nutrients. Therefore, our objective for this project was to determine if different legume living mulches could support the growth of organic corn. While there were no treatment differences observed for corn yield in the individual years, we did see significant differences between years.

Introduction

In the United States, agriculture accounted for 10.5% of greenhouse gas (GHG) emissions in 2022 (United States Department of Agriculture- Economic Research Service (USDA ERS), 2024). A source of nitrous oxide, one of the GHG emissions, can come from the application of synthetic nitrogen (N) fertilizers, which is a common practice in conventional agriculture (Menegat et al., 2022). This has led to discussions of promoting sustainability within the agriculture industry. While increasing sustainable practices can be achieved in various ways, organic agriculture is an option that can be a solution. Organic agriculture can also be of benefit from a marketing standpoint. On the consumer side, inflation-adjusted organic sales increased for the first time since 2020, reaching $65.4 billion in sales (USDA ERS), 2025).

Organic agriculture does not come without hardships. With limited options for organic-approved herbicides, weed control remains a main issue (Gomiero et al., 2011). Growing corn (*Zea mays* L.) conventionally is challenging because of its high input needs for both fertilization and weed suppression. This challenge is heightened in organic systems due to weed control issues and limited options for organic fertilizers. A viable option to help with both weed control and fertilization needs in these systems is by utilizing legume living mulches.

Living Mulches (LM) are plants grown concurrently with a cash crop for purposes other than harvest. The difference between a cover crop and a living mulch is that the living mulch is not terminated before planting, unlike cover crops. Since legumes are biological nitrogen fixators, they can add nitrogen to the system while also suppressing weeds through competition. While competition with the cash crop can be an

issue with living mulches, legumes have been shown to maintain or improve corn yields (Verret et al., 2017). Legumes add nitrogen to the system through three different pathways: senescence and decomposition of roots and nodules, root exudates, and mycorrhizae-mediated nitrogen transfer (Thilakarathna et al., 2016). But N transfer from forage legumes has been shown to increase in the year after establishment (Chapagain and Riseman, 2014).

Materials and Methods

A field experiment was conducted at the Middle Tennessee Research and Education Center (MTREC) in Spring Hill, TN, from September 2023 through September 2025. The experimental design was a randomized complete block design with six treatments and four replicates, for a total of 24 plots. The plot size was 20 ft x 30ft. The treatments were: control (NoLM), hairy vetch (*Vicia villosa*) as a cover crop (control) (HVcover), white clover (*Trifolium repens*) as LM (WC), red clover (*Trifolium pratense*) as LM (RC), hairy vetch (*Vicia villosa*) as LM (HV), and crimson clover (*Trifolium incarnatum*) as LM (CC).

Treatments were established on September 13, 2023, using a no-till drill. Poultry litter was applied to the experimental area at 80 lbs. of N/ac on April 1, 2024, and April 9, 2025. The NoLM and HVcover plots were cut and tilled before corn planting on April 25, 2024, and April 23, 2025, for termination. Rows were created using strip tillage with 30 in row spacing, and corn was planted on April 26, 2024, and April 23, 2025. The corn was harvested on September 19, 2024, and September 10, 2025. After the 2024 growing season, the HVcover, HV, and CC plots were replanted due to their annual life cycle.

To determine botanical composition, two random samples were taken monthly, per plot, from February to August in both 2024 and 2025 using a $1ft^2$ grid. Samples were then separated into their respective categories. Before corn planting, the NoLM samples were considered all weeds. After corn planting, the samples would be separated into grass weeds or broadleaf weeds. For the HVcover samples, they were separated into LM or weeds before corn planting, and then followed the same separation as the NoLM samples after corn planting. The HV, WC, RC, and CC were separated into LM and weeds for the whole season. After separation, the samples were dried at 55°C until constant weight and then individually weighed.

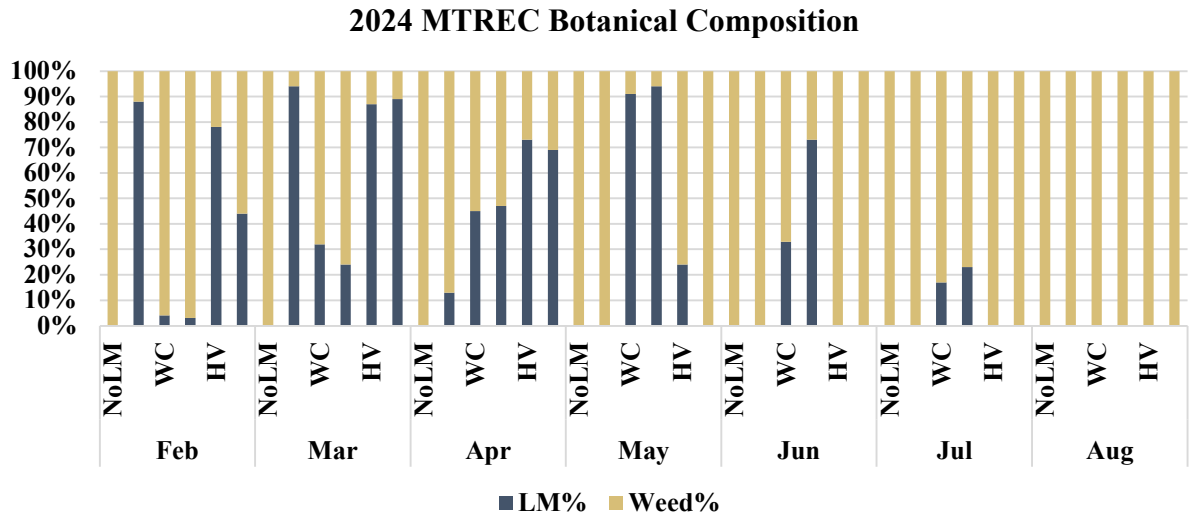

Figure 1. 2024 MTREC Botanical Composition.

Results and Discussion

There were statistically significant sampling month x treatment interactions for living mulch mass and weed mass in both 2024 and 2025, which is expected due to the life cycle of the different treatments. Weed control was effective early in the season, but became problematic in the summer (Figures 1 & 2). Due to the life cycles of our treatments, there was not enough living mulch there to compete with the weeds.

While we did not observe any treatment differences within individual years for corn yield, we did observe significant differences between years. Yield in the establishment year, 2024, was significantly lower than in 2025, 11.9 bu/ac and 60.7 bu/ac, respectively (Figure 3). For the cover crop and living mulch treatments, yield was significantly lower in 2024 than in 2025 (Figure 4). In contrast, for the NoLM treatment, yield did not differ from 2024 to 2025 (Figure 4). These results support that the legumes have higher N transfer in the year after establishment, and that there is potential for legume living mulches as fertilizers in organic corn systems.

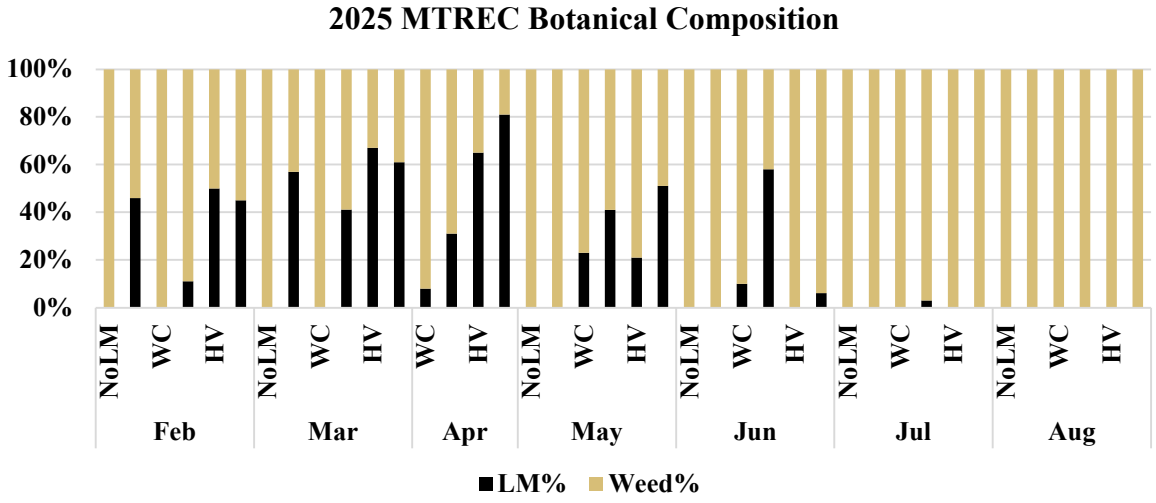

Figure 2. 2025 MTREC Botanical Composition.

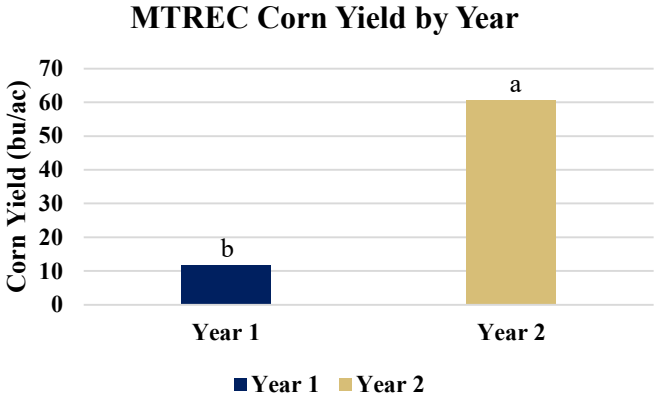

Figure 3. MTREC Corn Yield by Year. Lowercase letters represent stastical mean differences between years.

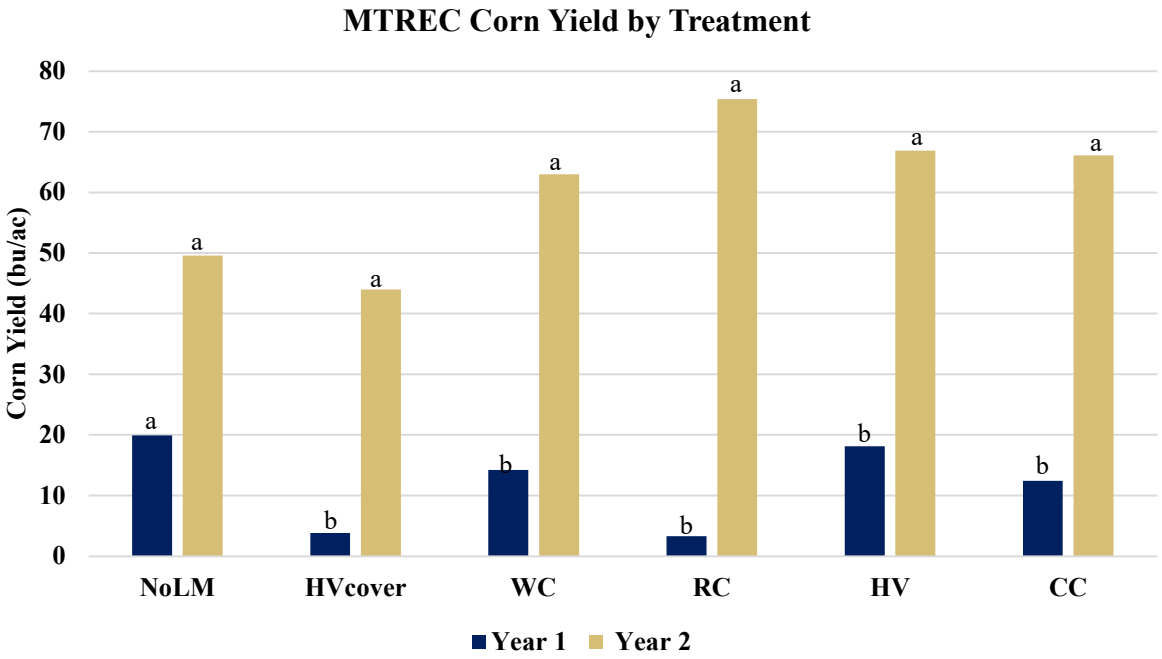

Figure 4. MTREC Corn Yield by Treatment. Lowercase letters represent statistical mean differences within treatments, between years.

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Establishment of Alfalfa in Fields Infested with Glyphosate-Resistant Palmer Amaranth: Glyphosate Management and Boron Fertilization

R. Furlan[1], T.C. Mueller[2], R.N. Oakes[2], L. Steckel[2], B.C Pedreira[3]

[1]Graduate Student
[2]Professor
[3]Associate Professor
[1,2,3]Department of Plant Sciences, University of Tennessee, Knoxville

Take Home Message: *The combination of proper glyphosate management and timely boron fertilization supports alfalfa establishment and productivity, enhancing competitiveness against glyphosate-resistant Palmer amaranth and improving stand establishment success.*

Introduction

Alfalfa (*Medicago sativa* L.) is the most valuable forage crop grown in the world and is the third most valuable field crop produced in the U.S.(NASS, 2023). Appropriate establishment is primordial to ensure alfalfa's forage production and marketability; a uniform stand is a prerequisite when targeting high productivity and the operation's profitability (Bleasdale, 1982).

Among fertility factors, boron is critical: alfalfa's requirement is higher than most crops. Boron deficiency, common in hay systems due to high nutrient removal and limited replacement (Rengel et al., 2022). In weed management, herbicide-resistant weeds, especially Palmer amaranth (*Amaranthus palmeri* S. Watson), threaten alfalfa establishment by outcompeting seedlings, often leading to stand failure or reduced forage accumulation the following year.

Objectives

1. Define which management strategy ensures greater forage accumulation through the first year after establishing 2. Answer if boron fertilization can improve forage accumulation in a deficient hayfield.

Materials and Methods

The two trials were carried out at the ETREC Holston Unit in Knoxville, Tennessee. The area was divided into two to replicate the trial in the following year. The Roundup Ready® alfalfa field from the WL 372HQ.RR variety was established on September 7, 2023, and September 11, 2024 at a rate of 20 lbs ac^{-1}. The experimental design was a randomized complete block in a 3 × 3 factorial arrangement with four replicates, totaling 36 plots (10 by 30 ft, each). The treatments are three boron rates (B0: 0, B2: 2, and B4: 4 lbs ac^{-1}) during establishment and the same levels after the first alfalfa harvest in the spring and three herbicide management levels (no herbicide; SG: 26 oz ac^{-1} of glyphosate after first alfalfa harvest in the spring; and FSG: 26 oz ac^{-1} of glyphosate on the establishment in the Fall + 26 oz ac^{-1} of glyphosate after first alfalfa harvest in the spring).

When the canopy reached 10% bloom in the following spring after seeding, forage was harvested for the first time. After this, plots have been harvested every 35-day interval, totaling three harvests per year. Two forage samples per plot have been clipped with electric hand-clippers inside a 2.7 ft^2 quadrat, leaving 4 in of stubble height. After each harvest, the plots were mowed to 4 in of stubble height. Forage samples were separated into alfalfa and weeds, then dried at 130º F until constant weight.

Data was analyzed using a mixed model method with parametric structure in the covariance matrix, through the MIXED

procedure of SAS (Littell et al., 2006) with repeated measurements and using the maximum likelihood restricted method (REML). Replication (block) was considered a random effect. Boron, herbicide, harvesting and year were considered fixed effects. Treatment means were estimated at least square means (LSMEANS) and compared using the Tukey test ($P < .05$)

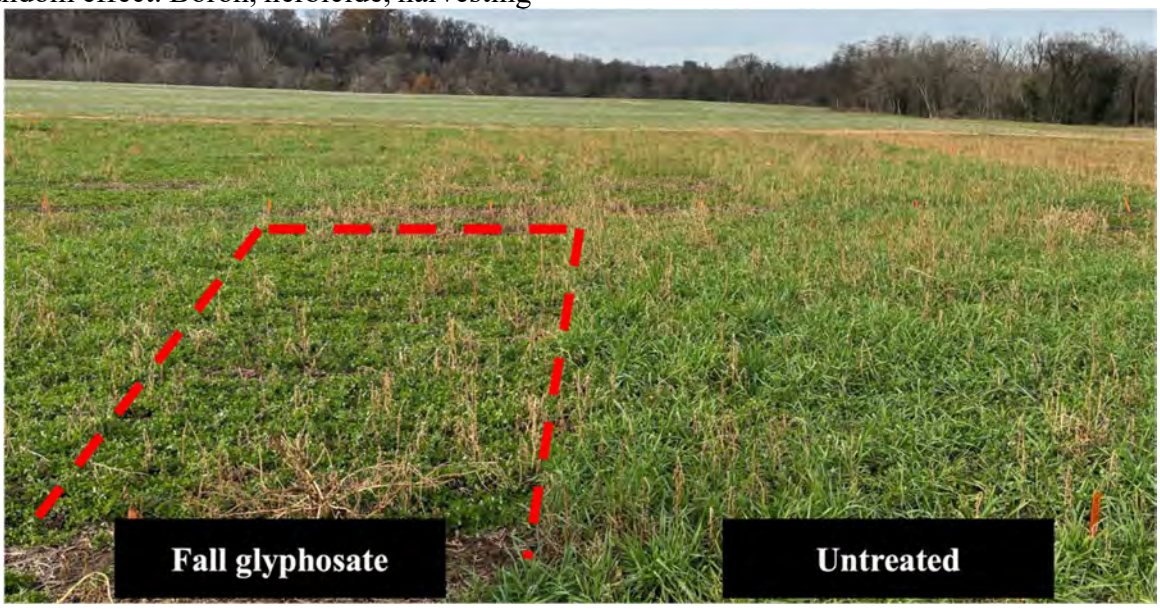

Figure 5. Fall glyphosate (FSG) and untreated plots 2 months after herbicide application

Results and Discussion

Two months after the fall glyphosate application and one week after the first hard frost, Palmer amaranth plants were killed after the first frost, while cool-season grassy weeds persisted in untreated plots. FSG plots entered winter with notably less weed competition (Figure 1)

In the spring of 2025, 2 weeks before the first alfalfa harvest, FSG plots had few visible weeds, whereas SG and control plots were infested with cool-season weeds, and alfalfa was barely visible. Dominant weeds included hairy vetch (*Vicia villosa* Roth), crown vetch (*Securigera varia* L.), sun spurge (*Euphorbia helioscopia* L.), wheat (*Triticum aestivum* L.), white clover (*Trifolium repens* L.), and Italian ryegrass (*Lolium multiflorum* Lam.)

Forage accumulation (FA) (Table 1) was affected by the boron × year × harvest interaction ($P = 0.0149$). Overall, FA was lower in 2025 than in 2024. In 2024, the second harvest (H2) had the greatest FA regardless of the boron rates. In 2025, FA did not differ between H2 and the third harvest (H3), but both were greater than the first harvest (H1) at all boron levels. The interaction indicates that boron fertilization resulted in higher FA for the 2024 H3, where B2 and B4 increased FA by 30%. In contrast, boron fertilization did not increase FA in 2025. The different responses in FA for boron fertilization can be attributed to the different soil and foliar tissue boron concentrations, when boron fertilization affected FA in H3, the boron concentration at the B0 were lower than 1 ppm and 30 ppm, which are the threshold values for adequate soil and foliar tissue concentration, respectively (Beegle, 2025; Kaiser, 2024; Kelling, 2000). On the other hand, in 2025, values were at deficiency levels for soil boron, and FA was not affected by the boron fertilization.

Table 1. Forage accumulation affected by the interaction boron × harvest × year in an alfalfa hayfield during two years.

