



COUNCIL FOR
BIOTECHNOLOGY
INFORMATION
Good ideas are growing

BIOTECHNOLOGY DROUGHT

ADDRESSING THE CHALLENGES OF DROUGHT






How Biotechnology Can Help



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 droughts.



Did You Know?

-  Droughts affect large parts of the United States every year and have been a persistent problem in agriculture for centuries. Now some experts predict that the United States could face erratic weather patterns that impact our daily lives, including our food production system. Conflicts over water resources are already occurring between states in the U.S. and between countries globally, and could lead to wars in the future.
-  Adequate moisture is the most pressing challenge for the nation's farmers, who provide us with essential crops and grains for food 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 2025.¹
-  For over a decade, farmers have been using plants improved through biotechnology to combat environmental stresses such as insects and to control weeds more effectively.
-  Dealing 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.

Continued



Researchers in both academia and industry are continuing to improve these plants and are developing a new generation of plants optimized to maintain crop yields through drought conditions. In effect, these plants will have the capacity to use water more efficiently—think of it as “more crop per drop of water”.



Since the introduction of biotech crops in 1996, the practice of no-till agriculture—the most soil-conserving form of conservation tillage—has increased by 35%.

“More Crop Per Drop”

As the nation’s population continues to grow so will our demand for food and energy. Therefore coping with drought conditions will become even more important to America’s economic future. Agricultural biotechnology has already produced plants that maintain yields in the face of various environmental stresses. Researchers in both academia and industry are continuing to improve these plants and are developing a new generation of plants optimized to maintain crop yields through drought conditions. In effect, these plants will have the capacity to use water more efficiently—think of it as “more crop per drop” of water.

Biotech Crops: Already Helping Reduce Agriculture’s Environmental Footprint

Historically, farmers have used tillage, or plowing, to control weeds. Tillage, however, can have unintended consequences that include greater wind and soil erosion and significant water runoff—consequences that can in turn reduce yields.

Encouraging Conservation Practices

- ☘ Prior to the introduction of biotech crops, concern about being able to effectively control weeds limited the adoption of conservation tillage, the practice of leaving much or all of the crop residue in the field and reducing or eliminating tilling. With plants improved using biotechnology, farmers now have dependable weed control. Since the introduction of biotech crops in 1996, the practice of no-till agriculture—the most soil-conserving form of conservation tillage—has increased by 35%.²
- ☘ Conservation tillage has many benefits including better absorption and conservation of water from rainfall and irrigation, reduced soil erosion, reduced soil compaction and healthier soil, all of which can contribute to maximizing plant yields while conserving water resources.³
- ☘ In addition, conservation tillage supports a habitat for beneficial insects, birds and other wildlife, and reduces the Carbon Dioxide (CO₂) released to the environment compared to conventional tillage practices.⁴



Maintaining crop yields on America's farmland has become even more important with the growing demand for crops for both food and fuel. Today, nearly all "arable" land—land fit for cultivation—is being farmed.

New Technologies Will Help Farmers Cope with Drought

Better crop yields, more certainty – Water shortages during critical times of the growing season pose a major challenge to farmers. Dry conditions can appear quickly and significantly reduce crop yields. Maintaining crop yields on America's farmland has become even more important with the growing demand for crops for both food and fuel. Today, nearly all "arable" land—land fit for cultivation—is being farmed. Plants capable of tolerating drought stress could help farmers maintain yield through periods of dry conditions. Biotech researchers are developing such plants, and this research is underway for many plants, including corn, cotton, canola and other important crops.

The Future is Right Around the Corner

Drought-tolerant crops already being tested – Field testing is well underway and preliminary results are promising for the development of drought-tolerant corn, cotton, canola and other crops that use water more efficiently. Such developments could stabilize yields in areas where the availability of water is variable, such as the Central and Western Corn Belt. This would mean less yield loss in dry years, less need for irrigation in normal years and good yields on land previously considered marginal for cost-effective production.

¹ This is estimated as of 1999 by the United Nations Environmental Program: Global Environment Outlook, 2000 – UN Environment Program. (<http://www.unep.org/geo2000>)

² Fawcett, Richard and Dan Towery, "Conservation Tillage and Plant Biotechnology," Conservation Technology Information Center (2002), p. 14. (<http://croplife.intraspin.com/BioTech/paper.asp?id=63>)

³ Ibid, page 9 for a discussion of absorption; page 1 for information about soil.

⁴ Ibid, page 1 for benefits to wildlife; pages 9-10 for reduction of CO₂.

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 bio-fuels 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.