

Gene-edited Ethiopian ‘teff’ grain with that prevents yield loss will not be regulated, USDA determines



pre-market regulatory status review conducted by the United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service has concluded that teff modified by genome editing to have a semi-dwarf stature is not subject to biotechnology regulation under USDA’s SECURE Rule.

The new semi-dwarf teff was developed by researchers at the Donald Danforth Plant Science Center’s [Institute for International Crop Improvement](#) (IICI), who are collaborating with the Ethiopian Institute of Agricultural Research to improve teff productivity using new plant breeding techniques. The reduced height of the new teff lines is expected to provide resistance to lodging (falling over) that results in yield losses of up to 25%.

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Lodging in teff, which causes the plants to bend or break because of wind or heavy rain, can significantly reduce harvestable yield of the grains and makes the plant more susceptible to diseases and pests. This can lead to reduced grain quality, such as lower protein content and increased levels of contaminants.

“I grew up on a farm in Ethiopia and know first-hand that if we succeed, the benefits will be immense for our farmers,” said the IICI’s Senior Manager, Regulatory Science, Getu Beyene Duguma, PhD.



Comparison of plant heights of unmodified Teff with edited lines containing various combinations of knockout mutations in genes controlling plant height.

Teff is a small grain native to Ethiopia, where it is a staple food for millions and is estimated to provide up to two-thirds of the protein and dietary fiber consumed in the country. In addition to being a staple food for Ethiopians, teff is also an important source of income for many small-scale farmers in the country.

Teff has gained popularity worldwide due to its many health benefits and culinary versatility. It is a nutrient-dense grain that is high in protein, fiber, and several important minerals such as iron, calcium, and magnesium. Teff is also gluten-free, making it a great option for people with celiac disease or gluten intolerance. Teff production in the western United States, primarily in California, Colorado, Idaho, Nevada, and Oregon, has been increasing in recent years because of a growing demand for gluten-free and healthful grains.

“We are greatly encouraged by this USDA decision as it establishes an important precedent for future teff plant breeding innovations to tackle productivity constraints, such as pod shattering, small grain size, weed control, and climate change,” said Donald MacKenzie, PhD, executive director of IICI. “Our semi-dwarf teff lines will be undergoing field performance evaluation this year at the Danforth Center’s field research site.”

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