

Observations: Nutrient Deficiencies in Kansas Wheat

by Matt Hagny & Ray Ward

TECHNIQUE

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Our crop nutrition program has numerous problems, to say the least. We have been complacent, and (to some extent) led astray by the often-stated ‘fact’ that wheat is less likely to be responsive to some of the micronutrients than are the summer crops. One suspicion is that no-till possibly changes this in our climate, especially in certain crop sequences, due to those soils not having enough warmth (and time) to mineralize appreciable amounts of these nutrients from soil organic matter. This would be particularly true, for instance, for wheat following soybeans.

A related issue is the building of soil organic matter under well-managed no-till, which is itself a ‘sink’ for many nutrients (you get them back, just not right away—it is similar to having a retirement account with

penalties for withdrawing early: the money is there, just not available to you at the moment unless you are willing to suffer losses to get it). Meanwhile, all these nutrients are being exported from the land as grain (or animal product) without replenishment, unless they are part of your fertilizer program. Eventually the soil cannot supply enough nutrients for the crop, and this happens regardless of tillage regime—converting long-tilled land to no-till simply advances the timeline a bit.

The article by Wayne Smith (see page 351) is an excellent primer for learning to diagnose plant nutritional deficiencies. As he has noted, symptoms vary in their expression due to climate and crop genetics, etc.,

so here we present a few photos to show Kansas wheat being afflicted by nutritional disorders. We would strongly encourage plant tissue analyses to confirm visual symptoms



Copper-deficient wheat in Kansas. The uppermost leaf is tipped, and rolls tightly. In the other photo, the head is distorted by copper deficiency. These occur over a wide area in Kansas. Freezes may get the blame, but weren't involved in either case.

Photos by Matt Hagny.



Zinc-deficient wheat in Kansas (variety: Santa Fe) despite applications of zinc both in-furrow and broadcast pre-plant. The Kansas climate produces very slow-growing wheat as dormancy breaks in early spring, which may be the cause of Zn-deficiency symptoms a bit different than Smith describes. Note the overall paleness of the plant, that the leaves are less than half of normal size, and the leaves have a slight upward bending or abnormal curling (spiraling). A few leaves do have the classic dead band across the leaf (margin to margin) with the outer half of the leaf still alive and green, although probably not over one in 300 leaves in this area exhibits that symptom despite acute Zn deficiency (and no other deficiencies present). Later in the season, the plants are thin-stemmed and have narrower-than-normal leaves, with the pale green persisting. The classic dead bands mid-leaf become more prevalent by 2d-node and boot stages.