Harvest	Boron			SEM
	B0	B2	B4	
	Forage accumulation (lbs DM ac^{-1})			
	2024			
H1	3910 Ba	3710 Ba	3750 Ba	230
H2	5700 Aa	5220 Aab	4910 Ab	220
H3	2980 Cb	3930 Ba	3940 Ba	220
	2025			
H1	1740 Ba	1540 Ba	1580 Ba	220
H2	2340 Aa	2590 Aa	2770 Aa	220
H3	2590 Aa	2590 Aa	2910 Aa	230

SEM: standard error of mean.
Means followed by common lowercase letters in the row and uppercase letters in the column are not significantly different by the Tukey's test ($p<.05$).

Forage accumulation (Table 2) was also affected by the herbicide × harvest interaction (P = 0.0039). Across all harvests, the fall and spring glyphosate application (FSG) plots had the greatest FA. the last

Table 2. Forage accumulation affected by the interaction harvest × herbicide during two years in an alfalfa hayfield.

Harvest	Herbicide		
	Control	SG	FSG
	Forage accumulation (lbs DM ac^{-1})		
H1	2270 Cb	2110 Cb	3730 Ba
H2	3900 Ab	3430 Ac	4440 Aa
H3	3070 Bab	2920 Bb	3460 Ba
SEM	170	170	170

SEM: standard error of mean.
Means followed by common lowercase letters in the row and uppercase letters in the column are not significantly different by the Tukey's test ($p<.05$).

glyphosate application, when FA in FSG and control did not differ. Within each harvest, results were consistent, with higher FA in FSG than in control and spring glyphosate (SG), except at H3, 60 days afterThe FSG, with the glyphosate application 4 weeks after seeding, resulted in greater FA in the following growing season, regardless of the experimental year and boron levels. The FSG treatment ensured that weed competition was effectively suppressed during the winter and spring seasons (Figure 1), resulting in a better-established stand in the following spring (Figure 2) that outperformed control and SG in both experimental years. The fall glyphosate application occurred during the critical window for weed control in alfalfa, from 1 to 7 trifoliate stage, which is primordial for proper establishment (Dillehay et al., 2011), as weed control performed later would not achieve results comparable to when associated with control during establishment

Conclusion

The management with the fall and spring glyphosate applications consistently improved FA throughout the growing season, even when the hayfield was established under a high presence of glyphosate-resistant Palmer amaranth. Additionally, boron fertilization increased FA when both soil and plant tissue boron concentrations were deficient.

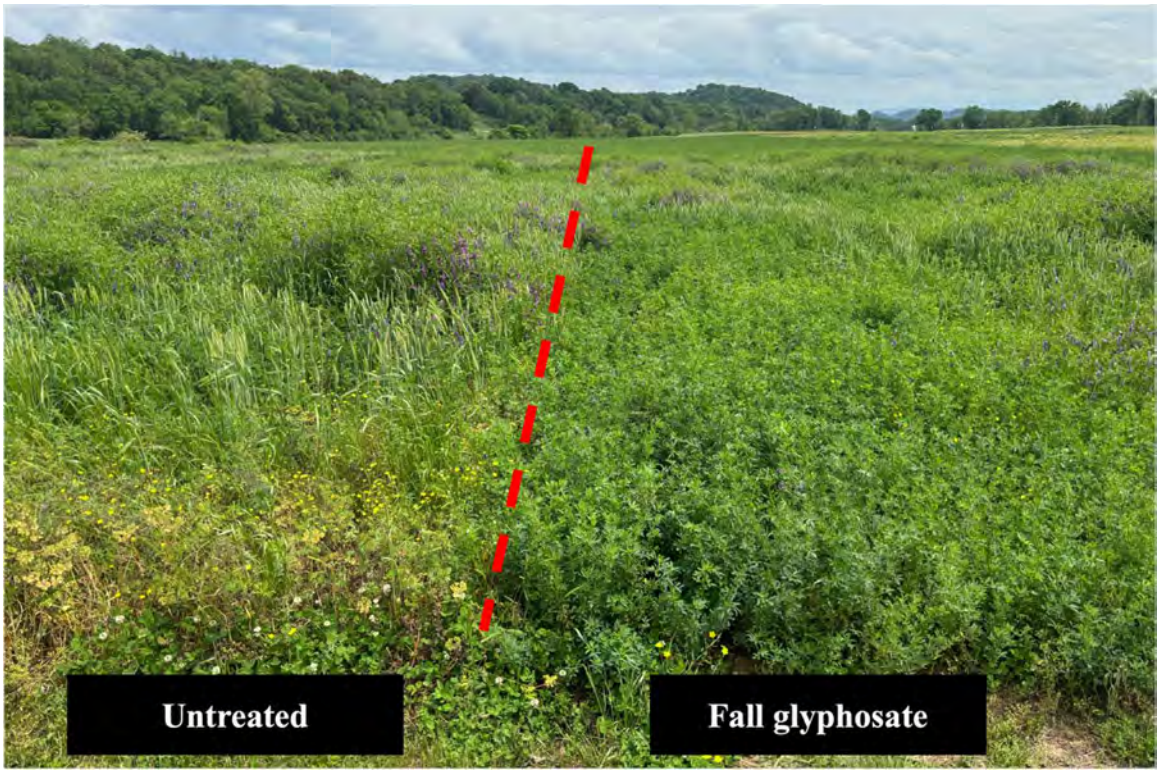

Figure 6. Untreated plot and fall glyphosate (FSG) 2 weeks before the first alfalfa harvest

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IN PROGRESS: System-wide evaluation of *Azospirillum brasilense* application in partial substitution of synthetic nitrogen fertilizer

R. C. da Silva, R. N. Oakes, C. C. Martinez, B. C. Pedreira, and S. Zoca.

Take Home Message: *The utilization of Azospirillum brasilense in the first year of our trial was efficient in sustaining forage mass production. Anecdotally, quality and botanical composition also did not differ, even when cutting nitrogen fertilization by 15 pounds per acre, which is a positive outcome considering all of the environmental benefits associated with the bacterial inoculation. The downside of the inoculant utilization occurs with regard to the economic feasibility of the production system. The high product and application costs, when using A. brasilense do not increase profitability even though there is a decrease in nitrogen fertilizer, and unintendedly increases operational risk.*

Summary: The utilization of bacterial inoculants is growing across the world. These inputs can improve plant production by manipulating phytohormones, fixing atmospheric nitrogen, and solubilizing phosphorus. The objective of this study was to include *Azospirillum brasilense*, a free-living soil bacterium that has been shown to improve plant growth and overall profitability in conditions similar to the state of Tennessee. In this study, 15 three-acre paddocks established with crabgrass and overseeded with wheat and ryegrass were used. The plots were also assigned to one of three treatments: 1) 60 lbs of N per acre (60N); (2) 45 lbs of N per acre + *A. brasilense* inoculation (A45N); (3) 60 lbs of N per acre + *A. brasilense* inoculation (A60N). Forage mass was collected biweekly, and the same samples were used to assess the nutritive value and botanical composition of the forage. A partial cost evaluation was made using the actual numbers obtained from the system, and simulations were estimated using the excel add-on, SIMETAR. The simulations varied fertilizer price, animal weight gain, and feeder calf prices, to verify the risk associated with adding the inoculant in the system. There is no difference observed in forage mass between treatments, showing that the bacteria was efficient in increasing plant growth. No differences were observed in botanical composition and nutritive value; however, the costs per acre when applying the bacteria were higher. This induced increased risk in the system, even though fertilizer variability was accounted for.

Introduction

Azospirillum brasilense is a free-living soil bacterium that has been reported to promote plant growth through plant hormone production and balance and nitrogen fertilization (Pedraza *et al.* (2020)). Because of these characteristics, it has been used across the world for increasing or maintaining agricultural production with limited synthetic fertilizer application (Santos *et al.* (2019).

A limitation of the current literature is that most of the inoculant research has occurred in tropical or subtropical areas. Thus, there is limited research regarding the adoption of these practices in a more temperate climate, such as Tennessee.

Adoption of inoculants is not solely based on increases in forage production; economic feasibility is a key adoption component. Profitability of *A. brasilense* application in corn has been assessed in

Brazil (Damasceno *et al.*, 2024), and it showed positive results. However, their prices and systems were different; therefore, it is unknown how this technology would work in a forage-based system and in the southeastern U.S.

Considering the lack of research on plant growth-promoting bacteria in the U.S., and in forages in general, our objective was to make a system-wide evaluation using *Azospirillum brasilense* inoculation to replace some of the required N fertilizer applied in the fields.

Materials and Methods

The trial is being conducted in Spring Hill, TN, at the Middle Tennessee AgResearch and Education Center. The soil in this trial is a mixture of Maury silt clay and Maury silt loam. The experimental area consists of 15 three-acre paddocks established with crabgrass. The paddocks were mowed to 3 inches high in late summer and overseeded with wheat and ryegrass. After approximately 30 days of stockpiling, 6 weaned steers, that were similar in weight, were placed in each paddock, and remained until early December.

The treatments included: (1) 60 lbs of N per acre (60N); (2) 45 lbs of N per acre + *A. brasilense* inoculation (A45N); (3) 60 lbs of N per acre + *A. brasilense* inoculation (A60N). The inoculation was applied using two different methods. For the established crabgrass stand, a liquid inoculant was diluted using untreated water and applied using a boomless sprayer attached to a John Deere 2355 tractor, following the supplier's recommended application rate. For the cool-season grasses, a powdered inoculant was used to coat the seeds prior to planting in the designated paddocks.

Botanical composition (BC) for each paddock was estimated by collecting samples on 3 random points in each paddock using a $1ft^2$ quadrat; these samples were then botanically separated into crabgrass, cool-season grasses, and weeds. After separation, the samples were dried and weighed.

Forage mass on a dry matter (DM) basis was estimated by adding the total mass of the samples collected for botanical composition on a per-acre basis. Additionally, forage mass was also estimated by using a rising plate meter (RPM). A calibration curve was developed by establishing a simple linear relationship between RPM readings and measured forage mass. This calibration was then applied to an average of 100 RPM readings collected across each paddock (RPM 100) to estimate forage mass per paddock.

Crude protein (CP%), neutral detergent fiber (NDF%), in vitro dry matter digestibility at 48 hours (IVTDMD48) and NDF digestibility at 48 hours (NDFD48) were estimated for each paddock. Subsamples collected within each paddock were composited, resulting in 15 representative samples. These samples were ground through a 2-mm sieve with a Wiley Mill Grinder (Thomas Scientific, Swedesboro, NJ), followed by further grinding through a 1-mm Cyclone Mill (FOSS-Cyclotec, Eden Praire, MN) and analyzed using near infrared spectroscopy (NIRS). On alternate sampling dates, simulated grazing (SG) samples were also collected from 30 randomly selected points per paddock to estimate the forage selected by grazing animals. These samples were processed and analyzed using the same grinding and NIRS procedures. The SG data were used to assess forage nutritive value related to animal performance.

Animal performance was monitored using C-Lock SmartScales installed in each

paddock to record daily live weight. Additionally, animal gain was measured by handling them through the scales in the chute on three occasions: prior to the beginning of the trial, halfway through, and at the end of the experimental period).

The partial budget input costs considered in our economic estimates were fertilizer, inoculant, and fuel (for inoculant application). Urea price was collected from the local coop, inoculant price was collected directly from the company producing it in the U.S., the diesel prices were collected on the American Automobile Association website, and tractor fuel consumption efficiency was collected from the Nebraska Tractor Test Laboratory (NTTL, 1987).

The partial net returns generated by each of the treatments were estimated using the following equation:

$$Partial\ Net\ Returns = \frac{((ADG \times Days) \times Price)}{Acres\ used} - (C_{Urea} + C_{In.} + C_{Diesel})$$

where ADG is the average daily gain obtained, Days is the amount of time the animals stayed in the system, Price is the feeder calf price ($/cwt) at which the animals were sold, Acres used was 15, since every treatment consisted of 5 three-acre paddocks, C_{Urea} is the cost of the Urea applied per acre, $C_{In.}$ Is the cost of the Inoculant used per acre, and C_{Diesel} is the cost of the Diesel used to apply the bacteria per acre

An add-on for Excel, SIMETAR, was used to estimate 1000 iterations of partial net returns for the 3 treatments. The 3 stochastic variables of the equation are ADG, feeder calf price, and urea price. The distribution for ADG was built with the actual observed data from the study, while feeder calf and urea prices were collected from the last 5 years' prices according to USDA-AMS and DTN, respectively. Days on the system (27), inoculant price, and diesel price stayed fixed.

The results for partial net returns were represented as values per acre. Similarly to the analysis done by Sheldon *et al.* (2023), the stoplight chart to be evaluated considered Net Partial Returns higher than $200/ac as favorable, between $0 and $200/ac as cautionary, and less than $0/ac (negative return) and unfavorable.

Results and Discussion

At the time of this report, no proper statistical analysis has been performed; anecdotally, there is no difference among treatments, just among collection dates. It was expected that the proportion of cool-season grasses to increase throughout the experimental period, based on the recorded temperatures, which led to the senescence of crabgrass. These conditions are ideal for growing winter-annuals (wheat and ryegrass), however, it was not evident based on these results.

One of the reasons for the current results may be due to animal grazing selectivity in the paddocks. During collections, visual observations indicated that immature cool-season grasses were being overgrazed, leading to a reduced proportion in the paddocks.

Statistical analysis of forage mass was conducted for the 2024 data. Results showed a month effect, but not a treatment effect, on the total forage mass of the paddocks. Although it was initially hypothesized that cool-season grasses would contribute to maintaining or increasing forage mass, the observed decline was

Figure 7. Average botanical composition (BC) within the collected forage mass

expected as stockpiled crabgrass was gradually consumed through the fall. This utilization effectively extended the grazing season and delayed the need for supplemental silage feeding.

The lack of a treatment effect remains noteworthy and warrants discussion. These findings suggest that *A. brasilense* inoculation may have helped sustain forage mass even with reduced N application. This is in accordance with Hungria *et al.* (2016), who observed an increased forage mass when N fertilization was combined with the inoculant.

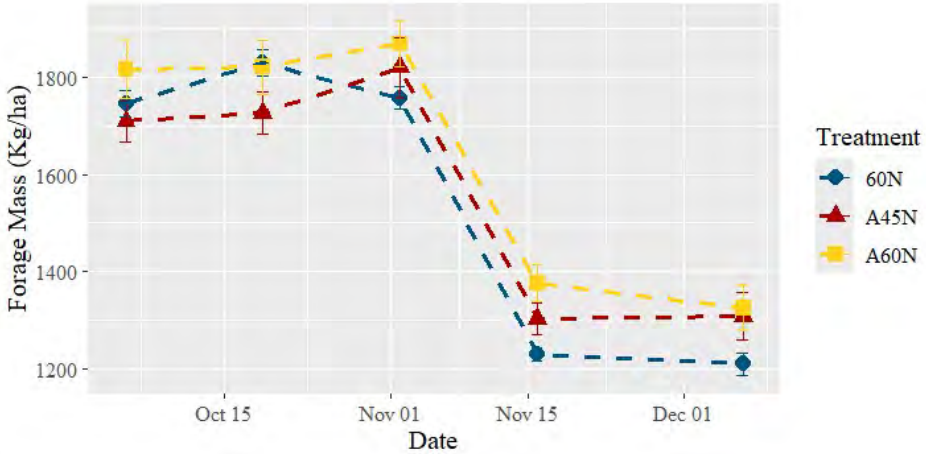

Figure 8. Forage Mass observed throughout the experimental period

Table 1. Average values for CP, NDF, IVTDMD48, and NDFD48 throughout the experimental period

	Treatments	5-Oct	19-Oct	2-Nov	16-Nov	7-Dec
CP (%)	60N	17.3	15.1	15.1	14.3	15.1
	A45N	16.4	15.1	15	13.3	15
	A60N	16.8	15.2	14.7	13.8	14.6
NDF (%)	60N	58.6	59	66.5	66.9	63
	A45N	60.2	60.4	66.2	66.8	65.2
	A60N	59.3	60.5	65.9	67.9	65.9
IVTDMD48 (%)	60N	75	75.3	69.2	67	69
	A45N	76.2	74.2	70.3	66.3	67.7
	A60N	76.8	73.1	70.5	65.8	66.3
NDFD48 (%)	60N	54.2	54.7	51.9	57.3	57.4
	A45N	57.9	53.7	54.1	57.8	55.8
	A60N	58.1	51.6	55.6	57.6	54.9

However, unlike their results, no additional increase in forage mass was observed in this study when inoculation was applied along with 60 lb of N compared to non-inoculated paddocks. Forage mass results are shown in Figure 2. Same as with BC, no proper statistical analysis was conducted for the nutritive value components observed yet; the average values are displayed in Table 1.

Anecdotally, observations suggest possible correlations between forage nutritive value (e.g., CP% and NDF%) variables and botanical composition across sampling dates, particularly as affected by the proportion of crabgrass within the paddocks. However, no differences among treatments were evident without formal statistical analysis. The partial cost analysis for the trial is represented in Figure 3.

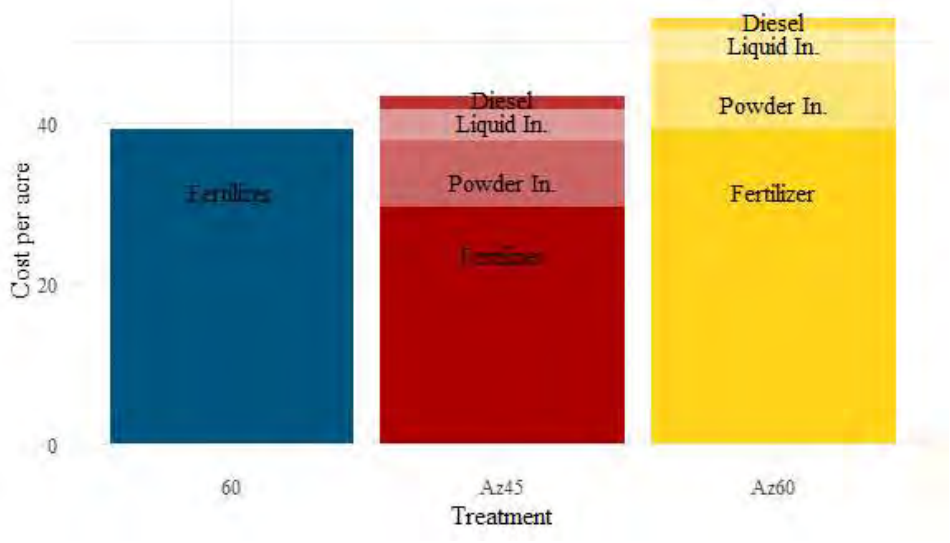

Figure 9. Partial production costs for each of the treatments

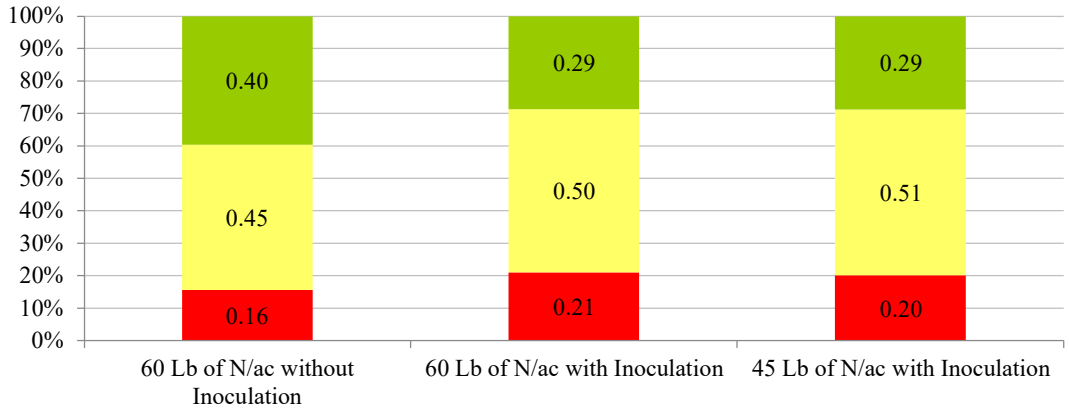

Figure 10. Stoplight chart for Partial Net Returns greater than $200/ac

Even though the cost of fertilizer on the treatment A45N was lower, this cost reduction benefit was not enough to compensate for the increased costs associated with the purchase and application of the inoculant.

