

# A sensible approach to crop fertilization

## Editorial

Over the last 20 years, many growers have applied fertilizer with the philosophy that more is better (insurance) to guarantee a high crop yield. Unfortunately, that practice not only costs more dollars per acre, but in reality does not consistently increase crop yields. There are several reasons why applying excess fertilizer does not translate into higher crop yields. Weather has a profound effect on plant growth during the growing season from planting to harvest. You really need to work with weather and not against it and not production decisions based on the yearly calendar. Generally, the recommendation for planting crops in the spring is when the soil temperature is at least 55°C three inches deep. Whether seeding or transplanting, cold soil temperatures reduces root and plant growth but also will stress the plant/seedling so that stress ethylene is produced by the plant or seed. Ethylene is a signal for both insect and disease infection. Prior to applying any fertilizer, a soil test is recommended at least every other year if not annually.

Soil testing will not only report the current level of major and minor elements in the soil, but can also report soil pH, cation exchange capacity, soil organic matter and composition of soil - sand, silt and clay. Soils samples for testing should be taken at about the same time every year and consist of soil samples from at least 20 cores per acre.

Broadcasting fertilizer is relatively easy and quick; however feeding potential weeds can lead to significant competition with crops. Also, broadcasting fertilizer weeks before planting the crop may result in significant leaching of nitrogen from soil under extreme rainy weather. The most efficient method of applying fertilizer to crops is banding the fertilizer two inches deep by two inches from the crop row at the time of planting the crop. Thus leaching of nitrogen is minimized and fertilizer rates are one-half banded versus broadcasting the same fertilizer. Once the crop has reached a 4 to 6 leaf stage of growth, side-dressing with low rates of nitrogen, only macro nutrients or both macro and micro nutrients (complete fertilizer) will maintain active plant growth. Application of high rates of nitrogen at the 4 to 6 leaf stage of growth can result in excessive vegetative growth at the expense of reproductive growth. Application of low rates of nitrogen over the course of the growing season insures not only optimum vegetative growth, but also optimum reproductive growth (fruits, flowers and seeds).

Injecting fertilizers in a drip irrigation tape in a plasticulture production system (raised beds with drip irrigation tape placed 2 inches below the soil surface and then covered with plastic mulch film) is recommended especially with small fruit and vegetable

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production. Injection of low rates of complete fertilizer weekly over the growing season not only enhances vegetative plant growth, but also very vigorous and healthy roots. Crops grown in a plasticulture system with weekly injections of complete fertilizers appear to somewhat more tolerant to disease infections.

Application of water soluble fertilizers at low rates when applying fungicides or insecticides during the growing season maintains active, healthy plant growth and development. Depending on the crop being fertilized, the application of macro nutrients (N, P, K, Ca and Mg) may only be the required elements for optimum plant growth. However, there are some crops that require not only the macro nutrients, but also the minor elements (Zn, B, Cu, B and Fe). Crops that require 100 plus days to reach maturity are prime candidates for application of both major and minor elements. Conducting tissue analysis (1 to 3) of the long maturing crops over the growing season is recommended. Tissue test results will help determine whether visual plant symptoms are due to nutrient deficiency, herbicide toxicity or disease.

There are several elements that are not generally applied on a regular basis including sulfur, silicon, cobalt, nickel and molybdenum. All of these elements support physiological metabolism in plants and are required in small concentrations to be effective in plant growth.

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## Conflict of interest

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