California Certified Organic Farmers

# CCOF magazine

Volume XX, Number 2 *Creating a Living Standard for Healthy Food* Summer 2003


# The Brave New World of Genetic Engineering

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## Observation, Reflection and Practice

*By Brian Leahy*
*CCOF President*

The skills needed to bring forth nutritious food from the earth are acquired through observation, reflection and practice. Applying accumulated skill to nature, the grower uses seed, water, soil, sunshine, labor and technology. The application of biology and technology has allowed agriculture to flourish, creating a reliable source of plentiful food.

Modern organic agriculture was born when farmers observed the deterioration of soil health and the decline in nutritional food value after the introduction of synthetic fertilizers. Observation led to reflection, which led to the desire to use science to discover the information contained in the structured chaos that makes up the natural world. Practical experiments on farms led to the understanding that increased yields and nutritional value could be achieved through organic farming, a system that relies on biology rather than chemistry to improve soil fertility.

Observing the consequences of using synthetic pesticides and herbicides to control insects and weeds led more growers to organic farming. One early organic farmer tried the new chemicals and observed that they killed birds, fish, and frogs, and decided that he did not want any part of an approach based on death. A few scientists noticed the negative consequences and questioned the validity of basing the production of food on the use of toxic chemistry. Unfortunately, most scientists seemed to shut off their powers of observation and reflection and continued to promote a bad technology.

*Imagine if California lost its ability to sell its wine, rice, nut crops, or its fruits and vegetables to the EU or Asia because of GMO contamination!*

Good farmers are too connected to the physical reality of their farm to use bad technology to produce food. By focusing on two fundamentals, that the purpose of agriculture is to grow nutritious food, and that the soil is a living system, organic farmers have avoided the tragic consequences inherent in the misuse of synthetic fertilizers, pesticides, growth regulators and livestock feed additives.

A new application of science, food biotechnology, in the form of genetically modified organisms (GMOs), has been rushed from a theoretical science to large scale application without being subjected to adequate observation or reflection. This is not surprising when one realizes that the food biotech industry is dominated by a handful of corporations with sordid histories and ethical lapses. Companies continued to promote such chemicals as dioxin and PCBs long after observation revealed deadly consequences. Their political power allowed these companies to put into place regulatory schemes that fail to safeguard human health and the environment.

Organic farmers and consumers have rejected the use of genetically modified organisms in the production of food as the continuation of an approach to agriculture that fails to honestly account for the true risks inherent in the technology. Farmers have noticed that GMO feed is causing health problems in livestock and that livestock prefer not eat GMO feed when given a choice. Interestingly, both these observations were also early warning signs to farmers of the problems with toxic chemical-dependent agriculture. Farmers have noticed the problem of GMO trespass and of consumer rejection, with dire economic consequences to American producers of corn and soy beans resulting from GMO technology. Transgenic DNA pollution is wandering into and changing weeds, insects, soil, and other living species in unknown ways that have not been adequately researched. Farmers have also noticed the changing relationship they once had with their seed companies. They now find themselves in one-sided licensing agreements and threatened by aggressive legal actions from the biotech companies.

### Section 771 Repealed

CCOF is celebrating the repeal by Congress of a rider, known as Section 771, contained in the Omnibus Appropriations Bill that had weakened organic livestock feeding requirements and threatened the integrity of the organic trade. After a strong showing by organic farmers, processors and consumers, Congress got the message that it should not play with organic standards. While USDA may think it owns the definition of "organic," once again the organic movement has reminded USDA that the people own the government.

### CCOF Receives State Grant

California Certified Organic Farmers has been awarded a $450,000 California International Market Promotion for Agriculture (CIMPA) competitive grant. The CIMPA program is part of Governor Gray Davis' Buy California Initiative. CCOF will use the grant to increase awareness and sales of California organic specialty crops through international marketing and promotion.

Biotech companies believe that it is to their benefit to patent life, transfer genes from one species to another, and to receive a royalty on each seed planted. It is our right to demand that our property rights be respected. Imagine if California lost its ability to sell its wine, rice, nut crops, or its fruits and vegetables because of GMO contamination! It is also our right to demand that the integrity of our bodies and all living things be respected. Our government and the owners of the new technology owed us due diligence before introducing something so novel as to warrant patenting. There is no pressing reason to rush into a GMO future; there is time to slow down, conduct scientific research that addresses true concerns about the safety of the technology, and to ask ourselves if we even want to go down this road.

## Submissions to the CCOF Magazine

Letters to the editor are gladly accepted, provided letters are succinct and remain on topic. Letters must include complete contact information, including daytime telephone number, and must be signed. Letters are subject to editing and will not be returned. Submitting a letter to the editor does not guarantee printing.

For information about submitting articles to *CCOF Magazine,* or to discuss article ideas, please contact Keith Proctor toll free at 1-888-423-2263, ext. 12, or e-mail to *keith@ccof.org*

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*To place a classified advertisement or to receive a quote*, contact Keith Proctor at 831-423-2263, ext. 12, fax 831-423-4528, or *keith@ccof.org* Advertisements submitted via e-mail are greatly appreciated.

*To place a display advertisement*, please contact Kenny Swain, Marketing Assistant, at ext. 22 or *kenny@ccof.org* to inquire about rates or for more information.

## Distribution

*The CCOF Magazine*, with a circulation of 10,000, is distributed quarterly to certified clients and supporting members and consumers in California and around the United States. It is also mailed to supporting members in Australia, Brazil, Canada, Chile, Italy, Japan, and Mexico.

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# ECO-AUDIT

*Environmental Benefits of Using Recycled Paper*

*The CCOF Magazine* is printed on New Leaf Opaque 70# paper, 80% recycled, made with 60% post-consumer waste, and bleached without the use of chlorine or chlorine compounds, resulting in measurable environmental benefits.[1] New Leaf Paper has provided CCOF with the following report of the annual environmental savings:

12 Trees — 1,153 Gallons of water
1,048 Pounds of solid waste — 3 Cubic yards of landfill space
1,504 Kilowatt hours of electricity (1.9 months of electric use in an average U.S. home)
1,905 Pounds of greenhouse gases (1,542 miles equivalent driving the average American car)
8 Pounds of HAPs, VOCs, and AOX combined

[1]Environmental benefits are calculated based on research done by the Environmental Defense Fund and the other members of the Paper Task Force who studied the environmental impacts of the paper industry. Contact the EDF for a copy of their report and the latest updates on their data. Trees saved calculation based on trees with a 10" diameter. Actual diameter of trees cut for pulp range from 6" up to very large, old growth trees. Home energy use equivalent provided by Pacific Gas and Electric Co., San Francisco. Hazardous Air Pollutants (HAPs), Volatile Organic Compounds (VOCs), and Absorbable Organic Compounds (AOX). Landfill space saved based on American Paper Institute, Inc. publication, Paper Recycling and its Role in Solid Waste Management.

## Magazine Production


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Printed at Community Printers, Santa Cruz, CA

*The CCOF Magazine* is printed using linseed oil-based inks on 80% recycled/60% post-consumer waste paper. Processed chlorine-free. New Leaf Paper, 1-888-989-5323.




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## Our Purpose

CCOF's purpose is to promote and support organic agriculture in California and elsewhere through:

- A premier organic certification program for growers, processors, handlers, and retailers.
- Programs to increase awareness of and demand for certified organic product and to expand public support for organic agriculture.
- Advocacy for governmental policies that protect and encourage organic agriculture.

# THE BRAVE NEW WORLD OF GENETIC ENGINEERING

*By Ellen Hickey, Pesticide Action Network, & Richard Caplan, U.S. Public Interest Research Group*

*If you listen to Monsanto, Aventis and even the U.S. Food and Drug Administration, genetic engineering is merely an extension of traditional plant breeding.*

THESE COMPANIES AND REGULATORS say that it is the same thing that farmers and plant breeders have been doing for generations, and that is why the FDA does not need to require any tests for these crops. But genetic engineering breaks down the barriers that exist in nature, and now it is possible for scientists to cross apples with chickens or strawberries with fish—things that are impossible to do using traditional plant breeding methods.

Genetic engineering permits scientists to manipulate genetic materials in ways that were once inconceivable. But the technology relies on methods that result in haphazard insertion of genetic elements into a plant's genetic code. This in turn may lead to disruption of complex gene interactions and unintended, potentially catastrophic results. It is a technology that has the power to transform food and the food supply in ways not possible with traditional breeding. Genetic engineering is very different, very powerful and worth a great deal of caution.

### SUBSTANTIAL EQUIVALENCE

The biotechnology industry and the FDA claim that genetically engineered crops and traditionally bred crops are "substantially equivalent."[1] Because some crops that are genetically engineered can be characterized as largely similar to 'natural' crops, the biotechnology industry and the FDA would like us to assume they pose no new health or environmental risks. This concept, aggressively advocated by manufacturers of genetically engineered foods and crops, has been endorsed by the UN Food and Agriculture Organization and World Health Organization and forms the basis of regulation of these products by the United States government.

Although the idea of "substantial equivalence" is simple and may even seem plausible to some, many scientists feel it is misguided. The agencies regulating genetically engineered food have never properly defined the term. As a result, there are no guidelines to test foods to see if this assumption holds true. At the same time, this vagueness makes the concept particularly useful to industry. Monsanto's Web site, for example, quotes Henry Miller of the Hoover Institution saying that, "genetic engineering [is] essentially a refinement of the kinds of genetic modification that have long been used," and the company itself calls the technology an "extension" of traditional plant breeding, only "more precise."[2]

However, a closer examination of the technology used to engineer plants and a look at some of the genes that scientists are inserting clearly demonstrates that traditional plant breeding and genetic engineering are radically different.[3]

### THE TECHNOLOGY: GENE INSERTION

Proponents of genetic engineering maintain that scientists can locate genes and insert them into new plants with great precision. But currently, the process of introducing genes is done through a limited number of relatively crude methods resulting in haphazard placement which in no way can be described as "precise." One common method of insertion uses bacteria that attach themselves to a plant and then transfer DNA into the host plant's genetic code.[4] Genes can also be introduced directly into plant cells using a "gene gun" that shoots microscopic particles (such as gold) covered with DNA into the plant tissues themselves. These techniques and others provide little control over the precise location of the inserted genetic material.[5]

The inability of developers of genetically engineered crops to fully understand what genes they are inserting into a plant cell was dramatically revealed in May 2000. Monsanto disclosed that its genetically engineered soybeans—their largest selling genetically engineered crop—contained gene fragments that scientists had not intentionally inserted.[6] After four years of commercialization,

## Why is CCOF opposed to genetically engineered food?

CALIFORNIA CERTIFIED ORGANIC FARMERS (CCOF) is opposed to the continued release of products that are the result of genetic engineering research for agricultural use. We oppose the experimentation of genetically modified organisms (GMOs) in open fields and commercial applications. Given the lack of information about their effects, the proliferation of GMOs must be stopped before they become irreversibly linked to life on the planet. Altered genes, once released in nature, cannot be recalled. Gene pollution is forever.

