

Volunteer GM wheat, mischief or carelessness?

Local scientists and US Department of Agriculture (USDA) officials in May reported finding genetically modified (GM) soft white wheat growing as weeds on an Oregon farm. Uncovering Roundup Ready wheat growing where it should not is proving puzzling for industry, agricultural and university experts as well as activists and investigators, particularly because this GM crop was never given the commercial go-ahead. Although some express mere perplexity, others make more pointed allegations of sabotage and eco-terrorism. In any case, wheat farmers faced more immediate worries when both Japanese and South Korean buyers suspended plans to purchase US-grown soft wheat varieties that resemble the GM-contaminated variety, despite its being found only in minuscule amounts on a single farm. In addition, lawsuits are being filed against Monsanto of St. Louis, the ultimate if indirect source of the GM wheat. More broadly, this incident has dealt another setback to the commercial development of GM wheat of any kind, largely on hold for the past few years (*Nat. Biotechnol.* 27, 974–976, 2009).

This episode began when an Oregon farmer, whose identity and farm's location are carefully kept secrets, noticed that at the time of spraying

a fallow field to clear weeds in preparation for planting, 'volunteer' wheat plants (not planted by the farmer but that sprout spontaneously among other weeds) did not die when treated with the herbicide glyphosate, which Monsanto markets as Roundup Ready (RR). The farmer had planted two kinds of soft wheat the previous growing season, neither of which was RR tolerant as such wheat seed is not commercially available.

The farmer sent samples of those herbicide-resistant volunteer plants to scientists at Oregon State University (OSU) in Corvallis for analysis. "My first reaction was 'no, it can't be,' but the plants tested positive as transgenic for the CP4 gene [*cp4 epsps*], which is present in all RR crops," says OSU weed science professor Carol Mallory-Smith, the first to analyze those samples. "How that trait got there, I have no idea, and it is still a mystery."

OSU scientists in turn contacted USDA, where further analysis became the responsibility of officials in the Animal and Plant Health Inspection Service (APHIS). Their investigation of the GM wheat from Oregon, which began early in May, is "active and ongoing," and will continue until "we run all the leads down," says Brian Mabry of USDA. Although spare on details, APHIS officials confirm the presence of the RR trait in wheat samples from that single farm in Oregon but no others. They also confirm that this trait corresponds to *cp4 epsps* that Monsanto tested in USDA-authorized field trials of several GM wheat varieties in 16 states from 1998 to 2005. Furthermore, the GM wheat from Oregon poses no food safety concerns, and "all information collected so far shows no indication of the presence of GM wheat in commerce," they say. Although USDA sanctioned numerous GM wheat field trials in past years, no such GM variety was ever "deregulated," that is, approved for commercial production.

Soon after this information was made public, Japanese and South Korean wheat buyers said that they would postpone purchasing US soft wheat from Oregon, Washington and Idaho, whereas officials from Taiwan said they would not buy US soft wheat from Oregon, according to Blake Rowe who heads the Oregon Wheat Grower's League in Pendleton. Meanwhile, two national wheat organizations, the US Wheat Associates (USW) and the National Association of Wheat Growers (NAWG) took steps to shore up "the trust we've earned with our customers at home and around the world."

Without doubt, wheat growers are watching these matters closely. "Our crops in

IN brief

Paper firm to improve poor farmers' crops

A Brazilian forestry company will be sharing yield-enhancement traits used in woody crops with a nonprofit research institute to improve the resilience of staple crops grown by small farmers in arid and semi-arid regions of Asia, Africa and Brazil. On May 29, Sao Paulo-based FuturaGene, a wholly owned subsidiary of forestry and paper company Suzano Pulp and Paper, based in Sao Paulo signed an agreement with the Donald Danforth Plant Science Center, a large nonprofit research institute based in St. Louis. The Danforth Center will use the agbiotech company's technology, already tested in genetically modified (GM) eucalyptus and poplar, to boost plant biomass levels, improve crop adaptation to climate change and facilitate processing for animal feed in strategic crops. The technology hinges on the endo- β -1,4-glucanase *CEL1* gene isolated from *Arabidopsis thaliana*, which encodes an enzyme implicated in cell wall metabolism. Expressing this gene relaxes the crystalline matrix of the plant cell wall facilitating cell expansion. Eucalyptus variants overexpressing this glucanase gene are currently in regulatory trials in Brazil. The Danforth Center expects to introduce the transgene into the model grass setaria and, if successful, to millet, sorghum and cassava. "We can envisage applications to increase biomass accumulation or to reduce crop-cycle duration," says Mike May, FuturaGene vice president of public affairs. This alliance "is an example to follow on what is possible when the public and private sector break down the barriers and join forces towards putting advanced technologies in the hands of resource-poor farmers," says Marc Van Montagu, chairman of the FuturaGene scientific advisory board and recent winner of the 2013 World Food Prize. "I believe that Brazil has a powerful role to play in guiding and training other countries, particularly in Africa," he says *Anna Meldolesi*

IN their words



"Activists have been working on this [GM food] labeling issue for a long time because they see it as a way to influence industry behavior. And they haven't had a lot of success in the United States otherwise."

Rachel A. Schurman, a sociology professor at the University of Minnesota, comments on the expected focus on GM foods in trade talks between the US and the EU. (*The New York Times*, 10 July 2013)



The wheat incident in Oregon has dealt another setback to the commercial development of genetically-modified wheat.