The simulations indicate a similar result. That is, there are greater economic gains when not applying the bacteria. As can be observed, when stochastically varying the feeder cattle price, ADGs obtained, and fertilizer price, there is still a higher probability of obtaining positive Net Partial Returns when not applying the *A. brasilense* (40 + 45 = 85%) than when substituting part of the commercial N applied for inoculation (29 + 51 = 80%). In other words, even with fertilizer price volatility, it is still less risky to apply 60 lb of N per acre directly than to substitute part of it with *A. brasilense* inoculation.

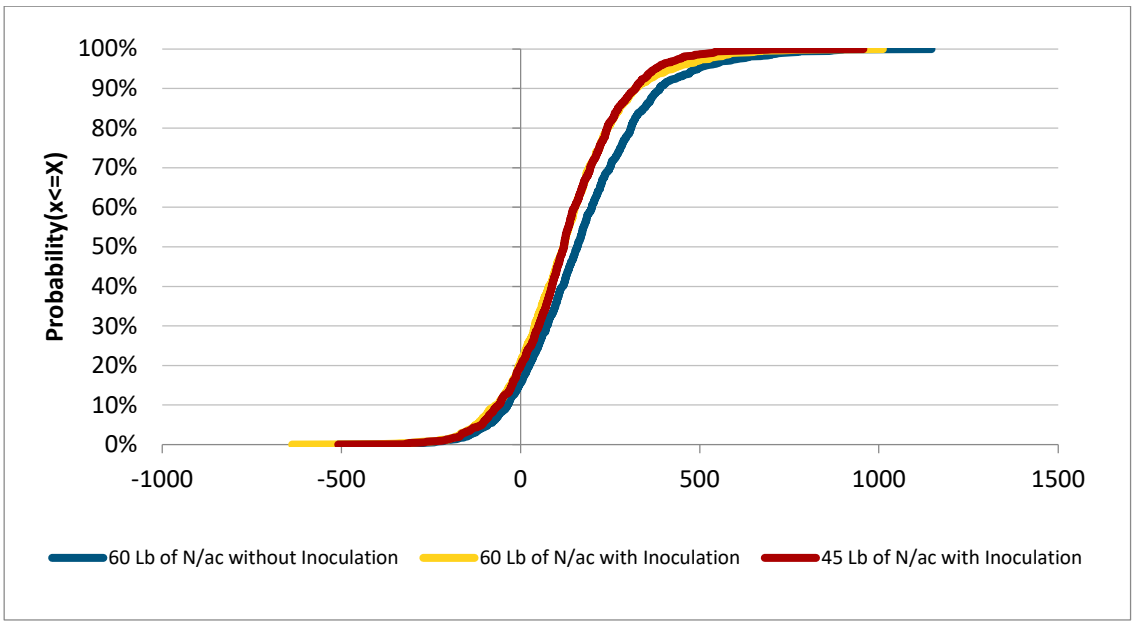

Figure 11. Cumulative distribution function for partial net returns for each of the Treatments

Another way to show these results is by estimating the cumulative distribution function (CDF) (figure 5). The CDF indicates that there are higher probabilities of greater Partial Net Returns when utilizing just 60 lb N/ac (blue line), when compared to using the inoculant associated with either dosage of N fertilizer (red and yellow lines). This is because the CDF for non-inoculated 60 lb N/ac is more to the right when compared to both inoculated treatments. Thus, through the first year of this trial, inoculation is not a viable economic option due to costs.

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Extension Update

IN PROGRESS – Measuring Nitrate Accumulation and Nutritive Value Following N Fertilization of a Warm-Season Annual and Investigating Nitrate Reduction in Sorghum-Sudangrass Baleage

R. Bustabad, K. Mason, B. Pedreira, D. McIntosh, M. Fancher, and J. Ivey.

Addressing the Issue

Incorporation of warm-season annuals into a forage system presents an opportunity to extend grazing days and lessen the burden of hay costs for Tennessee beef producers. Producers are often hesitant to utilize warm-season annuals due to fear of nitrate poisoning in cattle. Many warm-season annuals, including sorghum-sudangrass (*Sorghum x drummondii)*, maintain the potential to accumulate nitrates (NO3-) in the lower third portion of the plant during stressful conditions, including frost, cloudy days, hail, and the most predominant cause, summer and early fall drought. NO3- accumulation is more probable when providing exogenous N resources, often needed, to fertilize annual pastures. When NO3- concentrations are greater than 2,500 ppm, excess nitrite (NO2-) absorbs into the blood stream, limiting oxygen carrying capacity in the blood, leading to chronic or lethal damage in the animal's body. The interactions between warm-season annual NO3- accumulation, fertilization rates, and environmental conditions are not entirely defined, leading to Extension fertilizer recommendations that might not be optimal for producers across Tennessee.

In addition, NO3- concentration cannot be reduced through haying, curing, or physical modification, contributing to the continuous apprehension towards warm-season annual utilization. Although preventative techniques, like limiting grazing during stressful conditions or diluting high-nitrate forages, remain the prevailing warm-season annual recommendation, some research has provided evidence of NO3- reduction potential through ensiling processes.

The objective of this study is to understand the impact of varying N fertilization rates on sorghum-sudangrass nutritive value and NO3- accumulation and to measure the extent of NO3- reduction following an ensiling period.

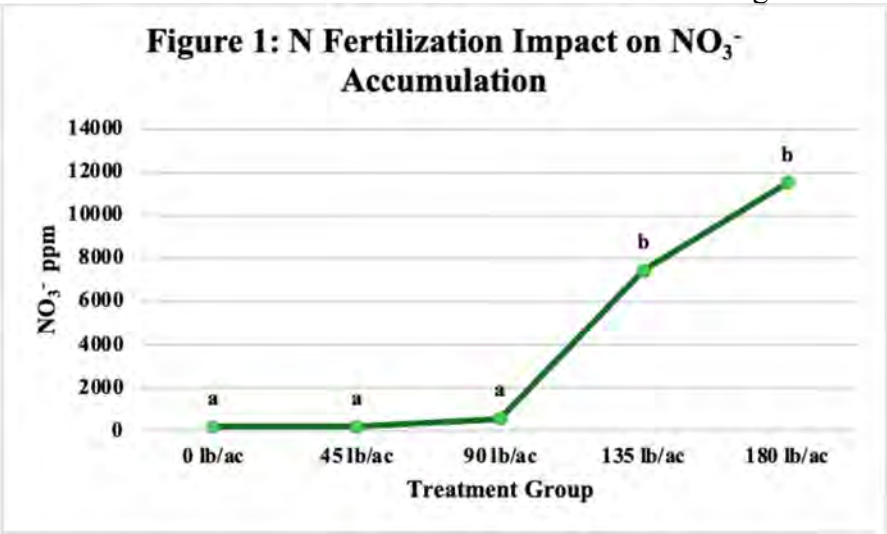


Figure 1. Fertilization Rate Impact on Forage Quality

In May 2024, a small plot trial of Greengrazer sorghum-sudangrass was planted into fifteen, 20 ft x 25 ft plots and initially fertilized with 60 lb/ac urea (46-0-0). Following the first harvest, five rates (0, 45, 90, 135, 180 lb/ac) of fertilizer were randomly applied to three plots each. These plots were then harvested to 3-in stubble between the boot and flowering growth stages and collected, dried, and finely ground for Near Infrared Spectroscopy and wet chemistry NO3- analysis. RStudio was used to analyze the initial nutritive value and NO3- data from this study.

Results from year 1 show crude protein (CP) concentrations increasing from 7.8 to 16.7% CP in the lowest and highest treatment N rates, respectively. Statistically significant differences were found when analyzing total digestible nutrients, neutral detergent fiber, and acid detergent fiber but were not biologically significant. Similarly, herbage mass increased from 2.25 to approximately 4 tons/ac in the lowest and highest N treatment groups, respectively. NO3- concentrations reached well above the safe feeding threshold with treatment rates above 90 lb/ac resulting in 7,000 - 11,000 ppm.

Part II - Fermentation Impact on Nitrate Reduction

Five 30 lb sample groups of Greengrazer sorghum-sudangrass along a gradient of NO3- levels, ranging from less than 100 to almost 12,000 ppm, were wilted to approximately 55% moisture. Three grab samples were taken from each group and double vacuum sealed to replicate the baleage ensiling process. Three more samples from each group were collected in the same manner following inoculation with Promote® Forage-Mate® EBL at a rate of 0.035 oz/ton of forage. These baleage samples fermented for six weeks before drying and grinding to be analyzed using Near Infrared Spectroscopy for nutritive value and wet chemistry NO3- reduction analysis. Reported data has not yet been statistically analyzed and is presented raw. Results indicate NO3- reductions ranging from 10-53%, with little consistency in response to starting

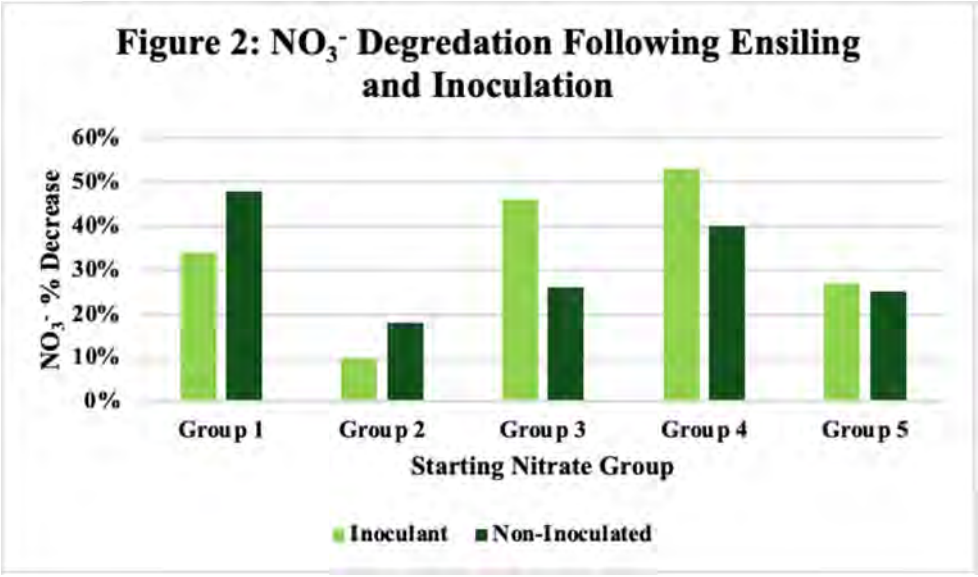


Figure 2. NO3 Degradation following ensiling and inoculation.

NO_3^- levels or inoculation (Figure 2). Groups with initial toxic concentrations did not reduce concentration below the safe feeding threshold (2,500 ppm), but many samples contained below 5,000 ppm. This forage could be considered safe to feed with minor additional toxicity prevention management.

Looking to the Future

Data from year 2 has been collected and is predicted to display differing results from year 1, stemming from an extensively different weather pattern and weed growth during 2025. The impact of fertilization rates on NO_3^- levels and nutritive value is well illustrated through the current trial results. However, future research must further investigate the influence of ensiling on NO_3^- levels to provide more situation and region-based fertilization recommendations for warm-season annual forages.

IN PROGRESS: Empowering Producers Through the Tennessee Master Forage Program

M. Fancher [1], D. McIntosh [2], and B. Pedreira[3].

[1]Research Specialist and Program Assistant
[2]Coordinator and Researcher
[3]Director and Associate Professor
[1]The University of Tennessee, Department of Plant Sciences, Knoxville, TN, USA

The Tennessee Master Forage Program (TMFP) is the newest addition to the Tennessee Master Producer Program series. It offers an in-depth exploration of forage–livestock systems, emphasizing the interactions among soil, plants, and animals. Through a practical, research-based approach, participants learn foundational concepts as well as the latest advanced practices to enhance productivity and sustainability. The program represents a collaborative effort among specialists from several land-grant universities across the southeastern United States, aimed at equipping participants with science-based recommendations for improved forage production. This online, asynchronous program features a comprehensive library of video modules taught by 16 specialists from the University of Tennessee, University of Florida, North Carolina State University, Auburn University, Mississippi State University, and Virginia Tech.

The TMFP is offered to participants through two delivery options. The first is a fully online program requiring participants to complete 12 credits of online modules to earn certification. The second is a hybrid option, in which participants complete 9 credits of modules and attend an approved Master Forage Tour event to receive course certification. These options are designed to provide flexibility while incorporating valuable hands-on learning experiences. In addition to selecting their preferred enrollment option, participants benefit from an asynchronous learning model that allows them to progress at their own pace.

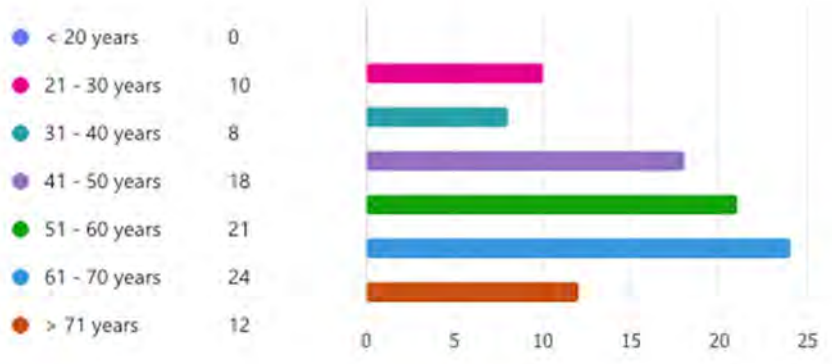


Figure 1: Age of Completed TMFP

Furthermore, participants can apply their TMFP certification toward eligibility for the Tennessee Agricultural Enhancement Program (TAEP) Cost Share Program.

Released in May of 2025, the TMFP had already 93 participants that have completed the course and received certification, and 137 participants currently enrolled in the program, totaling 230 participants. At the conclusion of each participant's program, a post-survey is sent to collect demographic information and evaluate the efficacy of the course. The following data has been collected from completed participants of TMFP.

Among the participants, 49% of them have from 51 to 70 years old (Fig 1). On average, we've seen a great increase in forage production knowledge when comparing course knowledge before and after completion. The knowledge base assessment revealed that although only 10% of participants had advanced knowledge prior to the program, 56% classified themselves as having advanced knowledge after completing the course (Fig 2).

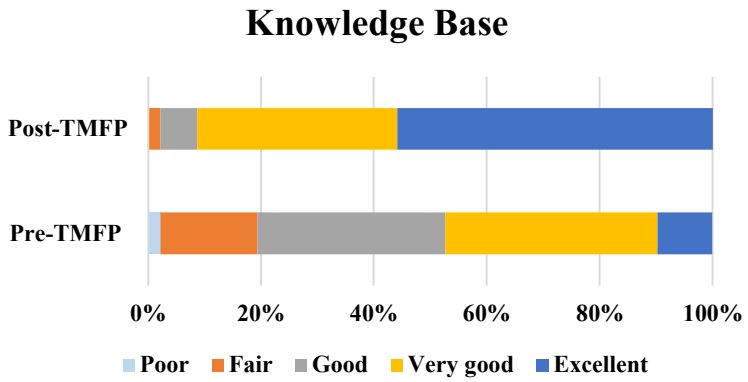


Figure 2: Pre/Post-Course Knowledge Base of TMFP Participants

Lastly, the main goal of the TMFP is to increase the likelihood of management changes among forage producers. Of the 93 participants who completed the program, 95% indicated they were likely to make a management change (63% very likely and 32% somewhat likely), suggesting a positive impact on their operations. On average, participants estimated the value of the information they received through the program at $9,200 per operation. When applied to the 93 producers who have completed the program to date, this translates to an estimated total economic value of approximately $852,500 for Tennessee forage producers. The Tennessee Master Forage Program intends to continue educating producers about forage production to see increased efficiency and decreased expenses amongst forage producers across the state, country, and world.

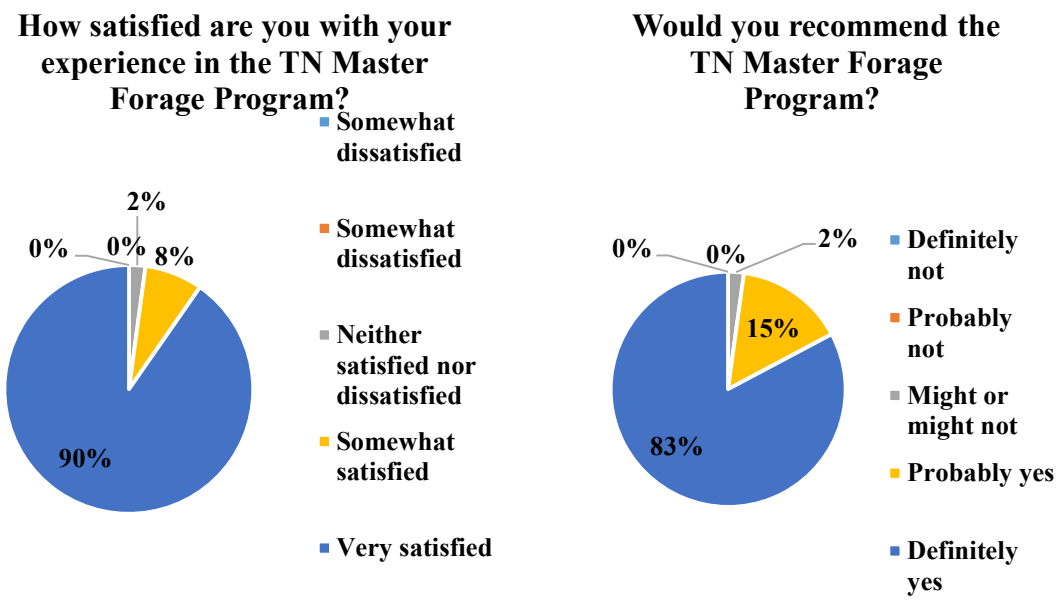


Figure 3. Satisfaction with the program (A) and likelihood of recommending the program (B).

