



Fertilizer Prices and Utilization in Cool-season Annual Grasses

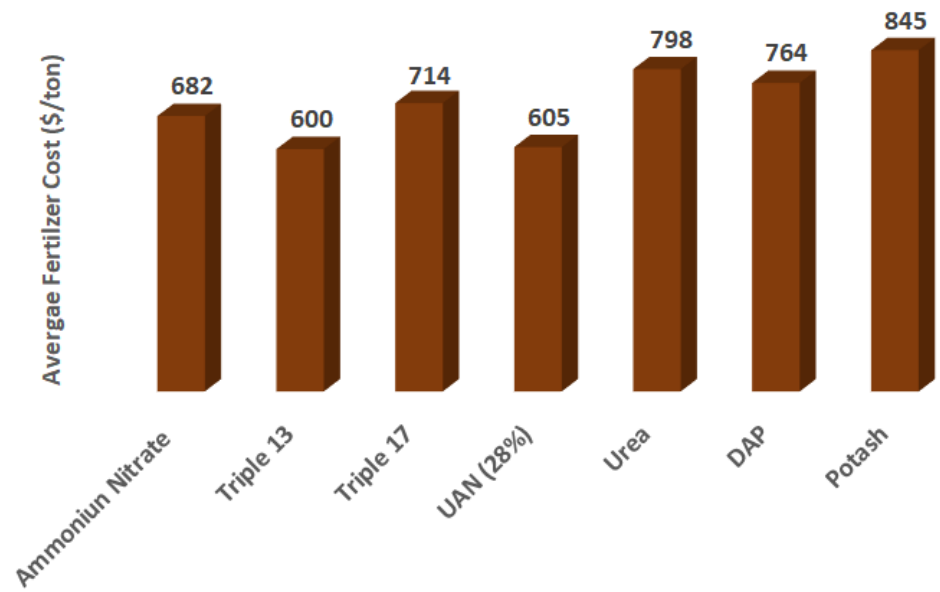
Volume 14, Issue 12

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Extension Forage Specialist

December 2021

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The increase in fertilizer prices, especially nitrogen (N) has producers determining ways to increase fertilizer use efficiency while reducing cost (Fig. 1). A comparison between 2020 and 2021 at this time of the year has indicated estimated price increases of 52, 81, and 72% per ton for urea, DAP, and potash. These are times where a soil test can be the most important tool to fine-tune fertilizer applications and make obtain the best results from fertilizer inputs. It is important assessing available soil nutrients through rigorous testing and pinpoint fertilizer needs. While using soil test recommendations, phosphorus and potash fertilizer can be applied at planting. On the other hand, nitrogen application should be applied to cool-season grasses (annual ryegrass, cereal rye, oat, triticale, and wheat) on split applications that might require one to three applications of 60 to 100 pounds of nitrogen per acre. It is advisable to delay initial applications until the grass emerges and has developed an active root system to increase nitrogen uptake and utilization.



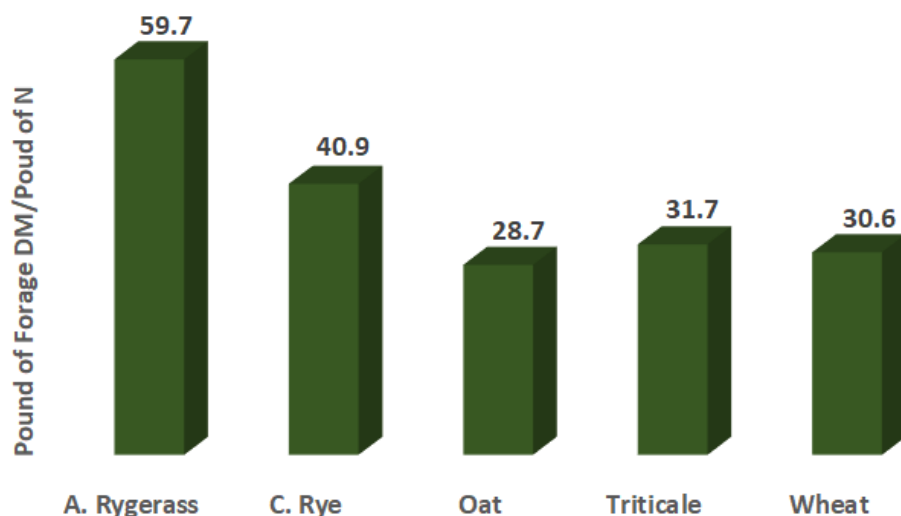
Efficient application of fertilizer will be an important component to budgeting fertilizer applications this winter. In Mississippi, the two nutrients that must be considered for optimum productivity of cool-season annual grasses are nitrogen and potassium. Keep in mind that numerous factors can affect N-use

