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When acidity goes high, wheat goes low

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Lead author, Christopher Gillespie, soil sampling a high-acidity plot. Photo by Hailin Zhang.

While the disastrous implications of the 1930s Dust Bowl have long since waned in the U.S. Great Plains, a different set of challenges has befallen the extensively cattle-ranched and heavily cultivated areas of this region. Those challenges are soil acidification and aluminum toxicity.

Researchers from north-central Oklahoma investigated the response of eight closely related wheat cultivars to changes in soil acidity and aluminum concentrations. Half of the cultivars possessed a trait for aluminum tolerance while the other half did not.

Results of the research, published in *Agronomy Journal*, showed that as aluminum concentrations increased, wheat yields decreased—despite the presence or absence of the trait. Surprisingly, the superiority of the cultivars (trait vs. no trait) switched between study years, revealing that the advantage of cultivars possessing vs. not possessing the trait in acidic soils was contingent upon environmental factors like soil moisture.

In lieu of a nationally orchestrated response to the spreading plight of soil acidification, acid-tolerant winter wheat cultivars stand as an economical and advantageous asset to farmers. However, this study suggests that the long-term productivity of forage and grain grown in acidic soils is not completely partial to plant genetics. Instead, climate and soil remediation are major considerations to keeping productivity high.

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Gillespie, C.J., Marburger, D.A., Carver, B.F., & Zhang, H. (2020). Closely related winter wheat cultivar performance in U.S. Great Plains acid soils. *Agronomy Journal*, 112. **https://doi.org/10.1002/agj2.20329**

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