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### PHOSPHORUS PLACEMENT FOR FORAGES

**Forage crops have a big demand for phosphorus.** This ranges from almost 10 pounds of  $P_2O_5$  per ton of grass to 15 pounds per ton of alfalfa. Forages need phosphorus for photosynthesis, energy, cell division, carbohydrate production, protein synthesis, root development and early growth, winter hardiness, and nitrogen fixation in the case of legumes.

**Phosphorus is the key element in forage establishment and continued productivity.** However, in some soils, the plant availability of applied phosphorus decreases quickly following application—especially fine-textured, acid soils. In high pH soils, phosphorus availability also decreases with time, but much of the applied phosphorus remains in plant available forms. Recovery of applied phosphorus ranges from about 10 to 30% in the year of application, but depending on the soil, forages will continue to recover fertilizer phosphorus for many years to come.

**Because applied phosphorus moves very little in soil, its availability to the plant can be strongly influenced by the method of placement.** Before seeding, phosphorus can be broadcast and worked into the soil or banded...either option “banks” phosphorus for later use. Banding on low phosphorus soils tends to be superior to broadcasting because concentrating phosphorus in a limited zone reduces the opportunity for reactions with the soil which lessen availability. Applying large amounts of phosphorus at seeding should suffice for several crops.

**After seeding, surface application has been the most common and most effective method of placement.** Forages have extensive root systems, with root branching, density, and activity greatest near the soil surface, making the crop very efficient at utilizing surface-applied immobile nutrients. However, under dry conditions, topdressed phosphorus may become stranded on the soil surface and inaccessible to shallow feeding roots. In these conditions, placement below the soil surface into moist soil near more active roots may be the best placement option.

**Banding phosphorus into established alfalfa can be advantageous if root disturbance and stand damage are minimized.** An Alberta study showed that banding can be an effective way to apply phosphorus in existing alfalfa stands. Averaged over 4 years, spring band applications of phosphorus produced about 750 pounds per acre more alfalfa than spring broadcast applications. The success of this banding operation is due to the disc-band coulter which cuts a narrow slot in the ground with minimal disturbance of the alfalfa roots. Other studies in established stands using shank openers have shown little advantage for banding over broadcasting because of injury to the stand during the banding operation.

**Whether you are broadcasting or banding—forages needs plenty of phosphorus.** Build your soil tests to the high range before stand establishment and apply enough phosphorus annually to offset crop removal and maintain soil test levels.

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