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Kent McKenzie, director and plant breeder, California Rice Experiment Station, says researchers discovered a single recessive gene in a common rice variety that makes it resistant to the herbicide Oxyfluorfen, providing hope that one day weed control in rice systems may be easier.

CROPS > RICE

Rice researchers discover herbicide resistance in popular variety

Any possible new rice variety is years away, but researchers are hopeful based on what they've seen in the greenhouse and test plots

Todd Fitchette 2 | Sep 27, 2017

A discovery by researchers at the Rice Experiment Station in Biggs, Calif. offers hope that a possible new rice variety may someday give growers better control of weeds in the aquatic system.

Kent McKenzie, director and plant breeder with the Rice Experiment Station (RES), says the idea came about in the greenhouse when studies of the popular M206 variety showed signs of resistance to Oxyfluorfen, an herbicide with other agricultural applications, but one not labeled for use in rice.

Weed control in California rice is a challenge for growers.

“It’s huge and it’s expensive,” McKenzie says.

Earlier this year, a granular mixture of benzobicyclon and halosulfuron, the active ingredient components of a Gowan Company product called Butte, was registered for use in California rice. What excited growers at the time is Butte provides a new mode of action (Butte is an HPPD-inhibitor) previously not offered in California rice systems.

According to McKenzie, researchers studying Oxyfluorfen (a PPO-inhibitor) in the greenhouse discovered M206 rice plants – a common variety among California growers – were not damaged by the herbicide. Additional tests and conventional breeding procedures from early populations of resistant rice found nine plants that did not die when exposed to Oxyfluorfen.

“So at that point we got a little excited and thought maybe we have something that is resistant to this herbicide,” he said.

From there McKenzie said researchers began looking at different kinds of weeds common to California rice systems that could be controlled by Oxyfluorfen and if it can work in the field.

“The advantage of this is we found it in M206 which is our most widely-grown variety,” he said. “From the plant breeding end this is very desirable because we shouldn’t have to fix a lot of things.”

Also desirable, and unlike other technologies that allow herbicides to be applied over the top of resistant crops, is this process does not involve genetic engineering.

“This isn’t going to fly in rice,” he said. “The technology is there but the markets haven’t accepted it.”

Instead, genetic studies show that the trait causing the herbicide resistance is inherited as a single recessive gene through common, long-standing breeding practices.

Though not a variety at this point, McKenzie says the Oxyfluorfen-resistant rice has been given the name “ROXY,” and is now patent-pending. Discussions are also under way to find a company willing to serve as the registrant for a product that could be labeled for California rice.

The search for a new mode of action to control rice weeds is critical as these weeds are developing resistance to currently labeled herbicides.

“It looks promising,” McKenzie says. “We still don’t know how long it will be before we have this, but people keep asking me and I just tell them ‘I’ll have the variety by the time you have the label’.”

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