LIVE.STOCK Podcast:

- **Dr. Dennis Hancock: Forage FAQ's**

  https://www.youtube.com/watch?v=LyIizIP4OIE

- **Dr. Justin Rhinehart: Finite or Infinite? Understanding Beef Cattle Production**

  https://www.youtube.com/watch?v=PXacOSipAR0

- **Dr. Rocky Lemus: Getting Started with Small Ruminants**

  https://www.youtube.com/watch?v=anx5yXrwKGU

- **Dr. Kyle McLean: Reproductive Management Strategies**

  https://www.youtube.com/watch?v=icyRbBDfxKI

- **Mr. Charles Hord: Current Events for Cattlemen**

  https://www.youtube.com/watch?v=ZxYmds_LJJA

- **Mrs. Jennifer Houston: Producer Perspectives**

  https://www.youtube.com/watch?v=Pp-fce38AiQ

- **Dr. Lew Strickland: Screwworm Watch: Detection and Prevention**

  https://www.youtube.com/watch?v=kY4CM3Bnh_o

- **Dr. Forbes Walker: Hurricane Helene: Aftermath and Recovery**

  https://www.youtube.com/watch?v=rZ61HIuQBJk

- **Dr. Leanne Dillard: Nitrogen Alternatives - Potential Use of PGPR in Forage Production**

  https://www.youtube.com/watch?v=d-GvX8QVKa0

- **Hans Goertz: International Agriculture: A Global Perspective**

  https://www.youtube.com/watch?v=DO3HjN5NNxY

- **Dr. Kelly Vierck: Meat**

  https://www.youtube.com/watch?v=d0jO3sNd0QE

- **Dr.Hannah Wright-Smith: Getting into the Weeds**
  https://www.youtube.com/watch?v=CR3AZthB4KA

LIVE.STOCK Companion:

https://utbeef.tennessee.edu/live-stock/

- **Volume 14 – January 2025**
- **Volume 15 – February 2025**
- **Volume 16 – March 2025**
- **Volume 17 – April 2025**
- **Volume 18 – May 2025**
- **Volume 19 – June 2025**
- **Volume 20 – July 2025**
- **Volume 21 – August 2025**
- **Volume 22 – September 2025**
- **Volume 23 – October 2025**
- **Volume 24 – November 2025**
- **Volume 25 – December 2025**

LIVE.STOCK companion

Volume 14: January 2025

MONTHLY TIP

While we're busy feeding hay, now is the perfect time to sit in a warm office and plan your yearly forage strategy. Reflect on your forage production throughout the year—has it met your herd's needs? The past two years of fall droughts have severely impacted forage production in Tennessee, emphasizing the need for more resilient systems.

Renovating pastures is costly, so our goal should be to develop long-lasting, sustainable systems. Tall fescue has served us well, but diversification is essential. Incorporating more species, annuals, and warm-season forages can strengthen resilience. Improved crabgrass and legumes like clovers enhance forage quality and nitrogen fixation, benefiting companion grasses.

Start rethinking your strategies now to prepare for 2025 and beyond. For details on forage variety trials, visit the UT Beef and Forage Center website at UTBEEF.COM.

Dr. Bruno Pedreira
UT Extension Forage Specialist

"Cheers to a new year and another chance for us to get it right."

-Oprah Winfrey

POST-FLOOD SOIL MANAGEMENT

Dr. Forbes Walker, Professor, Department of Biosystems, Engineering, and Soil Science
David McIntosh, Coordinator and Researcher, Department of Plant Sciences

In October 2024, East Tennessee was severely impacted by Hurricane Helene, resulting in widespread flooding that damaged many farms and thousands of acres of cropland. Floodwater covered fields with debris, including sand, silt, clay, river rocks, and organic matter, and in some areas, topsoil was washed away entirely. Sand, silt, and clay are typically deposited in layers, with silt being more fertile but also prone to forming a hard surface as it dries. Compaction and crusting are common issues with flood-deposited soils, particularly in areas with significant silt. It's important to avoid deep tillage or subsoiling when the soil is still wet, as this can worsen compaction. Additionally, covering the soil with locally available organic materials, such as spoiled hay or chipped wood debris, can provide protection and improve soil health throughout the winter. Please note, if hay or other organic materials are contaminated with herbicide residues there may be issues with target species planting and use. Restoration of flood-affected fields requires careful assessment of the soil's condition, nutrient levels, and physical structure. Soil testing is essential to determine pH levels and nutrient needs. In addition to major nutrients, flood-deposited soils may also suffer from micronutrient deficiencies that can affect plant growth. Soil testing should include an analysis of these nutrients to ensure adequate levels are available for future crops. Currently, a team of UT Extension Specialists and Researchers are developing recommendations for this coming spring planting period. Please reach out to your local UT/TSU Extension agent for any questions or updates. For more flood related resources visit: https://utextension.tennessee.edu/flood-related-resources/ *Adapted from UT Extension Publication D 246.*

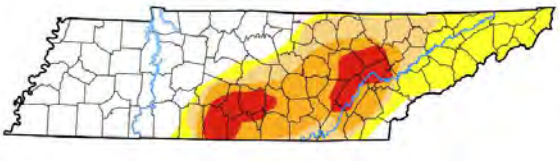
NUTRITION CONSIDERATIONS FOR MUDDY CONDITIONS AND COLD WEATHER

Dr. Katie Mason, Assistant Professor, UT Extension Beef Cattle Nutrition Specialist

Muddy conditions during the winter months can significantly impact cattle performance, especially in the Southeast. Excessive mud makes it difficult for cattle to move to feeding areas, which could reduce feed intake by 4-8%. To mitigate this, it is important to feed hay in well-drained areas and move feeding locations throughout the hay-feeding period to reduce wheel traffic across pastures. Additionally, strategies like reduced frequency feeding and bale grazing can help minimize daily trips but must be managed carefully to avoid disrupting rumen function, decreasing animal performance. Long term solutions include establishing a sacrifice paddock or heavy use feeding area reinforced with materials like concrete or stone alongside geotextile fabric can prevent excessive mud accumulation. Consider investing in equipment such as 4-wheel-drive vehicles and spreading gravel in key areas when needed. Winter weather increases cattle energy requirements by up to 30%, making high-quality hay essential to meet these needs. Low-quality hay can lead to rumen compaction, so supplementing with fiber-based feeds can improve energy availability. Offering hay on a free-choice basis is crucial in avoiding compromises in the cows' ability to meet their energy requirements. There are ways to manage and implement solutions to these winter challenges.

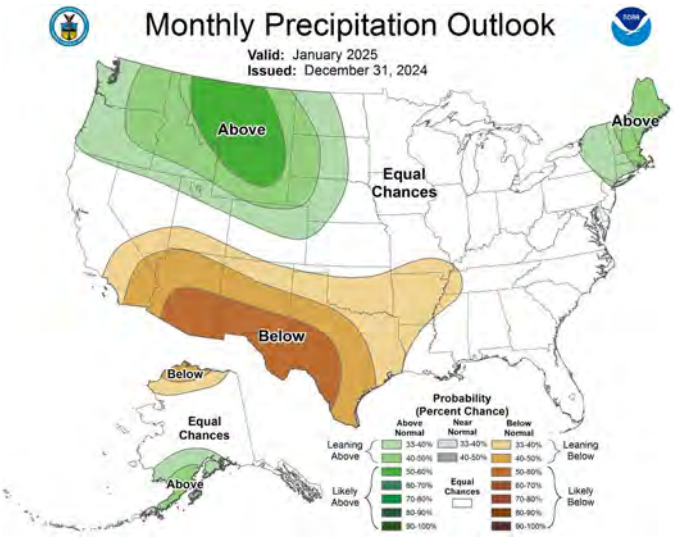
WEATHER

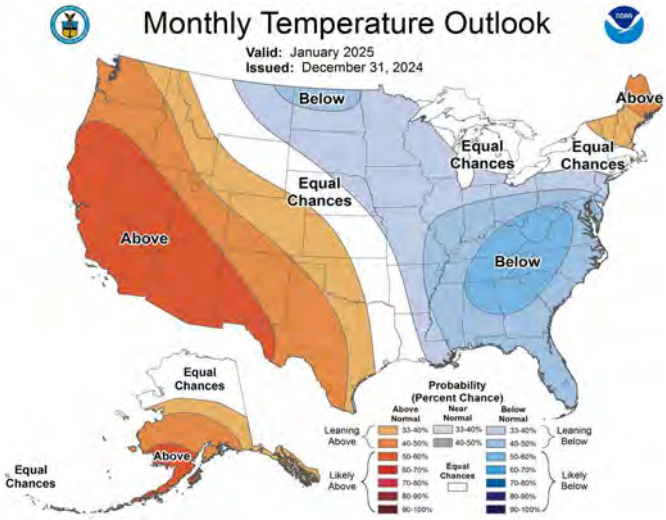
Dr. Bruno Pedreira, UT Extension Forage Specialist



December 2024 data was not available at the time of this release, but the 10-year December average is 43.7°F with 3.5 inches of precipitation. ncei.noaa.gov

With the winter break upon us, January temperatures are expected to be below average across Tennessee. Middle and East Tennessee are forecasted to be colder than the West. Precipitation chances are average for most of the state, except for a few counties in the West. In December, 65% of Tennessee was experiencing some level of drought (D0-D4). While conditions have slightly improved, over half of the state (54%) is still facing drought. In Middle Tennessee, Giles, Lincoln, Moore, Bedford, Marshall, Maury, and Coffee counties have been in extreme drought (D3) since October. In East Tennessee, counties now classified as D3 include Morgan, Cumberland, Bledsoe, Roane, Rhea, Meigs, Hamilton, and Loudon. droughtmonitor.unl.edu





UPCOMING EVENTS

- Live.Stock - Join us for our broadcast on February 12, 2025 at 2 PM ET
- Middle Tennessee Grain Conference
  February 4, 2025 at 7:30 AM CT
- Tennessee Novel Endophyte Tall Fescue Renovation Workshop
  March 4, 2025 at 8:45 AM ET

Details can found on UTBEEF.COM

Photo of the Month by Malerie Fancher: Dr. Bruno Pedreira speaking about Pasture Renovation at the 2024 Animal Science In-Service training for UT/TSU Extension Agents in Spring Hill, TN.

This and other useful information can be found at your local UT Extension office, or on our website.

UTBEEF.COM

LIVE.STOCK companion

Volume 15: February 2025

MONTHLY TIP

I can't get through February without talking about clovers, right? Like all legumes, clovers fix atmospheric nitrogen and store it in their tissues. That means they provide high-quality forage, rich in crude protein and highly digestible. Mixing clovers into cool-season pastures improves both forage quality and livestock performance. The goal is to have 25–30% of the pasture in clovers to balance quality (from clovers) and yield (from grass). For tall fescue pastures, the recommendation is to overseed 2 lbs of white clover and 4 lbs of red clover per acre. The ideal seeding window is February 20 to April 1. However, don't add clovers to a weedy pasture. Control the weeds first, then overseed.

For details on overseeding clovers, visit the UT Beef and Forage Center website at UTBEEF.COM.

Dr. Bruno Pedreira
UT Extension Forage Specialist

UTBEEF.COM

"An investment in knowledge pays the best interest."

-Benjamin Franklin

ANIMAL SCIENCE CONTINUES TO REBUILD FOR THE FUTURE

Dr. Neal Schrick, Head and Professor, Department of Animal Science

The Department of Animal Science at UTIA continues hiring faculty to set the stage for future Research, Extension and Teaching activities. Since 2011, Animal Science has overcome numerous retirements, advancements, and departures while building an undergraduate and graduate population to record numbers. Since 2020, three new Beef Extension faculty have been hired including Dr. Katie Mason (forages and beef nutrition; also teaches beef management and oversees the Master Beef Program), Dr. Troy Rowan (genetics/genomics; joint research appointment with UTCVM Large Animal Clinical Sciences as part of the UTIA Genomic Center for Advancement of Agriculture), and Dr. Saulo Zoca (beef cattle reproduction; oversees the Extension component of the UT Heifer Development Center and the UT Bull Test). The department also hired two poultry faculty in Dr. Tom Tabler (Extension/Research with a focus on commercial production) and Dr. Yang Zhao (Teaching/Research in Precision Poultry). Also, the department recently hired Dr. Yanqiu Yang (Precision Beef Research/Teaching; will utilize the Hickman Precision Unit at MTREC). Two future precision health positions will open soon with joint appointments between Animal Science and Large Animal Clinical Sciences with Research and Teaching appointments. Two additional hires include Dr. Elizabeth Shepherd (Research/Teaching in Parasite Immunology; Small Ruminants) and Dr. Blair Downey (multi-species Animal Behavior; ongoing study at MTREC with beef cattle and buzzards; Research/Teaching). While Animal Science and Food Science continue the process of building the Center for Protein Innovation, Dr. Kelly Vierck has been hired with an Animal Science Extension appointment and a Food Science Teaching appointment as a start to rebuild the meat science program in both departments. Future positions in planning for Animal Science include Research/Teaching faculty in Ruminant Nutrition and Muscle Biology.

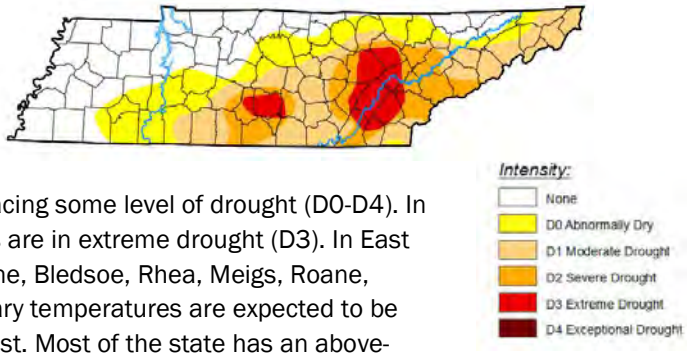
IDENTIFYING TOP COVER CROP SPECIES/VARIETIES FOR INTEGRATED ROW CROP/GRAZING SYSTEMS

Dr. Virginia Sykes, Associate Professor, Department of Plant Sciences

Winter cover crops provide a wide range of benefits to summer row crop systems like corn, soybean, and cotton. Benefits include increased nutrient availability, improved soil structure, increased weed suppression, and reduced erosion. The species used for cover crops are likely familiar to those incorporating annuals into forage systems as many of these species also provide high nutritive value for grazing. Incorporating grazing into cover crop systems is an excellent way to harness the ecological benefits these systems provide while also adding an economic value through the production of early season high quality forage. Maximizing value is highly dependent on finding the best species/variety to fit your specific system. Location along with cover crop planting/termination timing strongly impact which species/variety will provide you the maximum yield and nutritive value when incorporating grazing into a cover crop system. The University of Tennessee has had a cover crop variety trial since 2017. In 2022, we expanded this trialing program to cover a broad region of the South, including Arkansas, Kentucky, Tennessee, Virginia, North Carolina, South Carolina, Georgia, Alabama, Florida, and Texas. In addition to cover crop biomass at a pre-corn and pre-soybean/cotton termination timing, these trials also provide information on forage nutritive values. Results can be found at search.utcrops.com/cover-crops.

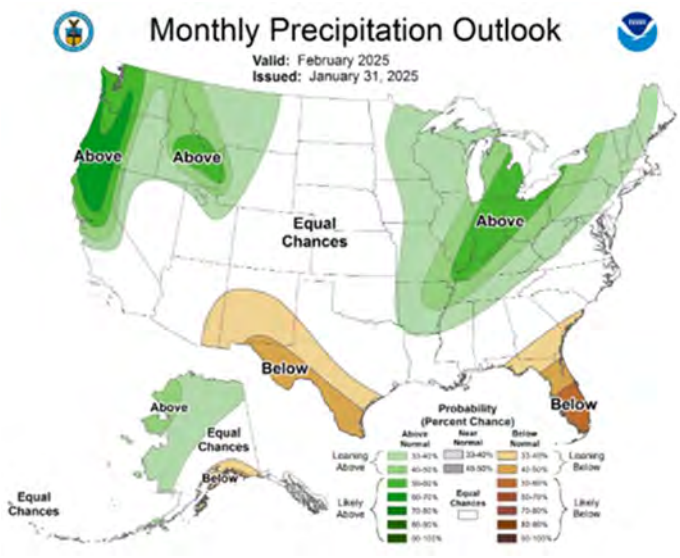
WEATHER

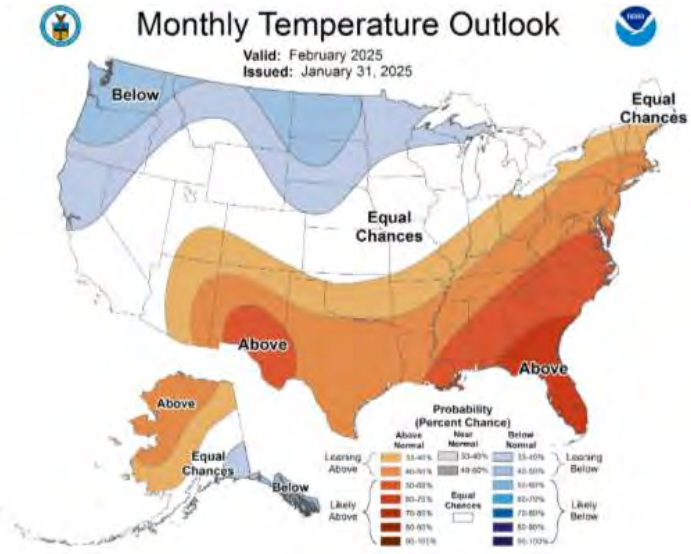
Dr. Bruno Pedreira, UT Extension Forage Specialist



January temperature averaged 4.7 °F lower than the average, and rainfall was 0.9 inches below the 10-year average of 37.4°F with 4.5 inches of precipitation. ncei.noaa.gov

Even with a few inches of snow, 63% of Tennessee (63%) is still facing some level of drought (D0-D4). In Middle Tennessee, Bedford, Marshall, Moore, and Coffee counties are in extreme drought (D3). In East Tennessee, D3 conditions now include Morgan, Cumberland, Roane, Bledsoe, Rhea, Meigs, Roane, Hamilton, Monroe, McMinn, Bradley, and Loudon counties. February temperatures are expected to be above average statewide, with East Tennessee hotter than the West. Most of the state has an above-average chance of precipitation, except for a few counties on the eastern border. droughtmonitor.unl.edu





UPCOMING EVENTS

- Tennessee Novel Endophyte Tall Fescue Renovation Workshop
  March 4, 2025 at 8:45 AM ET
- Live.Stock - Join us for our broadcast on March 12, 2025 at 2 PM ET

Details can found on UTBEEF.COM

Photo of the Month by Malerie Fancher: Our students Maggie Lindsey and Renan Cleto de Silva are doing setup by mixing substrate. Hands-on learning is a major component of research in the Pedreira lab.

This and other useful information can be found at your local UT Extension office, or on our website.

UTBEEF.COM

LIVE.STOCK companion

Volume 16: March 2025

MONTHLY TIP

March is a great time to check soil pH, which is a key indicator of the soil's chemical environment and nutrient availability. The optimal pH range for common Tennessee grasses is between 6.0 and 7.0, while legumes like alfalfa and clovers thrive best with a pH above 6.5. Keep in mind that adjusting soil pH takes time, lime requires moisture (rainfall) and can take up to a year to fully react. If your soil test indicates low pH, apply lime as soon as possible. Doing so now will improve soil conditions in time for fall seeding, ensuring a better environment for seedling establishment by September.

Check your soil, apply the correct lime rate, and give your pastures the best start. Maintaining the right pH ensures forage growth and long-term pasture health!

Dr. Bruno Pedreira
UT Extension Forage Specialist

"When you've finished changing, you're finished."

-Benjamin Franklin

RESEEDING STRATEGIES FOR HAY FEEDING AREAS

Dr. Bruno Pedreira, UT Extension Forage Specialist, Director of the UT Beef and Forage Center

After feeding hay during the winter, it is time to smooth and reseed hay feeding and heavy traffic areas. Bare soil can quickly become a hotspot for weeds and erosion. Lightly level the ground to prevent this, then run a cultipacker to improve soil-seed contact and ensure better establishment. If timing allows, reseed with oats or annual ryegrass in March. The best planting window is February 20 to April 1. Oats should be seeded at 100 to 150 lbs. per acre at a depth of 1 to 2 inches, while annual ryegrass needs 20 to 30 lbs. per acre and should not be planted deeper than ½ inch. If it's too late for cool-season forages, consider summer annuals like crabgrass, which thrive in hot summers and provide valuable forage when tall fescue goes dormant. To establish crabgrass, follow the same ground preparation steps, but drill 3 to 5 lbs. per acre for the best results. If you need to broadcast, do it at 5 lbs. per acre for better coverage. Investing time in pasture recovery now will improve forage availability, reduce erosion, and reduce weed pressure. Whether you plant cool-season or summer annuals, a well-managed pasture is more productive and resilient. Let's set the stage for a great grazing season ahead!