CCOF insists on the labeling of all products of genetic engineering. Consumers must be granted the right to make informed choices in order to protect their health. Therefore, CCOF insists on labeling that will ensure clear identification of GMOs.

Where genetically engineered crops are being cultivated in close proximity to organic production, the neighboring conventional farm growing these GE crops must accept the burden of legal and financial responsibility and liability for the effects of their GE crops on neighboring fields, animals and humans.

researchers discovered the two extra gene fragments in the soybeans. Neither Monsanto nor government regulators had any idea the supposedly inactive pieces of genetic material were inserted during the process of engineering the crop.

In 1997, a lack of precision in the insertion process for genetically engineered canola also proved to be a costly mistake for Monsanto. Approximately 60,000 bags of canola—enough to seed 600,000 to 750,000 acres of land—had to be recalled by Monsanto because the seed mistakenly contained an unapproved gene. According to some reports, quantities of seed had already been planted when Monsanto discovered the mistake.[7]

### Marker genes

Scientists cannot always be sure if a plant has incorporated inserted genetic material into its own DNA. To help determine if the insertion was successful, scientists put a "marker gene" into the plant along with the gene for the desired trait. The marker gene most commonly used in genetically engineered crops is a bacterial gene for antibiotic resistance.

There is growing concern that over time widespread use of antibiotic resistance marker genes may contribute to the increasing problem of antibiotic resistance in humans and animals. The British Medical Association has gone so far as to call for a permanent end to all use of these marker genes.[8] Some scientists fear that resistance genes may move from a genetically engineered crop into bacteria in the environment. Since bacteria readily exchange antibiotic resistance genes, such genes might eventually find their way into disease-causing bacteria resulting in antibiotic resistance, and therefore making control more difficult.

It is known that DNA can be taken up by bacteria, so the possibility exists that antibiotic resistance genes could be transferred to bacteria present in the human digestive tract. Furthermore, a recent report found that the human mouth contains bacteria capable of taking up and expressing DNA containing antibiotic resistance marker genes.[9]

### Gene promoters

Scientists may insert a gene for a desired trait into a plant's genome, but that doesn't necessarily guarantee that the trait will be expressed as the plant grows. As a result, in addition to the gene, powerful promoters or enhancers are inserted to maximize its expression. Promoters can respond to signals both from other genes and from the environment that tell it when and where to switch on, by how much and for how long. A promoter may produce different effects depending into which chromosome it has been inserted as well as its precise location on the chromosome. The uncertainty of where the promoter will be inserted means that there will be a fundamental unpredictability related to expression not only of the inserted gene(s), but also the expression of a large number of the host's genes, as well as the influence of chemicals, climate fluctuations, and geographical and ecological changes.

Most genetically engineered crops contain a promoter from the Cauliflower mosaic virus (called CaMV 35S), which in nature causes a disease in plants in the mustard family. The CaMV 35S promoter is used because it is so powerful that it leads to expression of the introduced gene at orders of magnitude two to three times that of the organism's own genes. Some scientists are concerned that use of this viral promoter may result in a major source of new viruses arising from recombination.[10]

### Unusual and unexpected results

The unpredictability of genetic engineering was illustrated by an experiment performed on a plant in the mustard family frequently used for biological research.[11] Scientists compared three lines of the plant that all contained the same gene for herbicide tolerance—one developed by a modified form of conventional breeding and two by genetic engineering. Since the plant is normally a self-pollinating species with very low rates of cross-pollination, researchers thought that there would be virtually no gene flow to other individual plants and little risk of genes moving from engineered plants to non-engineered neighbors.

They designed an experiment to test these assumptions, planting engineered, semi-conventional and wild varieties in close proximity, and later collecting seeds from the wild variety to see how many carried genes for herbicide tolerance. The results, as the authors note elsewhere, have "great implications for biotechnology and the controversy surrounding the risk of releasing transgenic crops into the environment."[12] The two genetically engineered varieties were four and 36 times more likely to cross-pollinate than the semi-conventional variety. With such a high rate of cross-pollination, the act of genetic engineering functionally turned a species that does not usually cross-pollinate into one capable of relatively higher rates of cross-pollination. This experiment demonstrates that genetic engineering can change the basic character of a plant.

In another example, scientists attempted to suppress the color of petunia flowers by transferring a gene created to turn off a pigment gene in the host plants.[13] However, the inserted gene did not have the anticipated effect and the color varied from plant to plant in both shade and pattern. The weather also affected the expression of the genes—some of the flowers changed colors or color patterns as the weather changed.

These problems were totally unexpected and unanticipated. If such dramatic changes could occur in the way the plants developed, it is possible that there could be changes in the plant itself that could affect the nutrition or safety of genetically engineered crops.

## GE, GM, GMOs?

**Genetic Engineering** relies on gene transfer using recombinant DNA technology to create a new plant or animal that could otherwise not have been created under natural conditions.

People refer to aspects of agricultural genetic engineering in many different ways. Below is a list of common terms:

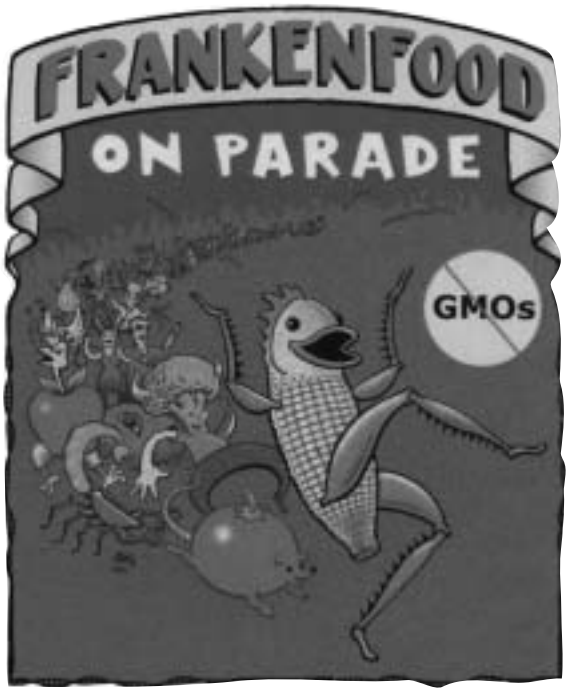
- **Agbiotech** = specifically the agricultural arm of the biotechnology industry
- **Biotech** = the biotechnology industry
- **Bt** (*Bacillus thuringiensis*) = a poisonous bacterium engineered into a crop, which then creates its own Bt pesticide in virtually all parts of the plant
- **GE** = genetic engineering/genetically engineered
- **GM** = genetically modified
- **GMO** = genetically modified organism
- **Pharm crop** = a GE crop that creates its own pharmaceutical byproducts in virtually all parts of the plant
- **Transgenic** = another name for GE

### New genes, new problems?

Using genetic engineering, scientists can, for the first time, insert genes from different species, families or even kingdoms, something inconceivable in traditional breeding. Under normal circumstances, for example, a strawberry can only acquire genetic material from other strawberries—that is, plants of the same or closely related species. However, using genetic engineering, scientists can develop strawberries containing genetic material from trees, bacteria, fish, pigs or even humans if they choose.

The following is a list of genetically engineered plants that have been cleared by the U.S. Department of Agriculture for field tests in the United States. Biotechnology corporations often refuse to list the type of gene inserted, calling such data "confidential business information." As a result, only those crops engineered by public institutions such as state universities regularly list the donor of the inserted gene and therefore it is not possible to determine how many other strange combinations might exist. It is also important to note that Environmental Assessments are not required for these releases (field tests).

- **Apples and chickens**
  To make apples resistant to fire blight, Cornell University has developed a type of genetically engineered apple that contains a gene from a chicken. They tested the crop in both 1994 and 1991 in the state of New York.[14]
- **Corn and humans**
  In 1998, Limagrain, a French multinational corporation and one of the world's largest seed companies, conducted field tests in Iowa, Illinois and Indiana on genetically engineered corn that contained a human gene. The corn was engineered to produce a pharmaceutical protein.[15]




- **Potatoes and mice and humans**
  The University of Idaho has engineered two types of potatoes—one using a mouse gene and one a human gene. Both were developed to be resistant to a number of viral diseases that infect potatoes. Field tests were held in Idaho in 1998.[16]
- **Rice and humans**
  To produce pharmaceutical proteins, Applied Phytologics, a California-based firm, inserted a human gene into a rice plant. The field test took place in California in 1996-97.[17]
- **Soybean and cows**
  The University of Illinois has inserted a gene from a cow into soybeans in order to alter a protein in the soy plant. The field test was in 1998-1999 in Illinois.[18]
- **Sugarcane and cows**
  Both the United States Sugar Company and Texas A&M University have field tested sugarcane in Florida and Texas that contains a gene from a cow as part of an effort to develop a crop resistant to clavibacter, a disease-causing bacteria. The test periods extend from 1998 to 2001.[19]
- **Tomato and flounder**
  In perhaps one of the most famous cases of unusual genetic combinations, DNA Plant Technology field tested a tomato with a gene from the flounder in an attempt to develop a tomato that was tolerant to cold temperatures. The field test took place in California in 1991.[20]

### Fifty acres of corn and chickens

None of the above crops has yet been commercialized; however, corn engineered to contain a chicken gene has been grown commercially in Texas. A Texas-based company, ProdiGene, has been working with the USDA to engineer a gene from a chicken into corn in order to produce the protein

avidin found in chicken egg whites. Avidin is toxic to many grain-feeding pests and may make the corn resistant to pests that can harm grain in storage. The research was conducted by the Grain Marketing and Production Research Center in Manhattan, Kansas and by scientists at ProdiGene in College Station, Texas.[21]

### Conclusion

Genetic engineering is an imprecise, haphazard technology—something completely different from traditional plant breeding. With alarming regularity, biotechnology companies have demonstrated that scientists cannot control where genes are inserted and cannot guarantee the resulting outcomes. Unexpected field results highlight the unpredictability of the science, yet combinations previously unimaginable are being field tested and used commercially.

