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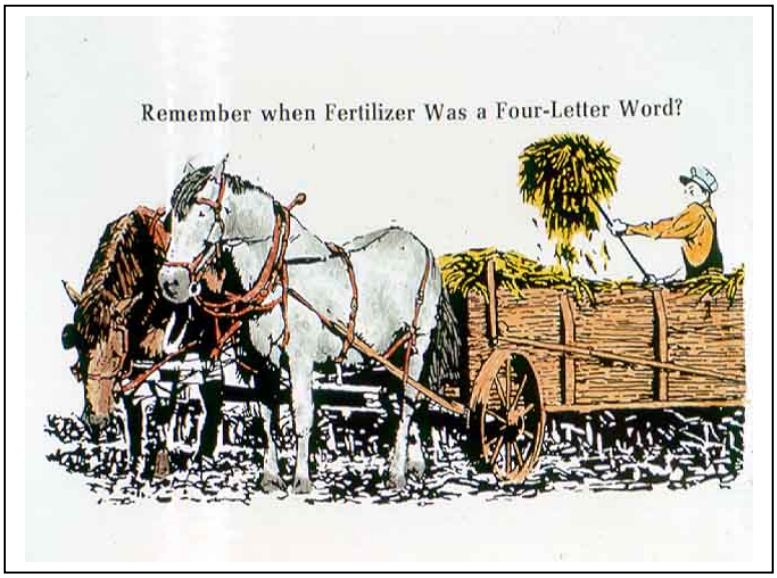
Minimizing Fertilizer Expenses on Livestock Farms

The cost of fertilizer, especially N fertilizer, has sharply increased because fertilizer production and transport are linked to energy costs. This is a serious development for forage/livestock producers, because fertilizer usually accounts for 40 percent or more of the cost of producing forage. Nitrogen alone can account for 20 to 40 percent of the cost of producing grass forages. The extent to which a livestock producer is able to minimize fertilizer expenses may mean the difference between profit and no profit. Here are some ideas regarding approaches that may be helpful in accomplishing this objective.



Soil Testing

Applying fertilizer without having taken a soil test amounts to guessing how much fertilizer is needed. Applying too much fertilizer is a waste of money; applying too little will result in less-than-optimum forage production. Auburn University's soil test recommendations assume a high level of management and production and are based on the assumption that the forage produced can and will be used. Be sure to follow liming recommendations on soil tests. More than half the soil samples for forage tested at the laboratory at Auburn University have a pH too acid for best production and need agricultural limestone to correct this. Fertilizer nutrients are less available when the soil pH is low.

Use Legumes

The single most beneficial technique for lowering N fertilizer costs is to grow forage legumes. Some legumes are grown in a pure stand, e.g. alfalfa or sericea lespedeza, but many species such as clovers work best in a mixture with forage grasses.

In association with Rhizobium bacteria, clovers and other legumes obtain N from the atmosphere. Specific strains of this type of bacteria infect the roots of particular legume plants from which the bacteria obtain food. In addition, the bacteria obtain N from air in the soil and "fix" it in a form usable by plants. The N accumulates in small nodules (knots) that form on the legume roots.

The amount of N fixed varies due to several factors. These include legume species, temperature, strains of bacteria present, the extent of sunlight versus shading, soil pH, soil nutrient availability, and extent of defoliation. However, as Table 1 indicates, the amount and value of N fixed by a good stand of various types of clovers (the type of forage legume most commonly-used in pastures) can be substantial.

Table 1. Value and amount of N fixed by clover.

Species	N fixed	N value ($/acre) @		
	--lb/acre/yr--	$0.35/lb	$0.45/lb	$0.55/lb
Red clover	75-200	26-70	34-90	41-110
White clover	75-150	26-53	34-68	41-83
Annual clovers	50-150	18-53	23-68	28-83

In addition to providing biological N, legumes offer other potentially important advantages. In some cases a legume/grass mixture may produce more dry matter per acre than grass alone, particularly as compared to grass receiving little or no N fertilizer. The distribution of forage growth in pastures may also be more favorable, thus helping reduce the need for stored feed. However, the single most valuable advantage forage legumes offer is better forage quality on average than grasses, which usually sharply increases animal gains and may enhance livestock reproductive rates.