MANAGING PASTURE-ASSOCIATED LAMINITIS IN EQUIDS DURING SPRING

Dr. Jennie L.Z. Ivey, PhD, PAS, Associate Professor and Equine Extension Specialist

Spring is a high-risk season for pasture-associated laminitis in horses, ponies, donkeys and mules due to rapid grass growth and non-structural carbohydrates (NSCs) levels. Laminitis is a painful and potentially debilitating condition caused by inflammation of the laminae, a soft tissue in the hoof that connects the hoof wall to the coffin bone. Laminitis is often triggered by metabolic disturbances linked to diet. Certain equids are more prone to developing laminitis, particularly those with underlying metabolic issues. Equids with insulin resistance/dysregulation, Equine Metabolic Syndrome (EMS), or Pituitary Pars Intermedia Dysfunction (PPID)/Cushing's disease, and those with a history of laminitis are at highest risk. Native and easy-keeper breeds are also more susceptible due to their evolutionary adaptations to sparse forage. NSCs – comprising sugars, starches, and fructans – can spike in spring grasses. Forages with NSC levels above 10% are considered dangerous for sensitive animals. Early morning grass may contain lower NSCs, while afternoon and evening grass, after a day of photosynthesis, can be much higher. To protect at-risk equids, pasture grazing access must be carefully controlled.

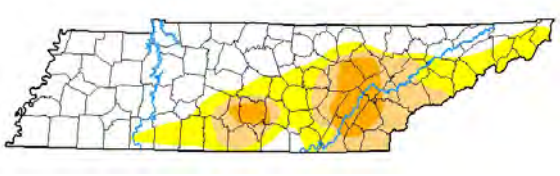
Strategies include:

- Limiting grazing time, especially during peak NSC periods (afternoon and evening).
- Using grazing muzzles to reduce intake.
- Dry lot turnout (non-grass paddocks) with low-NSC hay to eliminate pasture exposure.
- Monitoring body condition to prevent obesity.
- Regular exercise to improve insulin sensitivity.
- Testing pasture NSC content, if possible, to guide grazing decisions.

Veterinary oversight is crucial for animals with a history of laminitis or known metabolic issues. Preventive measures taken during spring can greatly reduce the risk of this serious condition and help maintain equine health throughout the grazing season. Contact your veterinarian, county Extension agent, or Equine Extension Specialist for more information.

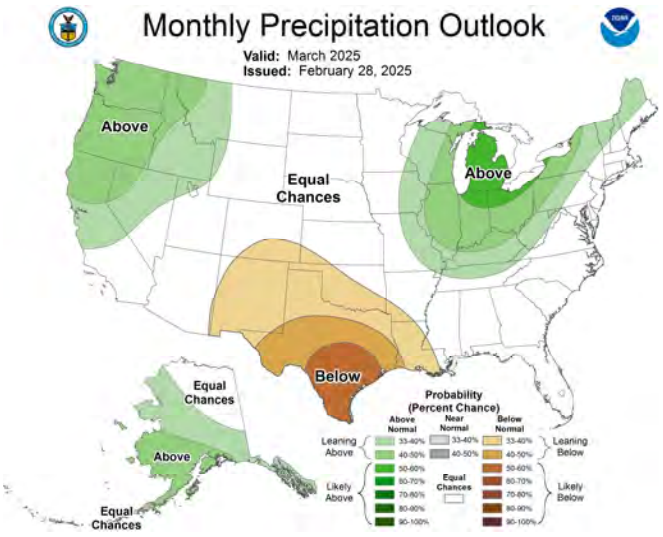
WEATHER

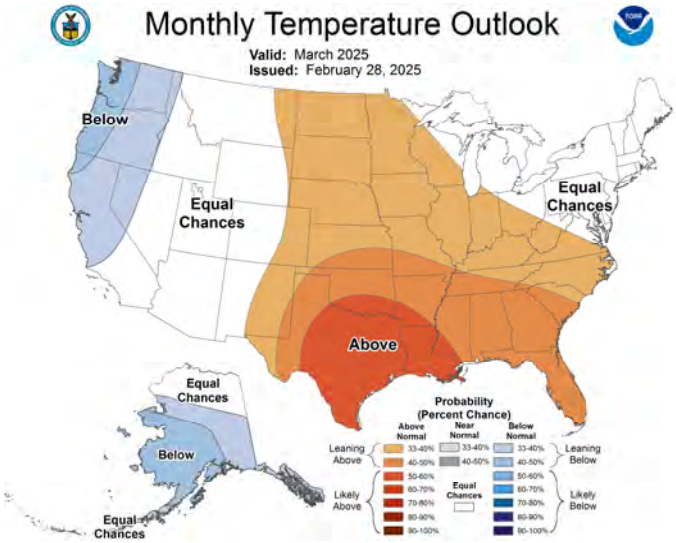
Dr. Bruno Pedreira, UT Extension Forage Specialist



February temperature averaged 4.2°F higher than the average, and rainfall was 2.3 inches below the 10-year average of 43.7°F with 6.7 inches of precipitation. ncei.noaa.gov

After recent rain, only 42% of Tennessee is still experiencing some level of drought (D0-D2), with no counties in D3 or D4. In Middle Tennessee, Bedford, Marshall, and Coffee counties are in severe drought (D2). In East Tennessee, D2 conditions now affect Morgan, Cumberland, Roane, Bledsoe, Rhea, Meigs, Hamilton, Monroe, McMinn, Bradley, and Loudon counties. March temperatures are expected to be above average statewide, with West Tennessee likely to be hotter than the East. Most of the northern part of the state has an above-average chance of precipitation, while the southern part has equal chances. droughtmonitor.unl.edu





UPCOMING EVENTS

- Live.Stock - Join us for our broadcast on April 9, 2025 at 2 PM ET
- Southeast Tennessee Beef Summit
  April 25, 2025 at 7:45 AM – 2 PM ET

  Details can found on UTBEEF.COM

Photo of the Month by Peter Bimmel: The Novel Endophyte Tall Fescue Renovation Workshop was held in Evansville, TN, through a partnership between the Alliance for Grassland Renewal and the UT Beef and Forage Center.

This and other useful information can be found at your local UT Extension office, or on our website.

UTBEEF.COM

LIVE.STOCK companion
Volume 17: April 2025

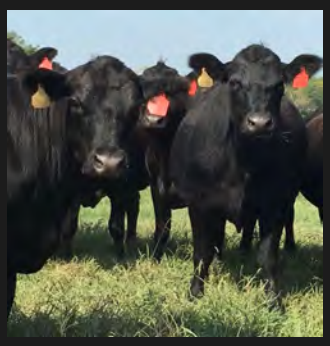
MONTHLY TIP

April is a key time to start planning for summer annual forages. Begin by assessing your pasture needs and determining if supplemental summer forage will be necessary. Keep in mind that tall fescue typically goes dormant during the hot, dry months. So having alternatives like crabgrass, sudangrass, or millet can help maintain or improve livestock performance.

It's also time to gear up for hay season. Before the first cutting, take time to inspect and service equipment. Check balers, mowers, and tedders to ensure everything's in working order. Make sure twine, net wrap, and other supplies are stocked and ready.

Good prep now can save time (and headaches) later. A strong start to the season leads to better forage and livestock production.

Dr. Bruno Pedreira
UT Extension Forage Specialist



"It takes grass to grow grass."

-Jim Gerrish

CARCASS COMPOSTING FOR BEGINNERS

Mr. Sawyer Main, Extension Assistant, Department of Animal Science
Dr. Shawn Hawkins, Associate Professor, Department of Biosystems Engineering and Soil Science
Dr. Jennie Ivey, Associate Professor, UT Extension Equine Specialist
Dr. Forbes Walker, Professor, Department of Biosystems Engineering and Soil Science

Composting is a practical, cost-effective method of large animal carcass disposal, particularly in agricultural settings. Static pile mortality composting is especially effective when proper materials and procedures are followed. Begin by selecting a slightly sloped site away from property lines. Step 1 involves laying a two-foot-thick base of carbon-rich material—sawdust, wood shavings, or utility woodchips work best. Step 2 is placing the carcass squarely in the center of the base, with all extremities at least two feet from the edge to allow for full coverage. Step 3 requires mounding another two feet of the carbon material over the carcass to shed rainfall and insulate the pile. It's important not to turn the pile, dismember or tie down the carcass, or "seed" the material with previously composted product—microbial activity will occur naturally. Once established, the pile should be left undisturbed except to maintain its shape. Elevated internal temperatures (typically 130 -160°F) indicate active decomposition and pathogen destruction. With wood-based amendments, the process is largely complete in about six months, resulting in a stable, humus-like product that can be safely applied to land. This method not only meets regulatory and environmental standards but also offers a cost-effective and low-maintenance solution for managing livestock mortality.

MANAGED GRAZING

Dr. Katie Mason, Assistant Professor, UT Extension Beef Cattle Nutrition Specialist

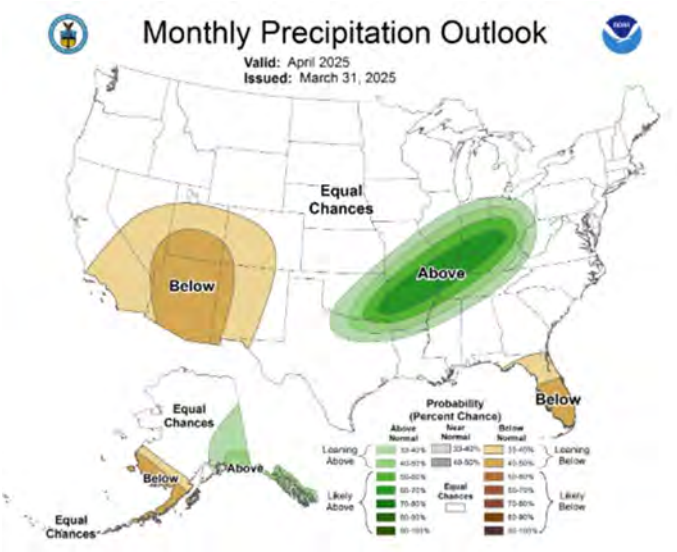
There are many factors that influence grazing management decisions. Some objectives to consider when managing grazing are optimal forage production, efficient utilization, plant persistence, and desired animal performance. The grazier makes decisions based on these objectives, while also considering external factors like time and labor availability, land availability, and weather conditions. Flexibility is key – no one approach will work on all farms, nor does one approach work for different seasons. Grazing intensity is likely the most important of the grazing management tools that we have. It relates to the severity of grazing, or in different terms, stocking rate: the relationship between animal weight and amount of forage available. When balancing stocking rate, it is important to target an optimal level of output for both the animal and the acreage. Grazing frequency is essentially the method used to graze, such as continuous or rotational. Selecting the method gives the grazier a way to fine-tune the grazing system, but it is still most important to focus on grazing intensity as this will have the most impact on plant persistence. Stocking methods may depend on resources such as water supply, fencing, and labor availability. Timing of grazing relates to the growth stage of the plant or amount of carbohydrate reserves available in a plant's roots. Properly timed grazing ensures plant recovery and long-term productivity. While there is no universal grazing strategy, understanding and applying these principles helps graziers navigate the balance between science and intuition, leading to more productive and sustainable systems.

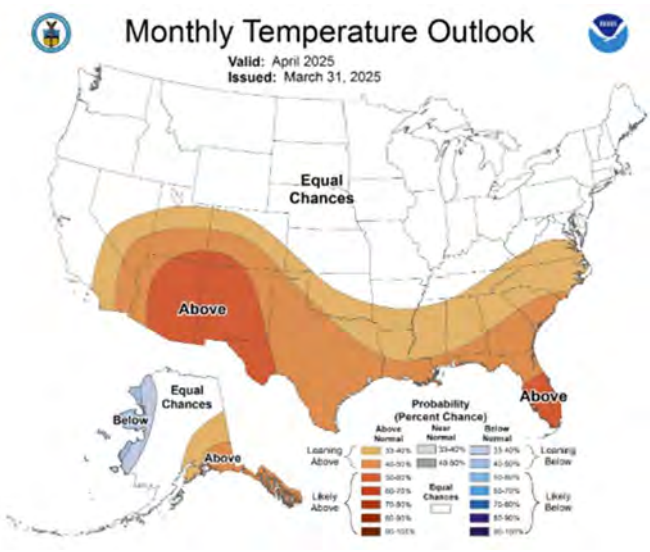
WEATHER

Dr. Bruno Pedreira, UT Extension Forage Specialist

March temperature averaged 1.7°F higher than the average, and rainfall was 0.80 inches below the 10-year average of 51.4°F with 5.8 inches of precipitation. ncei.noaa.gov

After months of dry soil, March finally brought the rain we had been hoping for. As of March 31st, 96% of the state is officially out of drought, a major boost for spring planting and pasture recovery. A few areas in the northeast are still hanging on to dryness. Johnson and Carter Counties remain in moderate drought (D1), while Sullivan, Washington, and Unicoi Counties are listed as abnormally dry (D0). So, while most of the state is in better shape, that corner still needs a bit more moisture. Looking ahead, May is expected to bring above-average temperatures across East Tennessee. Rainfall chances are looking better than normal for most of the state—though unfortunately, the areas that need it most in the northeast may miss out a bit. Here's hoping those skies stay generous and the growing season gets off to a strong start. droughtmonitor.unl.edu





UPCOMING EVENTS

- Southeast Tennessee Beef Summit
  April 25, 2025 at 7:45 AM - 2 PM ET
- Live.Stock - Join us for our broadcast on
  May 14, 2025 at 2 PM ET

Details can be found on UTBEEF.COM

Photo of the Month by Dr. Bruno Pedreira: University of Tennessee Researchers and Extension Specialists visiting Kapiti Research Farm in Kenya.

This and other useful information can be found at your local UT Extension office, or on our website.

UTBEEF.COM

LIVE.STOCK companion

Volume 18: May 2025

MONTHLY TIP

May has been a tough month for hay producers. With many fields now past the boot stage, forage quality is at risk. When sunny days aren't available for hay production, baleage becomes an alternative. Baleage involves cutting the forage, letting it wilt until it reaches about 40–60% dry matter, baling it tightly, and wrapping it right away. When making baleage, it's important to wrap the bales properly using bale wrapping equipment with 5 to 6 layers of plastic. This prevents oxygen from getting inside the bale, creating the anaerobic environment needed for fermentation. Skimping on the plastic and using fewer than 4 layers might save you money at first, but it can compromise the fermentation process and cause you to lose your forage.

Once wrapped, protect the bales from cattle and wildlife. Any holes in the plastic can let oxygen in, which can spoil the fermentation. So, if you find any holes, patch them as soon as you can to keep the baleage in good shape. However, remember that baleage has less flexibility for moving it around before feeding, so think through your storage and feeding logistics ahead of time.

Dr. Bruno Pedreira
UT Extension Forage Specialist

BEEF & FORAGE CENTER

"The days grow longer and the sun shines brighter, a sure sign that summer is on its way."

- Anonymous

THE TENNESSEE MASTER FORAGE PROGRAM

Dr. Bruno Pedreira, UT Extension Forage Specialist, Director of the Beef and Forage Center

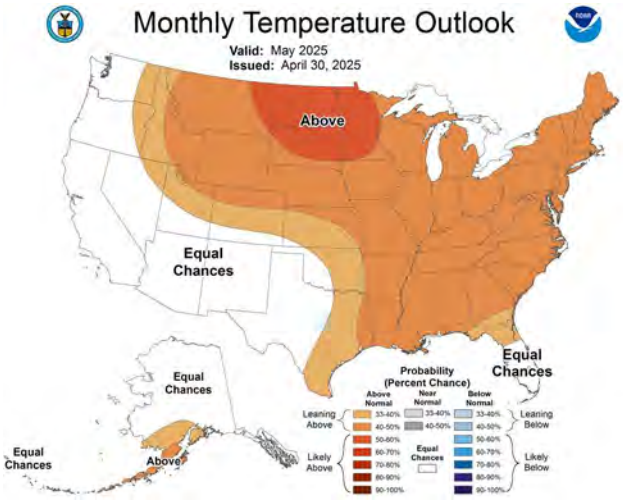
For Tennessee producers, good forage isn't just a seasonal concern, it's a year-round priority in all 95 counties. That's why we're excited to share that the Tennessee Master Forage Program is now available statewide. A practical program that works for everyone, from folks just getting started to experienced forage producers looking to sharpen their skills. This program isn't just a class, it is a producer-driven course featuring lectures from leading experts who will share insights into forage-livestock systems across different regions, including innovative practices and solutions from Tennessee and beyond. It covers everything from the basics of soil and plant health to more advanced topics like fertility programs, alternative nitrogen sources, forage quality, grazing strategies, weed control, silvopasture, storage techniques, and the economics behind good forage decisions. There are two ways to take part in the program: a 100% online or a hybrid option, which includes credits to be completed online and one in-person on-farm Forage Tour. These tours offer valuable hands-on learning through pasture walks, demonstrations, and real-world conversations about what's working in the field. Regardless of your choice, online or hybrid, monthly online meetings provide opportunities to ask questions and engage with other participants. Completing the Master Forage Program not only improves your forage management but also makes you eligible for the Tennessee Ag Enhancement Program (TAEP) cost-share. Sign up is through your local Extension office or via the UT Ag Store. More information at: https://utbeef.tennessee.edu/tennessee-master-forage-program/. We hope to see you at one of our online sessions or during an upcoming Forage Tours!

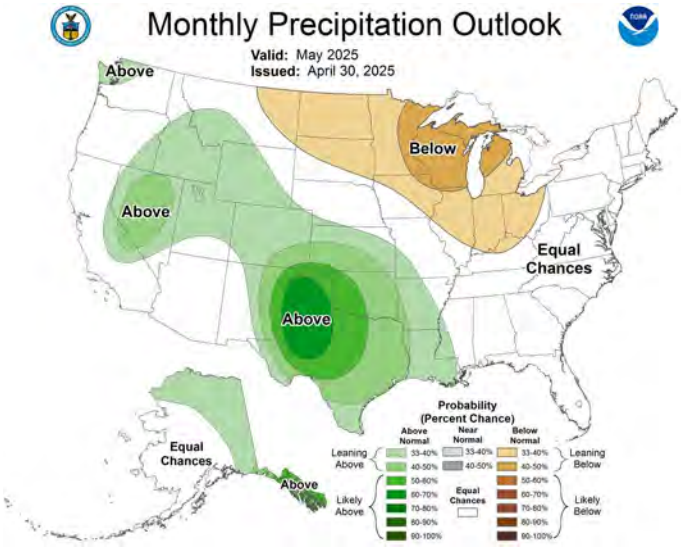
WEATHER

Dr. Bruno Pedreira, UT Extension Forage Specialist

April temperature averaged 3.5°F higher than the average, and rainfall was 1.72 inches above the 10-year average of 58.5°F, with 5.15 inches of precipitation. ncei.noaa.gov

Temperatures are expected to remain above average across Tennessee in May. While precipitation chances are near normal, it's been a rainy month so far. This is great for greening up pastures, but difficult for making hay. According to the latest drought monitor, only Johnson and Carter counties are experiencing moderate drought (D1), while Hawkins, Hancock, Grainger, Hamblen, and Jefferson counties are classified as abnormally dry (D0). For the rest of the state, soil moisture is not a problem. droughtmonitor.unl.edu





TENNESSEE BEEF HEIFER DEVELOPMENT PROGRAM UPDATE

Dr. Saulo Zoca, Assistant Professor, UT Extension Beef Cattle Reproduction Specialist

The Middle Tennessee AgResearch and Education Center at Lewisburg is proud to host two signature events that reflect the state's growing leadership in beef cattle production. On May 22, the Tennessee Beef Heifer Development Field Day will bring together producers, students, and industry professionals for a full day of education, including sessions on pasture improvement, genomic selection, and market readiness. On May 23, the 2nd Annual Bred Heifer Sale will feature approximately 80 high-quality bred heifers developed through the Tennessee Beef Heifer Development Program - animals bred through artificial insemination and natural service, with expected calving dates from August to November, offered in uniform groups ready for the herd. With historically strong cattle markets and the early signs of national herd rebuilding underway, this year's sale presents a timely opportunity for producers to invest in genetically superior, reproductively sound females raised in a structured, science-based environment. The Tennessee Beef Heifer Development Program is designed to enhance productivity, longevity, and profitability by focusing on health, nutrition, and genetics, making it an ideal resource for producers looking to build back stronger. Those interested in consigning heifers for the 2025–2026 class are encouraged to contact program coordinators and take part in the next cycle of this impactful and growing initiative.

