**Plant self-defense**

Plants recruit bacteria in the soil to assist in “nutrient uptake, nitrogen fixation, and pathogenic defense systems.” Of the microbes “that aid immunity, some function by out-competing pathogens for nutrients, while others actively secrete antibiotics or induce an immune response in the plant.

For example, maize seedlings to protect themselves secrete a chemical from their roots that eliminates harmful bacteria, insect, and other plants. In addition, this chemical attracts bacteria that protect the plant. These bacteria “can detoxify” the plant’s secretions and also ”out-compete” the bacteria that are harmful to the plant for the “limited nutrient supply in the soil around the plant’s roots.

Is there a lesson we might learn from this symbiotic phenomenon?

“To protect our food crops, we often apply pesticides that are harmful to other organisms and the environment. With maize, we see an example of a plant altering the chemical and biological properties of soil to suit its needs.”

Using a pesticide kills the beneficial bacteria in the soil around a corn seedling’s roots, as well as the harmful bacteria. Not applying a pesticide that would kill all the bacteria in the soil around the plant’s roots would enable the maize seedling to protect itself by enlisting the assistance of bacteria available in healthy soil that can “out-compete” the bacteria harmful to the maize plant.

**Might we refrain from using pesticides to protect our plants, allowing them time to activate their own defenses and recruit helpful bacteria as allies?**

Pursuing this strategy in an agricultural field, which has repeatedly been sprayed with pesticides and herbicides, would require protecting the soil with a cover crop or mulch for a significant period of time to enable the soil to revive. Testing the soil for its microbial diversity would reveal when it is sufficiently fertile to enable maize seedlings to defend themselves with the aid of nearby helpful bacteria.

“The roots of maize defend against phytopathogens by releasing a pesticide that also attracts a beneficial microbe that preys on the target pest,” Mar 23, 2020, <https://asknature.org/strategy/roots-recruit-symbiotic-soil-bacteria/>