To protect public health and the environment, Genetically Engineered Food Alert calls for the following:

***Genetically engineered food ingredients or crops should not be allowed on the market unless:***

1. Independent safety testing demonstrates they have no harmful effects on human health or the environment,
2. They are labeled to ensure the consumer's right-to-know, and
3. The biotechnology corporations that manufacture them are held responsible for any harm.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*Much of the information in the above article was based on* "Genetic Engineering Is Not an Extension of Conventional Plant Breeding: How genetic engineering differs from conventional breeding, hybridization, wide crosses and horizontal gene transfer," *by Michael Hansen, Research Associate at the Consumer Policy Institute. Available at* **www.biotech-info.net/wide_crosses.html**


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*Footnotes located at the CCOF website:* **www.ccof.org/magazine.html**

## First Impacts of GMOs on Organic Farmers are Now Documented

### OFRF Releases Partial Results of 4th National Organic Farmers Survey

In a nationwide survey conducted by the Organic Farming Research Foundation (OFRF), certified organic farmers have reported the first direct financial and related operational impacts associated with the threat of contamination by genetically modified organisms (GMOs). National standards for organic products exclude recombinant-DNA technologies from use in organic farming. In addition, there is a variety of strict tolerances for GMO contamination imposed on organic growers by foreign and domestic buyers.

"In 1998, when OFRF conducted our previous survey, GMO contamination was not yet a national issue," said OFRF Executive Director Bob Scowcroft. "These new survey results based on the 2001 crop year document that significant impacts have begun to occur within a very short time frame."

"This new data supports OFRF's call for a moratorium on the release of GMOs until there is a solid regulatory framework that prevents genetic pollution and assigns liability for the damages imposed by GMO contamination," said OFRF President Ron Rosmann.

Highlights of the survey results are as follows:

- **17%** of survey respondents indicated that they have had GMO testing conducted on some portion of their organic farm seed, inputs or farm products. 11% of those that had GMO testing conducted indicated that they received positive test results for GMO contamination on some portion of their organic seed, inputs, or farm products.
- **8%** indicated that their organic farm operation has borne some direct costs or damages related to the presence of GMOs in agriculture, including: payment for testing seed, inputs, or organic farm products for GMO contamination; loss of organic sales/markets due to actual contamination or perceived contamination risk; loss of sales due to presence of GMOs in organic product; or loss of organic certification due to presence of GMOs in organic products.
- **48%** have taken some measures to protect their organic farms from GMO contamination. 24% have communicated with neighboring farmers about GMO risks to their farm. 19% have increased buffer zones to neighboring farms. 18% have discontinued use of certain inputs at risk for GMO contamination. 15% have adjusted timing of crop planting. 13% have altered cropping patterns or crops produced. 9% have changed cropping locations.
- **46%** rated the risk of exposure and possible contamination of their organic farm products as moderate or greater, with 30% characterizing their farm's risk as high or very high.
- Survey respondents identified contaminated seed stock as their primary concern as a possible source of GMO contamination (identified as a moderate to high risk by 48% of respondents). This was followed by GMO pollen drift in the field (identified as a moderate to high risk by 42% of respondents) and contaminated farm inputs, other than seed, (identified by 30% of respondents as a moderate to high risk). Such inputs might include seed inoculants or manures and composts from materials obtained from off the farm.
- Only **10%** feel that a regulatory framework is in place to adequately protect their organic farm products from damages due to contamination from GMOs.

OFRF's 4th National Organic Farmers' Survey: *Sustaining Organic Farms in a Changing Organic Marketplace* will be published in fall 2003. **www.ofrf.org**

## Crop Failures: One More Problem of Genetic Engineering

There have been a number of crop failures with GE cotton and soybeans. In the case of cotton, bolls were deformed and fell off the plant before harvest. Some attributed this problem to companies hurrying Roundup Ready cotton to market without allowing state and federal cotton experts to test the seeds. As a result of the losses suffered, compensation was paid to farmers in a number of states including Mississippi, Arkansas, Tennessee, Missouri and Texas. Farmers also discovered that Monsanto's GE soybeans grown in hot climates are more likely to grow shorter and have their stems split open. GE soybeans grew an average of 15 cm. in hot climates compared to a conventional height average of 20 cm., and 100% of the GE plants had split stems compared to 50-70% for conventional varieties. *Source:* **www.panna.org**

**WEIRD SCIENCE: THE BRAVE NEW WORLD OF GENETIC ENGINEERING**

By Ellen Hickey, Pesticide Action Network, & Richard Caplan, U.S. Public Interest Research Group

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Originally published October 2000. Reprinted in *CCOF Magazine* (Vol. XX, no. 2) with permission.

*Much of the information in the article was based on "Genetic Engineering Is Not an Extension of Conventional Plant Breeding: How genetic engineering differs from conventional breeding, hybridization, wide crosses and horizontal gene transfer," by Michael Hansen, Research Associate at the Consumer Policy Institute. Available at http://www.consumersunion.org/food/widecpi200.htm.*

**Notes**

**1** The term appears to have been coined by the Organization for Economic Cooperation and Development in their 1993 publication "Safety Evaluation of Foods Derived by Modern Biotechnology: Concepts and Principles."
**2** From http://www.biotechbasics.com/basics.html. Accessed on October 10, 2000.
**3** Michael Hansen. "Genetic Engineering Is Not an Extension of Conventional Plant Breeding: How genetic engineering differs from conventional breeding, hybridization, wide crosses and horizontal gene transfer." Consumer Policy Institute/Consumer's Union. 2000. Available at http://www.consumersunion.org/food/food.htm.
**4** These bacteria cause a disease in plants by attaching themselves to the plant and then transferring part of their DNA into the host plant's genome. To use this bacterium in genetic engineering, scientists must delete the disease-inducing genes and insert genes that produce the desired traits. This engineered bacterium, sometimes called a bacterial "truck," is then mixed with the plant cells and allowed to infect them.
**5** Michael Hansen and Ellen Hickey. "Genetic Engineering: Imprecise and Unpredictable." Global Pesticide Campaigner. Volume 10, Number 1. April 2000.
**6** James Meikle. "Soya gene find fuels doubts on GM crops." The Guardian (London). 31 May 2000.
**7** Peter Montague. "Genetic Engineering Error." Rachel's Environment & Health Weekly. 5 June 1997.
**8** British Medical Association press release. "BMA statement on genetically modified organisms." 18 May 1999.
**9** Mercer, D.K., K.P. Scott, W.A. Bruce-Johnson, LA. Glover and H.J. Flint. 1999. "Fate of free DNA and transformation of the oral bacterium Streptococcus gordonii DL1 by plasmid DNA in human saliva." Applied and Environmental Microbiology. 65: 6-10.
**10** Ho, Mae-Wan, Angela Ryan and Joe Cummins. Hazards of Transgenic Plants Containing the Cauliflower Mosaic Viral Promoter: Authors' reply to critiques of "The Cauliflower Mosaic Viral Promoter—a Recipe for Disaster?" Microbial Ecology in Health and Disease (in press). (Online rebuttal to critiques, www.i-sis.org.uk/camv-mehd.php
**11** Joy Bergelson, Colin B. Purrington and Gale Wichmann. 1998. "Promiscuity in transgenic plants." Nature. 3 September 1998.
**12** Wichmann, Gale, Colin B. Purrington and Joy Bergelson. Abstract of "Male promiscuity is increased in transgenic Arabidopsis." Available at http://genome-www.stanford.edu/Arabidopsis/madison98/abshtml/321.html. Accessed 12 October 2000. (The AtDB Project database remained accessible until November 17, 2000. A new project The Arabidopsis Information Resource (TAIR) is now the NSF funded project for Arabidopsis information. www.arabidopsis.org)
**13** Peter Meyer, Linn Felicitas, Iris Heidmann, Heiner Meyer Z.A., Ingrid Niedenhof and Heinz Saedler. "Endogenous and environmental factors influence 35S promoter methylation of a maize A1 construct in transgenic petunia and its colour phenotype." Molecular Genes and Genetics (1992) 231: 345-352.
**14** Permit #99-088-09N, Permit #94-039-03R. http://www.nbiap.vt.edu/cfdocs/fieldtests1.cfm.
**15** Permit #98-117-01R, Permit #98-117-02R, Permit #98-117-03R. http://www.nbiap.vt.edu/cfdocs/fieldtests1.cfm.
**16** Permit #98-100-15N. Permit #98-100-16N. http://www.nbiap.vt.edu/cfdocs/fieldtests1.cfm.
**17** Permit #96-355-01R. http://www.nbiap.vt.edu/cfdocs/fieldtests1.cfm.
**18** Permit #98-128-17N. http://www.nbiap.vt.edu/cfdocs/fieldtests1.cfm.
**19** Permit #98-071-74N, Permit #98-320-03N, and Permit #98-049-04N. http://www.nbiap.vt.edu/cfdocs/fieldtests1.cfm
**20** Permit #91-079-01R, http://www.nbiap.vt.edu/cfdocs/fieldtests1.cfm.
**21** ProdiGene press release, June 7, 2000, "New Biopesticide Developed from Egg White Featured in Nature Biotechnology Magazine."

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**Articles begin on even-numbered (left-facing) pages.**

# CALIFORNIANS FOR GE-FREE AGRICULTURE READYING STATEWIDE CAMPAIGN

*By Will Stockwin*

GENETICALLY ENGINEERED FRUITS, vegetables and grains will be introduced into California within the next several years if the biotechnology industry proceeds with its plans unchecked. These plans are being made without the knowledge, consent or desire of most of California's citizens. A newly formed coalition, Californians for GE-Free Agriculture, is making its own plans.

Since the advent of genetically engineered crops in the late 1990s, there have been a number of groups and organizations cautioning about the risks and uncertainties associated with genetically modified organisms in food, and working to encourage the rejection of GE foods in the marketplace. Until now, there has been no coordinated effort to enlist farmers, processors and consumers to fight biotechnology in the most logical place – the farm.

Californians for GE-Free Agriculture (Cal GE-Free) is doing just that. Cal GE-Free is unique in that it joins farmer-based organizations with consumer and environmental groups that have been working on GE issues for years (see box facing page). The diversity of that constituency gives the Coalition the strength needed to challenge the biotech threat facing California's farmers.

It's a threat that Dave Henson, Director of the Occidental Arts and Ecology Center, says is very close to becoming reality. "As soon as next year, Bayer Cropscience plans to introduce its herbicide-tolerant rice. Monsanto and its partners are developing genetically engineered fruits and vegetables, including Monsanto's Roundup Ready strawberries, lettuce, and pest-resistant wine grapes," he said. "Right now cotton is the only commercial GE crop in the state, but as more are introduced, it gets harder to stop the trend. There is still time for California farmers to heed the hard lessons learned by farmers in the Midwest."

To date, GE research and application has focused on soy, corn, canola, and cotton, and the battles to protect sustainable agriculture have thus far been waged in the Midwest where these crops are grown. Corn and soybean growers have lost more than $1 billion dollars in exports because of consumer rejection of GE foods in Europe and Asia. Resistance to Roundup is starting to be identified in some weed species due to cross-pollination between weeds and herbicide tolerant GE crops. Midwestern organic corn farmers have lost markets and face the high costs of testing their fields for GE contamination. Farmers are increasingly vulnerable to legal action from biotech companies for patent infringement — Monsanto has already sued over 400 farmers.

