



Liquid Fertilizers and Their Role in Hay Production

Volume 15, Issue 12

Rocky Lemus
Extension Forage Specialist

December 2022

Visit us at: <http://bit.ly/mississippiforages>

The increase in nitrogen (N) fertilizer prices has forage and livestock producers searching for other alternative sources that could allow sustainable forage production and profitability (Fig. 1). There are multiple liquid fertilizer products flooding the market with production claims without research data that can validate their efficacy, production, improvement in nutritive value, and economic return. Most products indicate that liquid fertilizers are comparable to granular fertilizers while providing advantages such as greater accuracy of application, improved nitrogen use efficiency, and reduced losses with effective cost. Another claim is these fertilizers can increase protein and energy concentration, improve digestibility, and optimize growth, increase forage biomass and utilization while improving animal performance.

A preliminary study was conducted at Mississippi State on 'Tifton 9' bahiagrass. The replicated study consisted of ten treatments.

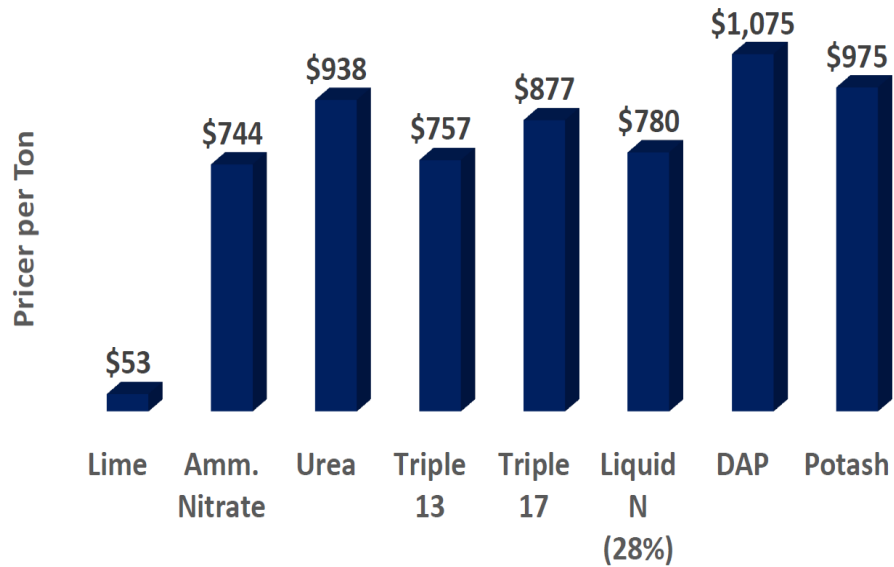


Figure 1. Average fertilizer prices for the southern USA. Source: USDA-AMS AMS Livestock, Poultry and Grain Market News. November 14, 2022. https://www.ams.usda.gov/mnreports/ams_3051.pdf

The treatments included a control (C), two granular fertilizers, and seven liquid fertilizers. The granular fertilizers were urea (U, 46-0-0) and urea ammonium sulfate (UAS, 33-0-0). Granular fertilizers were applied at rate of 50 units of N per acre per cut of hay. The liquid fertilizers included urea ammonium nitrate solution (UAN, 32-0-0), Agritech Plus (AGP, 10-20-0), Pasture Booster Pro (PBP, 30-0-0), and Royal Grow (RG, 30-0-0). The UAN fertilizer was applied at 50 units of nitrogen per acre per cut of hay only. The other three fertilizers were applied at the manufacturer's recommendation of one gallon of product per acre or adjusted to meet the recommended rate of 50 units of nitrogen per acre per cut of hay. All treatments were adjusted for phosphorus

