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## Field of Dreams

### Science Makes Exciting Ag Advances, but “Natural” Naysayers Stand in Way

by Robert B. Goldberg

**Sunday, December 5, 2004**—During the next 50 years, we will need to produce more food than in the entire history of mankind. And we will need to do this on a rapidly shrinking amount of land that is suitable for agriculture.

Los Angeles illustrates this point dramatically. In the 1920s, Los Angeles County was one of the most productive agricultural areas in the United States. Bean fields, citrus orchards and dairy farms were scattered across the county and the new southern branch of the University of California—now known as UCLA—had an agricultural college that provided assistance and new technology to local farmers, educated a new generation of agriculturists and plant scientists, and helped launch the California avocado industry that thrives to this day.

Fast forward to the present. Agriculture has vanished from Los Angeles County, with housing developments, freeways and shopping malls replacing the fertile fields of the past. A similar story could be told in many parts of California and the United States. Ironically, from the 1920s to present time, food production in the U.S. has increased almost 300 percent and the number of workers required to produce our food has shrunk from over 50 percent of the labor force to less than 2 percent. And the percentage of our income that we spend on food has decreased from 40 percent to only 15 percent.

How was this achieved and what are the implications for the future?

About 100 years ago, at the turn of the past century, Mendel’s experiments with peas were rediscovered, and the science of genetics was born. New breakthroughs in genetics were used by plant breeders to develop hearty new crop varieties that produced more food on less land. Technological advances such as the tractor, novel irrigation systems, fertilizers

and chemicals to fight off pests and weeds, as well as new discoveries about how plants grow, contributed significantly to the cheap, plentiful supply of healthy food that we buy in grocery stores today.

The achievements of the past using old technologies, however, are not sustainable in our current era of burgeoning population growth and limited resources. Just as our parents and grandparents turned to science to help give us the most productive agriculture in the world, we must do so today if we are to meet the challenge of producing a healthy supply of food with limited water, land and other natural resources.

There has never been a more exciting time for agriculture and the plant sciences. The new field of plant genomics is uncovering genes that confer resistance to drought and pests and that can increase the yield of crops significantly above what has been done by conventional breeding over the past 100 years. These discoveries have the potential for creating a new green agriculture, one that is sustainable and that can provide an adequate supply of food to the world’s growing population on less land and with much smaller inputs of water and chemicals. A green agriculture that can spawn new industries, such as biofuel production to replace our dependence on oil and reduce the harmful environmental effects of burning fossil fuels.


Sadly, just as new opportunities and advances in agriculture are within our reach, an ideological battle is raging that is slowing to a snail’s pace the transfer of exciting laboratory discoveries to reality in the field.

The anti-science forces of darkness have proclaimed that the same genetic engineering technologies that have given us miracle drugs that can treat cancer, diabetes and heart disease should not be used to produce new crop varieties that require small amounts of water,

are resistant to pests, require no pesticides and yield significantly more food than conventional varieties.

Why? Because they are not “natural,” claim the naysayers.

Yet agriculture has never been natural. The vast majority of food in a grocery store has been produced on land cleared of trees, fortified with nutrients either in the form of manure or fertilizers, and irrigated with water that is piped to the fields. This has been going on since agriculture was invented by our ancestors 10,000 years ago and is the result of a simple biological fact—plants need land, light, water and food in order to grow. Most crops that we use as food have been bred for thousands of years not to grow in the wild, but in the artificial environment that we call a farm.

If we are going to create a new kind of agriculture that is both sustainable and productive, we will need to use all of the scientific tools and discoveries at our disposal, including genetic engineering. Not to do so would break a continuous path of agriculture breakthroughs that has advanced the progress of mankind for thousands of years. In a future of rising populations and shrinking natural resources, turning our backs on modern science’s potential would be a major tragedy for us and our children. 

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