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Plant Diversity in the 4th Dimension: Do Crop Rotations Enhance Soil Ecosystem Functions?

Agroecosystems are limited in plant diversity compared to their natural counterparts. We explored whether crop diversity through time (i.e. the 4th dimension) can substitute for high spatial diversity found in many natural ecosystems. More specifically, we determined whether increasing diversity through crop rotations can enhance some of the soil ecosystem services we rely upon in agroecosystems - services like sequestering C and provisioning nutrients to plants. Using a quantitative literature review, field experiments, and laboratory experiments we show that crop diversity through time does enhance these soil ecosystem services. Overall, using crop rotations appears to have many belowground benefits and seems to be a critical component of sustainable agriculture.