Pasture Fertilization

in Louisiana

LSU AgCenter Research & Extension

Many different strategies are available for fertilizing pastures. They vary according to stocking rate, presence or absence of legumes and whether the pastures consist of summer or winter plants.

The recommendations in this publication assume a good stand of grass and a stocking rate of one cow per acre. Producers using lighter stocking rates can reduce fertilizer use, thereby substituting land for fertilizer.

Soil Testing

Soil testing is strongly encouraged to determine lime and fertilizer needs. A good soil testing program can identify problem areas in fields, save money on unnecessary fertilizer applications and increase yields through increased fertilizer use.

Proper soil sampling is important. Divide large fields into 10-acre blocks for sampling. Sample fields smaller than 10 acres individually. Also, sample areas with known problems separately.

For each sample, collect soil from 10-15 places in the field at random from a depth of zero to 6 inches. Place the soil in a clean plastic bucket. Thoroughly mix the soil and remove about 1 pint for analysis. Your county agent can provide information sheets and soil sample boxes.

pH and Liming

Summer grasses (Bermuda grass and bahiagrass) are tolerant of acidic soils. They rarely respond to lime applications until the soil pH reaches very low levels. Louisiana research has shown that coastal Bermuda grass fails to respond to lime applications when the soil pH is 4.9 and calcium levels are adequate. Studies in other states support this work.

Clovers and winter grasses are less tolerant of acid soils. Maintain the soil pH at 5.5 or higher if clovers or winter grasses (ryegrass, wheat, etc.) are grown.

Winter Annuals – Prepared Seedbed

Planting winter annuals (ryegrass, wheat, etc.) on a prepared seedbed generally will provide more days of grazing than overseeded systems because of earlier establishment of the crop. On a prepared seedbed system, apply all the recommended phosphate and potash before the last tillage trip and incorporate them.

Nitrogen may be handled in several ways. In general, use about 1 pound of actual nitrogen per acre per day of grazing. In south Louisiana, where 180 days of grazing is possible, 180 pounds of actual nitrogen (390 pounds of urea) per acre may be needed. In north Louisiana, only 150 pounds of nitrogen (325 pounds of urea) per acre may be needed because of fewer grazing days in the winter.

One method of nitrogen application is to apply one-half of the needed nitrogen along with the phosphate and potash just before planting. The remainder of the nitrogen can be applied in February.

Some producers prefer a three-way split of the nitrogen: applying 20-30 pounds at planting; applying 60 pounds when the grass becomes tall enough to fall over; and applying the remainder in February.

If the nitrogen is to be surface-applied and not incorporated in hot weather, ammonium nitrate is the preferred nitrogen source. If the nitrogen is applied in cool weather, ammonium nitrate, ammonium sulfate or urea can be used with equal effectiveness.

Table 1. P and K Recommendations for Winter Annuals by Soil Test Level		
Soil Test Level	Recommended rate (lb/A)	
	P_2O_5	K_2O
Very Low	100	120
Low	80	90
Medium	60	60
High	0	0
Very High	0	0

Sulfur and magnesium may be needed on winter annuals. If soil test magnesium levels are medium, low or very low, use magnesium to avoid grass tetany disease in cattle. In very sandy soils, sulfur may be deficient. If grass fails to "green up" after a nitrogen application, suspect a sulfur deficiency. A 24-pound application of sulfur per acre should eliminate sulfur deficiency.

Winter Annuals – Sod-Seeded

Sod-seeded winter annuals usually provide good grazing in the spring, but little, if any, in the fall and early winter. The competition by the summer grass usually eliminates much growth by winter annuals in the fall and early winter.

This early season competition complicates fertilization of sod-seeded winter annuals. In general, less nitrogen should be applied than in prepared seedbed systems because fewer days of grazing will be obtained. Usually 90-120 pounds of actual nitrogen is sufficient in sod-seeded systems.

Timing of fertilization is important in sod-seeded systems. If fertilizer is applied too early, the summer grass will grow and choke out the winter annuals. The best procedure appears to be applying all the recommended phosphate and potash and 24-40 pounds of nitrogen after the summer grass has become dormant (usually after the first killing frost). Apply the remainder of the nitrogen in February. Because all fertilizer application should be made during cool weather, the effectiveness of urea, ammonium sulfate and ammonium nitrate should be equal.

Table 2. Recommended N Rate by Production System and Location		
Production System	Recommended N (lb/A)	
	North La.	South La.
Ryegrass – Prepared Seedbed	150-160	180-200
Ryegrass – Overseeded	90-120	90-120
Ryegrass – Clover	0	0

Winter Annuals With Legumes

Adding legumes to a winter annual system requires two major management changes. First, the soil pH should be above 5.8. Most clovers do poorly in acidic soils. Liming the soil to a pH of at least 5.8 will help ensure a good stand of clover.

