The Right Fight for Biologists

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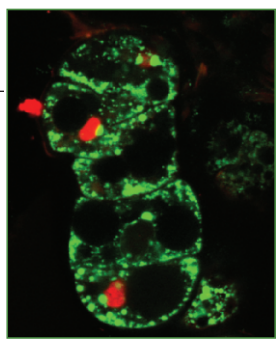

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Cover: These maize callus cells have been manipulated to express green fluorescent protein fused to a bacterial signal peptide. Gold particles, coated with DNA encoding the fluorescent protein and the signal peptide, were fired into the cells using a "gene gun," or biolistic particle delivery system. Some cells that have been bombarded this way take up and express the DNA-encoded proteins, and thus the technique is widely used in plant biotechnology. The signal peptide localizes the green fluorescent protein to specific regions of interest within the cell; in this image, the red bodies within the cells are the nuclei, stained with propidium iodide. In the article that beings on p. 391, Lorena Moeller and Kan Wang discuss a variety of techniques, including biolistic particle delivery, that are used in research on the production of improved genetically engineered crops such as maize. Photograph: Lorena Moeller and Kan Wang.

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Organisms from Molecules to the Environment

American Institute of Biological Sciences

The Right Fight for Biologists

Deadly food riots in Haiti and Egypt, together with recent price-related unrest in several other countries, are disturbing reminders of the vulnerability of the poorest. Just as it is impossible to ascribe any single weather event to global warming, it is impossible to attribute any one instance of unrest to worldwide ecological trends. The importance of conflict, corrupt governance, and poor trade links in causing poverty—and thus food deprivation—is widely accepted. Yet it is also inescapable that global grain price increases of 80 percent during the past year, which are contributing to the unrest and undoing gains against poverty, are a reaction to combined demographic and environmental trends affecting agriculture. Drought in some parts of the world, combined with rapidly growing demand for meat, fish, fruits, wheat, and vegetables—especially in China and India—is putting upward pressure on feed-grain prices. The concurrent surge in oil prices is persuading more farmers to produce crops for biofuels. Both trends drive up prices for staple foods. United Nations officials see no respite in the foreseeable future.

If rising food prices have a silver lining, it is that farmers should be able to invest more. Yet environmental constraints such as soil salinity, as well as the growing cost of nitrogenous fertilizers and market failures, limit growers in many places. With the world population expected to grow by a third before 2050 and climate change potentially exacerbating some threats, there is an obvious need to boost the efficiency of food production in a sustainable way.

Ideas from organic farming can help but by themselves are insufficient. New biotechnologies are critical in preventing more world hunger. Crops produced by direct manipulation of DNA, the subject of the article that begins on p. 391, have demonstrated enormous power to boost food supplies and reduce environmental damage. As authors Lorena Moeller and Kan Wang point out, such crops can provide improved resistance to stressors and pests of all sorts, as well as improved nutritional properties. More than 100 million hectares of these crops were planted worldwide in 2006 by over 10 million farmers. Most of these farmers are in developing countries, and they are chiefly cultivating pest-resistant cotton. Yet regulatory obstacles stemming from often-exaggerated fears impede the cultivation of genetically engineered food crops in much of the world.

As with any new technology, there are risks, and scientists and governments should be on the lookout for them. So far, however, careful scrutiny has found no evidence of health dangers from growing or eating approved genetically engineered crops. Certainly, any ecological or health consequences of these products need to be monitored and prudence observed. But all crops are the result of some type of manipulation of DNA, and the activists who denounce direct manipulation of crops' DNA should think hard about the human costs. They could act constructively to change particular agribusiness policies, or to respond to their pain at the loss of so much of nature, without opposing a much-needed technology. The rioters have a more physical pain, and all of science's tools are needed to alleviate it.

TIMOTHY M. BEARDSLEY
Editor in Chief

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