

Phosphorus, Potassium Management Of Forage Crops

NORCROSS, Ga. — High yielding, quality forage production is critical to achieving a desired level of animal performance and profitability.

Good forage growth places a heavy demand on the soil's nutrient supplying power. Whether the forage is for grazing, winter feed, or sale, optimizing production requires that soil nutrient deficiencies be corrected.

Phosphorus and potassium are key elements in forage crop establishment and year-to-year productivity. Forage crops require phosphorus for photosynthesis, energy, cell division, carbohydrate production, protein synthesis, root development and early growth, winter hardiness, and nitrogen fixation. Potassium plays a similar role in addition to improving the crop's tolerance to drought and minimizing susceptibility to disease. When in proper balance with nitrogen, sulfur and micronutrients, sufficient phosphorus and potassium ensure high yields of quality forage.

The annual removal of phos-

phorus and potassium by forage crops is high relative to annual cereal, oilseed, and pulse crops. Alfalfa removes approximately 15 pounds P₂O₅ per ton and 60 pounds K₂O per ton of forage production. The values for grass hay are 11 pounds P₂O₅ and 45 pounds K₂O per ton. With these rates of nutrient removal, it is easy to see how forage stands can rapidly decline in productivity on soils with either low phosphorus and/or potassium levels or in the absence of nutrient application with fertilizer or manure.

Forage crop phosphorus and potassium requirements are best determined using a combination of soil testing and crop nutrient removal. Soil sampling those areas that represent the good producing areas of the field is the best way of assessing soil nutrient supply. If the field is highly variable, it is better to take several soil samples from each of these distinct areas, as opposed to taking a composite sample. Composite samples in variable fields tend to mask possible problems, and can result in recommendations that either miss a

possible deficiency or suggest fertilizer application where adequate nutrients are available. Based on a combination of average nutrient removal per ton of forage and annual production levels, an estimate can be made of the nutrient removal and fertilizer requirements to correct potential deficiencies.

Given that phosphorus and potassium move very little in the soil, their availability can be strongly influenced by the method of application. Broadcast application and incorporation of enough phosphorus and potassium for several years of forage production in the year of forage establishment is an effective means of ensuring adequate nutrient supply. On soils testing low in phosphorus or potassium, band application methods tend to be superior to broadcasting.

Preplant banding concentrates the nutrients in a limited soil volume, reducing the opportunity for reaction with the soil and leading to reduced plant availability. Once established, forage stands can either be fertilized by surface broad-

cast application or injection into the soil using a low-disturbance disk coultter.

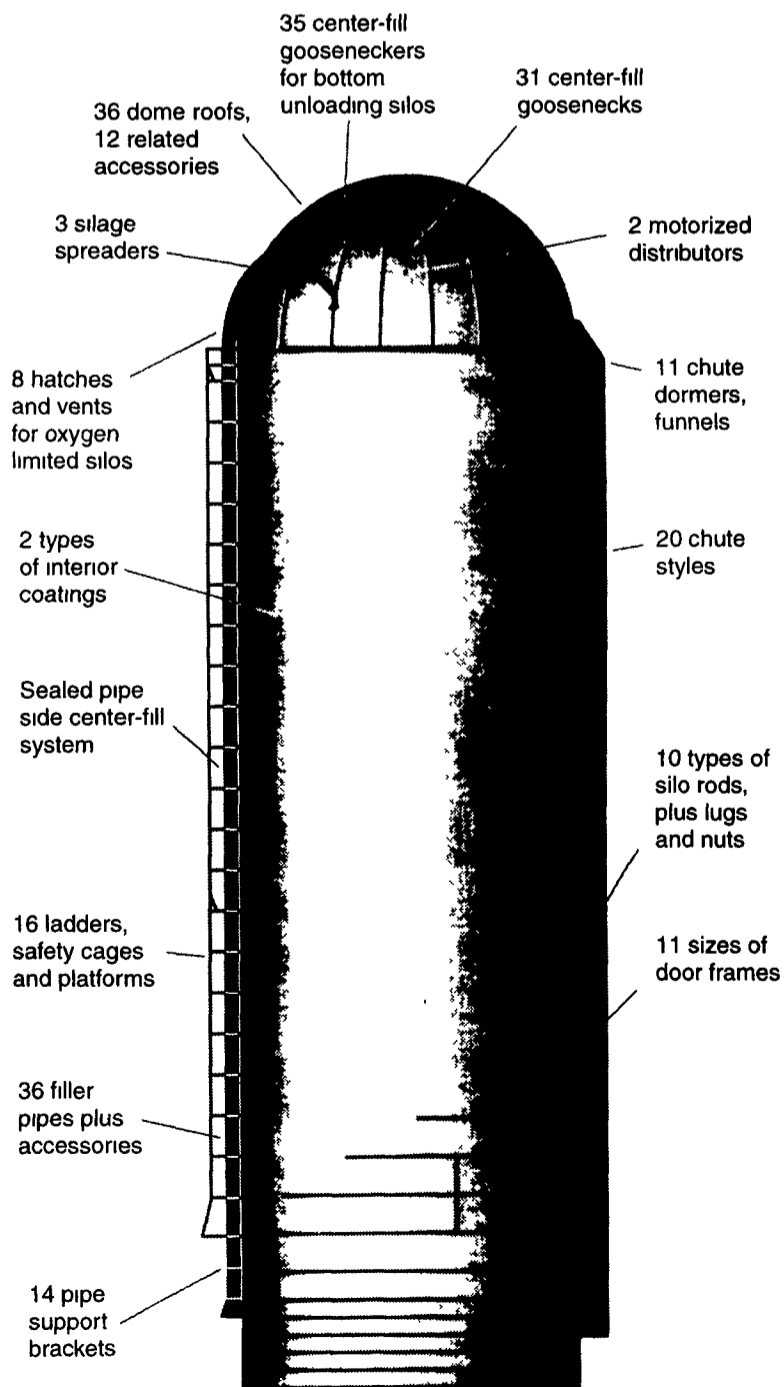
Research conducted in western Canada has reported that subsurface banding of nutrients can improve forage yield over surface broadcast application by 800 pounds per acre per year for alfalfa and 500 pounds per acre per year when renovating mixed forage stands. Low disturbance coultter injection allows for the maintenance of forage yields in established stands, while minimizing the damage to the stand.

Optimizing forage crop yield and quality demands attention to meeting crop nutrient requirements. Forage producers can achieve this with an understanding of crop nutrient requirements for yield and quality, as well as fertilizer application methods that maximize crop response.

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