



Mitigating wheat yield loss in acid soils

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Drone image of a central Montana field of safflower exhibiting symptoms of aluminum toxicity from

Drone image of a central Montana field of safflower exhibiting symptoms of aluminum toxicity from low-pH surface soils. Photo by Dr. Scott Powell.

Low surface pH (0–4 inches) is becoming commonplace in agricultural soils fertilized regularly with high rates of nitrogen, even in regions where soil pH has historically been very high. Lime applications can minimize yield loss caused by aluminum toxicity in acid soils but may not be economical in dryland wheat systems. Planting wheat varieties tolerant to aluminum is a potentially lower-cost alternative to liming, but aluminum tolerance is not the only important consideration.

A two-year field study recently published in *Agricultural & Environmental Letters* found that yield of a given spring wheat variety was dependent on whether it carried a genetic marker for aluminum tolerance (*TaAlmt1*) as well as its “adaptedness,” or its ability to achieve high grain yield across multiple locations with disparate weather and soil conditions. The data show plant-available aluminum concentrations are more

variable than soil pH in the same study.

In light of this variability, the authors recommend selecting varieties with strong yield potential in both low- and neutral-pH soils. On farms and fields with documented low-soil-pH issues, an appropriate cultivar suitability index is grain yield in acid soils (pH < 5) averaged with grain yield in non-acid soils (pH > 6.5).

Dig Deeper

Fordyce, S., Jones, C.A., Dahlhausen, S.J., Lachowiec, J., Eberly, J.O., Sherman, J.D., McPhee, K.E., & Carr, P.M. (2020). A simple cultivar suitability index for low-pH agricultural soils. *Agricultural & Environmental Letters*, 5, e20036.

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