"Genetic engineering presents tremendous economic vulnerability for California farmers, especially for family-scale and organic farmers," said Renata Brillinger, Cal GE-Free's Campaign Coordinator. "California's primary export markets have rejected GE, farmers assume liability risks if they contaminate neighboring non-GE fields, and the seed contracts are restrictive and costly. And for farmers who don't want to grow GE product, including organic farmers, it's a disaster waiting to happen, since genetic contamination could destroy their entire crop."

The Cal GE-Free Coalition is pursuing these goals:

- ***To develop a base of farmers*** who refuse to plant the GE crops targeted for commercialization in California.
- ***To work with farmers and consumers*** to convince agricultural food processors affecting California planting decisions to refuse to process GE crops.
- ***To convince consumers*** to publicly refuse to purchase the next wave of GE crops in California.

"In our first two years the Coalition's work will focus on farmer and market-based rejection of GE rice, strawberries, lettuce and wine grapes," said CCOF's Brian Sharpe, working on the campaign as a farmer organizer. "The campaign will work primarily with farmers to develop a base of

educated, informed spokespeople who believe it is in the best interests of farmers to reject GE agriculture."

Since GE rice presents the most imminent threat to California agriculture, the campaign will focus first within the rice industry. Bayer Cropscience recently petitioned the Environmental Protection Agency (EPA) for final regulatory approval of its herbicide tolerant rice to be commercialized for the 2004 growing season. The company has applied for regulatory authority to use traditional airplane seeding of the crop in the Sacramento Valley, even though the resulting contamination for organic and non-GE rice growers could be devastating.

Sharpe says that the rice campaign will focus largely on countering the biotech industry's slick promotion and promises with the truth about the economic and performance realities of biotech crops. Brillinger says, "We want to provide farmers with information on the disadvantages and risks of GE—the kind of information that never makes it into the industry's promotional materials. The campaign will also provide farmers with economically and agriculturally sustainable alternatives to GE."

Cal GE-Free Coalition members are convinced that, with enough balanced information, farmers will reject this economically risky, uncontrollable technology.

*For more information about the Coalition and joining the campaign, contact: Cal GE-Free at (707) 874-0316,* or *calgefree@oaec.org.*

***Scientists from Purdue University found that if just 60 individual genetically-engineered fish were introduced into a population of 60,000 wild fish, the species would become extinct within only 40 generations.***

From *Fatal Harvest: The Tragedy of Industrial Agriculture*
**www.fatalharvest.org**

## Cal GE-Free Coalition of Farmer-based, Environmental, and Consumer Organizations

*California Certified Organic Farmers (CCOF)* **www.ccof.org**
*Center for Food Safety (CFS)* **www.centerforfoodsafety.org**
*Community Alliance with Family Farmers (CAFF)* **www.caff.org**
*Ecological Farming Association (EFA)* **www.eco-farm.org**
*Genetic Engineering Action Network (GEAN-USA)* **www.geaction.org**
*Greenpeace* **www.greenpeaceusa.org**
*Occidental Arts and Ecology Center (OAEC)* **www.oaec.org**
*Organic Consumers Association (OCA)* **www.organicconsumers.org**
*Four Elements Farm*

*Advice and Support ~ Pesticide Action Network (PANNA)* **www.panna.org**

# WHEN TRANSGENES WANDER, SHOULD WE WORRY?

*By Norman C. Ellstrand, Professor of Genetics, University of California — Riverside*

IT IS HARD TO IGNORE THE ONGOING, often emotional, public discussion of the impacts of the products of crop biotechnology. At one extreme of the hype is self-righteous panic, and at the other is smug optimism. While the controversy plays out in the press, dozens of scientific workshops, symposia, and other meetings have been held to take a hard and thoughtful look at potential risks of transgenic crops. Overshadowed by the loud and contentious voices, a set of straightforward, scientifically based concerns have evolved, dictating a cautious approach for creating the best choices for agriculture's future.

Plant ecologists and population geneticists have looked to problems associated with traditionally improved crops to anticipate possible risks of transgenic crops. Those that have been most widely discussed are: (a) crop-to-wild hybridization resulting in the evolution of increased weediness in wild relatives, (b) evolution of pests that are resistant to new strategies for their control, and (c) the impacts on nontarget species in associated ecosystems (such as the unintentional poisoning of beneficial insects; Snow and Palma, 1997; Hails, 2000).

Exploring each of these in detail would take a book, and such books exist (e.g. Rissler and Mellon, 1996; *Scientists' Working Group on Biosafety,* 1998). However, let us consider the questions that have dominated my research over the last decade to examine how concerns regarding engineered crops have evolved. Those questions are: How likely is it that transgenes will move into and establish in natural populations? And if transgenes do move into wild populations, is there any cause for concern? It turns out that experience and experiments with traditional crops provide a tremendous amount of information for answering these questions.

The possibility of transgene flow from engineered crops to their wild relatives with undesirable consequences was independently recognized by several scientists (e.g. Colwell et al., 1985; Ellstrand, 1988; Dale, 1992). Among the first to publish the idea were two Calgene scientists, writing: "The sexual transfer of genes to weedy species to create a more persistent weed is probably the greatest environmental risk of planting a new variety of crop species" (Goodman and Newell, 1985). The movement of unwanted crop genes into the environment may pose more of a management dilemma than unwanted chemicals. A single molecule of DDT [1,1,1,-trichloro-2,2-bis

(p-chlorophenyl)ethane] remains a single molecule or degrades, but a single crop allele has the opportunity to multiply itself repeatedly through reproduction, which can frustrate attempts at containment.

In the early 1990s, the general view was that hybridization between crops and their wild relatives occurred infrequently, even when they were growing in close proximity. This view was supported by the belief that the discrete evolutionary pathways of domesticated crops and their wild relatives would lead to increased reproductive isolation and was supported by challenges breeders sometimes have in obtaining crop-wild hybrids. Thus, my research group set out to measure spontaneous hybridization between wild radish (*Raphanus sativus*), an important California weed, and cultivated radish (the same species), an important California crop (Klinger et al., 1991). We grew the crop as if we were multiplying commercial seed and surrounded it with stands of weeds at varying distances. When the plants flowered, pollinators did their job. We harvested seeds from the weeds for progeny testing. We exploited an allozyme allele (Lap-6) that was present in the crop and absent in the weed to detect hybrids in the progeny of the weed. We found that every weed seed analyzed at the shortest distance (1 m) was sired by the crop and that a low level of hybridization was detected at the greatest distance (1 km). It was clear, at least in this system, that crop alleles could enter natural populations.

But could they persist? The general view at that time was that hybrids of crops and weeds would always be handicapped by

crop characteristics that are agronomically favorable, but a detriment in the wild. We tested that view by comparing the fitness of the hybrids created in our first experiment with their non-hybrid siblings (Klinger and Ellstrand, 1994). We grew them side by side under field conditions. The hybrids exhibited the huge swollen root characteristic of the crop; the pure wild plants did not. The two groups did not differ significantly in germination, survival, or ability for their pollen to sire seed. However, the hybrids set about 15% more seed than the wild plants. In this system, hybrid vigor would accelerate the spread of crop alleles in a natural population.

When I took these results on the road, I was challenged by those who questioned the generality of the results. Isn't radish probably an exception? Radish is outcross-

ing and insect pollinated. Its wild relative is the same species. What about a more important crop? What about a more important weed? We decided to address all of those criticisms with a new system. Sorghum (*Sorghum bicolor*) is one of the world's most important crops. Johnsongrass (*Sorghum halepense*) is one of the world's worst weeds. The two are distinct species, even differing in chromosome number, and sorghum is largely selfing and wind pollinated. Sorghum was about as different from radish as you could get.

We conducted experiments with sorghum paralleling those with radish. We found that sorghum and johnsongrass spontaneously hybridize, although at rates lower than the radish system, and detected crop alleles in seed set by wild plants growing 100 m from the crop (Arriola and Ellstrand, 1996). The fitness of the hybrids was not significantly different from their wild siblings (Arriola and Ellstrand, 1997). The results from our sorghum-johnsongrass

experiments were qualitatively the same as those from our cultivated radish-wild radish experiments. Other labs have conducted similar experiments on crops such as sunflower (*Helianthus annus*), rice (*Oryza sativa*), canola (*Brassica napus*), and pearl millet (*Pennisetum glaveum;* for review, see Ellstrand et al., 1999). In addition, descriptive studies have repeatedly found crop-specific alleles in wild relatives when the two grow in proximity (for review, see Ellstrand et al., 1999). The data from such experiments and descriptive studies provide ample evidence that spontaneous hybridization with wild relatives appears to be a general feature of most of the world's important crops, from raspberries (*Rubus idaeus*) to mushrooms (*Aqaricus bisporus;* compare with Ellstrand et al., 1999).

When I gave seminars on the results of these experiments, I was met by a new question: "If gene flow from crops to their wild relatives was a problem, wouldn't it already have occurred in traditional systems?" A good question. I conducted a thorough literature review to find out what was known about the consequences of natural hybridization between the world's most important crops and their wild relatives.

Crop-to-weed gene flow has created hardship through the appearance of new or more difficult weeds. Hybridization with wild relatives has been implicated in the evolution of more aggressive weeds for seven of the world's 13 most important crops (Ellstrand et al., 1999). It is notable that hybridization between sea beet (*Beta vulgaris* subsp. *maritima*) and sugar beet (*B. vulgaris* subsp. *vulgaris*) has resulted in a new weed that has devastated Europe's sugar production (Parker and Bartsch, 1996).

Crop-to-wild gene flow can create another problem. Hybridization between

*Photo: USDA*

a common species and a rare one can, under the appropriate conditions, send the rare species to extinction in a few generations (e.g. Ellstrand and Elam, 1993; Huxel, 1999; Wolf et al., 2001). There are several cases in which hybridization between a crop and its wild relatives has increased the extinction risk for the wild taxon (e.g. Small, 1984). The role of hybridization in the extinction of a wild subspecies of rice has been especially well documented (Kiang et al., 1979). It is clear that gene flow from crops to wild relatives has, on occasion, had undesirable consequences.

Are transgenic crops likely to be different from traditionally improved crops? No, and that is not necessarily good news. It is clear that the probability of problems due to gene flow from any individual cultivar is extremely low, but when those problems are realized, they can be doozies. Whether transgenic crops are more or less likely to create gene flow problems will depend in part on their phenotypes. The majority of the "first generation" transgenic crops have phenotypes that are apt to give a weed a fitness boost, such as herbicide resistance or pest resistance. Although a fitness boost in itself may not lead to increased weediness, scientists engineering crops with such phenotypes should be mindful that those phenotypes might have unwanted effects in natural populations. In fact, I am aware of at least three cases in which scientists decided not to engineer certain traits into certain crops because of such concerns.

