DEFENSE RESPONSES OF AUSTRIAN PINE TO TWO OPPORTUNISTIC PATHOGENS OF CONTRASTING AGGRESSIVENESS UNDER COMBINED DROUGHT AND TEMPERATURE STRESS

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Understanding the effects of climate change on host pathogen relationships is key to managing diseases in new weather extremes expected in the future, especially among long-lived perennials like trees. For example, trees under drought stress become more susceptible to pathogens as resources are allocated towards basic survival rather than chemical defenses, thus creating more favorable conditions for disease development. Our study investigates the defense mechanisms underlying the responses of Austrian pine (*Pinus nigra*) to the tip blight and canker pathogens *Diplodia sapinea* and *D. scrobiculata* under combined, elevated temperature, and drought; two conditions that are projected to become the norm in many areas of the world. Among the defense mechanisms likely to be affected by temperature and water restrictions are those involving specialized metabolites, specifically phenolics, which are modulated, in part, by the particular amino acid pathways associated with the response to drought. We are analyzing gene expression and amino acid metabolism, as well as accumulation/depletion of soluble phenolics and lignin. Increased understanding of the interactions between hosts and pathogens undergoing climate stress will contribute to the development of integrated management strategies, such as implementing updated monitoring/detection programs, creating predictive models, and furthering our understanding of host resistance mechanisms.

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