

Fertilizer Management for Forage Crops in the Canadian Great Plains

A Summary

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Forages are the cheapest source of feed for cattle and play an important role in livestock production in western Canada. Forages are generally grown on low fertility soils and their production can be increased markedly with fertilization. The effectiveness of fertilizers on forages in increasing dry matter yield and economic returns is dependent upon the levels of nutrients in soil, climatic conditions, soil type and forage type.

Grass forages respond very well to N fertilizer on most soils in western Canada and dry matter yield increases from N application are much greater in moist areas than in dry areas.

A large initial one-time application of N produces less sustained production of forage than the equivalent amount of N applied annually over a period of several years.

Early spring broadcast application of N usually results in higher dry matter yield than autumn or late spring applications.

Urea is usually less effective in increasing dry matter yield than ammonium nitrate (AN), but its efficiency can be improved markedly by banding it below the soil surface (i.e., providing the banding operation does not cause any serious damage to grass stand and fertilizer is completely covered with soil).

Seeding high levels of alfalfa in mixed stands with brome grass can generate savings in N fertilizer costs (for pure brome grass stands) equivalent to about 100 kg N ha⁻¹ or more, increase net returns and energy performance, without any detrimental effect on forage yield and quality. Forage yield increase and economic returns from N fertilization of grass-legume mixtures are influenced by the percentage of legume in the mixed stands and initial NO₃-N in soil. Addition of N fertilizer to mixed stands reduces the proportion of legume in the stand.

Pure grass stands often give lower forage yield response to application of P fertilizer than pure legume stands. On P-deficient soils, P application to alfalfa increases dry matter yield, protein and P content in forage.

The residual effect of single application of P fertilizer to forage stands can last for 5 to 10 years.

Legumes (especially alfalfa) have higher requirements for K than grasses. Potassium fertilization has been shown to increase dry matter yield, protein and K content in forage and reduce winterkill of alfalfa.

Sulphate-S fertilization increases dry matter yield, protein and S content in forage on S-deficient soils.

Increasing harvest frequency reduces cumulative dry matter yield and protein content in perennial forages.

Rejuvenation of old forage stands using N fertilizer was found more effective method to improve dry matter yield and forage quality than the mechanical methods.

Aeration and other mechanical methods of rejuvenation showed little benefit, while sod seeding forages into unproductive stands is most effective when pasture growth is suppressed.

Main points to consider when fertilizing perennial forages are: soil test on a regular basis and apply fertilizers according to soil test recommendations, and whenever possible, band the fertilizers (particularly P, K and urea-N) into the soil for most efficient use of nutrients. Alternatively, rates of these fertilizers be increased to compensate for lower efficiency when surface-broadcasting or broadcasting followed by incorporation method is used.