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Breeding Water-Conserving Crops: Why Understanding the Physiological Basis of Water Conservation Traits is Helpful

Soybean lines that appear less sensitive to drought (delayed wilting phenotype) have around for several decades, but the incorporation of this trait into superior yielding germplasm has been slow due to inconsistent yield performance of progeny lines. Here I reported studies begun in my lab in which we found that the slow-wilting phenotype (in PI416937) is the result of limited hydraulic conductivity within the leaf that causes stomatal closure during high atmospheric vapor pressure (VPD). Identification of the hydraulic basis for delayed wilting behavior has allowed the development of screens for the phenotypic expression of this trait in breeding material and thus the commercialization of this "water conservation" trait.