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USA – DROUGHT-TOLERANT TOMATOES

Tomatoes Against Drought
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Without water there is no life, but even in deserts, where water is rarely available, life is possible. How? A research team in Connecticut asked the same question in their quest to produce a drought resistant tomatoes.

Recently, a research team under the lead of Dr. Roberto Gaxiola, from the University of Connecticut managed to engineer a drought resistant crop plant by enabling the plants to produce more of a specific enzyme called H+-pyrophosphatase (H+-PPase).

Since hunger and famines are still omnipresent issues of our planet, it is of global interest to improve agriculture. Beside political barriers that limit agriculture, several environmental conditions effect global agriculture for these issues and may be fought by researchers. One of most limiting problems is drought.

Different life forms have evolved mechanisms to deal with drought or have even become drought resistant. It is easily imaginable that drought resistant crop plants would provide a great benefit to the global market. Dr. Roberto Gaxiola told Checkbiotech, "Especially arid and semi-arid areas of the planet would benefit the most from such an invention."

To achieve this, the research team first tested if genetically modifying plants so that they produced an increased amount of a specific enzyme, the H+-pyrophosphatase (H+-PPase) AVP1, would result in salt and water stress tolerant Arabidopsis plants. Arabidopsis is commonly used as model organisms. They found that the increased production of enzyme rendered the Arabidopsis plants more resistant to drought.

Thus, encouraged by these positive results they went one step further by testing whether AVP1 could be used to engineer a drought-resistant crop plant. By using a special biological technique they transferred the AVP-1 gene to tomato (Lycopersicon esculentum, a cultivar tomato).

The results were astonishing: an increased root system and an enhanced ability to recover from water deficit stress. Due to a more robust root system, the transgenic tomatoes were able to increase their water uptake during drought periods.

Considering the results of this study, the team concluded that the overexpression of the AVP-1 gene could provide a general strategy to gain drought-resistant crop plants. When Checkbiotech asked Dr. Gaxiola whether his team is testing other plants as well, or is intending to study the effect in other plants, he answered, "Yes, we are currently working with rice and poplar trees and plan to work with legumes."

Since many people are afraid of organisms that have been genetically modified, Checkbiotech asked Dr. Gaxiola what the general public needs to understand about is enhanced tomatoes, Dr. Gaxiola told Checkbiotech, "GMOs should be analyzed on a case by case basis. In this particular case, we are only up-regulating the expression of a natural plant gene conserved through evolution.

The investigations of Dr. Gaxiola and his team are important and stand to improve agricultural situations in many developing countries.

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