Maize benzoxazinoids restructure root and rhizosphere microbiota

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Abstract

Root and rhizosphere microbiota play a critical role in the health and success of plants, but selectively breeding plants for a healthy microbiome has proven difficult. Plants will often directly influence their root microbiota via compounds exuded from their roots. Examining these pathways for potentially heritable traits could improve our ability to selectively breed for healthy microbiomes. One such pathway is a class of defense compounds secreted by maize roots called benzoxazinoids (BXs). Researchers examined the root and rhizosphere microbiotas of BX-producing and BX-defective lines of maize across several locations and soil types. BX secretion affected the community composition in both root and rhizosphere microbiotas. The root microbiota of BX-exuding lines consistently had less Flavobacteriaceae and Comamonadaceae. Further research is needed to determine what impacts these BX-conditioned microbiomes have on plant health, but this study identifies the BX pathway as a potential breeding target to influence plant-microbiota interactions.