

ABSTRACT

You Humans Think You're Thirsty? Try Life as a Plant! The Quest to Improve Crop Plant Water Use & Drought Tolerance. Crop plants require a substantive amount of water during their life cycle. One-inch of water spread over an acre represents 27,154 gallons, or 113 tons, of water. In Nebraska, a May-to-September soybean crop producing 70 bushels per acre requires about 20 acre-inches of water, which totals to 543,080 gallons or 2,266 tons of water! Why do plants require so much water? To acquire carbon dioxide (CO₂) for photosynthesis, plant leaves have pores in their leaves that open to let CO₂ enter, but because the leaf interior is near 100% relative humidity, water (H₂O) escapes (i.e., transpiration) to the much drier atmosphere. For every CO₂ molecule that enters a soybean leaf pore on a typical summer day, 400 (!) H₂O molecules escape from that same leaf pore. To avoid dehydration, the plant's root system must remove water from the soil to replenish this daily transpiratory water loss. Specht will discuss research on the quest for genetic factors that can optimize the photosynthesis/transpiration ratio (i.e., water-use-efficiency) to improve soybean drought tolerance.

SPEAKER BIOGRAPHY

James E. Specht, Ph.D. is a Charles E. Bessey Professor in the Department of Agronomy and Horticulture at the University of Nebraska – Lincoln. Dr. Specht's major research area of interest is soybean physiological genetics/genomics, with a particular interest in how soybean plants respond to seasonal water availabilities that can range from scarce to abundant. He was the first researcher to show that (1) the yield response of soybeans to a seasonal water gradient was linear, (2) the slope of the yield response-to-water trend line was effectively a yield-based estimate of soybean water-use efficiency, and (3) that soybean varieties differed relative to that slope. Dr. Specht is a member of a national team of USDA and Land-Grant State University soybean researchers whose current research is aimed at improving the drought tolerance of USA soybean cropping systems.

THE NATIONAL COALITION FOR
FOOD & AGRICULTURAL RESEARCH

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THE NATIONAL COALITION FOR
FOOD & AGRICULTURAL RESEARCH

Program:

**“You Humans Think You're Thirsty?
Try Life as a Plant!”**

***The Quest to Improve Crop Plant Water Use
& Drought Tolerance***

July 14, 2008

PROGRAM

Welcome and Introduction

Dr. Diane Bellis

National C-FAR

Research Outreach Committee Member

Distinguished Speaker

DR. JAMES E. SPECHT
University of Nebraska--Lincoln

Open Forum

Closing

Diane Bellis

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