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Title: *Investigating Plant Terpene Metabolism toward Agricultural and Bioproduct Applications*

Plants are nature's master chemists; they deploy complex networks of specialized metabolites to interact with other organisms and cope with environmental challenges. Among these metabolites, terpenoids encompass the largest class with critical functions in plant development, chemical ecology and stress adaptation. Their chemical diversity also offers a rich source for bioproducts, including flavors, fragrances, pharmaceuticals and more. However, a broader application of plant-derived terpenoids remains limited by the typically low abundance of these compounds in often only a single plant family or species. We integrate functional genomics, metabolomics and various protein biochemical approaches to discover terpenoid-biosynthetic genes and pathways in a range of food, bioenergy, and medicinal plants. We will report on the discovery of common and species-specific terpenoid pathways in the food and bioenergy crops maize, Foxtail millet and switchgrass that provide core components of chemical pathogen defenses and possibly adaptation to abiotic stressors. These insights and gene resources can enable the prediction and breeding of crops traits, as well as the development of combinatorial pathway engineering platforms for terpenoid bioproducts.

Bio

Philipp Zerbe is an Associate Professor at the Department of Plant Biology, University of California at Davis. His research focuses on the discovery and engineering of specialized terpenoid metabolism in food, bioenergy and medicinal plants for developing tools for the production of terpenoids with human benefit. For his research, Dr. Zerbe recently received the 2015 Arthur Neish Young Investigator Award, a 2016/17 Hellman Fellowship, and 2018 Elsevier Young Investigator Award. Prior to his position at UC Davis, Dr. Zerbe received his PhD from the Ruhr-University Bochum, Germany (2007) with emphasis on structure-function studies plant hormone metabolism, followed by positions as a Postdoctoral Fellow and Research Associate at the University of British Columbia (Vancouver, Canada) where he focused his research on the discovery of terpenoid metabolism with relevance for bioproducts and stress tolerance in food crops and forest trees.