Gene editing poised to spark innovation in herbicide- and disease-resistant sugar cane

Sugarcane is one of the most productive plants on Earth, providing 80 percent of the sugar and 30 percent of the bioethanol produced worldwide. Its size and efficient use of water and light give it tremendous potential for the production of renewable value-added bioproducts and biofuels.

But the highly complex sugarcane genome poses challenges for conventional breeding, requiring more than a decade of trials for the development of an improved cultivar.

Two recently published innovations by University of Florida researchers at the Department of Energy's Center for Advanced Bioenergy and Bioproducts Innovation (CABBI) demonstrated the first successful precision breeding of sugarcane by using CRISPR/Cas9 genome editing — a far more targeted and efficient way to develop new varieties.

CRISPR/Cas9 allows scientists to introduce precision changes in almost any gene and, depending on the selected approach, to turn the gene off or replace it with a superior version. The latter is technically more challenging and has rarely been reported for crops so far.

"Now we have very effective tools to modify sugarcane into a crop with higher productivity or improved sustainability," [researcher Fredy] Altpeter said. "It's important since sugarcane is the ideal crop to fuel the emerging bioeconomy."

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