

PRODUCING MORE CROP PER DROP

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Nearly every year, some parts of the United States and other parts of the world suffer from drought, which can hamper the growth of crops and significantly reduce harvests. It is estimated that in any given year, one-third of all U.S. corn acres probably experience some level of yield-reducing drought stress. Climatologists believe that our changing global climate might produce even more severe and widespread dry conditions in the future, with potentially serious consequences for agriculture and food availability (Wenzel, 2008).

Did You Know?

- Drought affects large parts of the United States every year and has been a persistent problem in agriculture for centuries. Now some experts predict the United States could face more erratic weather patterns that affect our daily lives, including food production.
- Adequate water is the most pressing challenge for the nation's farmers who provide us with essential crops and grains for food, fiber, and, increasingly, for the production of biofuels to enhance our nation's energy security. It is predicted that, if present consumption patterns continue, two out of three people will live in drought or water-stressed conditions by the year 2025 (UNEP, 2001).
- For over 12 years, farmers have been using plants improved through biotechnology to combat environmental stresses such as insects and to control weeds more effectively.
- Dealing directly with drought conditions is the next frontier. New developments in agricultural biotechnology can play a role in helping American farmers produce crops that use water more efficiently, thus reducing the negative consequences of drought. Climatologists, scientists and farmers today see biotechnology as having the potential to help address this challenge.



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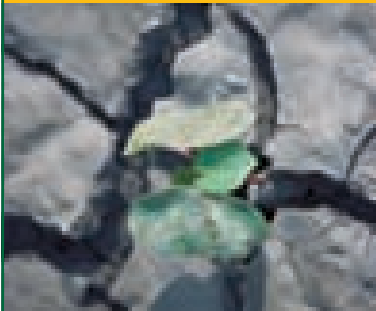
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Field testing is well underway for a variety of drought-tolerant crops, including corn and canola. Initial results show encouraging yield increases for some crops. Drought tolerant corn could be widely available as early as 2010.



Biotech Crops: Environmental Stewardship through Water Conservation

- **From the lab to the field** – While research continues around the world, some initial breakthroughs have already arrived. Field testing is well underway for a variety of drought-tolerant crops, including corn and canola. Initial results show encouraging yield increases for some crops. Drought tolerant corn could be widely available as early as 2012 (ISAAA, 2008).
- **Plants that produce the same amount or more, despite less water** – Imagine plants that could use less water yet produce the same yield as they would under normal conditions. An international team of researchers at the University of California-Davis recently tested cutting-edge biotech plants by subjecting them to drought conditions of 70% less water than normal. They survived with almost no loss in yield (Blumwald et al., 2007). Crops like these could potentially help farmers avert the disaster of a lost harvest due to drought.
- **Plants that use water more efficiently** – The biotech crops tested by the University of California-Davis proved resilient in a number of ways. They began using water two to three times more efficiently when subjected to dry conditions. And their water content dropped only slightly – 6% (from 92% to 86%) – during the induced drought (Blumwald et al., 2007).
- **Plants that can recover from dry conditions** – Scientists are developing biotech crops that can recover after dry conditions, instead of dying due to the environmental stress of a prolonged lack of water. In the University of California-Davis study, the biotech crops eventually regained their pre-drought water content and continued growing after researchers ended the induced drought. In stark contrast, all of the non-biotech crops tested died despite being given water after the two-week induced drought was ended.

CITATIONS:

Blumwald, Eduardo; Gepstein, Amira; Gepstein, Shimon; Kojima, Mikiko; Mittler, Ron; Rivero, Rosa M.; and Sakakibara, Hitoshi. Delayed leaf senescence induces extreme drought tolerance in a flowering plant. *Proceedings of the National Academy of Sciences*. Oct. 11, 2007.
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Wenzel, Wayne. H2O Optimizers, *Farm Journal*, March 14, 2008.
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ABOUT THE COUNCIL FOR BIOTECHNOLOGY INFORMATION

The Council for Biotechnology Information communicates science-based information about the benefits and safety of agricultural and food biotechnology to sustainable development. Sustainable development seeks to balance and integrate immediate and long-term community needs. It helps enhance our quality of life today, as well as to protect, preserve, and fulfill our needs in the future. Sustainable agriculture is a key component of sustainable development, particularly because it allows for economically and environmentally sustainable agricultural practices. In the United States agricultural biotechnology is contributing today to sustainable agricultural practices, and it has the potential to make even greater contributions in the future through production of biofuels to help meet energy needs; development of drought-tolerant plants to better preserve and manage water resources; and increased crop production to feed our nation and the world's growing population. CBI members are the leading agricultural biotechnology companies.



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