Plant Physiology®

September 2015 ● Vol. 169 ● No. 1

On the Cover: The composite image shows the submergence response found in flood-tolerant *Rumex* spp. and a ribbon model of the receiver domain from the ETHYLENE RESPONSE1 (ETR1) ethylene receptor of Arabidopsis (*Arabidopsis thaliana*). *Rumex* spp. escape from submerged conditions by fast elongation of petioles. This cell elongation process is initiated by the accumulation of ethylene inside the submerged plant tissues, related to the slow diffusion of gases in water. Subsequently, other plant hormones, along with regulators of photomorphogenesis, mediate this growth response, leading to the stimulation of target processes such as cell wall loosening. After the leaf tips emerge into the atmosphere, oxygen can diffuse into the plant to ensure survival. In the ribbon model of the ETR1 receiver domain, amino acids that are important for various traits described by Bakshi et al. (pp. 219–232) are shown in space-filling structures. Mutation of three amino acid residues (gray carbons) results in a receptor that cannot stimulate nutational bending in response to ethylene. Mutation of two residues in the γ loop (white carbons) results in a receptor that inhibits germination on salt more effectively than wild-type ETR1, whereas mutation of two residues just prior to the γ loop (black carbons) results in a receptor that cannot inhibit germination on salt. The model of the ETR1 receiver domain was generated by Molecular Operating Environment (version 2012.10) based on the receiver domain crystal structure (Protein Data Bank 1DCF). Cover image credits: Ole Pedersen, Freshwater Biological Laboratory, University of Copenhagen (*Rumex* spp. submergence response); and Brad M. Binder, Department of Biochemistry, Cellular, and Molecular Biology, University of Tennessee, Knoxville (ETR1 receiver domain). Cover layout by Diane McCauley.

FOCUS ON ETHYLENE

EDITORIAL

UPDATES

Continued on next page

Continued from preceding page

RESEARCH ARTICLES

Continued on next page

Continued from preceding page

Continued on next page

Continued from preceding page

Continued on next page

Continued from preceding page

REGULAR ISSUE

ON THE INSIDE

BREAKTHROUGH TECHNOLOGIES

UPDATE

RESEARCH ARTICLES

BIOCHEMISTRY AND METABOLISM

Continued on next page

Continued from preceding page

CELL BIOLOGY

Continued on next page

Continued from preceding page

ECOPHYSIOLOGY AND SUSTAINABILITY

GENES, DEVELOPMENT, AND EVOLUTION

Continued on next page

Continued from preceding page

MEMBRANES, TRANSPORT, AND BIOENERGETICS

Continued on next page

Continued from preceding page

SIGNALING AND RESPONSE

Continued on next page

Continued from preceding page

[OPEN] Articles can be viewed without a subscription.