



John B. Orr Endowed Chair in Environmental Plant Sciences

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Plant Sciences

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ENDOWMENT PURPOSE

The John B. Orr Chair in Environmental Plant Sciences was established in 2003 through a bequest from Mr. Orr. A glazier for UC Davis for over 20 years, John Orr had a fondness for UC Davis, as evidenced by this gift. The endowment supports research and teaching in the area of environmental plant sciences, and is intended to strengthen the internationally recognized research activities in this area on the UC Davis campus.

RESEARCH

Rubisco, the most prevalent protein on the planet, catalyzes both a reaction with carbon dioxide that initiates the production of carbohydrates and a reaction with oxygen that facilitates protein production. Rubisco binds with either magnesium or manganese, but the extent to which it binds each metal is unknown. When Rubisco binds with magnesium, the reaction with carbon dioxide proceeds five times faster than the one with oxygen; when it binds with manganese, both reactions proceed at similar rates. I have developed a new method to assess simultaneously cellular magnesium and manganese activities. I am using this method to assess how rising carbon dioxide levels in the atmosphere will influence the balance between plant carbohydrate and protein production.

During the last two decades, wheat protein production in California has declined 12% because of rising atmospheric carbon dioxide levels. Wheat provides 20% of the protein in the human diet. We are screening nearly 900 wheat varieties to determine the genetics of grain protein production under rising carbon dioxide levels.

TEACHING

We are teaching an undergraduate course in which the students create a video about their major. These videos are posted on the websites of the majors to assist high school and transfer students select an appropriate major at UC Davis.



This year we opened my online general education course about Climate Change to staff members of California State Agencies that have responsibilities for evaluation and regulation of climate change. About 100 staff members participated in the course. Next year we hope to expand this offering to additional staff members.

STUDENTS

A graduate student in the laboratory, Pornpipat Kasemsap, has a Fulbright Fellowship, but it does not cover all of his stipend, benefits, and tuition. The Orr Endowment covered some of the remainder.

This summer we used some of the endowment to hire three undergraduates to assist Mr. Kasemsap in screening wheat cultivars for improved protein production under rising atmospheric carbon dioxide levels.

THANKS

I am most grateful to the John B. Orr Endowment that has provided critical funding for our research on sustaining food quality under rising atmospheric carbon dioxide levels.