UPCOMING EVENTS

- Live.Stock - Join us for our broadcast - June 11 at 2 PM ET
- Tennessee Beef Heifer Development Field Day – May 22 at 8 AM–3 PM CT
- 2nd Annual TBHDP Bred Heifer Sale – May 23 at 1 PM CT
- Tobacco, Beef, and More Field Day – June 26 at 8 AM–3 PM CT

Details can found on UTBEEF.COM

Photo of the Month by Ken Goddard: Dr. Fred Allen and Dr. Bruno Pedreira discuss the Native Warm-Season Grass Breeding Program at ETREC, Knoxville, TN.

This and other useful information can be found at your local UT Extension office or on UTBEEF.COM

BEEF & FORAGE CENTER

LIVE.STOCK companion

Volume 19: June 2025

MONTHLY TIP

Poison Hemlock (Conium maculatum) is a dangerous weed that's poisonous to cattle. If animals eat it — whether fresh in the pasture or dried in hay — it can make them very sick or even kill them. The poison stays in the plant even after it's been cut, dried, and stored, so hay with hemlock in it is still a risk.

One of the big problems with poison hemlock is that it looks a lot like Queen Anne's lace (Daucus carota), a harmless wildflower. Both have white, umbrella-shaped flower heads. But poison hemlock has purple spots on its hollow stems, and it can grow up to 8 feet tall with many branches. It usually shows up in late spring.

If you find poison hemlock in your hayfield or pasture, don't bale or feed hay from that area, even if it's been dried — it's still toxic.

To control it, spray with 18–20 ounces of DuraCor herbicide. You'll get the best results if you spray early in the bloom stage, before the plant goes to seed.

Dr. Bruno Pedreira
UT Extension Forage Specialist

BEEF & FORAGE CENTER

"Agriculture is our wisest pursuit, because it will in the end contribute most to real wealth, good morals, and happiness."

- Thomas Jefferson

USDA SCIENTIFIC EXCHANGE PROGRAM RECIPROCAL VISIT RECAP

Malerie Fancher, Research Specialist, UT Beef and Forage Center

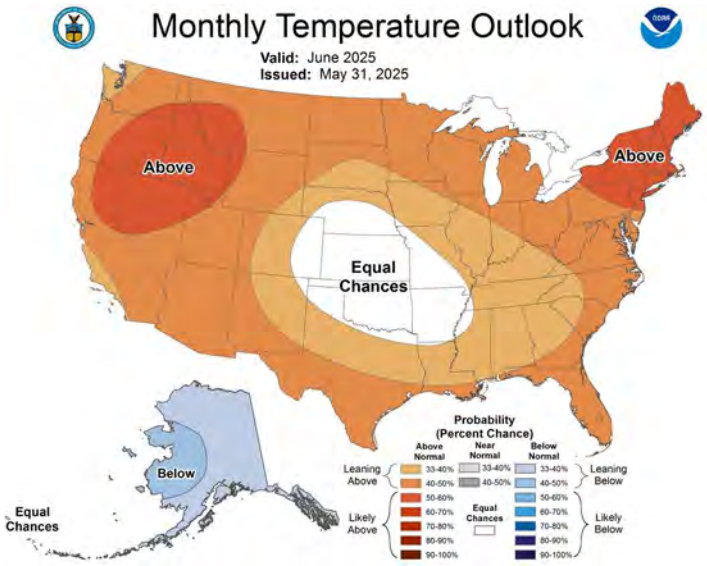
In 2024, Dr. Bruno Pedreira, alongside staff within the UT beef and Forage Center, had the opportunity to host and mentor two faculty from Algeria as scientific exchange fellows for ten weeks. During those ten weeks, both exchange fellows were involved in a variety of different experiences, including forage analysis using Near-Infrared Reflectance Spectroscopy, greenhouse trial experimentation using Plant Growth Promoting Rhizobacteria, and interactions with producers and stakeholders during several UT Extension programs, field days, and outreach events. In May, five UTIA faculty and staff participated in reciprocal visits to Algeria and Morocco. Reciprocal visits are a crucial part of the USDA Scientific Exchange Program to better understand what scientific advancements can be contributed to international collaboration. While in Algeria and Morocco, workshops were conducted to learn more about INRAA and INRA research programs. The UTIA team also spoke about their respective programs to a variety of faculty and staff at each research institute. In all, this trip was a vital component of the Scientific Exchange Program to gain a better understanding of how each fellow can not only have a better impact on their own research programs but positively impact producer knowledge and efficiency through scientific findings.

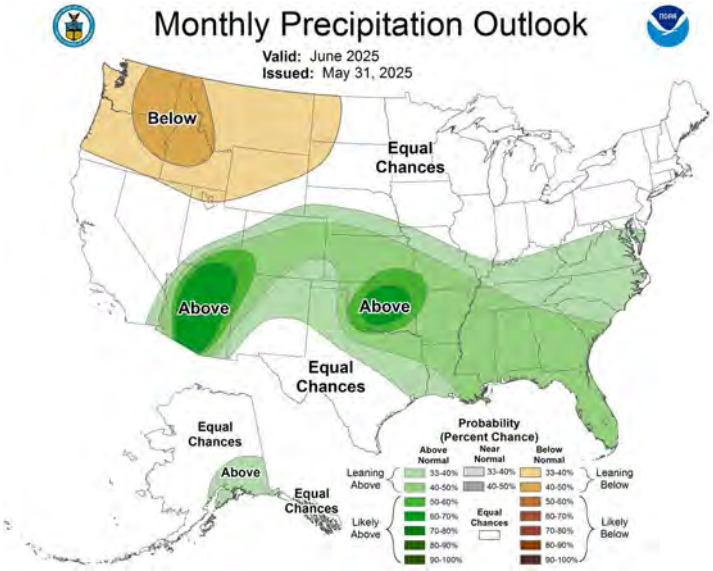
WEATHER

Dr. Bruno Pedreira, UT Extension Forage Specialist

May temperature was 0.9°F below, and rainfall was 2.01 inches above the 10-year average of 67.4°F, with 4.94 inches of precipitation, respectively. ncei.noaa.gov

It's looking like June will stay warmer and wetter than usual across Tennessee, with the western part of the state getting the most rain. All the moisture has made it tough to get hay up, but on the bright side, pastures are about as green as we've seen in a while. Hay quality's taking a hit as most fields were cut late, past the boot stage, with a lot of seed heads showing. On the upside, soil moisture is in good shape. There's no drought reported in any county across the state. droughtmonitor.unl.edu





UT BULL TEST: DRIVING GENETIC PROGRESS FOR TENNESSEE CATTLE PRODUCERS

Dr. Saulo Zoca, Assistant Professor, UT Extension Beef Cattle Reproduction Specialist

The University of Tennessee Bull Development and Evaluation Program, widely known as the UT Bull Test, offers seedstock producers a respected platform to develop and showcase high-quality bulls backed by science and performance data. Held at the Middle Tennessee AgResearch and Education Center in Lewisburg, the program evaluates bulls for growth, structural soundness, fertility, and carcass merit. Through a standardized development period and the use of genomic-enhanced expected progeny differences (EPDs), the UT Bull Test gives both consignors and buyers confidence in a bull's potential to improve herd productivity and profitability. Bulls must meet strict health, age, and weight requirements to qualify, and only the highest-quality animals are selected for the final sale. Each bull undergoes a breeding soundness exam and ultrasound carcass evaluation, equipping buyers with the tools to make informed, data-driven decisions. The UT Bull Test continues to serve as a reliable source of information for commercial producers seeking genetically superior sires. Consignors benefit from a structured environment that highlights their breeding programs and adds credibility to their genetics. The nomination deadline for the 2025 test is June 23, 2025 and the sale will take place on December 11, 2025. Space is limited to 80 bulls, and early nomination is encouraged to allow time for eligibility review and planning. For producers looking to invest in performance-tested bulls or market their top prospects, the UT Bull Test remains a trusted resource for advancing Tennessee cattle operations.

UPCOMING EVENTS

- Live.Stock - Join us for our broadcast - July 9 at 2 PM ET
- Tobacco, Beef, and More Field Day – June 26 at 8 AM–3 PM CT
- Tennessee 4-H State Beef Exposition – July 10-12

Details can found on UTBEEF.COM

Photo of the Month by Dr. Bruno Pedreira:
Hurricane Helene came with devastating effects, but we are fortunate establish trials in affected hayfields to learn more about changing production systems.

This and other useful information can be found at your local UT Extension office or on UTBEEF.COM

BEEF & FORAGE CENTER

LIVE.STOCK companion

Volume 20: July 2025

MONTHLY TIP

Listen on Spotify

Exciting News!

The Live.Stock Podcast, sponsored by the University of Tennessee Beef and Forage Center, is now streaming on Spotify! Tune in for deep dives into the latest ideas and innovations within the beef and forage industries.

Whether you're an experienced producer, or just curious about agriculture, Live.Stock brings expert interviews, real-world stories, and actionable insights from researchers, subject specialists, and industry leaders straight to your ears.

Subscribe today by searching for "Live.Stock" on Spotify and never miss an episode. Join the growing community of listeners shaping the future of livestock and agriculture, one conversation at a time.

Follow, share, and stay connected with Live.Stock wherever your curiosity takes you!

Malerie Fancher
Research Specialist
UT Beef and Forage Center

BEEF & FORAGE CENTER

"Beef. It's What's for Dinner."

- National Cattlemen's Beef Association

JULY IS BEEF MONTH IN TENNESSEE

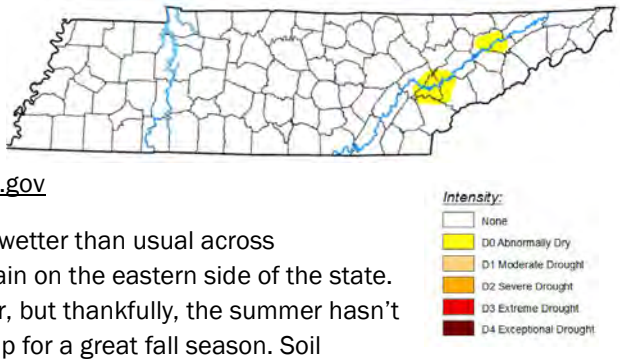
Dr. Katie Mason, UT Extension Beef Cattle Nutrition Specialist

Cattle play a crucial role in the agricultural economy in Tennessee, with beef being the state's second highest-grossing farm commodity. Currently, Tennessee is home to about 1.6 million head of cattle, and it ranks 9th in the nation for total number of cattle farms and 16th in cattle numbers. And of course, beef cattle have the "superpower" of turning forages into high quality protein for humans!

Beef has many essential vitamins and minerals, such as B12 and iron, to support a healthy diet. A 3-ounce serving of beef provides about 25 grams of protein, but the greater concentration of iron and zinc compared to chicken makes it a nutritional powerhouse! Aside from its nutritional benefits, it's just plain tasty! The Tennessee Beef Industry Council provides a wealth of information, like recipes, cooking tips, and stories of local beef producers. You can find out more about preparing juicy steaks and delicious burgers at www.tnbeef.org/recipes. Tennessee Agriculture Commissioner Charlie Hatcher, DVM, said it best in a recent article about beef month: "Our cattle producers are the backbone of Tennessee agriculture. The beef industry supplies high-quality, nutrient-rich food, supports jobs, promotes soil conservation, and helps fuel our state's economy. We're proud to celebrate Beef Month and recognize the hard work and dedication of the men and women who make it possible.

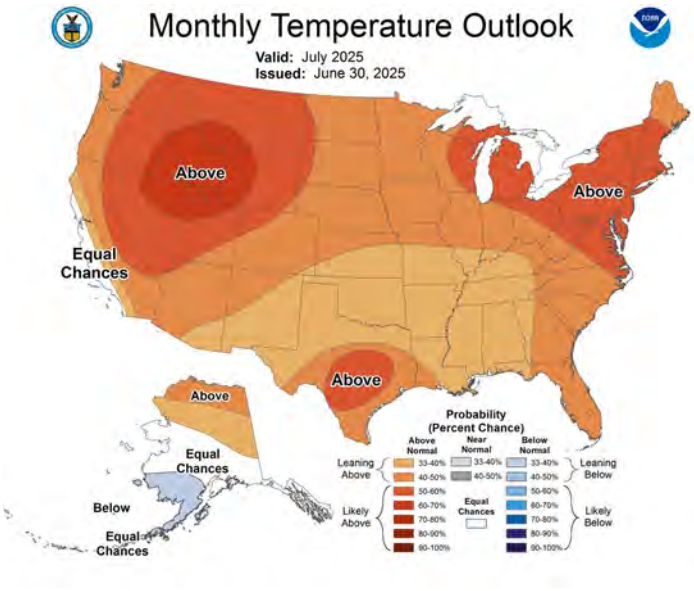
WEATHER

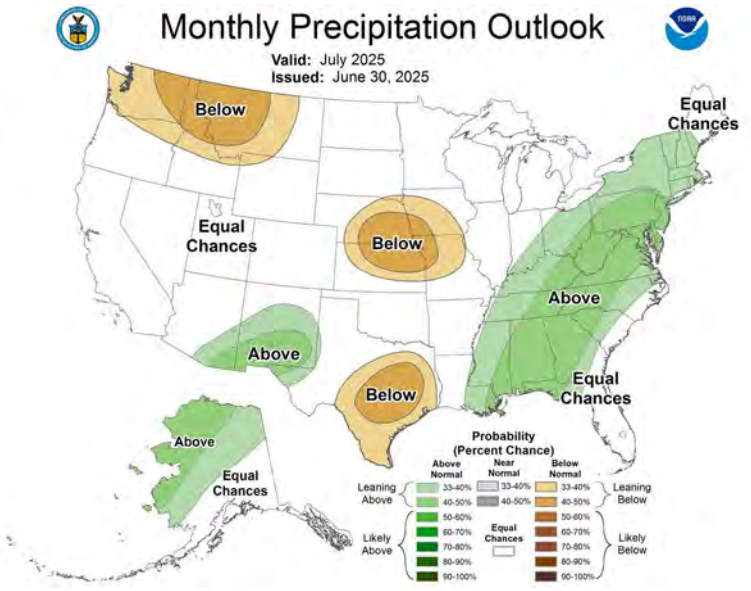
Dr. Bruno Pedreira, Director of the Beef & Forage Center



June temperature was 0.98°F above, and rainfall was 1.6 inches below the 10-year average of 74.6°F, with 4.28 inches of precipitation, respectively. ncei.noaa.gov

July is shaping up to be warmer and wetter than usual across Tennessee, with higher chances of rain on the eastern side of the state. Most hayfields were cut late this year, but thankfully, the summer hasn't been dry at all, hopefully setting us up for a great fall season. Soil moisture is holding up well in most of Tennessee. However, parts of Loudon, Blount, Roane, Knox, Monroe, Grainger, and Hamblen counties are currently classified as D0 (Abnormally Dry). droughtmonitor.unl.edu





MANAGING BROOMSEDGE IN COOL-SEASON FORAGES

Dr. Bruno Pedreira, Director of the Beef & Forage Center

Broomsedge is a warm-season perennial grass increasingly seen in pastures and hayfields in Tennessee. While not a sign of bad luck, its presence is a clear indicator of poor soil fertility, especially low pH, phosphorus, and potassium, and weak forage stands due to overgrazing or improper mowing. Broomsedge thrives in acidic, nutrient-depleted soils and outcompetes desirable cool-season grasses like tall fescue and orchardgrass when they are stressed. Since there are no selective herbicides that target broomsedge without harming forages, an integrated, multi-year approach is needed.

1. **Start with Soil Fertility:** The most important step is taking a soil test and correcting pH and nutrient deficiencies. Apply lime to raise soil pH above 6.0 and fertilize as needed. A vigorous stand of tall fescue can eventually outcompete broomsedge with consistent fertilization over 3–5 years.
2. **Maintain Adequate Stubble Height:** Avoid grazing or mowing below 3–4 inches to protect the plant's energy reserves and promote regrowth. Strong regrowth helps the forage stand compete more effectively against weeds.
3. **Strategic Mowing:** Mow broomsedge during summer while tall fescue is dormant. Timely mowing (around July and August) reduces seed production and weakens the broomsedge.
4. **Reseed If Needed:** If less than 50% of the desirable forage remains, consider full renovation with herbicide and fall reseeding. For moderate infestations, overseeding can help thicken the stand.
5. **Use a Weed Wiper:** When broomsedge stands taller than the forage, a rope wick applicator can be used to apply herbicide selectively, minimizing damage to the pasture.

With proper pasture management, broomsedge infestations can be significantly reduced, restoring productivity to pastures over time.

UPCOMING EVENTS

- Live.Stock - Join us for our broadcast - August 13 at 2 PM ET
- Hurricane Helene Flood Recovery Initiative Field Day - August 20 at 9 AM ET – 3 PM ET
- Steak and Potatoes Field Day - August 21 at 8 AM CT

Details can be found on UTBEEF.COM

Photo of the Month by Brie McLerran:
Farm visits are a vital part of the Extension system. Through hands-on learning, Dr. Pedreira provides future researchers and Extension educators with real-world, on-farm experiences that help them develop sustainable solutions.

This and other useful information can be found at your local UT Extension office or on UTBEEF.COM

BEEF & FORAGE CENTER

LIVE.STOCK companion

Volume 21: August 2025

MONTHLY TIP

Stockpiling forages such as tall fescue and orchardgrass is a smart and cost-effective way to reduce hay expenses and extend the grazing season here in Tennessee. These cool-season grasses will continue to grow well into the fall and can maintain good quality even as they mature.

To make the most of this practice, wait for a good rain, then fertilize selected pastures with up to 150 lb of urea per acre. Keep livestock off these areas until after the first frost to allow maximum growth and nutrient storage. Before fertilizing, clip old growth or weeds to encourage fresh, leafy regrowth.

Pastures that contain legumes are especially valuable because legumes naturally fix nitrogen in the soil and provide a higher protein forage. To avoid trampling and waste, consider using rotational or strip grazing, along with temporary fencing, for better control and efficiency. Weather plays a major role in success, so be sure to check the temperature and precipitation outlook on page two of this newsletter before making final plans.

