Nitrogen Fertilizer on Grass Pastures

Nitrogen Fertilizer on Grass Pastures is one of the two biggest factors limiting growth. The other is moisture. Nitrogen deficiency in pastures is commonly indicated by lush, dark green growth surrounding manure and urine spots. It is important to consider nitrogen (N) fertilization and decide if, when, where, what source and how much N to use.

Is N fertilization necessary? If current forage production meets grazing or haying needs, then N may not be necessary. If production is less than desired, N might be useful. First, get a soil test for fertility recommendations for area soils and climate. If soils are lacking in phosphorus (P) or potassium (K), the pastures will not be as responsive to N. So, overall fertility is important.

When to apply N is just as critical. Spring applied N is helpful to increase production if harvested. However, if grazed and forage is already abundant, added growth at this time may not be efficiently used by animals. If so, then a mid-late June application may be the best return to increase mid-summer forage production when it may be more needed. N research in Minnesota showed that applying N in June increased forage production in July and August 0.3 – 0.7 tons/acre.

Since many pastures are under-used in the spring and over-used in summer, one application of 50-75 lbs N/acre in mid-June may be the most profitable in pasture systems. Above 75 lbs N/acre, split applications are a good choice. If applying 100 lbs N/acre, consider applying 50 lb in mid-June and 50 in mid-July. The mid-July application would be to stimulate growth for stockpiled grazing in the fall. If applying 150 lbs N/acre consider three separate applications with 1/3 (or less) in spring, 1/3 (or more) in mid-June and 1/3 in mid-July. At all N rates, efficient use of extra forage is important.

The method in which pastures are harvested will also affect N fertilization strategy. Three tons of grass hay containing 12.5% crude protein will remove about 120 lbs N/acre. If grazed, over 80% of N consumed by livestock is returned to pastures as urine and feces. N fertilization in grazed pastures can be an effective way to increase total N in pastures. However, N is often not evenly distributed by grazing animals. Grazing with higher stocking rates for shorter periods can assist distribution. Shading and watering locations can greatly inhibit N distribution unless well managed.

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Nitrogen fertilization effects on grass pastures enhance plant tops (leaves) which means more forage production per acre and thicker stands. However, it may not lead to better animal performance if not efficiently utilized. N can also affect botanical composition since it will favor more productive grasses. For example, smooth bromegrass and quackgrass will tend to increase over bluegrass with N pasture fertilization.

Nitrogen can impact grass-legume mixtures as it tends to favor grass growth, especially when harvested for hay. P and K tend to favor legume growth. However, under grazing, legumes can generally compete with grasses, even under relatively high N rates. Also, it's important to realize that grass-legume mixtures tend to increase production about 15% over either grown alone. The grass-legume mixture tends to also be a higher quality mix over straight grass mixtures.

Nitrogen sources to pasture by growing legumes or animal manure can be an excellent option. Legumes can provide 80-100 lb N/acre to grasses in a pasture. Manure and urine can return 80% of the N produced by the grazed pasture legumes. Legumes are not only an excellent source for N but research shows that even 200 lb N/acre on cool-season grass pastures (primarily bromegrass) was not as competitive as a grass/legume pasture. The fertilized grass stand produced 20% less forage. However, it may be easier to manage a grass pasture and supply the N than to manage legumes in a grass-legume stand.

Identify and Focus N inputs on more productive areas which contain more fertile soils and more productive species to get the most bang for the bucks. Urea is generally the first and cheapest source if straight N is the concern. If urea is the choice, then try to apply timely before a rain as up to 20% of effective N can be lost to volatilization according to Wisconsin researchers. Compare cost differences along with volatilization potential.

Trials in Michigan using N costs at $0.185/lb plus $3.75 application cost/acre show that added yields of 0.7 tons/acre for each additional 50 lbs N produced forage value twice that of the N application costs. Forage was valued at $50/ton of hay. If forage was only 60% utilized, returns to each 50 lb additional N on bromegrass pasture were $8-$9 per acre. Thus, if utilized, N response to grass pastures is an investment to consider.

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