California State University, Fresno
Department of Biology presents

How Plants See Their Neighbors: Variations on a Theme

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Plants depend on light for their photosynthetic growth, thus shade from neighboring plants can be detrimental. Many plants have a sophisticated suite of responses to neighbor shade that enable them to compete for light. Known as the shade avoidance response, this response can include increased hypocotyl elongation, increased leaf angle, elongated internodes and petioles, altered branching, and early flowering. Interestingly the best response varies for plants adapted to different habitats: strong shade avoidance is beneficial to plants native to sunny environments but maladaptive for herbaceous plants growing underneath the forest canopy.

I will discuss our investigations into how the shade avoidance pathway varies both within and between species. To ask whether changes in the canonical shade avoidance genes underlie natural variation in Arabidopsis shade avoidance we performed a genome wide association study (GWAS). This GWAS identified previously known shade avoidance genes and highlighted novel genes in the pathway. We have begun to ask how well shade avoidance mechanisms are conserved between tomato and Arabidopsis. These studies show differences in the roles of phytochrome family members between tomato and Arabidopsis, while tomato quantitative trait locus (QTL) mapping points towards the auxin growth hormone network as a convergence point for the effects of natural variation in shade avoidance.

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