

Lightening up soybean leaves may boost food supply

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Lighter and darker soybeans used in the research. Credit: UIUC/Claire Benjamin

A new university-led study has shown that lightening the color of soybean leaves may increase the growth and yield of this major world food crop. The finding offers a strategy to help address Earth's future food needs.

A science team led by Donald Ort of the University of Illinois and

research scientist Berkley Walker of the University of Düsseldorf, Germany, combined detailed field measurements of nearly 70 varieties of soybeans with a sophisticated model of the above-ground portion of [soybean plants](#), developed by co-author Darren Drewry of NASA's Jet Propulsion Laboratory in Pasadena, California. They set out to examine how variations in the amount of [chlorophyll](#), the key pigment used to capture light for photosynthesis, could provide new avenues for enhancing photosynthesis. This is a key step toward increasing crop yields to help meet the world's growing [food](#) requirements.

The team used [soybean](#) variants with lighter green leaves than those typically planted for food production. The green pigment chlorophyll gives the leaves their color; a decrease in chlorophyll lightens the leaves. The scientists found that reducing chlorophyll by 20 percent conserved 9 percent of the plant's use of nitrogen, a major component of chlorophyll, without reducing the plant canopy's photosynthesis rate. Over time, it might be possible to breed [plants](#) that would apply this extra nitrogen to growing more beans.

"Our study demonstrates that soybean fields can have reduced chlorophyll while still maintaining high levels of photosynthesis," said JPL's Drewry. His model, called MLCan, acts as a synthetic field laboratory, allowing scientists to perform experiments that would require extensive field trials and vast resources if done using actual plants.

"This study was a crucial step in the process to increase food production," Ort said. "The next step is to figure out where to redirect that conserved nitrogen." This study paves the way for future studies to determine how nitrogen can be better distributed for a more efficient plant.

Results are published in the journal *Plant Physiology*.

Provided by NASA

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