Dr. Bruno Pedreira
UT Extension Forage Specialist
Beef and Forage Center Director

BEEF & FORAGE CENTER

"Rooted in tradition, growing with purpose."

- Anonymous

FARMING POST-FLOOD

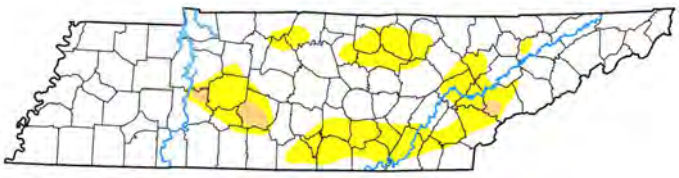
Dr. Forbes Walker, Professor, UT Extension Environmental Soil Science Specialist

On September 26, 2024, Hurricane Helene made landfall in Florida, as a Category 4 hurricane. Hurricane Helene then headed north, through Georgia, North Carolina, South Carolina, Tennessee, and Virginia. By the time Helene hit Tennessee on September 27, it was a tropical storm. Much of the damage in Tennessee was the result of record rainfall in the mountains of western North Carolina that resulted in flooding in some areas that had not been seen in hundreds of years. Many farms lost topsoil on their most productive fields, others had large deposits of sediment burying what was once productive hay and pasture fields, row crop fields or vegetable fields. In many cases trees that once protected the riverbanks from erosion were knocked down. Damage to farms across an eight-county area in East Tennessee is estimated to be over $1 billion. Since October 2024, a team of scientists from the University of Tennessee Institute of Agriculture has been working to assist farmers across the flood impacted areas. The team has collected sediments from across the region. Sediments have been tested for plant nutrients, as well as contaminants. Germination tests and greenhouse studies were conducted to determine how to re-establish forages and other crops on the flood impacted fields. This summer research plots and demonstrations were established to evaluate strategies for restoring fields and protecting the streambanks. The field day on August 20 will showcase what has been learned so far and discuss strategies that will be tested in the future.

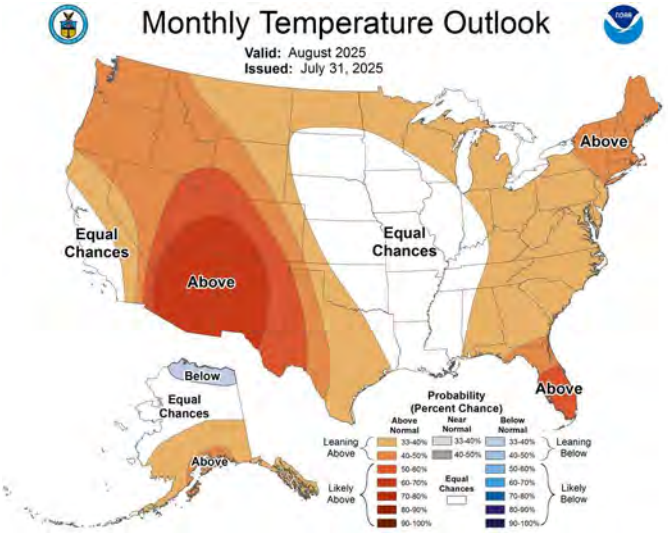
WEATHER

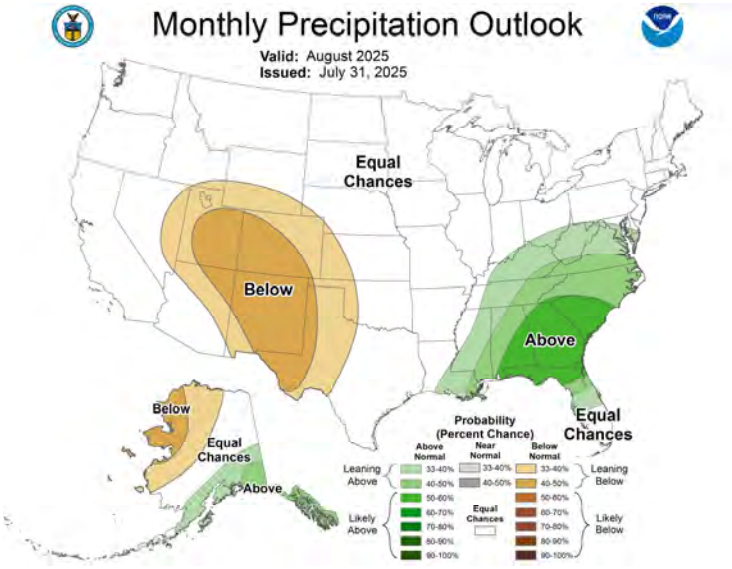
Dr. Bruno Pedreira, UT Extension Forage Specialist

July temperature was 1.9°F above, and rainfall was 1.96 inches below the 10-year average of 78.6°F, with 5.02 inches of precipitation, respectively. ncei.noaa.gov



August still looks to be warm and mostly wet. The forecast shows above-average temperatures for the eastern half of Tennessee, and above-average rainfall for most of the state, except for a few counties along the western border. Currently, about 20% of the state is in D0 (abnormally dry) conditions, and 1.3% is in D1 (moderate drought). Hopefully, with the current August forecast, we can keep our pastures green in Tennessee for a few more weeks. droughtmonitor.unl.edu





TAKE WEIGHTS!

Dr. Troy Rowan, Assistant Professor, UT Extension Beef Cattle Genetics Specialist

As we approach weaning time for our spring-calving herds, it's important to remember one crucial step: to weigh both your calves and your cows. Good managers in any business know we can't improve what we don't measure, and for most Tennessee herds, capturing performance at this point in the production cycle is critical. Recording weights gives us a clear picture of how our management and breeding decisions are playing out. An increase in herd average weaning weight may confirm that a recent bull purchase was a good investment or that a new grazing strategy is paying off. On the other hand, a calf with an unusually low weight may point to a cow with production issues who needs to be culled. While individual weights will vary, herd averages provide a reliable way to track progress year after year. Weighing cows is almost as important as weighing calves. Larger cows have higher maintenance requirements, needing more feed and forage to sustain their body weight. Across the industry, mature cow size has steadily increased due to selection for heavier weaning, yearling, and carcass weights. But those extra pounds come with a cost: higher feed demand that can offset the added revenue from heavier calves. One of the best measures of cow efficiency is how close she comes to weaning half of her body weight. It's far easier for a 1,200 lb cow to wean a 600 lb calf than it is for an 1,800 lb cow to wean a 900 lb calf.

So, let this be your annual reminder: take, record, and use both calf and cow weights at weaning!

UPCOMING EVENTS

- Live.Stock - Join us for our broadcast - September 10 at 2 PM ET
- Steak and Potatoes Field Day - August 21 at 8 AM CT

Details can found on UTBEEF.COM

Photo of the Month by Malerie Fancher, The Tennessee Master Forage Program kicked off its Western Region tours in McNairy County. We had great discussions covering a variety of forage management topics.

This and other useful information can be found at your local UT Extension office or on UTBEEF.COM

BEEF & FORAGE CENTER

LIVE.STOCK companion

Volume 22: September 2025

MONTHLY TIP

Check Seed Depth:

As planting season kicks off, don't forget the importance of seed depth. It's a common mistake to assume a drill is calibrated just because it worked last year, or because a neighbor used it. But every pasture is different, and soil texture plays a big role.

For most of cool-season forages, we want seeds placed about ¼ to ½ inch deep. A drill set up for heavier clay soils may cut too deep when moved to a sandy field, where there's less structure to hold it. That can leave seeds buried too far to germinate well.

The fix is simple: each time you move to a new pasture, run the drill a few feet, stop, and check the seed depth. Adjust as needed. Remember, seeds don't need to be buried, just tucked at the right depth for strong emergence.

For more information in seed depth please check our Forage and Field Crops Seeding Guide for Tennessee.

Dr. Bruno Pedreira
UT Extension Forage Specialist
UT Beef and Forage Center Director

BEEF & FORAGE CENTER

"What a great day for football, all we need is some green grass and a ball."

- Anonymous

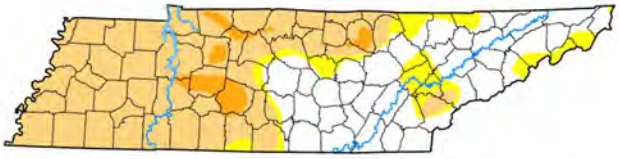
TIME TO PLANT COOL-SEASON FORAGES

Dr. Bruno Pedreira, Center Director | UT Extension Forage Specialist

September marks the start of planting season for cool-season forages. Many areas are still under drought conditions, so waiting a few days for rain before planting may not be a bad idea. Once soil fertility has been addressed, soil moisture will be the main factor driving successful pasture establishment. For most cool-season forages, such as tall fescue, the ideal planting window runs through October 1. Every year we ask ourselves if planting can be delayed—especially in dry years—but on average, October 1 is the cutoff. The reason is simple: we need enough time for seeds to germinate and seedlings to grow strong before the first frost arrives. The later we plant after October 1, the greater the risk that frost will hit seedlings at an earlier, more vulnerable stage, compromising pasture establishment. Some years we may not see frost until December, while other years it can arrive much earlier. That uncertainty is part of our open-sky farming gamble. The key takeaway: aim to get seeds in the ground by October 1 whenever possible. Giving your forages a head start now will help them withstand the challenges of fall and winter, setting the stage for a strong pasture in the seasons ahead.

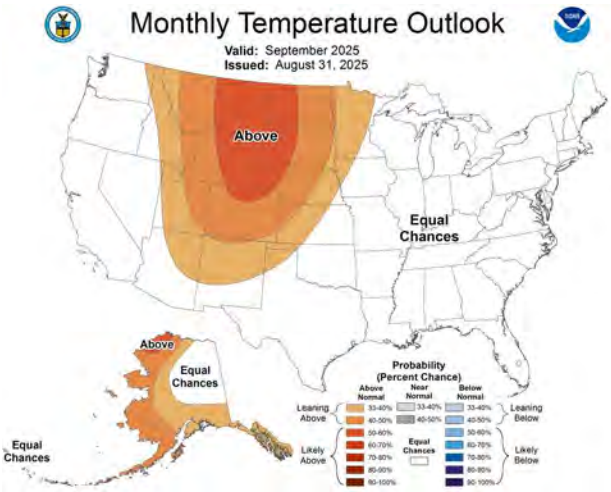
WEATHER

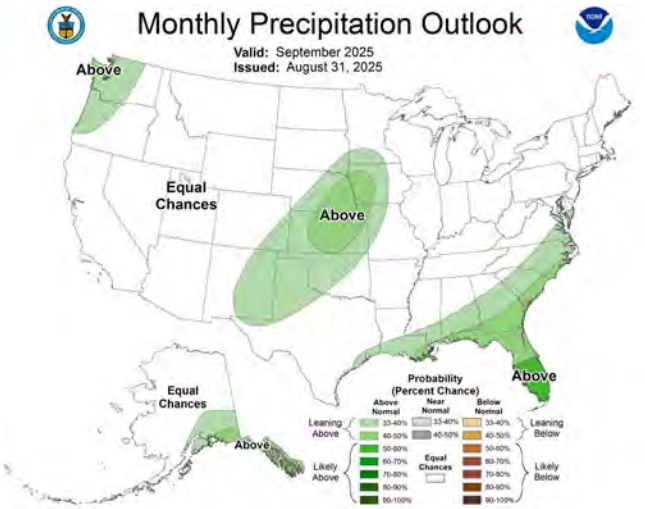
Dr. Bruno Pedreira, Center Director | UT Extension Forage Specialist



August precipitation totaled 1.25 inches, which is 3.5 inches below the 10-year average of 4.7 inches. The average temperature was 76.7°F, just slightly above the 10-year average of 76.4°F. ncei.noaa.gov

Even though August started with no drought reported, by the end of the month about 64% of Tennessee was under some level of drought. That lines up with what many of you are seeing in pastures turning brown and slow regrowth. The September outlook shows equal chances for both temperature and rainfall, which typically points to near-average precipitation. Over the past 10 years, September rainfall has averaged 3.75 inches, but it has ranged widely—from just 0.5 inches in 2019 to 7.41 inches in 2024. If the rains come, it will be a great chance to stockpile forage and move forward with pasture renovation. If they don't, it may be another year where we have to be flexible and manage around limited growth. droughtmonitor.unl.edu





WINTER HAY PLANNING: A COMPLETE GUIDE FOR HORSE OWNERS

Dr. Jennie Ivey, Associate Professor, UT Extension Equine Specialist

When the pastures go dormant and temperatures drop, hay becomes the cornerstone of a horse's diet. Planning ahead is the best way to ensure your horses stay healthy and your hay supply lasts until spring. But proper hay planning involves more than just estimating how much your horses will eat—it requires understanding the many variables that affect consumption and having buffers in place for the unexpected. On average, horses consume 2–2.5% of their body weight in forage daily. For a 1,000-lb horse, that's 20–25 pounds per day or roughly 1.1–1.9 tons over a five-month winter. However, these numbers can shift based on age, body condition, workload, and hay quality. While the 1.5-2.5% body weight rule provides a good baseline, individual horses can vary considerably in their hay consumption. Age plays a significant role: older horses may need higher quality hay or may consume less if they have dental issues that make chewing difficult. Young, growing horses often eat toward the higher end of the range. Body condition and metabolism also matter. "Easy keepers" who maintain weight readily might consume less hay, while "hard keepers" who struggle to maintain condition may need more forage to meet their energy requirements. Finally, remember that hay supplies the bulk of calories and fiber in the winter diet, but may not meet all needs. Most hay is sufficient for maintaining mature horses in light work, but growing horses, pregnant or lactating mares, and horses in regular work often need additional protein, vitamins, and minerals. Adding appropriate concentrates or supplements can help balance the diet and may reduce the total volume of hay needed if the concentrates provide significant calories. However, horses should always receive most of their nutrition from forage sources, as this supports proper digestive health and natural feeding behaviors. A forage test remains the best way to know exactly what's in your hay and identify any nutritional gaps that need addressing through supplementation. With thoughtful planning that accounts for all these variables, you can ensure your horses maintain good health and body condition throughout the winter months while avoiding the stress and expense of running short on hay when prices are highest and availability is most limited.

UPCOMING EVENTS

- 2025 Precision Livestock Farming: Beef and Forage Systems Field Day
  - September 23 & 24 at 8 AM – 3 PM CT
- Live.Stock - Join us for our broadcast
  - October 8 at 2 PM ET

Details can be found on UTBEEF.COM

Photo of the Month by Malerie Fancher:
Dr. Bruno Pedreira and Malerie had the opportunity to meet and interact with several new county Extension agents at the annual New ANR Agent In-Service hosted by UT Extension. Dr. Pedreira discussed the importance of understanding forage quality. We are excited to see the success of these agents in their home county!

This and other useful information can be found at your local UT Extension office or on UTBEEF.COM.

LIVE.STOCK companion

Volume 23: October 2025

MONTHLY TIP

Join us for TFGC 2025!

The Tennessee Forage and Grassland Council (TFGC) is pleased to invite you to our Annual Meeting on Friday, November 7th, 2025, beginning at 8:30 AM (CT) at the Lane Agri-Park Auditorium.

This year's keynote speaker will be Dr. Bronc Finch, Soil Fertility Extension Specialist from the University of Arkansas. Dr. Finch will share valuable insights on "Connecting Soil Health and Soil Fertility in Forage Systems."

Please make sure to pre-register for the annual meeting by using tiny.utk.edu/TFGC. This will help with lunch preparation! You may pay online or when you arrive at the door. Also, in-person registration will be available at the event but send us a quick note to expect your presence!

Email: utbeef@tennessee.edu

Dr. Bruno Pedreira
UT Extension Forage Specialist

BEEF & FORAGE CENTER

"The farmer has to be an optimist, or he wouldn't still be a farmer."

- Will Rogers

WELCOME TO OUR NEW WEED CONTROL SPECIALIST

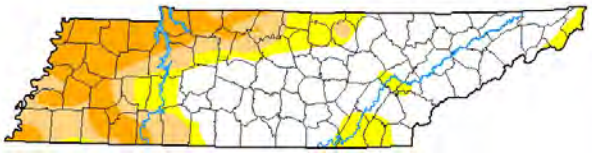
Malerie Fancher, Research Specialist
Dr. Hannah Wright-Smith, UT Extension Weed Specialist

The University of Tennessee Department of Plant Sciences and Tennessee Extension is delighted to welcome Dr. Hannah Wright-Smith onboard as an Assistant Professor and Extension Weed Specialist. Dr. Wright-Smith earned her Ph.D. in Crop and Soil Sciences with an emphasis in Weed science from the University of Georgia. She will be leading the forage and horticultural crop weed control education program. Dr. Wright-Smith is excited to join the Plant Sciences Department and Tennessee Extension faculty and begin her programming. She will be leading the Forage and Horticultural Crop Weed Control Education Program. Join us in giving Dr. Hannah Wright-Smith a warm Tennessee welcome to Knoxville!

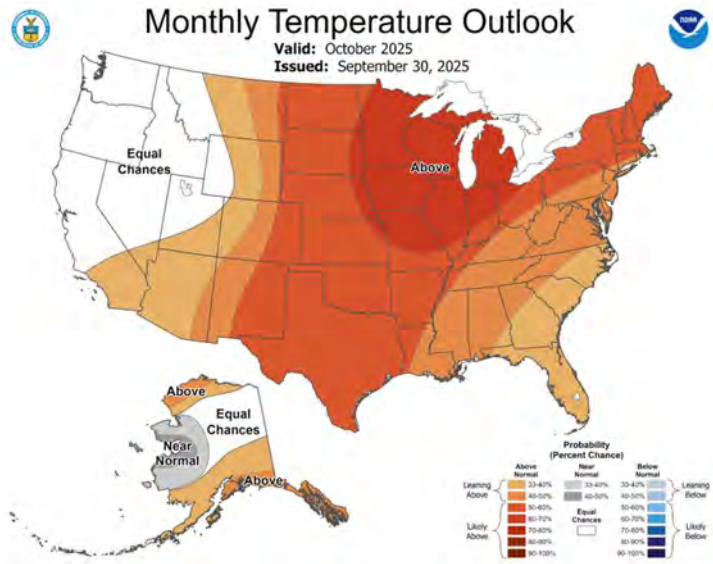
WEATHER

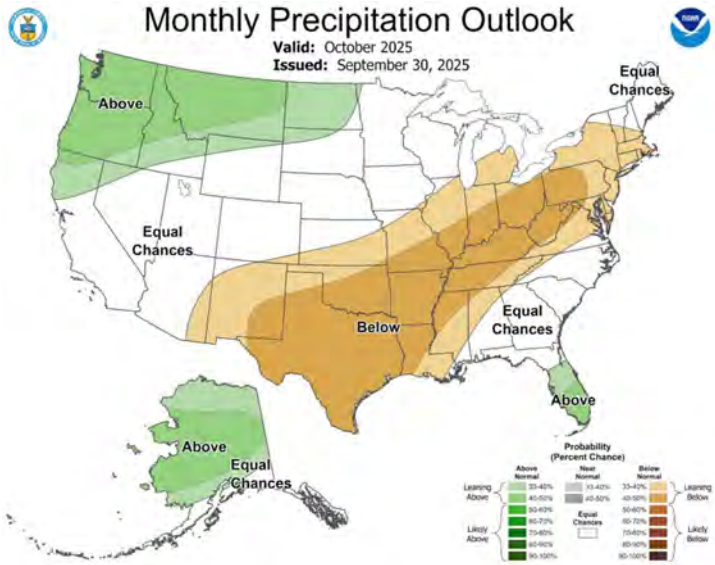
Dr. Bruno Pedreira, UT Extension Forage Specialist

Due to the government shutdown, September 2025 temperature and rainfall data are unavailable. The 10-year averages are 71.6°F and 3.75 inches of precipitation, respectively. ncei.noaa.gov



The October forecast calls for warmer and drier than usual conditions across Tennessee. The western region is expected to experience the highest temperatures and lowest rainfall. Stockpiling fescue has been a challenge in many counties due to limited soil moisture. Although overall drought conditions have improved compared to last month, about 48% of the state remains in some stage of drought. droughtmonitor.unl.edu





UT BULL TEST: DRIVING GENETIC PROGRESS FOR TENNESSEE CATTLE PRODUCERS

Dr. Andrew P. Griffith, Aisling G. Hagan MS, Dr. Karen L. Delong, Dr. Christopher N. Boyer, Dr. Charley Martinez, and Susan Schexnayder

Genomic testing has been used extensively in cattle seedstock operations and commercial heifer retention to select specific traits and to predict animal performance for several years. Thus, genomic testing has been beneficial in mating decisions and female retention decisions. In addition to these uses, genomic testing can be used on feeder cattle to predict feedlot performance and carcass merit. Thus, we conducted research to examine whether feedlots are willing to pay for cattle based on genetic test results. A survey of feedlot operators was conducted in 2021 and 2022. The examined genetic test provides a weighted score of an animal's predicted hot carcass weight (45%), ribeye area (10%), marbling (15%), tenderness (5%), fat thickness (10%), residual feed intake (10%), and calving ease direct (5%) and is scored on a scale of 1-10 with 10 being the best. Feedlot operators were asked to provide their willingness to pay for feeder cattle without a genetic test and then the price of the same pen of cattle scoring 4.5, 5.5, or 6.5. Feedlot operators were not willing to pay a different price for cattle with a score of 4.5, but they were willing to pay 2.7% ($4.06/cwt) and 4.6% ($6.92/cwt) more for cattle scoring 5.5 and 6.5, respectively. Thus, if cattle are expected to perform better than average in the feedlot then there is value in marketing them with genomic information.

