

Disease-induced changes in plant microbiome assembly and functional adaptation

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Video Byte

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Abstract

The plant microbiome plays integral roles in plant growth and health, and the soil environment of the roots, known as the rhizosphere, can recruit beneficial microbes to suppress soil-borne pathogens. However, the processes that regulate microbiome assembly and function both below- and aboveground during pathogen invasion are unclear. To learn more, researchers recently compared the microbiomes of different parts of chili pepper plants with or without Fusarium wilt disease (FWD). Sequencing analysis revealed that FWD affected the root/stem microbiomes (particularly the upper stem microbiome) more than the fruit microbiome. FWD also affected fungal communities more strongly than bacterial communities and made the roots and stems more susceptible to colonization by pathogenic fungi. Notably, the below- and aboveground compartments were able to recruit potentially beneficial bacteria in key taxonomic groups, and genes related to detoxification, biofilm formation, and plant-microbiome signaling pathways, such as chemotaxis, were upregulated, indicating active defense against FWD. Although additional research is needed, this study increases understanding of plant microbiome assembly under disease conditions and provides insights for plant microbiome manipulation to promote plant health and sustainable agriculture.