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Roots show strong ability for compensative water uptake

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A view of the lysimeters with tomato plants and their split roots from above. Inset: Roots of split-rooted tomato following removal from lysimeters at the experiment's end. Photos by Alon Ben-Gal.

Plant root systems are exposed to different soil conditions. Short-term compensation—where roots in areas with high water availability take up more water at the expense of roots in areas where water is less available—is not well understood or quantified.

A *Vadose Zone Journal* study used a novel experimental setup, splitting roots of single tomato plants into two separate compartments (lysimeters) to measure their individual water uptake. Researchers stressed plants for less than a day by increasing salinity on one or both sides of the roots.

One-sided exposure to salinity led to less uptake from the salt-affected compartment and increased uptake from the non-treated compartment. The fact that compensation occurred at relatively low salinity while the whole root system was exposed is likely the study's most remarkable finding. At higher salinity, transpiration decreased by about 50% when the total root system was exposed; when only half of the roots were exposed, total uptake was maintained with as much as 85% of water uptake occurring from the non-treated compartment.

As long as there is no restriction to uptake in some part of a tomato plant's root zone, temporary reduction in water availability in other parts are not expected to affect plant-scale transpiration.

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Tzohar, D., Moshelion, M., & Ben-Gal, A. (2021). Compensatory hydraulic uptake of water by tomato due to variable root-zone salinity. *Vadose Zone Journal*. **https://doi.org/10.1002/vzj2.20161**

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