For more information, please read the full article:
Hagan, A.G., K.L. DeLong, A.P. Griffith, C.N. Boyer, C. Martinez, K.L. Jensen, and S.M. Schexnayder. 2025. "Feedlot Willingness to Pay for Genomic Tested Feeder Cattle." *Journal of Extension*, 63(3): 1-9.
https://open.clemson.edu/joe/vol63/iss3/7

UPCOMING EVENTS

- **Northeast Tennessee Beef Expo**
  October 17th at 8 AM – 3 PM CT
- **Live.Stock** - Join us for our broadcast
  November 12th at 2 PM ET
- **Tennessee Forage and Grassland Council Annual Meeting**
  November 7th at 8:30 AM CT

Details can be found on UTBEEF.COM

Photo of the Month by Dr. Bruno Pedreira:
Although Hurricane Helene brought devastating affects to the Eastern part of our state, our team has been dedicated to the pursuit of informed decision-making for recovering producers.

This and other useful information can be found at your local UT/TSU Extension office or on UTBEEF.COM.

BEEF & FORAGE CENTER

LIVE.STOCK companion

Volume 24: November 2025

MONTHLY TIP

Tis the season...

To Spray for Winter Weeds!

Late fall between Thanksgiving and Christmas is a great time to make herbicide applications to control cool-season weeds.

At this point in the year, cool-season weeds like Buttercup are small, so the herbicide is going to be more concentrated in the plant, resulting in better control.

We typically recommend a 2 to 3-day period with temperatures around 50-60 degrees Fahrenheit before making an application to ensure the plant is actively growing, so the herbicide can be absorbed and moved to its active site.

Typically, cool-season weed control is much easier in late fall when compared to winter or early spring when finding a dry period of adequate temperatures to get into the field.

Dr. Hannah Wright-Smith
UT Extension Weed Specialist

BEEF & FORAGE CENTER

"Don't wish for it, work for it!"

- Anonymous

FIBER FUELS THE RUMEN

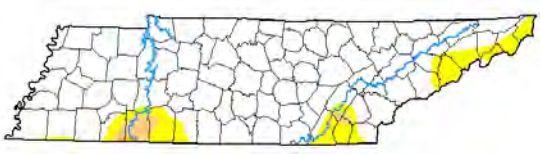
Dr. Katie Mason, UT Extension Beef Cattle Nutrition Specialist

One of the most fascinating things about cows is how they turn fiber into energy. Inside the rumen– a giant fermentation chamber– billions of microbes work to break down fibrous plants. As they do, they produce volatile fatty acids, which supply much of the cow's energy. Fiber isn't just filler; it is essential for keeping the rumen healthy. It gives those microbes something to work on and helps stimulate saliva production, which buffers the acidic rumen environment. When you look at a forage test, fiber shows up as neutral detergent fiber (NDF), acid detergent fiber (ADF), and lignin. NDF is especially important because it is tied to how much a cow will voluntarily eat. As NDF goes up, intake goes down, because high-fiber feeds take up more space in the rumen. A cow should eat about 2 to 2.5% of her body weight in dry matter per day. A simple rule of thumb for estimating intake is 120 ÷ NDF (%). For example, hay testing at 68% NDF means the cow will likely eat only about 1.7% of her body weight in dry matter each day. Even with free-choice access, that physical limit can keep her from getting enough energy, so a supplement might be needed. Paying attention to fiber levels helps predict intake and make sure your herd's energy needs are met, especially when relying on hay through the winter.

WEATHER

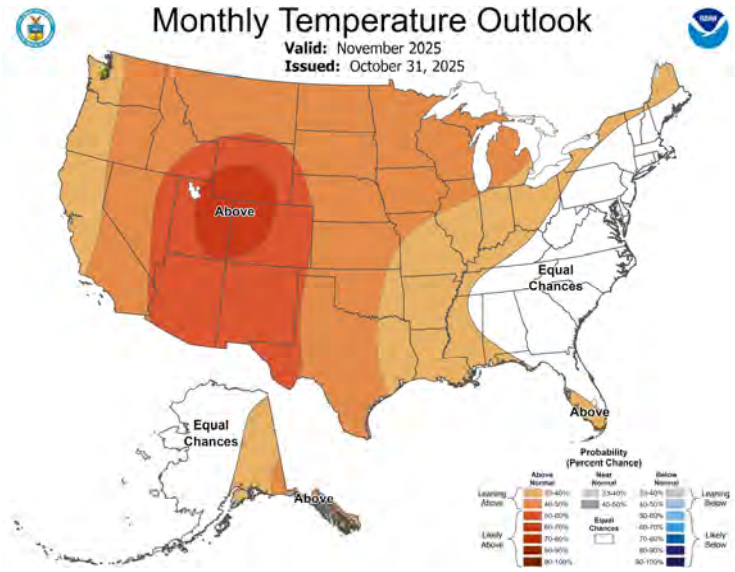
Dr. Bruno Pedreira, Director of the Beef & Forage Center

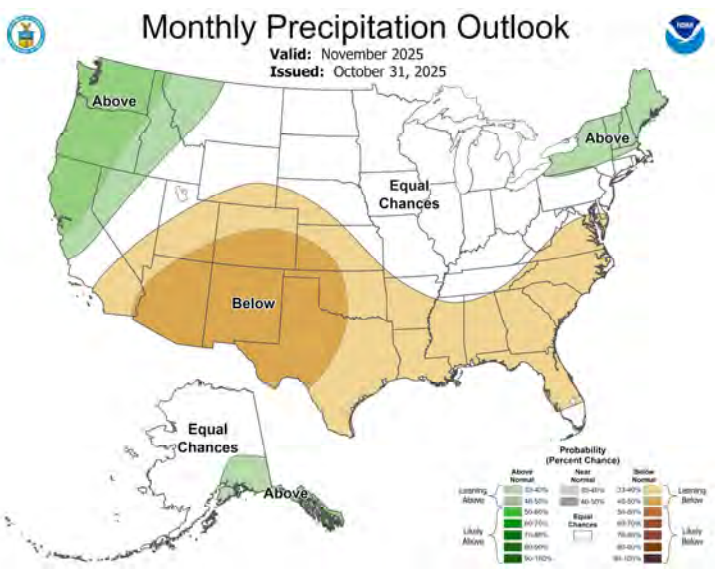
Due to the government shutdown, October 2025 temperature and rainfall data are unavailable. The 10-year averages are 60.9°F and 3.7 inches of precipitation, respectively. ncei.noaa.gov



November is shaping up to bring mostly normal conditions across Tennessee. A few counties in the western part of the state may see slightly warmer temperatures than usual, while areas along the North Carolina and Georgia borders could have a bit less rainfall.

October's rains arrived at just the right time, giving new seedlings a strong start and helping stockpiled pastures recover nicely. Overall, growing conditions look favorable heading into fall. Only about 11% of the state is experiencing any level of drought, which is a good sign for the months ahead. droughtmonitor.unl.edu





THE SEEDS TELL THE STORY: WHY SAVING A SAMPLE MATTERS

Dr. Bruno Pedreira, Director of the Beef & Forage Center

November is typically when I start receiving calls about pasture renovation failures. Most of the time, the reason for poor germination comes down to one unpredictable factor: the weather. Sometimes, it's because the rain never made it to that pasture sown in September. Other times, a light shower may have been enough to start germination, but not enough to keep seedlings alive. And occasionally seeding happens too late, just before the first frost, which kills those young tillers. Whatever the case, weather is usually the main reason seedlings fail to establish. It's all part of the blessings (and curses) of farming! However, every year I also encounter two other common situations:

1. Everything was done right where the weather cooperated and management was sound, but germination still didn't happen as expected.
2. Unexpected plants appear, someone brings forage samples to a meeting in November, and it turns out the plants growing aren't what you paid for.

In both cases, there's not much that can be done *unless* you have saved a small sample of your seed at planting time. If you kept a few pounds of seed (from a few seed bags) in labeled Ziplock bags and stored it in a climate-controlled space (not in a barn with extreme temperatures), we can send that sample for a germination test or grow it in a greenhouse to confirm the seed variety. Mislabeling does happen, and sometimes germination can be reduced due to poor handling, transportation, or storage conditions but without a retained sample, it's almost impossible to verify what went wrong. So, next time you buy seed:

- Take pictures of the seed bag and label.
- Save two or three small Ziplock bags of seed.
- Store them in your house or office, where temperatures stay relatively constant.

Those simple steps can make a big difference in tracking seed lot issues and getting answers if your pasture renovation doesn't go as planned.

UPCOMING EVENTS

- Live.Stock - Join us for our broadcast December 10th at 2 PM ET
- AFGC 2026 Annual Conference January 12-14th, Asheville, NC.

Details can be found on UTBEEF.COM

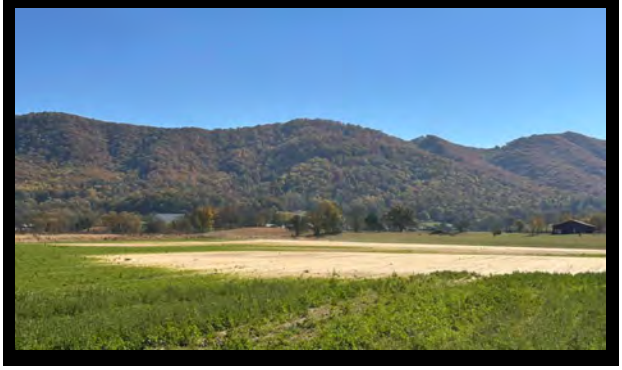


Photo of the Month by Dr. Bruno Pedreira:
After Hurricane Helene, many farmers have been working hard to restore their pastures. In Washington County, recovery has been especially challenging because of the heavy sand deposits left behind by the storm.

This and other useful information can be found at your local UT/TSU Extension office or on UTBEEF.COM.

BEEF & FORAGE CENTER

LIVE.STOCK companion

Volume 25: December 2025

MONTHLY TIP

As we begin feeding hay this winter, it's important to think strategically about where bales or hay-feeding devices are placed. Hay feeding always results in some waste, so consider where you want those nutrients to be redistributed in the pasture. Moving rings or placing bales in different areas helps prevent nutrient buildup in one spot and promotes more uniform soil fertility.

While losses are unavoidable, our goal is to minimize them because hay is expensive. Unrolling hay can spread nutrients well but may increase waste to as much as 40%. Using well-designed hay-feeding devices can reduce losses to 5–10%, improving efficiency while still making good use of the nutrients that do fall to the ground.

There is always debate about the benefits of unrolling hay. If that's your goal, focus on bare or weedy spots—using it as a targeted way to help recover poor areas.

Dr. Bruno Pedreira,
Director of the Beef & Forage Center

BEEF & FORAGE CENTER

"May your holidays be filled with abundant blessings and a bountiful future."

- Anonymous

THE 2025 ANNUAL PERFORMANCE TESTED BULL SALE

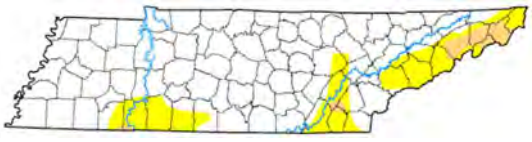
Dr. Saulo Zoca, Assistant Professor, UT Extension Beef Cattle Reproduction Specialist

The 2025 Annual Performance Tested Bull Sale will be held on December 11th at the Middle Tennessee AgResearch and Education Center in Lewisburg, TN at 12 PM CST. The sale features over 60 lots of Performance Tested Bulls, including Angus, Red Angus, Hereford, SimAngus, and Simmental Bulls. Bidding can either be done in person at the Middle Tennessee AgResearch and Education Center, or by Video Auction at LiveAuctions.tv.

For more information, please visit tiny.utk.edu/bulltest,

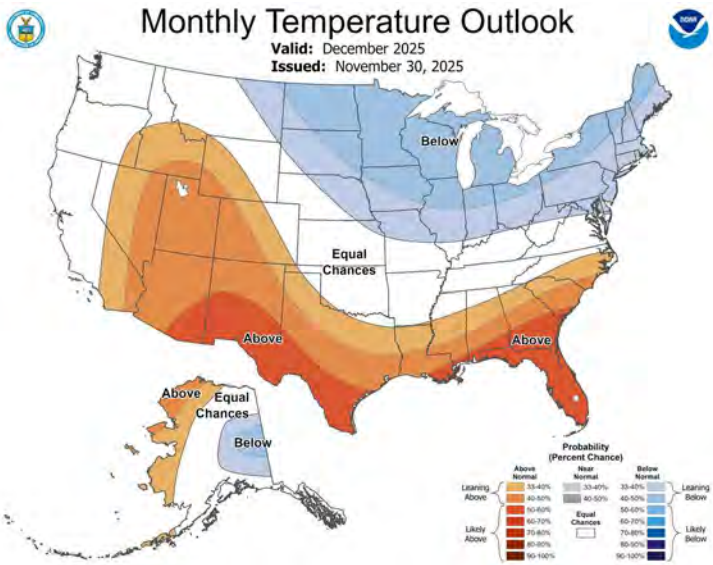
WEATHER

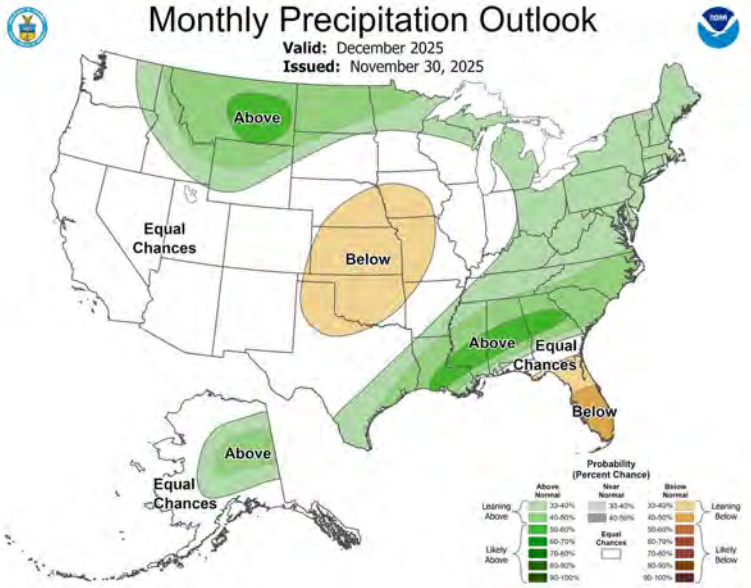
Dr. Bruno Pedreira, Director of the Beef & Forage Center



November precipitation totaled 2.6 inches, which is 0.84 inches below the 10-year average. The average temperature was 51.1°F, just slightly above the 10-year average of 49.7°F. ncei.noaa.gov

Drought conditions are not a major concern for most counties. However, about 18% of the state is experiencing some level of drought, which is a 7% increase from October (droughtmonitor.unl.edu). November's rainfall benefited most regions, allowing stockpiled fescue pastures to grow well. For example, forage samples from stockpiled pastures in Clay For example, forage samples from stockpiled pastures in Clay County showed about 3,200 pounds of dry matter per acre accumulated from early September to mid-November. Production varied from 2,300 to 3,600 pounds per acre, depending on nitrogen fertilization. The December outlook suggests normal temperatures across Tennessee with a tendency toward above-average precipitation.





NOVAGRAZ: A NEW PASTURE HERBICIDE

Dr. Hannah Wright-Smith, UT Extension Weed Specialist

Novagraz, which you may know by its former name as ProClova, is a new herbicide from Corteva that can be used to kill broadleaf weeds in pastures without killing white clover or annual lespedeza. This herbicide is a good option for those with mixed pastures needing to control buttercup, plantain, or thistles and data has shown that control of some weeds, like buckhorn plantain, is improved with NovaGraz compared to 2,4-D alone. NovaGraz can also be used in the summer to manage weeds like pigweed and tall ironweed.

It is crucial to note that NovaGraz is NOT safe for other clovers such as Red, Crimson, Persian, Alsike, and Burclover. I've also heard several mentions the word "safe" in reference to NovaGraz and clover, and I want to stress that "safe" doesn't necessarily mean unharmed. NovaGraz will initially cause lodging and leaf yellowing in white clover, but plants will survive and typically recover within 4-6 weeks.

UPCOMING EVENTS

- Live.Stock - Join us for our broadcast - January 14th at 2 PM ET
- AFGC 2026 Annual Conference - January 12-14th, Asheville, NC.

Details can be found on UTBEEF.COM

Photo of the Month by Dr. Bruno Pedreira:
Recently, The UT Beef and Forage Center Forage Testing Laboratory had visitors from the Federal University of Mato Grosso, Brazil.

This and other useful information can be found at your local UT/TSU Extension office or on UTBEEF.COM

BEEF & FORAGE CENTER

Infographics

WELCOME TO BARN LAB

Beef AI & Robotics Network — Building the Future of Precision Livestock Farming at UTIA

B

Beef

Develop precision technologies for beef cattle health & welfare

A

AI

Advance artificial intelligence for on-farm decision-making

R

Robotics

Design drone and robotic systems for pasture automation

N

Network

Foster collaborations across animal science & engineering

Lab PI:
Yanqiu Yang

Lab Members:
Supun Chathuranga Nabadawa Hewage
Safal Kshetri
Eric Opoku

Contact: Dr. Yanqiu Yang (yyang118@utk.edu)

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1/2026