

Plant Adaptation to Drought --- Interdisciplinary Research at the University of Missouri

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Drought is the most important cause of crop failure in Missouri and limits plant productivity in large parts of the US and the world. Drought induces severe reductions in average annual crop yields on a regional scale and can have devastating effects at the farm level. Regional droughts can also strikingly reduce net primary productivity of natural ecosystems. Research on plant adaptation to drought is a long-standing, important component of MU faculty members, who comprise a strong, collaborative team of university and USDA-ARS scientists and are among the international leaders in drought research. Group members represent expertise from a broad range of disciplines, including plant physiology, agronomy, forestry, plant breeding, molecular biology, biotechnology, entomology, plant pathology, and soil science. Areas of research span from basic to applied aspects of plant adaptation to drought, fostering the translation of basic discoveries of underlying mechanisms to the delivery of more drought-tolerant crops at the doorsteps of American farmers. In addition to local collaborations, the team interacts with other scientists in the state of Missouri (e.g. Danforth Plant Sciences Center and Washington University in St. Louis) and at the national and international levels (including Australia, England, India, Mexico [CIMMYT], and The Philippines [International Rice Research Institute]). Active research projects conducted by the drought community at MU include research funded by state, federal, commodity group (e.g. Missouri Soybean Merchandising Council, United Soybean Board, Cotton Inc.) and private (Monsanto, Syngenta) sources. Of particular note, members of the group were recently awarded over \$1.5 million from the Missouri Life Sciences Research Board to establish "rainout shelters" that will allow control of precipitation under field conditions. The ability to manage the timing, duration, and intensity of water deficit stress under field conditions is essential to examine plant responses to drought and interactions of drought and biotic stresses in mid-western environments. The track record of excellence in drought research and the broad range of expertise of the interdisciplinary group provide fertile grounds for creative and productive research endeavors that are directed to optimize crop and woody plant biomass production.