The crops most likely to increase extinction risk by gene flow are those that are planted in new locations that bring them into the vicinity of wild relatives, thereby increasing the hybridization rate because of proximity. For example, one can imagine a new variety that has increased salinity tolerance that can now be planted within the range of an endangered relative. It is clear that those scientists creating and releasing new crops, transgenic or otherwise, can use the possibility of gene flow to make choices about how to create the best possible products.

It is interesting that little has been written regarding the possible downsides of within-crop gene flow involving transgenic plants. Yet a couple of recent incidents suggest that crop-to-crop gene flow may result in greater risks than crop-to-wild gene flow. The first is a report of triple herbicide resistance in canola in Alberta, Canada (MacArthur, 2000). Volunteer canola plants were found to be resistant to the herbicides Roundup (Monsanto, St. Louis), Liberty (Aventis, Crop Science, Research Triangle Park, NC), and Pursuit (BASF, Research Triangle Park, NC). It is clear that two different hybridization events were necessary to account for these genotypes. It is interesting that the alleles for resistance to Roundup and Liberty are transgenes, but the allele for Pursuit resistance is the result of mutation breeding. Although these volunteers can be managed with other herbicides, this report is significant because, if


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correct, it illustrates that gene flow into wild plants is not the only avenue for the evolution of plants that are increasingly difficult to manage.

The second incident is a report of the Starlink Cry9C allele (the one that showed up in Taco Bell's taco shells) appearing in a variety of supposedly non-engineered corn (Callahan, 2000). Although unintentional mixing of seeds during transport or storage may explain the contamination of the traditional variety, inter-varietal crossing between seed production fields could be just as likely. This news is significant because, if correct, it illustrates how easy it is to lose track of transgenes. Without careful checking, there are plenty of opportunities for them to move from variety to variety. The field release of "third generation" transgenic crops that are grown to produce pharmaceutical and other industrial biochemicals will pose special challenges for containment if we do not want those chemicals appearing in the human food supply.

The products of plant improvement are not absolutely safe, and we cannot expect transgenic crops to be absolutely safe either. Recognition of that fact suggests that creating something just because we are now able to do so is an inadequate reason for embracing a new technology. If we have advanced tools for creating novel agricultural products, we should use the advanced knowledge from ecology and population genetics as well as social sciences and humanities to make mindful choices about to how to create the products that are best for humans and our environment.

**Acknowledgments**

This article was written while I was receiving support from the USDA (grant no. 00-33120-9801). I thank Tracy Kahn for her thoughtful comments on an earlier draft of the manuscript and Maarten Chrispeels for his encouragement and patience.

*Previously printed in* Plant Physiology, Editor's Choice, *Vol. 125, pp. 1543-1545, April 2001.*


*Footnotes located at the CCOF website:* **www.ccof.org/magazine.html**

## Insects Thrive on GE "pest-killing" Crops

**New research by scientists at Imperial College London** and the Universidad Simon Rodrigues in Caracas, Venezuela suggests that pests can actually feed on *Bacillus thuringiensis* (Bt) genetically engineered into crops, rather than succumb to the poison as the crops were designed. The research radically undermines one of the key benefits claimed for GE crops—breeding crops that come equipped with their own pesticide.

Drawbacks have already emerged, with pests becoming resistant to the toxin. Environmentalist's say that resistance develops all the faster because the insects are constantly exposed to it in the plants, rather than being subject to occasional spraying.

Bt, a naturally occurring toxin, is widely used as a pesticide by organic farmers. However, organic farmers in the U.S. may use only approved non-genetically engineered Bt products, which are often weaker than GE Bt products.

Researchers fed resistant larvae of the diamondback moth—an increasingly troublesome pest in the southern U.S. and in the tropics—normal cabbage leaves and ones that had been treated with a Bt toxin. The larvae eating the treated leaves grew much faster and bigger—with a 56% higher growth rate. They found that the larvae "are able to digest and utilize" the toxin and may be using it as a "supplementary food," adding that the presence of the poison "could have modified the nutritional balance in plants" for them. Researchers conclude: "Bt transgenic crops could therefore have unanticipated nutritionally favorable effects, increasing the fitness of resistant populations."

"The present results and previous work on re-selected SERD4 populations (Sayyed & Wright 2001) suggest that resistant larvae may be using Cry1Ac as a supplementary food protein, and that this may account for the observed faster development rate of Bt resistant insects in the presence of the Bt toxin."

Pete Riley, food campaigner for Friends of the Earth, said, "This...destroys the industry's entire case that insect-resistant GE crops can have anything to do with sustainable farming."

Genetically engineered Bt crops have spread fast. The amount of land planted with them worldwide has grown more than 25-fold—from four million acres in 1996 to well over 100 million acres in 2000—and the global market is expected to be worth $25 billion by 2010.

*Source:* Geoffrey Lean, *The Independent,* UK, 03/30/03

**WHEN TRANSGENES WANDER, SHOULD WE WORRY?**

By Norman C. Ellstrand, Professor of Genetics, University of California — Riverside

Previously printed in *Plant Physiology, Editor's Choice*, Vol. 125, pp. 1543-1545, April 2001.


**Acknowledgments**

This article was written while I was receiving support from the U.S. Department of Agriculture (grant no. 00-33120-9801). I thank Tracy Kahn for her thoughtful comments on an earlier draft of the manuscript and Maarten Chrispeels for his encouragement and patience.

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**Articles begin on even-numbered (left-facing) pages.**

# ARE GMOS BEING REGULATED OR NOT?

*By Claire Hope Cummings, M.A., J.D.*

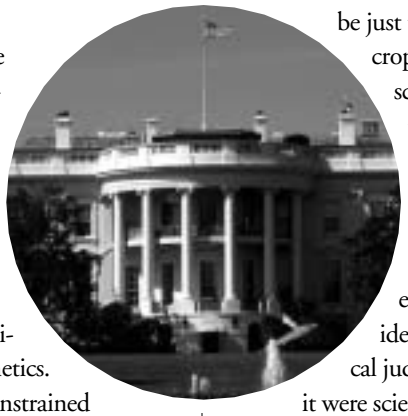
NEW GENETICALLY MODIFIED organisms (GMOs) are on the loose and they are causing trouble. These are not the GMOs most people hear about: soybeans that resist weed killers or corn that kills insects. These are experimental crops that contain pharmaceutical proteins, industrial chemicals, even human genes. They are being grown outdoors in hundreds of secret locations all over the country, in open-pollinated plants such as corn. This powerful new use of biotechnology is called "pharming," and it poses very real threats to our personal and environmental health. Cases of pharm contamination have already occurred, raising new criticisms of the regulatory system in the United States.

When GMOs were first introduced into agriculture, farmers and consumer groups questioned the lack of basic protections. Since then, GMO contamination has spread from the corn fields in the Midwest to the birthplace of corn in the remote mountains of Mexico. Farmers have not been able to protect themselves from this genetic trespass. Instead of holding GMO manufacturers liable, the courts are upholding the patent rights of seed companies and making the farmers pay. Taxpayers are subsidizing the costs of GMO food recalls. While national polls show that well over 90% of U.S. consumers want GMO food labeled, government regulators still refuse to consider it.

By almost any measure, regulatory oversight of agricultural biotechnology is failing to protect the public interest. The reason is, it was designed that way. Long before there were any products ready for market, the GMO manufacturers were in Washington, D.C. taking pre-emptive action to ensure that the regulatory climate would favor their interests. The industry wanted to leave just enough regulation in place to give the public a sense of assurance, while leaving the manufacturers free of any real restraint.

In 1986, then Vice-President George Bush hosted Monsanto executives at the White House to discuss the "deregulation" of biotechnology. Then, after he became President, the framework that had been constructed during years of behind-the-scenes negotiations was announced by his Vice-President, Dan Quayle. Brushing aside the concerns voiced by independent scientists, farmers and consumer groups, Quayle said that "biotech products will receive the same oversight as other products" and not be "hampered by unnecessary regulation."

The system that was created then is still in force today, with only a few minor exceptions. Basically, it was decided that there would be no new laws passed governing biotechnology. As a result, federal agencies are still struggling to evaluate and approve a plethora of new and potentially dangerous products, using laws designed to deal with chemicals and pathogens, not genetics. And they continue to be constrained by concepts developed with the best science available in the 1960s.



The reporting system is essentially voluntary and industry is trusted to inform the government of any problems that arise. It's sort of a "don't tell, don't ask" arrangement. If industry does not tell government what it knows or suspects about its GMOs, the government does not ask. Once crops are released, there is no monitoring or follow-up. Agencies are free to ignore significant findings from independent sources, including reports about the nutritional deficits in food made from GMO crops, how genes wander when GMO crops cross with other plants, about recombinant viruses on the loose, and the growing problems of resistance and tolerance, to name just a few. As a result, evidence of emerging human health and ecological problems are routinely disregarded.

The federal government says that its processes are rigorous. It says that the lack of any reported human health problems associated with GMOs is evidence of its effectiveness. The biotech industry claims that their products are "the most studied" on the market. But the industry is simply referring to the studies they have done as they develop the product. They are not referring to any post-market evaluation. Underneath the government's claims of safety lies a little known but fundamentally flawed idea that undermines the whole system.

The governing principle behind the regulation of GMO food and agriculture is a concept called "substantial equivalence." It means that a GMO crop can be considered to be just the same as a conventional crop. Unfortunately there is no scientific justification for this idea. According to an article in the prestigious scientific journal *Nature,* the concept of substantial equivalence is "pseudo-scientific." The article calls this idea a "commercial and political judgment masquerading as if it were scientific" and it was "created primarily to provide an excuse for not requiring biochemical or toxicological tests." Legislators have never agreed on the meaning of substantial equivalence. This ambiguity, according to the article, "acts as a barrier to further research into the possible risks of eating GMOs."

As applied, substantial equivalence means that regulators only look at a GMO product itself. They do not take the process used to manufacture it into consideration. This is a crucial mistake, because it is the process that makes GMOs unique. GMOs are organisms that can not be created using traditional breeding methods. The process is imprecise and unpredictable and more often than not, it results in failure. Getting a useful product out of that process depends on the use of viral vectors, anti-bacterial markers, promoters, switches and other genetically altered molecules to succeed. And it is these process-

related molecules that should trouble us. They are the basis for some of the safety concerns of other countries and international biosafety protocols.

