

Sulfate helps plants cope with water scarcity

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Plants absorb the mineral sulfate from groundwater. An international research team led by scientists from Heidelberg University has uncovered how sulfate controls the production of the drought stress hormone ABA in plants and thus contributes to their drought-resistance. These findings improve scientists' understanding of how the drought-

stress signal travels from the roots to the leaves. The studies in Heidelberg were carried out at the Centre for Organismal Studies (COS).

Plants take in carbon dioxide for photosynthesis through pores in their leaves. When rainfall is low, however, these openings spell disaster for the plants because strong sunlight and active photosynthesis draw a lot of [water](#) through the open pores. Without [fresh water](#) from the roots, the plants wither and ultimately die. The hormone ABA controls how far the pores open in order to regulate the water loss of the plant.

Last year the researchers uncovered that the nutrient sulfate accumulates in the water transport pathways of the plants when the soil begins to dry out. Now the team led by Dr. Markus Wirtz and Prof. Dr. Rüdiger Hell has shown that the mineral actually known as sulfate plays a critical signalling role in supplying water to the plant. "Even we were surprised how efficiently sulfate triggers the synthesis of ABA and thus controls closure of the pores," states Prof. Hell.

"The extremely dry summer of 2018 was a preview of the imminent effects of global warming on the growth of [plants](#) and nutrient production," stresses Dr. Wirtz. "To be able to cultivate [food crops](#) that are more resilient during periods of water scarcity and drought, we need to understand how [environmental factors](#) regulate the formation of the hormone ABA".

Researchers from Germany, China, Pakistan, and Italy participated in the project, which was carried under the auspices of the "Cellular Surveillance and Damage Response" Collaborative Research Centre of Heidelberg University. The results of the study were published in the journals *The Plant Cell* and *Plant Physiology*.

More information: Sundas Batool et al. Sulfate is incorporated into cysteine to trigger ABA production and stomata closure, *The Plant Cell*

(2018). [DOI: 10.1105/tpc.18.00612](https://doi.org/10.1105/tpc.18.00612)

Frosina Malcheska et al. Drought-Enhanced Xylem Sap Sulfate Closes Stomata by Affecting ALMT12 and Guard Cell ABA Synthesis, *Plant Physiology* (2017). [DOI: 10.1104/pp.16.01784](https://doi.org/10.1104/pp.16.01784)

Provided by Heidelberg University

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