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# Environmentalism: A New Sensibility

by Dale A. Miller

A cynic once defined a farm as an irregular patch of nettles bounded by short-term notes. While simplistic, that description does have significance to those in the agricultural industry. My job, as CEO of a crop protection company, is to take care of the nettles while a banker's job is to handle the short-term notes.

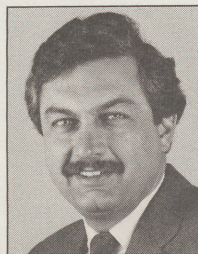
For all its importance, farming is not an easy business to run or understand, and during the 1990s – the Decade of the Environment – it will take all the ingenuity that bankers and growers can muster to stay on top of the nettles and notes.

Like the rest of the nation, people involved in agriculture have taken the environmental message to heart. Long ago, agricultural scientists began looking for ways to control pests and boost crop yields that would be more environmentally compatible than traditional programs and products. Despite the recessionary times, that search is now coming to fruition.

Despite the differences with the environmental community, we all know that concern for the environment is a necessity. In this world, where the population continues to expand and cities sprawl across county, state and national borders, we agree that certain standards for air and water and the general environment must be met. These standards also must be maintained, if the earth is to adequately support future generations.

## *The Roots of Environmentalism*

About 20 years ago, this country began to take environmentalism seriously. One of the first results was landmark legislation. The Clean Air, Clean Water, Resource Conservation and Recovery Acts and new amendments to the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) were passed. The Environmental Protection Agency was formed to deal with the intent of those laws. As time passed, environmental sensitivity grew. Californians voted for anything that included the word "environment" in its description and even in the industrial, money-grubbing Rust Belt people called for a cleanup of the



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Great Lakes. As the gross problems were taken care of, the public continued to become even more sensitive to the need to protect the earth. Agriculture became an area of particular concern, and people began to look at things in their own homes they could do to be environmentally "with it."

As this sensitivity has grown, however, the people involved in financing and producing goods and services in this country have found themselves caught between their own belief in the need to safeguard the earth, and the feeling that things were beginning to get out of hand. When the

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### *Genetic engineering promises to be a real boon to modern pest control.*

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National Resources Defense Council and the media managed, in February 1989 to cause a valuable pesticide product to be banned, the agricultural community was visibly shaken. Then serious reaction set in. We can only hope it isn't too little too late. In the past year, the agricultural industry, members of the scientific community and even a few government and media people have made a significant effort to set the record straight. And based on November's referendum results, it may be having an impact.

During the past summer and fall, those in the agricultural industry were out in force to explain that certain proposed export legislation and the California Big Green Initiative, despite their good intentions, were not the correct way to solve the problem.

And something happened.

Big Green was voted down in California by a 2-to-1 margin. Expensive recycling proposals in New York and Oregon also were voted down. Congress tabled the so-called Circle of Poison legislation. This is a good sign. The rejection of these initiatives and bills are not a rejection of the environmental ethic, but a movement forward in people's thinking. In their

defeat of these measures, the American public has shown a new sensibility to environmental concerns.

There will be more environmental proposals on future ballots in California. There will be more pesticide bills in Congress and the Iowa legislature. I hope, however, that the American public has turned a corner and will look carefully at the proposals, judging them on their merit, rather than on the word "environment" in their titles. A move, so to speak, from sensitivity to sensibility will save the country many millions of dollars and enable the public to focus on real rather than imagined problems. This can only be good for American agriculture, which now finds itself whipsawed between an emotional but irrelevant food safety debate and serious efforts to produce crops in a more environmentally sound manner. I am not saying change isn't necessary — some is — but the system works and only needs refinements.

### *Biological Breakthroughs*

The combination of technological breakthroughs in the biological sciences during the past 20 years, plus the growing sensitivity to environmental concerns have put agribusiness in step with the Environmental Decade. Throughout industry, new, biology-based products are on their way to the marketplace.

Biology, rather than chemistry has become the basis for new pest-control products of the 1990s.

Today, with the great awakening in biological understanding that began with the identification of DNA in the 1950s and exploded with the first movement of genetic material from one organism to another in the 1970s, scientists have begun to approach problems by studying crop plants and pests from the inside out. From understanding the mechanisms that cause the pest to grow and develop, they are learning better ways to use natural materials and also to build chemicals that mimic the pests' natural processes.

These new biorational products will, by definition, affect the growth or reproduc-

tive processes of pest plants and insects, but will be so target-specific they won't threaten other plants or animals. In all likelihood, they also will be used in very small quantities over very large areas, eliminating potential hazards in transportation or storage as well as reducing handling and exposure problems and longer-term environmental contamination.

Genetic engineering – the ability to move genes from one organism to another – also promises to be a real boon to modern pest control. One of the most exciting areas, and one where considerable field testing already has taken place, is in the genetic engineering of plants. By taking genes from pesticidal microbes and inserting them into germplasm, agricultural scientists have been able to produce plants that defend themselves against certain insect pests.

Before long, farmers will be able to protect their field crops with various kinds of biological pesticides that have been genetically engineered to be more broad-spectrum, longer-lasting and effective than any natural products now in the marketplace. Mycogen Corp. has conducted large-scale commercial field trials on its bioengineered pesticide, MVP. This pesticide, which targets caterpillars in vegetable crops, has been in small-scale field tests during 1988 and 1989.

Sandoz has produced and sold biological insecticides for more than 30 years. These products are based on a naturally occurring microbe, *Bacillus thuringiensis*, or B.t. Various strains of B.t., which scientists have discovered in nature, are toxic to certain caterpillars, beetles, mosquitoes and the like. Up to now, each B.t. product was very target specific to a certain type insect. Because they are natural products, they have handling and storage requirements that are different from chemicals, and they are not so fast-acting in the field.

These characteristics kept the market for B.t. fairly small despite the positive environmental profile of the products. Last fall, however, Sandoz field-tested a new, genetically engineered strain of the B.t. microbe that has the potential to affect multiple species and to last longer in the

environment. When this, or a similar bug makes it to the marketplace, it should be more effective and easier to use than many present B.t. products, and more environmentally acceptable to growers, and hopefully, their bankers.

Sandoz scientists also are working on a variety of other biological pest-control agents. One of the most promising is a naturally occurring but genetically altered fungus which has great potential as a broadleaf herbicide.

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### *Bankers have a major role to play in the farmer's future.*

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The company also is investigating a variety of insect viruses. One virus product, off the market for a decade because it did not work as fast or effectively as the pyrethroid chemicals, is being looked at today by the USDA as part of an integrated program to combat heliothis in cotton. Other viruses are seen as logical delivery systems for unique insecticide materials such as spider venom – thanks to the techniques of genetic engineering.

A much longer-term research project is one involving insect neuropeptides, the switches that turn hormone release on and off in insects, triggering their various stages of growth. If we can find ways to copy and reproduce these substances, we can produce biorational products which would affect the pests' growth – stopping them before they get to the destructive larvae stage, or the risky egg-laying stage. We would do this with a substance that is found only in insects, thus making it totally benign to mammals, farm workers and the environment in general.

There's a lot going on out there, and we are very excited by what we see and what we believe we can do for agriculture, mostly with nature's own tools. New genetically engineered biological products are well along in development and will begin to be available on American farms before the mid-1990s.

*(more on page 29)*