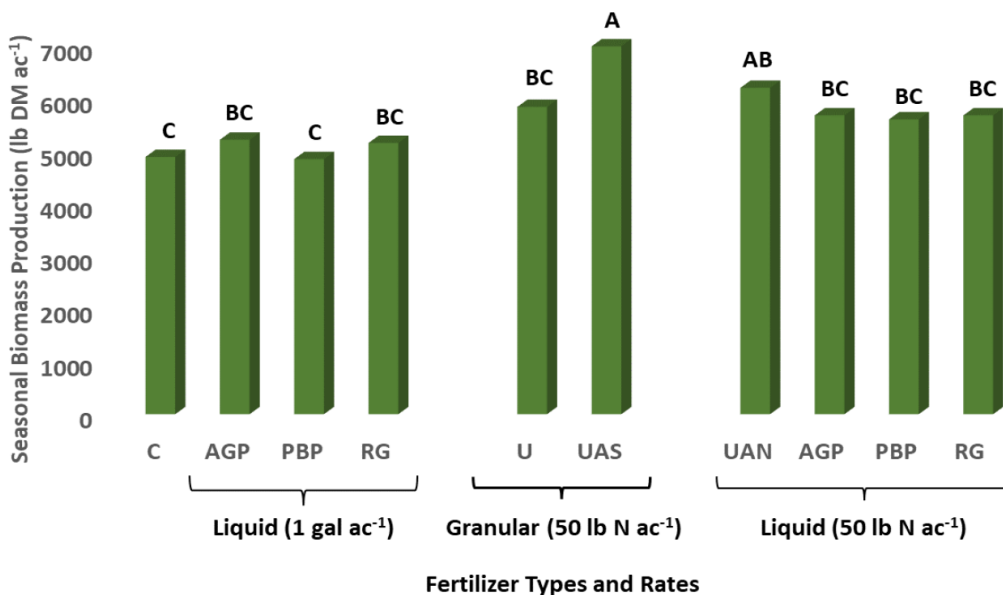


Figure 2. Biomass production of Tifton 9 bahiagrass when treated with granular or liquid fertilizers.

and potassium based on soil test recommendations. Hay was harvested in approximately a 30-day interval and there were three harvests.

This preliminary data indicates that liquid fertilizer applications into your in-season nitrogen program have not proven beneficial at the manufacturer recommended rate in terms of biomass production (Fig. 2), nutritive value, and cost per pound of biomass production (Table 1). When the liquid fertilizers were applied at the rate of 50 units of N per cut of hay, there were not significant different from the granular fertilizers. However, their increase in biomass compared to the control were lower than the granular fertilizers or UAN. The granular fertilizers (urea and urea ammonium sulfate) had greater crude protein concentrations than the rest of the liquid fertilizers across the recommended or adjusted application rates. Although some of the liquid fertilizer had lower cost per pound of seasonal dry matter produced, their percent yield increase compared to the control were lower than the granular fertilizers across both application rates.

Table 1. Preliminary comparative analysis of granular and liquid fertilizers applied to Tifton 9 bahiagrass. There were three applications across three harvests.

Units	Bulk Amount Applied	Treatment	Yield (lb/ac)	Yield Increase (%)**	Fertilizer Cost (\$/ton or \$/Gal)	Cost (\$/ac)	Cost (\$/lb DM increase)
	0	Control	4893	--	--	--	--
lbs	218	Urea (46-0-0)	5844	19	938.00	101.96	0.11
lbs	304	Urea Ammonium Sulfate (33-0-0S)	6998	43	825.00	125.00	0.06
Gal	42	Urea Ammonium Nitrate Solution (32-0-0)	6207	27	730.00	114.06	0.09
Gal	3	AgritechPlus (10-20-10)	5221	7	37.00	111.00	0.34
Gal	132	Agritech Plus*	5684	16	37.00	4884.00	6.17
Gal	3	Pasture Booster Prime (30-0-0)	4852	-1	54.99	164.97	-4.02
Gal	48	Pasture Booster Prime*	5608	15	54.99	2639.52	3.69
Gal	3	Royal Grow (30-0-0)	5160	5	7.20	21.60	0.08
Gal	48	Royal Grow*	5684	16	7.20	345.60	0.44

*Denotes application of product to meet the recommended application of 50 lb N/ac per cut.

**Percent Yield increase compared to the control.

Grasses cannot tell the difference between nitrogen supplied by the granular and liquid fertilizers, but the fertilizer application, efficacy, and uptake can impact biomass production and nutritive value. There is still a need to collect data in the water dissolving time, foliar absorption, and application rates that are economically sustainable. To develop a fertilizer plan to maximize hay yields, your forage can never be hungry for nitrogen or other essential nutrients like phosphorus or potassium. An optimum soil pH is also very important. This may mean increasing your fertilizer rates and adding additional secondary or micronutrients into your fertility program. Splitting fertilizer applications throughout the season is another great way to ensure your hay has all the nutrients it needs. An economically planned fertilizer program which includes N, P, K and other possible secondary macronutrient and micronutrients is important to maximize profit and maximize return. This means that having access to custom blended fertilizer can help fine-tune a forage fertility program and potentially improve production efficiency resulting in a decrease in production costs.

Upcoming Events

Cool-season Forage Field Day—March 2023

For upcoming forage related events visit: <http://forages.pss.msstate.edu/events.html>



Find Your Place in the World of Forages at Mississippi State University

Cooperative Extension Service • Mississippi State University

Mississippi State University is an equal opportunity institution. Discrimination in university employment, programs or activities based on race, color, ethnicity, sex, pregnancy, religion, national origin, disability, age, sexual orientation, genetic information, status as a U.S. veteran, or any other status protected by applicable law is prohibited.