Use Broiler Litter or Other Organic Materials

Alabama produces more total nutrients annually in broiler wastes than are in all the fertilizers sold in the state. Many producers are taking advantage of this relatively abundant source of organic fertilizer. On the average, a ton of fresh broiler litter will contain a total of around 60-60-40 pounds $N\text{-}P_2O_5\text{-}K_2O$. If one had to purchase these nutrients, they would be worth around $45 to $55 at today's prices. Delivery and spreading would add even more value. A consistent problem is being able to find the litter when you need it and have it delivered and spread, especially if your farm is outside of the poultry-growing regions of the state. If you need to find a Certified Animal Waste Vendor in your area, go to the following web site and contact them by phone. If a local vendor does not have litter available, he/she may know someone who does.

http://www.aces.edu/dept/aawm/County.php

There are other municipal, industrial, and agricultural organic wastes that may be available to producers. The feasibility of using organic waste materials depends on two factors. First, is the value of the nutrients in the material high enough to justify the cost of obtaining and applying it? To answer this question requires knowing the level of nutrients in the material as well as how much will actually become available to plants. The second factor is whether the material contains any pathogens, heavy metals, or other undesirable components that could be harmful to animals, humans, or to the soil. If neither of these factors is a problem, then using a waste material as a soil amendment may be quite justifiable.

Urea As A Nitrogen Source

Urea is less expensive compared to ammonium nitrate and other sources of N because it is easier to manufacture. On the other hand, it is also more volatile and thus more likely to be lost during warm weather.

Can you afford to use a urea source of N fertilizer during warm weather? The answer is that you probably can in many situations if urea is substantially cheaper than other N sources. While the potential losses of urea by volatilization during warm weather can be significant, recent research by Auburn University scientists demonstrate that losses in pasture situations were rarely greater than 10 to 20%. Losses are lower when there is little pasture growth present and/or if the soil pH is less than 7.0.

Liquid N is usually a mixture of urea and ammonium nitrate, but only the urea component is vulnerable to volatilization loss. Considering the total cost of urea, a producer may be able to apply a little extra to compensate for potential N loss from volatilization. This is not a problem in cool, wet weather. Another alternative is to purchase fertilizer treated with Agrotain®, a commercial product that claims to greatly reduce volatilization losses from urea and urea-ammonium nitrate solutions.

Prioritize Fertilizer Application

Not every acre of pasture is equal, because some areas have a much higher yield potential than others. For example, a rich, deep, and relatively level bottomland pasture may be much more productive than an eroded, thin hillside. The reasons are that on the hillside water runs off quickly, the soil may not hold nutrients well, and roots may only have a few inches of good soil in which to grow. In the bottom there will probably be better moisture and nutrient availability during most of the growing season and roots can penetrate deeply. The point is that the first priority should be on providing nutrients in areas that have the potential to be most productive.

Timing Of Fertilizer Applications

If a producer has limited funds to invest in fertilizer, it makes sense to time the applications such that pasture forage will be available when it is most valuable. For example, on a farm in north Alabama that is not heavily stocked, there may be excess forage available in spring. In such a situation, fertilizer dollars would result in more valuable forage production if used to apply fertilizer in autumn to stimulate autumn grazing or to stockpile fescue forage to help reduce hay requirements.

Grazing Management

Utilization of pasture forage is greatly affected by grazing method. In fact, research has shown that in many poorly managed continuous grazing situations, less than half the forage produced in a pasture ends up being consumed by livestock. On the other hand, with controlled grazing management the percent of utilization of the forage produced may be 20 to 30% higher. This is the same result that would occur if 20 to 30% more fertilizer was applied.

Conclusion

There is no single answer to the problem of higher N fertilizer costs. Different livestock producers will need to take different approaches based upon their location, resources available, and type of operation. In fact, a given producer may need to take different approaches at different times or in different fields including using soil testing, legumes, organic wastes, alternative sources of fertilizer N such as urea, timing of fertilizer application, and improved grazing management.

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