‘Second generation’ GMO plants could turn marginal soils into productive farmland

Roughly one-third of the world’s arable land suffers from lack of accessible iron, rendering it inhospitable to staple crops like maize and soybeans.

[In 2018], a Stanford research team led by associate professor of chemical engineering Elizabeth Sattely discovered a genetic adaptation that allows one hardy plant to thrive on these marginal soils …. Although more studies are needed, Sattely believes this avenue of research will one day enable scientists to splice this adaptive mechanism into the genomes of staple crops, thus opening up more farmland for food production and leading to a new, eco-friendly form of plant genetic engineering. “We may be able to take traits developed through natural selection and move them where we need them,” Sattely says.

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Many arid regions of the world, including the western United States, have alkaline soils, and this alkalinity acts like a chemical lock that traps iron in the ground. But after studying this problem for years, Sattely’s lab discovered how a plant known as Arabidopsis thaliana …. [secretes] a molecule in the coumarin family that exerts a chemical pull that helps yank iron into the plant, overcoming the countervailing tug exerted by the alkalinity of the soil.

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