



Drought resistant GM crops ready 'in four years'

GM oilseed rape and maize that tolerate water shortages are in field tests - opponents remain sceptical

James Randerson Science correspondent
theguardian.com, Wednesday 8 October 2008 00.01 BST



More and more maize is being grown for ethanol in the US, where it is generously subsidised. Photograph: Christopher Furlong/Getty Images

Genetically modified crops that are drought resistant will be grown by farmers within four to five years, according to scientists developing the technology.

Dr David Dennis, the chief executive of Performance Plants Incorporated in Kingston, Ontario, said varieties of drought-tolerant oilseed rape and maize were already being tested in field trials in the US. He claimed the new varieties can increase yield by 40% when the plants are most water-stressed.

Climate scientists predict that global warming will make arable land in many developing countries less productive or unusable. Advocates of GM crops often defend the technology by arguing that drought and salt-tolerant varieties can play an important

role in adapting to global warming.

Last month, the then UK science minister Dr Ian Pearson told the Guardian he thought the British public would support GM if the industry demonstrated environmental benefits.

"I think that the public want to see benefits for GM technology for the consumer, not just for the fertiliser company or the farmer. If GM can demonstrably provide benefits for people living in sub-Saharan Africa then I think the public will want to support those as products and want to see them commercialised," he said.

But GM's opponents counter that drought and salt tolerance always seems to be just out of reach. "We would take any claims that these crops are just around the corner with a large pinch of salt because we have heard it all before," said Claire Oxborrow of Friends of the Earth. So far, almost all GM varieties available commercially are either tolerant of herbicides or produce their own pesticide.

She said that companies are using the food crisis and the threat of climate change as a PR opportunity. "We are seeing a lot more promises, especially now connected with the food crisis," she said.

Dennis said his company is developing several crops with modifications to existing genes which result in a variety of different effects. The company plans to license its technology to major crop companies such as Syngenta and Pioneer.

Drought-tolerant oilseed rape plants, which have been in field trials in the American Mid-West, Colorado and California for four years, are at the most advanced stage. A drought tolerant variety of maize has been tested in field trials for two years. The company is also working on modifications for more efficient water use, larger seeds, heat tolerance and increased biomass. The latter modification is aimed at producing fast-growing material for the nascent biofuel industry.

Dennis predicted that it would take four to five years of field testing and clearing regulatory hurdles before the plants can be sold. "You've got to show that it will work in situ in the field over several years," he said.

One concern is that the plants may cross with wild relatives, potentially creating a drought-resistant super-weed that becomes impossible to eradicate. Dennis said that this was a remote possibility because hybrids between his crop varieties and wild species do not survive well.

"Is there a risk in it? There's risk in everything we do," he said. "I think the risk is so

small I'm not worried about it. But I am worried about what we do if we don't develop these technologies."

He said the world needed a 21st century version of the "green revolution" to increase crop yields to feed the projected world population of 9 billion by 2050.

Dennis said his company would also make the technology freely available to farmers in the developing world. Performance Plants signed an agreement with Africa Harvest Biotech Foundation International — an NGO based in Kenya that has previously collaborated with Monsanto — which allows them to distribute the technology without paying licence fees.

"If the technology is used by small farmers we will forgo any royalties. It will be available to them free of charge," said Dennis. The group is also beginning work on pursuing similar genetic modifications in local crops such as sorghum and cassava.

The company identified its target genes by inducing genetic changes in up to 100,000 plants — for example by blasting them with x-rays — and screening them for desirable characteristics. Dennis's researchers then select those plants with the desired characteristics. The drought tolerant varieties have a mutation that changes the activity of an enzyme called farnesyltransferase. The modification leads to changes in the way the plant reacts to a hormone that is involved in its response to low water levels. "The plant responds to drought a lot faster and more effectively than other plants," said Dennis.

Oxborrow said she was sceptical that significant drought tolerance could be achieved with a single gene change. "The reason we haven't seen drought tolerant crops come to commercial reality so far is because the plant physiology is much more complicated than the relatively simple technology around herbicide tolerance and insect resistance," she said. "Plant scientists are still working out how plants cope with water shortage."

More from the Guardian [What's this?](#)

[FBI struggles to seize 600,000 Bitcoins from alleged Silk Road founder](#) 07 Oct 2013

[Chase and Status: Brand New Machine – review](#) 06 Oct 2013

[How teachers are rated in 21 countries around the world](#) 03 Oct 2013

[Climate change sceptics aren't all alike, so don't tar them with the same brush](#) 09 Oct 2013

More from around the [What's this?](#)

web

[13+ Things You Shouldn't Eat at a Restaurant](#) (Reader's Digest)

[Coconut Donuts](#) (Foodie)

[Six plants that repel mosquitoes](#) (Canadian Gardening)

[A turning point for deforestation](#) (Sydney Morning Herald Environment)

Badger cull has killed less than half the number of animals intended 07 Oct 2013

How 3D Printing Will Turn Manufacturing on Its Head (CSC)

© 2013 Guardian News and Media Limited or its affiliated companies. All rights reserved.