**A Less Polluting Pig**

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There's good news in the fight against farm pollution, say researchers in the Department of Molecular Biology and Genetics at the University of Guelph in Ontario, Canada. In August, John Phillips, Cecil Forsberg, and Serguei Golovan announced a new kind of pig that makes better use of phosphorus, a nutrient that in high concentrations can deplete oxygen levels in waters downstream. Phosphorus runoff from livestock farms has been blamed for killing aquatic life and creating algae blooms in lakes and rivers. By identifying a gene that promotes recovery of phosphorus in a pig's digestive tract, Phillips and his colleagues say they have devised a pig that pollutes less.

For Phillips, a professor of molecular biology and genetics, phosphorus waste was an obvious focus for swine research. Farmers like to use hog manure as fertilizer because it is rich in nutrients, but because pigs cannot completely digest the phosphorus in their diet, their manure contains much higher concentrations of phosphorus than of other nutrients. When runoff carries the manure downstream, the excess phosphorus fuels extremely high algae growth. "It's not just a local problem, it's an international problem," Phillips says.

Other efforts to reduce phosphorus runoff from livestock farms have sought to decrease the amount of phosphorus in feed grains. Victor Raboy, a plant geneticist with the U.S. Department of Agriculture (USDA) Agricultural Research Service in Aberdeen, Idaho, developed and tested lowphytic-acid corn and found that by making phosphorus easier to absorb, the amount that ends up in hog manure is reduced. Vincent Varel, a microbiologist at the USDA's Roman L. Hruska U.S. Meat Animal Research Center in Clay Center, Nebraska, says that the corn feed (being released commercially in cooperation with Pioneer Hi-Bred International) may be more versatile than the enviropig because the corn can be fed to any pig as well as to poultry.

Varel notes another benefit of nutritional approaches over genetic solutions: the public's discomfort with genetically modified (GM) products. Most European countries require labels to specify GM ingredients. In Europe, public suspicion over the health effects of GM products is running high and was heightened by a trade flap between the United States and the European Union last June in which the European Union imposed a ban on imports of hormone-treated beef and other GM foods from the United States. Varel says the issue "could be a negative factor in selling enviropig products."

Critics say that the enviropig marks only a stopgap solution to farm pollution. Jane Rissler, a plant pathologist and senior staff scientist with the Union of Concerned Scientists, a nonprofit organization based in Washington, DC, says, "The solution to the hog production [waste] problem is not to genetically engineer pigs but to return to a more sustainable form of farming." According to Rissler, today's large hog "factories" will likely merely use the enviropig to boost hog densities at their facilities, packing more hogs into the same size facility while still complying with total phosphorus runoff limits. What's more, the effect on the hogs' long-term health is still unclear. Phillips points out, however, that enviropigs will also be useful on low-density hog farms and in less developed countries, where inadequate phosphorus in pigs' diet limits their growth.

Farmers will have to wait several years to compare enviropigs with low-phytic-acid feed. Phillips says that farmers won't be able to get enviropigs from breeders for three years or so, and it's too early to say how much they will cost.