

# Use of Biostimulants and Nitrogen on Novel-endophyte Tall Fescue in Northern Alabama

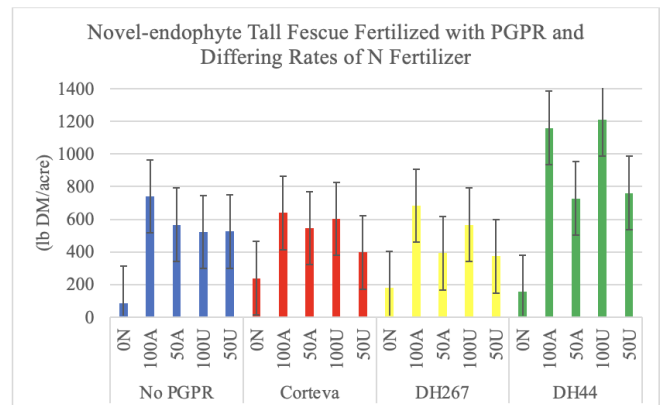
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Tall fescue is a widely used forage in many states throughout the Eastern US and throughout Northern and Central Alabama. The most common being 'KY 31' which contains a toxic endophyte requiring producers to use intensive management to prevent fescue toxicosis in cattle. Newer varieties do not contain the toxic endophyte, rather they contain a "friendly" endophyte, and are called novel-endophyte tall fescue. Varieties include Texoma MaxQII and BarOptima +E34, among others. These novel endophyte varieties are gaining attention due to the benefits of the endophyte, such as increased drought tolerance and pest resistance, without the harmful effects on livestock associated with the toxic ergot alkaloids present in 'KY 31.' BarOptima +E34 has been shown to persist in extreme conditions, improve livestock reproductive rates, increase the weaning weights of nursing calves, and reduce supplemental feed costs. This results in better overall herd health and productivity, meaning significant economic benefits for producers. Additionally, BarOptima +E34 has been linked to a reduction in supplemental feed costs due to the forage providing more consistent nutritional value over a longer grazing period which reduces the need for external feed sources.

The recommended N rate for tall fescue in spring is 60 lb N/acre, with the rising costs of N fertilizer other options are being researched to reduce the total N need. This research includes biostimulants, such as plant growth promoting rhizobacteria (PGPR). These commonly found bacteria are non-pathogenic, soil-inhabiting beneficial bacteria that colonize the seeds and roots of plants. These bacteria benefit the host plants through increasing drought tolerance, insect resistance, nutrient uptake, and increasing top and root growth. Research in Iowa in conjunction with Auburn has shown that PGPR can enhance the efficiency of N uptake, meaning less N fertilizer may be required for optimal plant growth. PGPR have also been associated with improving soil structure and health, further supporting the plant's growth due to water infiltra-

tion and retention in soils. This is important for areas that are more drought prone, as this helps maintain productivity under unfavorable conditions.

Auburn University has an ongoing three-year study at the Tennessee Valley Research Station in Belle Mina, AL. The study is using BarOptima +E34 novel-endophyte tall fescue (Barenbrug USA) fertilized using three PGPR strains and two rates N fertilizer (100 and 50% recommendation) and two common types of N fertilizer (urea (46-0-0) and ammonium sulfate (21-0-0)). This study is also being repeated at the University of Tennessee with 'KY31' tall fescue. In Alabama, two of the PGPR used were developed at Auburn University (DH44 and DH267) and the third product is commercially available product from Corteva (Utrisha). The fertilizer treatments were applied in late March of 2024 and two harvests were collected April and May 2024. Samples for forage yield and nutritive value were collected and brought back to Auburn University for analyses.



The graph above shows the different PGPR and N fertilizers used, A is for ammonium sulfate and U is for urea. From the results DH44 produced the most yield as compared to other bacteria and the control treatment of water only. The commer-

cial Corteva-Utrisha product and DH267 performed similarly to one another. DH44 had from 100 - 400 lb/acre more dry matter yield than any other treatment. After the first year, results are promising that biostimulants, specifically those used in this study, can be used to reduce the amount of N fertilizer needed in tall fescue fields. Results on plant stress responses and soil characteristics are still being determined, but are also encouraging.



Bar Optima +E34 tall fescue without differing levels of PGPR and N fertilizer at the Tennessee Valley Research and Extension Center, Belle Mina, AL.



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