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Breeding maize to expand low-protein diets

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First author Matthew Woore in the field evaluating corn varieties. Photo by Jim Holland.
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As many as a million people worldwide suffer from genetic conditions that prevent their bodies from metabolizing specific amino acids. These individuals must maintain strict low-protein diets throughout their lifetime, which limits their food options and prevents them from partaking in culturally significant foods with their families and communities.

In a new *Crop Science* article, researchers report on efforts to identify low-protein cultivars of maize and evaluate their potential for use in a low-protein breeding program to enhance the utility of maize in these specialized diets.

The team found a wide range of kernel protein levels (5–18%) in both wild-type and mutant maize lines. Protein content was mostly conditioned by genetics rather than environment, indicating that it is amenable to modification by breeding. The team also determined that hybrids had lower protein content than inbreds, suggesting that hybrid corn varieties made from low-protein lines would have even lower protein content.

Low-protein lines were found that do not rely on kernel mutations for their effect, which might form the basis of a useful low-protein maize breeding program. This research points the way toward a targeted breeding program to develop a low-protein food-quality maize to improve the lifestyles of people on low-protein diets.

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Woore, M.S., Flint-Garcia, S.A., & Holland, J.B. (2021). The potential to breed a low-protein maize for protein-restricted diets. *Crop Science*.

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