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NUTRIENT INPUTS AND COOL SEASON FORAGE GRASSES

Cool season grass species can provide high quality forage and pasture for the fall and spring months.

The general ranking of the different forage classes for nutritive value are: legumes > cool-season annual grasses > cool-season perennial grasses > warm-season annual grasses > warm-season perennial grasses. The yield and quality of cool season grasses can be significantly affected by nutrient inputs, so it's a good idea to evaluate fertility programs for these systems going into the fall.

It is well known that nitrogen (N) fertilizer can impact forage grass yield. For example, over 31 site years N alone (120 lb N/A) increased smooth bromegrass forage yield by an average of about 3,600 lb/A (141% over control) in a Kansas study (Lamond, 2002). Nitrogen nutrition also influences forage quality, mostly by increasing crude protein (CP) content. In this study bromegrass CP was increased from 7.2% in the control to 10% by application of 120 lb N/A, based on a 15 site year average. Another example of the quality effect is in an irrigated ryegrass study in Texas where CP was increased from 12% in the control to 20% by application of 240 lb/A (Lippke, 1999).

The application of phosphorus (P) can also significantly impact cool season grass yield. In the above-mentioned irrigated ryegrass study by Lippke the application of P fertilizer (40 lb P₂O₅) increased yield by 4,100 lb/A (163% over control, 3-year average) where 240 lb N was applied annually. Aside from the yield impact, P is most often associated with early root development, but is also affects winter hardiness, disease resistance, drought tolerance, early growth, and seedling vigor. It can also impact N and water use efficiency. Winter forages usually have higher P content than summer forages, and P fertilizer application can increase P tissue levels, thereby impacting forage mineral content. In the above-mentioned bromegrass study application of 30 lb P₂O₅/A increased tissue P levels by 29%, from 0.14 to 0.17%, at the 80 lb N/A rate (11 site years).

Where soil levels are low, potassium (K) can improve pasture and forage crop performance. Where forage is mechanically harvested substantial amounts of K can be exported from soils, thus levels should be monitored by periodic soil testing.

Other nutrients may also be needed for optimal cool season grass nutrition. Deficiency of sulfur (S) is not uncommon in cool season production. Yields may be increased and forage digestibility enhanced by application of S where deficient. In the work reported by Lamond (2002) a S treatment was evaluated where 80 lb N and 30 lb P₂O₅ were applied. Sulfur application (20 lb S/A) increased average yield over 11 site years by 400 lb/A and increased tissue S by 31%, from 0.13 to 0.17%.

A general point to consider is that nutrient release from organic matter in soils tends to be reduced during cool season forage species production periods as compared to warm season species because of lower soil temperatures, thereby increasing the probability of need for nutrient input from external sources.

Information from a sound soil test is usually a good foundation upon which to make nutrient input decisions. Complete and balanced fertility, including consideration of the 4Rs of nutrient management, is critical to producing optimal yield and quality of cool season forages and helps assure the ultimate goal—top animal performance.

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