

WIRED
June 2008

Superefficient Frankencrops Could Put a Real Dent in Greenhouse Gas Emissions

By Spencer Reiss

Keeping 6 billion people fed boosts global warming more than all the world's cars, trucks, trains, ships, and planes put together. Agriculture accounts for almost 14 percent of greenhouse gas emissions worldwide, according to the latest report from the Intergovernmental Panel on Climate Change. One response is to eat fewer of the two- and four-legged greenhouse gas factories known as animals. Before you send back that T-bone, though, call in the bioengineers.

Genomics experts have been optimizing food crops for decades, punching in traits for lower herbicide use, less tilling, and higher yields — carbon cutters, all. But the fountainhead of agricultural emissions is nitrogen-based fertilizer, whose manufacture (mainly from natural gas) and poor take-up rates add up to nearly one-third of agriculture's contribution to global warming. Monsanto, DuPont, and Syngenta, along with a flotilla of venture-backed startups, are trying to change that. California-based Arcadia Biosciences is already peddling genes for nitrogen-efficient rice that the company reckons could save the equivalent of 50 million tons of carbon dioxide a year. Arcadia's CEO, a lifelong Sierra Club member, is working to get carbon credits for Chinese farmers who make the switch.

What some greens deride as Frankencrops are also the only serious hope for biofuels. Right now, their net carbon benefit is negligible. Corn engineered for high yields and low fertilizer will help, but even better will be plants under development whose stalks and leaves can easily be turned into fuel.

The plunging cost of gene synthesis should help bio geeks deliver on another big promise: a new economy in which biochemical reactions replace industrial processes. J. Craig Venter's Synthetic Genomics is working with BP on microorganisms that produce cleaner alternatives to gasoline. Rival Amyris Biotechnologies is working on bugs that make jet fuel. Meanwhile, the genetic engineers are cooking up climate-friendly meat without feet: The first symposium on lab-grown animal flesh met in Norway in April.