



# Applying Fertilizer and Lime to CRP Land

## SUMMARY

Sample and test soil to determine how much fertilizer, manure, and lime to apply to meet crop needs when converting land in CRP to crop production.

### Soil Sample First

The soil fertility status may have changed since establishment of CRP. Soil testing is the only method to determine nutrient needs for the following crop. Take soil cores to a 6-inch depth, with at least 10-12 cores per sample. The sampling pattern can be based on a systematic grid system, soil map units, or a spatial organization of sampling areas according to similar management zones. Each sample should represent a uniform field area, which often means collecting samples from approximately 10 acres or less. Soil should be sampled in either the fall or spring. While it will be easier to sample CRP land before planned tillage, for improved determination of crop available phosphorus (P) when tilling CRP land, sampling a few weeks after tillage may give a better representation of crop P availability. See Iowa State University Extension publication *Take a Good Soil Sample*, (PM 287) for more specific information on soil sampling. Have soil samples analyzed for P, potassium (K), pH, and lime needs (soil buffer pH).

### Phosphorus and Potassium Fertilizer Application

Guidelines for soil-test P and K interpretation and fertilizer application for agronomic crops described in Iowa State University publication *A General Guide for Crop Nutrient and Limestone Recommendation in Iowa* (PM 1688) do apply to land being taken out of CRP and converted to crop production. Fertilization rates should be

decided based on soil-test results and estimates of P and K crop removal. No one specific P fertilizer application method is recommended for Iowa crops, except for starter in some conditions (for example, with early corn planting dates in wet and cold soils or those soils covered with high amount of plant residue). For K, however, deep-band fertilizer application (5 to 6 inches deep) is recommended for no-tillage and ridge-tillage management.

If the CRP land is to be managed with full-width tillage, P and K fertilizer materials should be applied before primary tillage (chisel or moldboard plowing) or before secondary tillage (disking or field cultivating).

If the CRP land is to be managed with no-tillage, deep banding all or part of the K fertilizer is recommended, although P can be deep banded also. If the CRP sod left a large amount of residue and the planned P and K rates are equal to or less than the need of one crop (as compared to applying once the need of a 2-year crop rotation) then starter fertilizer may be beneficial for corn; mainly when strip tillage and deep-band fertilization are not used. With no-tillage management and expected both high residue cover and dense root mass in the topsoil, a small amount of P-K starter can help a corn crop; mainly when broadcast rates are small or not applied. Starter nitrogen (N) also can be beneficial for corn unless the full N recommendation is applied pre-plant in spring.

This bulletin is part of a series to help CRP contract holders assess the land-use options available to them when the contracts expire. The series is funded in part by the Leopold Center for Sustainable Agriculture. Other bulletins in the series and additional information are available at county ISU Extension offices.

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## Nitrogen Fertilizer Application for Corn

Because of the expected large amount of plant residue, both root mass and above ground plant material, that will be decomposing from CRP sod, soil N and some of applied fertilizer N will be immobilized (tied-up) by organisms during decomposition. Until the energy (food) supply in the residue is used up, the immobilized N will not be available for plant use. Estimating mineralization (release) and immobilization of N following CRP, and therefore expectation of soil supply of crop available N to corn, is difficult.

A preferred approach for meeting the N needs of a corn crop following CRP includes two steps: (1) apply approximately two-thirds of the estimated amount of needed N as fertilizer or manure before or at planting and (2) use the late spring soil nitrate test to determine the amount of additional fertilizer N needed, if any, and apply it sidedress. Use of the soil nitrate test can be valuable if manure is applied to meet crop P and K needs. See ISU Extension publication *Nitrogen fertilizer recommendations for corn in Iowa* (PM 1714), for corn N fertilization requirements, and guidelines for soil sampling and interpretation of the soil nitrate test.

A broadcast application of N will be more susceptible to immobilization than a knifed-in or injected band regardless of the form of N applied. Also, a surface broadcast and non-incorporated application

of urea or solutions containing urea (UAN, urea-ammonium nitrate solution) is not recommended because of potential volatilization loss from the urea. This potential loss is greatest when large amounts of plant residue are on the soil surface, such as in no-tillage and that present after CRP, and if limestone is surface applied and not incorporated into the soil.

## Soybean Inoculation

Because it will not be known if sufficient rhizobia are present to nodulate soybeans, applying an inoculant at planting is highly recommended. If nodulation does not occur, N fertilizer application is the only good rescue treatment.

## Limestone Application

If the soil test indicates a need for limestone to neutralize soil acidity, limestone should be applied and tilled into the soil, preferably by moldboard plowing or chisel plowing and disking. Limestone that is left on the soil surface and not tilled into the soil will initially raise the pH where the lime is applied, and will only slowly increase pH below the surface layer. The recommended amount of limestone to apply is adjusted for the depth of tillage, which determines the volume of soil to be neutralized. Be sure the depth of tillage is stated on the soil sample information sheet when sending soil samples to the soil testing laboratory. If the field is to be managed with no-tillage and there will be no cultivation for weed control, state a 2 to 3-inch soil depth.