



Potassium for crop production

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Potassium is present in relatively large amounts in most soil, averaging about 1.9 percent. Total K content of soils may range from a few hundred lb/A in some sand soils to more than 50,000 lb/A in some fine-textured soils. This K is distributed in three forms described as unavailable, slowly available and readily available.

Unavailable K is contained in micas, feldspars and clay minerals. It accounts for 90-95 percent of the total K in the soil. Plants cannot use this potassium over the course of a season. However, over a long period of time, some of this K becomes available.

Slowly available K is trapped between the layers or “plates” of certain kinds of clay particles and is sometimes called “fixed” potassium. This form accounts for 3-9 percent of the total K in the soil. Plants cannot use much of the slowly available K during a single growing season. However, the soil’s ability to supply K over a longer period of time is related to its supply of fixed K.

Readily available K is held on the surface of the clay and organic matter as exchangeable. A small amount of available K is present in soil solution. These two forms represent 1-2 percent of the total K and are readily absorbed by plants. Soil tests for available K extract these forms, but do not remove unavailable and slowly available forms of K.

Since K^+ is attached to the exchange complex of the soil, it is not readily leached on most soils. However, on organic soils, sands and loamy sands there may be considerable leaching over the course of a winter. Consequently, fall broadcast applications on these soils are not advisable.

It is generally thought that K is equally effective whether broadcast or banded. Where large rates are needed, broadcast provides a convenient method of application because excessive amounts of banded K may reduce germination. On soils testing less than 100 lb K/A, up to 75 lb K_2O/A should be banded.

There is increasing evidence that some K should be banded in no-till corn and on corn grown on poorly drained soils particularly where small amounts are needed.

Some recommendations suggest that soils should be fertilized to a predetermined soil test level for optimum yields. Data from Michigan, Wisconsin, Ohio and Iowa doesn’t support this concept. These data show that similar yields may be obtained with the combination of fertilizer K at a lower soil test compared to where the soil test was adjusted to a predetermined level. Consequently, there is no advantage to large build-up applications of potassium fertilizers.

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