

## Agave genes could hold key to drought-resistant crops

Agave may be most associated with tequila, but this plant has a less familiar use — it's teaching scientists about how to craft more drought-resistant plants.

The hardy succulent, along with species like prickly pear (an edible cactus), pineapple and vanilla orchids, has evolved over millions of years to perform a different kind of photosynthesis that allows the plants to survive in semiarid environments where water isn't always readily available.

The process is called crassulacean acid metabolism, or CAM, and a small group of scientists have been studying it for several decades because the plants that have it use less water. However, it has only been in the last couple of years that a growing number of researchers have been attempting to fully identify and transfer this photosynthetic pathway to other plant species.

What makes photosynthesis in agave and cactus so different? Unlike most plants that take up carbon dioxide through stomata in their leaves during the day (known as C3 and C4 plants), CAM plants absorb most of their CO<sub>2</sub> at night. This timing shift means less water evaporates off of the leaves through transpiration. When the sun rises, the plants break down the organic acids, releasing the CO<sub>2</sub>.

Xiaohan Yang, a staff scientist in the Biosciences Division at Oak Ridge National Laboratory, and his colleagues are planning to create a C3 hybrid that will be able to switch to a more water-saving metabolism if exposed to drought or high-salinity conditions.

One reason for optimism is that these dually capable plants already exist in nature. *Clusia pratensis* is what is known as a facultative CAM. With normal rainfall, the Panamanian plant will take in CO<sub>2</sub> during the day as it acts like a C3 plant, but during dry periods, it begins to take in CO<sub>2</sub> at night.

**The GLP aggregated and excerpted this blog/article to reflect the diversity of news, opinion and analysis. Read full, original post: [Could agave hold the secret to more drought-resistant farming?](#)**