It is also revealing to take a look at how the three executive agencies that are primarily responsible for GMOs operate. The Food and Drug Administration (FDA), an agency of the Department of Health and Human Services, oversees GMO foods. The Environmental Protection Agency (EPA) deals with GMO pesticides. The Animal and Plant Health Inspection Service (APHIS), an agency of the United States Department of Agriculture (USDA), administers GMO plant testing in the field. All three operate only under their own legislation and none of their efforts are coordinated.

The USDA relies on the *Plant Pest Act,* which narrowly defines plant pests and does not include all the processes or organisms currently used in genetic engineering. Permits for field tests are obtained from APHIS through a simple notification process, after which they are deregulated. There are only bare standards for biological containment of the field test and no provisions for evaluating certain ecological risks. APHIS can require an environmental assessment if the applicant indicates one might be required. A study of over 8,000 field test results submitted to the USDA showed that not one resulted in an environmental assessment.

The FDA uses the *Food, Drug, and Cosmetic Act* to review GMOs. The substantial equivalence doctrine fits nicely with FDA logic. It goes like this: any "novel" substances in food must be tested and perhaps labeled. However, if something can be "generally regarded as safe" (GRAS), as most conventional foods are, then they are exempt. Since GMOs are "substantially equivalent" to conventional food, they are considered GRAS and thus they do not require testing or labels.

The EPA makes some effort to deal with the environmental impacts of GMOs. It regulates GMO pesticides (primarily the Bt crops) under the *Federal Insecticide, Fungicide, and Rodenticide Act* and the *Toxic Substances Control Act.* The EPA operates under the assumption that Bt is safe, even though GMO Bt has been shown to have detrimental impacts on soil micro-organisms and beneficial insect populations. The EPA recommendations and permit requirements, such as its Insect Resistance Management Plans for farmers, which are supposed to slow down the development of resistance to Bt, are not adequate to the task.

Here is an example of how this regulatory patchwork plays out in the field: In April 2003, the EPA announced that a company growing experimental GMO corn in Hawaii had finally satisfied the agency's regulatory requirements. The company, Pioneer Hi-Bred, had been fined for permit violations in 2002 and was ordered to test and report its findings to the EPA to ensure that their experimental corn did not contaminate nearby fields. When the company failed to report on its testing, in direct violation of its agreement with EPA, it was fined again. Later, after acquiring and reviewing the test findings, the EPA said it was satisfied that the company was in compliance. But did that mean there was no contamination? No, there was. But it involved fields that were regulated by the USDA, so the EPA was not concerned about that. For their part, the USDA had no comment, saying it was investigating. Meanwhile, the company has asked neighboring farmers on the island not to plant any of the crops that Pioneer is using in its experiments, as a way of avoiding cross-contamination.


About the Author

**Claire Hope Cummings** was a lawyer for the USDA during the Carter Administration. She has farmed in California and in Vietnam where she had an organic farm along the Mekong River. As a print and broadcast journalist, she covers the environmental and cultural costs of industrial agriculture and follows the progress of the sustainable agriculture movement. Her latest work on agricultural biotechnology was published in *World Watch Magazine* in December, 2002, and she has written *A Farmer's Guide to GMOs for Farm Aid and The National Family Farm Coalition,* and *the Environmental Media Services Reporter's and Editor's Guide to Genetic Engineering in Agriculture.* She is a 2001 Food and Society Policy Fellow.


## State Legislation on Genetically Engineered Agriculture & Food Issues

**Vermont** ~ In April, the State Senate passed a bill, S. 182, which requires labeling of GE seed. The bill also requires that the distributors of GE seed report to the State Commissioner of Agriculture how many GE seeds were sold in any given year. Threatened with not passing in the State House, the language of the bill was attached as a rider to an appropriations bill, which is currently pending conference committee. Three other bills on the GE ag issue are pending at the committee level. The bills address biotech liability issues, moratorium on GE plantings, and labeling of GE food. Visit Vermont GEAN for more info: **www.gefreevt.org/home.html**

***Source:*** *CropChoice news,* 04/04/03

**Texas** ~ The House of Representatives is considering a bill, HB 3387, that would ban from the state GE food crops and animals that produce proteins for drug production. Texas is home to Prodigene, the company responsible for two known incidents of pharmaceutical corn contaminating corn and soy intended for the food supply. The Prodigene corn was genetically engineered to produce a pig vaccine. Livestock and food crops such as corn should not be genetically tinkered to produce drugs, industrial chemicals and other nonfood items, and they should not be allowed in Texas, according to the bill sponsored by Rep. Lon Burnam, D-Forth Worth. Frito-Lay is in support of the bill, along with Consumers Union. The Texas Farm Bureau and the biotech industry are opposed to the bill.

For more information on the bill go to: **www.capitol.state.tx.us**

For more information on pharmaceutical crops, go to: **www.truefoodnow.org**

***Source:*** *Express-News Business,* 04/11/03

**Montana** ~ In April, the State Legislature passed a resolution, SJ 8, calling on the federal government to withhold introduction of GE wheat and barley until there is market acceptance. For a full copy of the resolution, go to: **http://data.opi.state.mt.us/bills/2003/billhtml/SJ0008.htm**

For more information on farmer opposition to GE wheat, go to: **www.worc.org/index.html**

***Source:*** *Bozeman Daily Chronicle,* 04/09/03

**Oregon** ~ The State Legislature is debating a bill that would prohibit local government from passing food labeling laws, including labeling of GE food. The bill, HB 2957, passed the Oregon House of Representatives in April – 43 in favor, 8 opposed. The bill is now pending on the Oregon State Senate. In the 2002 Oregon election, the biotech and food industry spent millions to defeat Measure 27, a state ballot initiative that would have required GE food labeling. The bill would not prevent future state ballot initiatives or state legislation requiring GE food labeling. It would only prevent local municipalities in Oregon from passing food labeling laws.

For more information, go to: **www.leg.state.or.us/billsset.htm**

For more information on GE food labeling, go to: **www.thecampaign.org**

***Source:*** AP, 04/11/03

# GENETICALLY ENGINEERED FOODS AND PESTICIDES

*By Skip Spitzer, Pesticide Action Network*

HAZARDOUS PESTICIDES OFTEN end up in our environment, the places where we work and play, and in our food. Agricultural biotechnology companies would have you believe that GE foods are the alternative to these toxics. Here's the real story about GE foods and pesticides.

### GE CROPS ARE DESIGNED FOR PESTICIDE USE

Nearly 100% of GE crops now on the market are designed to be used with weed-killers ("herbicide-tolerant crops"), to produce their own pesticides ("insect-resistant crops"), or both. (Insect-resistant crops are also known as "Bt crops," so called for the bacterial Bt toxin they are engineered to produce.) Furthermore, GE crops often require the use of pesticides in addition to those they were to engineered to resist or produce.

### GE CROPS DO NOTHING TO STOP THE "PESTICIDE TREADMILL"

Pesticides are intended to control pests. Yet it is not uncommon for pest populations to grow in response to pesticide use. Moreover, pests often eventually develop resistance to particular chemicals. This growth and adaptation of pests generally requires farmers to use even more pesticides. This treadmill of pesticide reliance is left unchanged with GE crops, since they are designed to be used with or produce pesticides. Already, the widespread use of herbicides with GE herbicide-tolerant crops is causing some weeds to become resistant to pesticides. The use of insect-resistant crops engineered to produce their own Bt pesticide is hastening the development of resistant insects.

*Dangerous to handle. Safe to eat? Photo: USDA*

### THERE IS LITTLE EVIDENCE THAT GE CROPS GENERALLY REDUCE PESTICIDE USE

There is little credible evidence that GE crops generally require less pesticide use. In the case of herbicide-tolerant soy, accounting for about 59% of GE crops worldwide (September 2001), independent studies report anywhere from a pesticide reduction of 10% to moderately lower use in five states, 10% or more greater use in three states and 30% or more greater use in six states. In the case of insect-resistant Bt corn, which account for about 18% of GE crops worldwide, independent pesticide use assessments range from modest reductions to the idea that farmers are using Bt corn in addition to pesticides, rather than as a replacement. While there is considerable evidence for at least short-term pesticide reduction from the use of Bt cotton, these crops account for only about 7% of GE crops worldwide.

### HERBICIDES USED WITH GE HERBICIDE-TOLERANT CROPS ARE HAZARDOUS

While herbicides used with GE herbicide-tolerant crops have sometimes replaced more toxic pesticides, they are still hazardous. All three of the most common herbicides used with GE crops can threaten wildlife and human health. Glyphosate (the active ingredient in Monsanto's popular Roundup herbicide) has been associated with an increased risk of miscarriage, premature birth and reduced fertility. It also contaminates groundwater. Testing glufosinate on laboratory animals, researchers found an increase in premature delivery, miscarriages and dead fetuses, and arrested development of fetal kidneys. Bromoxynil is classified as a possible human carcinogen and is known to be a developmental toxicant, causing birth defects in mammals. Some companies are developing GE crops that are tolerant to even more toxic and persistent herbicides such as 2,4-D.

In addition to the existing evidence about these herbicides, it is likely that a lack of long-term testing has lead to a substantial underestimation of the effects of herbicides on humans and other animals generally. Moreover, although little studied, some of the so-called "inactive" ingredients in pesticide formulations are also considerably toxic.

### REASONS TO EXPECT GREATER PESTICIDE USE AND HARM DUE TO GE CROPS

There are a wide range of reasons why we can expect greater pesticide use and harm due to GE crops.

**These include:**

- The development of pest resistance may require additional or more potent pesticide applications.
- GE herbicide-resistant crop plants can spring up as weeds after switching to another crop, requiring additional or more potent pesticides.
- "Super-weeds," weeds that have taken on the engineered herbicide-resistance trait via pollination, may require additional or more potent weedkillers.
- GE herbicide-tolerant crops may encourage extra herbicide use since it won't harm the crop.
- GE Bt crops express their pesticide even when the target pest is absent. In fact, while Bt crops are often planted every year, the European Corn Borer, the primary target of Bt crops, is on average (in the U.S.) only a significant pest problem in one in five years.
- The use of GE herbicide-tolerant trees is expected to vastly increase the use of hazardous herbicides in forestry.
- Expansion of GE crops to the Third World is expected to lead to greater and largely unregulated pesticide use in areas where little or no use now occurs.
- Bt crops may pose threats to beneficial insects such as lacewings and ladybugs,

and so may disrupt the natural mechanisms that help keep pests in check.

- GE crops further lock farmers into an industrial style of agricultural that causes crops to be vulnerable to pests, requiring extensive pesticide use.
- GE crops undermine sustainable, non-pesticide-based farming. This is because:
  1. About ⅔ of U.S. organic farmers rely on natural, organic-approved Bt biopesticides (at least as a method of last recourse) and will face a serious crisis when pests develop resistance due to excessive exposure to crops engineered to produce their own Bt pesticide;
  2. GE crops steer farmers away from non-chemical, environmentally sound pest management techniques, such as frequent crop rotation and intercropping;
  3. Pouring research dollars into highly profitable agricultural biotechnology reduces the resources available for research and investment in sustainable farming.

