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Fertilizing Corn in South Dakota

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Fertilizing Corn in South Dakota

Cooperative Extension Service
SOUTH DAKOTA STATE UNIVERSITY
Brookings, South Dakota
Fertilizing Corn in South Dakota

South Dakota farmers are using 3 times as much fertilizer today as they were 30 years ago. About one-half of the fertilizer used in South Dakota is used for corn production, yet it is estimated that we could profitably use 3 to 4 times this amount of fertilizer on corn alone.

PHOSPHORUS

The soil must supply 1.5 pounds of nitrogen, 0.5 pounds of phosphorus (P2O5) and 2.0 pounds of potash (K2O) to produce 1 ton of corn. This mineral is a very small portion of the soil's total mineral content, yet it is responsible for many of the mineral deficiencies we see in corn.

Most of the phosphorus in the soil is in a form that is unavailable to corn. The most available form is called soil solution because only a small portion of the phosphorus in soil solution is leached by rainfall or irrigation. The available phosphorus in soil solution must be replaced from 100 to 500 times than 0.25 ppm (1/2 lb./acre). This phosphorus is the only phosphorus available to the plant. Below 0.25 ppm phosphorus, corn yield losses will occur. Phosphorus in the soil solution must be replaced from 100 to 500 times

NITROGEN

The leaf will eventually die.

In older plants nitrogen will move out of the lower, older leaves into the growing parts. The leaf edges and tips will turn yellow. These yellow strips start on or near the base of the lower leaves. Later, leaves may be reddish-bronze in the center. The leaf will eventually die.

Nitrogen deficiency should not be confused with nitrogen stress. Nitrogen stress in young corn plants is characterized by slow, stunted growth and dark green foliage. In older plants nitrogen will move out of the lower, older leaves into the growing parts. The leaf edges and tips will turn yellow. These yellow strips start on or near the base of the lower leaves. Later, leaves may be reddish-bronze in the center. The leaf will eventually die.

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Most South Dakota soils have large quantities of nitrogen stored in the organic matter (3000-5000 pounds of N per acre) and if it were readily available to plants, no nitrogen fertilizer would be needed. But release of soil nitrogen is extremely slow (it will take 200 years to release enough nitrogen to make a ton of hay) so additional nitrogen needs to be added.

A soil test for organic matter is a good guide for estimating the amount of nitrogen released and should be the first step is deciding how much nitrogen to use. But a soil test is not the whole answer; the previous cropping and tillage practices also play a big part in the nitrogen picture.

Although most crops grown on well-drained soils absorb nitrogen primarily in the nitrate form, other forms of nitrogen in fertilizers are equally effective in increasing corn yields. For a detailed discussion of how much nitrogen to apply and when to apply the fertilizer, see chapter 10 of "Fertilizing Corn in South Dakota," by Edward J. Langin and Earl P. Adams, Extension Agronomist, South Dakota State University.

Phosphorus

Phosphorus is a soil nutrient that is commonly used in combination with other fertilizer programs to improve corn yields. Phosphorus is essential for root development and photosynthesis. Phosphorus is also important for the formation of chlorophyll, which is responsible for the green color of plants.

Nitrogen

Nitrogen deficiency in young corn plants is characterized by slow, stunted growth and dark green foliage. In older plants nitrogen will move out of the lower, older leaves into the growing parts. The leaf edges and tips will turn yellow. These yellow strips start on or near the base of the lower leaves. Later, leaves may be reddish-bronze in the center. The leaf will eventually die.

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The use of starter without adequate nitrogen may mean an addition of 5 to 10 bushels per acre. Usually, 50% to 60% of the potassium is applied prior to planting and the remainder is applied by broadcast or banding.

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