Figure 1. Average fertilizer prices for the southern USA. Prices might vary depending on local markets for supply and demand. Source: USDA-AL Dept of Ag Market News, Montgomery, AL.

efficiency on annual cool-season grasses such as soil pH, deficiency of other nutrients (phosphorus or potassium), or environmental conditions such as cloudy days and cold temperatures can affect the photosynthetic activity and delay fertilizer uptake and growth. Producers need to be as efficient as possible. There are numerous ways to determine N-use efficiency, but the most useful is to calculate the pounds of additional forage the field produces per actual pound of applied N. On average, producers can expect approximately 59.7, 40.9, 28.7, 31.7, and 30.6 of additional dry matter forage per pound of N applied across different environmental conditions for annual ryegrass, cereal rye, oat, triticale, and wheat, respectively (Fig. 2). This level of efficiency is good for application rates of 100 lb N/ac in split applications. If we consider that the producer would like to achieve a ryegrass yield of 4,000 lb DM/ac, it will require 67 lb N/ac (4000 lb DM/ac ÷ 59.7 lb DM/lb N = 67 lb N/ac). To determine how much N needs to be applied to achieve yield goals for different annual cool-season forages, you can divide by the forage produced by the pound of N applied. There is a hard and fast rule as to how much N rates can be reduced. Keep in mind that soil type, soil nutrient levels, environmental conditions, and grazing management can affect the amount of biomass produced per pound of N applied. Under grazing, you might find that applying another 30 to 50 lb N/acre in early spring is required, particularly if there are leaching rains, or livestock are not redistributing excrement uniformly across the pasture.

Nitrogen fertilizer prices continue to rise. Nitrogen is best applied to annual pastures in small increments (30-50 lb N/ac)

and uses multiple applications over the growing season. This is because actively growing plants can take up N very readily once it is in the root zone and can be translocated to the above growth of photosynthetically active plants. This means that grazing animals can significantly remove a portion of the applied N as protein. When using granular fertilizers such as urea (46-0-0) or urea ammonium sulfate (33-0-0), applying the annual rate twice during the season (after seed emergence and after the first grazing cycle) is ideal. If using liquid urea ammonium nitrate (UAN, 32% solution), then it might be best to reduce application and do at least three applications during the season. These products are less susceptible to volatilization during the winter months. Although there is an option to apply urease inhibitors to urea or UAN to reduce N volatilization, their effectiveness has not been extensively tested under winter conditions. These products can add to the cost of the N fertilizer, and the added expense needs to be weighed against the potential of improving subsequent N-use efficiency and forage productivity. Some producers also are relying on poultry litter as a nitrogen source. However, N content and availability are highly variable and most of the N is trapped in the organic matter. Keep in mind that breaking organic matter requires microbial activity which is diminished by cold temperatures. Be sure to base poultry litter application rates on a nutrient test and complement with chemical fertilizer sources as needed.



Cool-season annual forage grasses are well adapted to most climatic regions of Mississippi and can have levels of forage production, but their choice is largely dependent on the producer's management philosophy and livestock production needs. The maximum forage production is generally a function of soil texture, soil moisture, planting date, planting method, and fertility. Nitrogen influences the productivity and quality of cool-season annual grasses depending on forage species. Nitrogen applications should include 60 to 100 pounds of nitrogen per acre in split applications after establishment followed

Figure 2. Estimated dry matter forage production per pound of nitrogen applied to different cool-season annual grasses in Mississippi.

by another application in the spring. Higher N applications beyond this recommendation might not be economically justifiable. Little nitrogen is usually lost from cool-season pastures under these guidelines and lowering N applications rates may be a suitable strategy to manage risks associated with escalating fertilizer prices. Given the high fertilizer costs, applying nitrogen or other fertilizers without a soil test will become more costly. A priority should be to evaluate your fertilizer needs and focus on a program that could help reduce unnecessary fertilizer applications.

Upcoming Events

Sheep and Goat Production Webinar Series (6:00 PM to 7:00 PM CST) Registration Required

January 4, 2022— Converting Performance: Improving Productivity Through Sheep and Goat Selection for a Successful Operation
Registration at https://bit.ly/2022_Jan04SGPW

Jan 18, 2022— Addressing Reproductive Issues in Goats
Registration at https://bit.ly/2022_Jan18SGPW

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

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