### There are novel risks associated with the use of GE-crop pesticides

Pesticide management with GE crops also entails special environmental and health risks due to the nature of gene insertion. For example:

- In order to be herbicide tolerant or to produce pesticide, GE crops have specific genes haphazardly inserted into their DNA, raising potential health risks. Microbiologist, medical doctor, and Professor of Food Safety Richard Lacey said "It is virtually impossible to even conceive of a testing procedure to assess" such effects.
- There is some evidence that herbicides used with herbicide-resistant crops may be causing a dramatic decrease in the amount of weeds on which birds feed, threatening their survival.
- The widespread adoption of a small number of commercially successful GE crop varieties greatly erodes agricultural biodiversity, the variety of crops and other organisms needed for successful farming.

### Ecological agriculture: The real solution to hazardous pesticide use

Fortunately, we don't have to choose between GE crops and conventional agriculture, both of which rely on harmful pesticides. Ecological farming offers a viable model of a locally-based, socially-just, environmentally and economically sustainable food system, without the use of hazardous pesticides. Of course, it's up to us to challenge the biotechnology and agriculture industries to realize that vision!

*Two Dog Farm, Santa Cruz County, CA. Realizing the pesticide-free future of agriculture. Photo courtesy of Ann Baier.*

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*Pesticide Action Network North America is one of the founding members of GE Food Alert, a coalition of organizations concerned with the protection of consumer rights, public health and the environment.* **www.gefoodalert.org**

# PUBLIC OPINION OF GE FOODS, 1989–2002

**OF 819 AMERICANS RANDOMLY SELECTED,** **92%** want GE foods labeled. **26%** would eat GE foods, while **23%** would not, and **51%** are undecided. **28%** think genetic modification makes food unsafe, while **25%** think GE food is safe, and **47%** are unsure. **43%** are undecided if GE foods from animals are safe; **39%** see them as unsafe; only **17%** say they are safe. About two-thirds of the respondents mistrust food information from elected officials, business executives, and celebrities, while farmers and professors are well trusted. **71%** would pay more for food that protects the environment; **60%** would pay more for food produced without chemicals. (NC State U., 2002)

**90%** of Americans said foods created through GE processes should have special labels on them (Rutgers U. Food Policy Institute, 11/01).

**90%** of American farmers support labels on GE products if they are scientifically different from conventional foods. **61%** support labels on GE products even if not scientifically different. (Farm Foundation/Kansas St. U., survey of farms throughout the U.S., 09/01)

**93%** of Americans say the federal government should require labels saying whether a product been genetically modified or bioengineered. "Such near unanimity in public opinion is rare" (*ABC News.com,* 06/01).

**86%** of Americans think the government should require the labeling of all packaged and other food products stating that they include corn, soy or other products that have come from GE crops (Harris Poll, 06/00).

**79%** of Americans said it should not be legal to sell GE fruits and vegetables without special labels (*USA Today,* 02/00).

**81%** of Americans think the government should require GE food products to be labeled. **89%** of Americans think the government should require pre-market safety testing of GE foods before they are marketed, as with any food additive. (MSNBC Live Vote Results, 01/00)

Over **80%** of Americans support the right of the European Union and Japan to require the labeling of GE food imported from the U.S. (Univ. of Md. Center for the Study of Policy Attitudes, et al., 11/99).

**92%** of Americans support legal requirements that all GE foods be labeled (BSMG Worldwide for the Grocery Manufacturers of America, 09/99).

Almost **70%** of Americans think the U.S. government should require more extensive labeling of ingredients in GE food (Edelman Public Relations Worldwide in *Bloomberg News,* 09/99).

**81%** of American consumers believe GE food should be labeled. **58%** say that if GE foods were labeled they would avoid purchasing them. (*Time* magazine, 01/99).

**93%** of women surveyed say they want all GE food clearly labeled (National Federation of Women's Institutes, 1998).

**93%** of Americans who responded to a Novartis survey agree that GE foods should be labeled as such (Novartis, 02/97).

**94%** of 1,900 consumers polled believed that milk should be labeled to distinguish milk from rBGH-treated cows, **10%** of milk drinkers say they buy their products from non-treated cows, and more than **74%** of consumers say they are concerned about the possible discovery of negative long-term effects on human health associated with rBGH (USDA, March-June 1995).

**92%** of 36,000 polled say they want GE food labeled, with a **94%** pro-labeling response from women and an **84%** pro-labeling response from men (Vance Publishing, in Food R&D, 02/95).

**81%** of 8,000 subscribers to Prodigy Internet service think that milk containers should be labeled to indicate whether or not the milk comes from cows treated with rBGH—**92%** of women; **78%** of men (Prodigy Internet company, 03/94).

**88%** of respondents favor mandatory labeling from rBGH-treated cows, **9%** oppose mandatory labeling, and **3%** are unsure (St. Norbert College and Wisc. Pub. Radio, 02/94).

**85%** of those polled think that labeling of GE food is "very important" (USDA, 1992).

Labeling of dairy products from rBGH-treated cows was favored in all the following studies: University of Wisconsin (**68%**) 1990
Dairy Today (**81%**) 1989
Virginia Polytechnic Institute (**85%**) 1990
University of Missouri (**95%**) 1990
Johanna Dairy (**98%**) 1989

*Source:* The Center for Food Safety, **www.centerforfoodsafety.org**

## Views on Genetic Modification of Food Influenced by Religious Beliefs, Not Just Science

**WHEN ASKED SPECIFICALLY ABOUT THEIR OWN RELIGIOUS** or moral views in regards to agricultural biotechnology, 57% of Protestants (62% of Evangelicals) oppose the technology based on their religious or ethical views while 37% are in favor; Catholics followed closely behind with 52% opposed and 42% in favor. Among Muslims, 46% said they are opposed, with 32% in favor. Jews were the most favorable of the technology, with 55% in favor and 35% opposed.

When probed on the question of whether man has been empowered by God to use science to improve life or whether man is "playing God," a majority of all those polled felt humans have been empowered by God to improve life. Jewish adults feel most strongly that humans have an obligation to improve the world (60%). Protestants are more likely than other religious groups to say that humans should strike a balance (43%), with nearly half of born-again Christians (48%) saying humans should strike a balance.

The poll, part of a nationwide survey of 1,117 adults 18 and older, was conducted by Zogby International from July 16–20, 2001. The margin of error is +/- 5% for Protestants, +/- 5.7% for Catholics, +/- 7% for Jewish, and +/- 9% for Muslims.

*Source:* The Pew Initiative on Food and Biotechnology

# FRANKENGRASS

*By Steven M. Zien, Executive Director of Biological Urban Gardening Services (BUGS)*

YOU ARE PROBABLY FAMILIAR with the term "Frankenfood," Americans' new diet constituent which, unknown to the consumer, contains genetically modified crop ingredients. Well, get ready for another horrifying fact. Our lawns may soon contain "Frankengrass." Open field trials of approximately 100 acres in 15 states are growing genetically engineered (GE) turfgrass. The major players in this potentially disastrous experiment are Monsanto in association with the Scotts Company (major national suppliers of chemical lawn care products). They (along with other companies) are now growing GE creeping bentgrass and Kentucky bluegrass. The two traits they are looking to commercialize are a slow growing turfgrass and one that is resistant to the herbicide Roundup (Roundup Ready Turfgrass). The reason for the interest in GE turfgrass is that industry officials suspect GE lawn and garden products could have sales reaching $10 billion annually.

There are several concerns regarding GE turfgrass. The use of Roundup in lawns is currently limited to spot treatments, since it kills anything with which it comes in contact. When Roundup Ready lawns are installed, the grounds manager will be able to apply Roundup over the entire lawn area. Use of this herbicide will dramatically increase on home lawns, school grounds, athletic fields, and golf courses around the country and world. Kentucky bluegrass and creeping bentgrass are already problem weeds in native areas and in our home lawns. As a landscape professional, I regularly see creeping bentgrass invading a fescue lawn, drastically reducing the quality of its appearance. In both natural areas and in home lawns, if these weeds become resistant to Roundup, their control will be more difficult. Plus, these seeds can remain viable for 10 to 15 years! There is also the potential for biological pollution. Grass pollen is spread by wind and it can travel up to 100 yards. Studies indicate the wind pollinated seeds would hybridize, resulting in the genetic contamination of areas where conventional lawns are grown, as well as native grasses.

Mark Schwartz, head of the branded plants group at Scotts, has suggested that they may utilize Monsanto's Terminator technology, which would make the seeds sterile. This is in contrast to a statement Monsanto CEO Robert Shapiro made in 1999, promising that the company would abandon its development of Terminator technology. Even if Monsanto holds true to those words, other companies are working with GE grasses and investigating the incorporation of Terminator technology.

Currently these GE grasses are regulated by the United States Department of Agriculture (USDA). A permit is required to grow them in field studies, plus they cannot be sold commercially. Recently Monsanto and Scotts petitioned USDA to deregulate the species, opening up the market for these frankengrasses. If deregulated, these crops would be allowed to be sold to the public for use in residential and commercial lawns. The International Center for Technology Assessment (ICTA), along with the Center for Food Safety, has brought a lawsuit against the United States Department of Agriculture, regarding its failure to evaluate these GE grasses as "noxious weeds." In addition, ICTA wants the USDA to list them as "noxious weeds" to avoid future approval and is also seeking a court order to end field trials until this lawsuit is settled.

ITCA points out several potential problems associated with GE grass:

- Increased use and potential misuse of glyphosate (the killing agent in Roundup) resulting in pollution, and damage to non-target plants.
- Development of glyphosate resistant weeds.
- Economic harm resulting from the contamination of conventional turfgrass growing grounds.
- Economic harm to organic growers near GE planted grasses due to contamination by GE materials and herbicides.

Other organizations, including the American Society of Landscape Architects (ASLA), the Foundation on Economic Trends, and The Nature Conservancy, have all urged USDA to adopt a moratorium on the release of GE grass and suspend all field studies until independent studies are conducted. Concerns of the ASLA include:

- Build-up of herbicide tolerant weeds.
- Contamination of native vegetation by GE genes.
- Loss of biological diversity.
- Harm to wildlife dependent on native plants for food.
- Potential lawsuits resulting from lawns contaminated by GE plants.

