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.

THE SEARCH FOR "MORE CROP PER DROP"

Nearly every year, the United States and other parts of the world suffer from droughts, which can hamper the growth of crops and ruin harvests. 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 security. Since drought conditions usually impact entire communities and regions, not just individual farms, their economic impact can be significant and prolonged. 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.[1]

Ground-breaking research in agricultural biotechnology is underway—at leading universities, government labs, and agribusinesses—to help farmers cope with these challenges. Some of the most exciting results suggest a future when plants will be able to produce "more crop per drop" of water:

- **Plants that produce the same amount, 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.[2] At Southern Illinois University at Carbondale, corn with a gene from a common soil microorganism reportedly has been found to weather drought while yielding roughly 10% more than corn that lacks the gene.[3] 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.[4]

- **Plants that can recover from dry conditions** – Scientists are developing biotech crops that can recover and regrow 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

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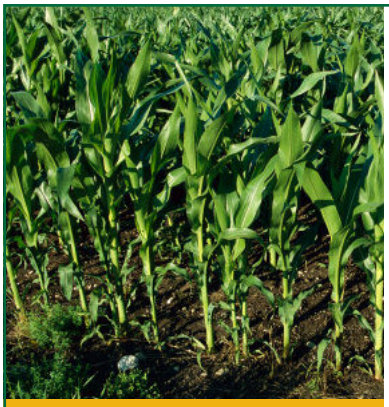

Field testing is well underway for a variety of drought-tolerant crops, including corn and canola. Initial results show encouraging yield increases for some crops. Drought tolerant corn could be widely available as early as 2010.

contrast, all of the non-biotech crops tested died despite being given water after the two-week induced drought was ended.

- **From the lab to the field** – While research continues, 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 2010.[5]

The solutions to the potential problems of water scarcity in the U.S. will come from a wide variety of strategies—from conservation to technological improvement to better planning. Climatologists, scientists and farmers today see biotechnology as having the potential to address water resource challenges and advance agricultural sustainability.

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1 Pioneer Focuses on Developing Drought-Tolerant Corn, Pioneer Corporation Press Release, Oct. 23, 2006. (http://www.pioneer.com/web/site/portal/menuitem.9f9b3892debfb930f671a226d10093a0/); and as referenced by Jeff Schussler, a research scientist with Pioneer's drought program, quoted in: Wenzel, Wayne, H20 Optimizers, Farm Journal, March 14, 2008. (http://www.agweb.com/Get_Article.aspx?sigcat=farmjournal&pageid=141772)

2 Rivero, Kojima, Gepstein, et al. Delayed leaf senescence induces extreme drought tolerance in a flowering plant. Proceedings of the National Academy of Sciences, Oct. 11, 2007, p. 1. (http://www.pnas.org/cgi/doi/10.1073/pnas.0709453104)

3 Jaehnig, K.C. Scientist Develops Corn that can Weather Drought, Southern Illinois University Carbondale News, Sep. 16, 2005. (http://news.siu.edu/news/September05/081605kj5097.jsp)

4 Rivero, Kojima, Gepstein, et al. Delayed leaf senescence induces extreme drought tolerance in a flowering plant. Proceedings of the National Academy of Sciences, Oct. 11, 2007, p. 2. (http://www.pnas.org/cgi/doi/10.1073/pnas.0709453104)

5 Wager, Robert. "Engineering Drought Tolerance," The Globe and Mail, July 7, 2006. (http://www.theglobeandmail.com/servlet/story/RTGAM.20060612.gtflwagerjun12/BNStory/Technology/)

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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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