Second, the nitrogen requirement is eliminated. Properly managed, clovers can supply all the nitrogen necessary in a grass-legume mixture. Be sure to inoculate the clover seed properly with the correct Rhizobium species inoculant.

Apply all the recommended phosphate and potash when the clover is seeded or when clover growth begins, if the clover is coming back from the previous year's seedings. Don't apply any nitrogen at this time.

If nitrogen is applied during this period, there is the danger the grass will grow so quickly it will choke out the clover. Have patience for the clover to establish. Most grazing in a grass-clover system will come in the spring.

If a clover stand is not established, treat the field as described in the two preceding sections on prepared seedbed and sod-seeded winter annuals.

Table 3. Nitrogen Fertilizer Replacement Value of Selected Clovers (Rosepine, La.) Bowie Fine Sandy Loam		
Clover	N Replacement (lb/A)	Seeding Rate (lb/A)
Arrowleaf	121	5
Crimson	125	12
White	75	3
Red	97	8
Subterranean	90	12
Berseem	94	5
Source: Louisiana Agriculture Vol. 34, No. 2, Winter 1990-91.		

Table 4. Effect of Nitrogen Rate on Percentage of Clover in Grass-Clover Mixture		
N Rate (lb/A)	% Clover	
	April 29	May 29
0	30	29
60	17	10
120	1	6
Source: Alabama Agricultural Experiment Station Bulletin 559. June 1984.		

Summer Perennial Grasses

Summer perennial pastures in this region generally are Bermuda grass, bahiagrass, Dallis grass and some native grasses. Fertilization rates vary according to your location in the state and stocking rate.

Fertilizer timing and rates also will differ whether pastures are newly planted or established. For new plantings, apply all the phosphate and potash recommended by the soil analysis. Before planting and before final tillage, apply 20-40 pounds of nitrogen per acre. If heavy weed pressure exists, however, use the lower amount of nitrogen. Applying too much at this time will encourage excessive weed growth.

After the planted grass emerges and begins to cover, apply 40-60 pounds of nitrogen per acre. This application will help the grass cover quickly. But, don't apply nitrogen if the weeds are outgrowing the grass. It may be necessary to clip or spray broadleaf weeds and annual grasses to reduce their competition with the planted grass.

When the grass is fully established, fertilize as indicated in the next section.

Table 5. P and K Recommendations for Summer Perennial Grasses by Soil Test		
Soil Test Levels	Recommended rate (lb/A)	
	P_2O_5	K_2O
Very Low	100	120
Low	80	100
Medium	60	80
High	0	0
Very High	0	0

Fertilizing Established Grasses

For established summer grasses, apply all the phosphate and potash recommended by soil analysis and 60-80 pounds of nitrogen in the spring soon after the grass begins to grow. In south Louisiana, this is usually early March. In north Louisiana, this is usually in mid-March to early April. Applying fertilizer earlier than this does not make the grass grow any sooner and encourages weed growth. If broadleaf weeds are present, control them before applying fertilizer.

Apply an additional 60-80 pounds of nitrogen in early to mid-June. These two applications are usually sufficient except in south Louisiana. In that area, another 30-40 pounds of nitrogen may be applied in late August or early September for late fall grazing if ryegrass is not to be overseeded in the field.

In summer pastures, ammonium nitrate or ammonium sulfate are generally preferred over urea-containing sources because of less loss of nitrogen from volatilization.

Table 6. Recommended N Rate for Summer Perennial Grasses by Location		
Time	Recommended N (lb/A)	
	North La.	South La.
Grass Growth Begins	60-80	60-80
June	60-80	60-80
Late August	0	30-40

Summer Annual Grasses

Summer annual grasses generally include millet, Sudan grass or a sorghum-Sudan grass cross. These grasses require a higher soil pH than perennial summer grasses. The soil should be limed for these grasses when the soil pH drops below 5.5.

Apply all the recommended phosphate and potash plus 60-80 pounds of nitrogen at or shortly before planting. Apply an additional 4060 pounds of nitrogen monthly after each rotational grazing or cutting.

If a second planting of summer annual grass is made in the same field in the same year, apply 60-80 pounds of nitrogen per acre at the second planting. To prevent nitrate poisoning, don't apply nitrogen to these grasses in dry weather. Also, avoid grazing these grasses after a frost to prevent Prussic Acid poisoning.

Summary

Pastures may be fertilized in many different ways depending on the individual producer's needs. All methods should begin with a good soil analysis. With that information you can execute different fertilizer schemes to reach your desired outcome. The recommendations in this publication assume a relatively heavy stocking rate of about one cow per acre.

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