Currently Monsanto and Scotts have withdrawn their petition for deregulation of GE grass. However, Peter Jenkins with ICTA believes that they will soon resubmit a petition to have USDA deregulate these potentially environmentally damaging, genetically manipulated lawn grasses. For additional information, contact The International Center for Technology Assessment, Center for Food Safety, 660 Pennsylvania Ave., SE, Suite 302, Washington, D.C. 20003; (202) 547-9359; e-mail *info@icta.org;* web site: **www.icta.org.**

*Reprinted by permission from Biological Urban Gardening Services (BUGS), an international membership organization (established in 1987) devoted to reducing our reliance on potentially toxic agricultural chemicals in our highly populated urban landscape environments. Members receive the latest environmentally sound urban horticultural information through the newsletter,* BUGS Flyer —The Voice of Ecological Horticulture *and a catalog of educational brochures. BUGS also provides soil analysis with extensive organic recommendations. For more information, contact BUGS at P.O. Box 76, Citrus Heights, CA 95611, or visit BUGS on the web:* **www.organiclandscape.com**

# (WILD)LIFE SUPPORT: *Rice*

*By Lisa M. Hamilton*

TO GROW RICE IN A WET CULTURE, farmers create an artificial wetland that acts like the real thing: water arrives from elsewhere, collects into a pool that hosts birds and insects (who in turn grant fertility), and eventually drains off into other waterways. The most natural approach is that championed by Japanese farmer Matsunoba Fukuoka in his book *The One-Straw Revolution.* He does not till the soil, nor weed, instead leaves the rice to grow on its own, springing from seeds left on the ground from the previous year. American organic growers generally are not so passive, but they are currently shaping their own version of Fukuoka's ideal: concentrating on not just the crop, but the web of life that supports it.

The mistakes large conventional growers have made stem from exactly the opposite: not recognizing their microcosm as part of a larger system. In the 1950s, California first saw the exotic rice weevil, whose larvae feed on rice seedlings. For years growers employed the insecticide carbofuran. It solved the immediate problem but created a new one. Birds ate the granular chemical and died en masse; between 1972 and 1997, carbofuran was responsible for 76% of reported bird kills in California, more than any other pesticide.

The same approach backfired with weed control. Rice is plagued by weeds—far more than by insects or disease. Because dense, wet rice plantings cannot be cultivated, conventional growers have depended on herbicides. As weeds develop resistance, they must use ever-greater amounts and experiment with new, more expensive herbicides. As the water drains off fields, the chemicals enter the larger world; in California, this means the greater Sacramento water supply and the Sacramento River, home to endangered salmon and innumerable other aquatic organisms. In 1984 the Department of Pesticide Regulation began mandating reduction of herbicide run-off. Yet 12 years later, the reproductive toxin molinate (a popular rice herbicide) was still detected in Central Valley surface waters 74% of the time, with 48% of those samples exceeding water quality goals.

Meanwhile, the long-time practice of burning rice straw after harvest was polluting the air, producing more carbon dioxide and particulate than all the state's energy plants put together. Further, it was extracting vital organic matter from the rice fields' ecosystem, which was then being replaced with heavy applications of synthetic fertilizers.

Third-generation Glenn County farmer **Allen Garcia** recalls a meeting in the mid-1980s held by Pesticide Action Network to address the burning. "The room was filled with mothers with kids on their laps. They were crying, saying 'You're killing our children.' I was the only farmer in the room, and it took all the courage I had just to get up and speak." After that, he and concerned colleagues took the initiative to turn rice farming from a symbol of agriculture's dangers into a model of environmental partnership.

The immediate steps—none initiated by the rice farmers—lay in stopping the harm. Carbofuran was phased out beginning in 1991, and has been all but eliminated from rice fields. As per *The Rice Straw Burning Reduction Act of 1991,* detritus is now burned only for disease control. Mandatory holding periods now require water to stay on fields long enough for herbicides to break down. This is not to say non-organic rice farming has become innocuous—it still involves toxic chemicals whose manufacture, application, and breakdown injure the environment irreparably. But it is a lot better than it was 15 years ago.

The improvement lies more in what is replacing old practices. The rice weevil larvae still kill seedlings, there is still rice straw to deal with, and the weeds have not gone away. In fact, the weeds are worse. Years of herbicide use have cultivated strains resistant to most everything. As Sutter County farmer **Ed Sills** remembers, the weeds were what sealed his switch to organics. "Water quality regulations were phasing out a lot of chemicals, so even if we found something that did work there was no guarantee we'd be able to use it next year," he says. "The thing that pushed us mostly was that we didn't see a future."

Meanwhile, visionaries such as Garcia recognized that by embracing rice's place in the greater ecosystem, things could turn around. Step number one was welcoming the birds.

Each winter, the Sacramento Valley becomes what Garcia calls a "bed and breakfast for ducks." Originally, the migratory waterfowl came for the Central Valley's 2 to 4 million acres of wetlands. Thanks to urbanization and agriculture, only 300,000 acres remain in natural wetlands, and so the bird numbers have dropped—from 40 to 50 million annually in the late 1800s, to 3 to 5 million today. And the rice fields have become a surrogate habitat.

For years it was unintentional. Unharvested seed left on the ground after burning was eaten by the hungry birds. But since burning has been outlawed, researchers such as UC Davis' Cass Mutters are proving that the best alternative is to create habitat. Today most growers disk in their straw then flood the fields for winter. The waterfowl arrive to eat the leftovers, and subsequently act as composters—stirring the straw with their feet and turning the seed into their own natural fertilizer, which in turn attracts the microbes that digest the straw and fertilize the fields.

Garcia is the local guru of farming with birds. He has two purely for-profit farms, a conventional operation he runs with his family and an organic farm of his own. And on the Nature Conservancy's Cosumnes River Preserve, he has a third set-up: a model farm designed to demonstrate the benefits of returning rice to its place in the larger ecosystem. The approach could be called "realistic holistic," in that it experiments only in ways that would be financially feasible for a regular farm. Each decision must uphold equally three objectives: habitat creation, community contribution, and financial survival.

The farm is on a three-year rotation. It begins with growing weeds, even the watergrass that is a rice farmer's nemesis. All summer the plants host shorebirds, some species which are only recently returning to the Valley from the Bay Area, where they went after habitat declined. Just before the weeds produce seed, Garcia tills them in as a green manure. The following season produces virtually no weeds—their annual reproduction having been stilted a year—meaning he can concentrate on the plant's vigor, which allows it to simply outgrow pests.

The key is paying attention on a closer level than most farmers do. Garcia fertilizes according to a map of the field, adjusting the amount of compost according to a specific area's slope, drainage, and natural composition. And whereas other growers change water levels weekly, Garcia adjusts them daily, making sure the rice has exactly what it needs. "I learned it from the biologists at the preserve," he says. "They manage the landscape to climax a species instead of killing off the other ones."

As the techniques prove themselves, he brings them to his other acreage. Two controls that have made it to all his farms are those he relies on in the third season, when the weeds return. He uses a pre-plant flash irrigation, in which he sprouts the weed seeds, tills them in, and then plants his rice. And he manages with water: flooding to drown the weeds, draining to scorch them with the hot summer sun.

Ed Sills uses a similar flood-and-drain method on his Pleasant Grove farm, but he also relies on crop rotation. Most rice farmers have soils so heavy they can plant only rice there or leave it fallow, making rotation unprofitable. But Sills farms on upland acreage. His best soil gets a four-year rotation of rice, dry beans, wheat, and corn. The rice's summer flooding clears out the dry-land weeds, and three years dry eliminates some of the water weeds. Even in his heaviest ground, Sills alternates rice with a dry cover crop. He does not till it; he just lets it go to seed to provide food (and habitat) for upland creatures—hawks, rodents, and deer.

In addition to building the soil and deterring disease, the rotation has the unexpected benefit of eliminating rice water weevil. The insects work like this: sometime in spring the adults take flight, and where they set down, they lay eggs—usually in a rice field. Growers go crazy trying to predict the flight patterns so they can time their expensive aerial pesticide applications. But because the insects enter fields both flying and swimming—and you cannot predict which—hard numbers are elusive. In 2001, flight peaks within a 20-mile radius ranged from April 22 to May 27. Growers can plant their rice late to avoid the flight, but the whole process takes almost a month, and anything that goes in after June 1 is almost guaranteed a measurable yield decline. On Sills' farm, there is no

## Rice Research - Non-GE Advances

### Farmers' Varieties Supply All Special Traits Claimed for GE

Farmer-developed traditional varieties of rice can supply all special traits claimed for GE varieties, according to a register prepared by the NGO Navdanya (India) as part of its movement to fight for farmers' rights on seeds. The register lists scores of rice varieties, tested over hundreds of years, which are tolerant of flooding, drought, and salinity—contingencies which have been used to force acceptance of GE technology on third world countries.

### Traditionally Bred Rice Has Extra Vitamin A, Iron and Zinc

Scientists working at the world-famous International Rice Research Institute (IRRI), Manila, Philippines have created a new nutritionally fortified variety through traditional breeding, not genetic engineering. The rice contains over twice the normal amount of iron along with Vitamin A and zinc. Field trials have already taken place near IRRI. Over 10,000 traditional varieties of rice stored in the IRRI gene bank were screened to look for the right characteristics. After working for more than five years, scientists came up with the right combination of a traditionally bred rice plant. A trial carried out on 30 anemic women in Philippines showed their health improved in less than three months.

### Organic Methods Increase Rice Yield By 100%

A purely organic system of rice planting developed in Madagascar claims to increase rice yield per hectare (2.471 acres) by as much as 100%—doubling average rice yields of 3.5 metric tons (MT) per hectare to as much as 8 MT. Norman Uphoff, director of Cornell University's International Institute for Food and Agriculture Development (CIIFAD), presented the findings. Mr. Uphoff noted that even he himself doubted the system until it underwent several field tests in different countries, including China, Indonesia and the Philippines, which showed that the system's success could be replicated. The system of rice intensification (SRI) grew out of insights gained by Fr. Henri de Laulanie, S. J., from his three decades of work with rice growing farmers in Madagascar.

"Genetically engineered (GE) rice—such as the now-famous Vitamin A rice or 'Golden Rice'—is being heavily promoted as a solution to hunger and malnutrition. Yet these promotional campaigns are clouding the real issues of poverty and control over resources, and serving to fast-track acceptance of genetically engineered crops in developing countries. (…) Vitamin A rice is a techno-fix to the problems of the poor decided upon and developed, without consultation, by scientists and experts from the North."

*~ Joint statement to the press by three farmer organizations from Southeast Asia, 06/02/02*

***Sources:*** Norfolk Genetic Information Network, Greenpeace.

# Become a CCOF Supporting Member

*support the roots of certified organic food and agriculture*

There are many important causes in this world that need and deserve our support. CCOF's Certified Members, Supporting Members, and staff believe that one of these causes is organic food. CCOF has been working for three decades to increase public awareness of and demand for certified organic products, and to expand support for sustainable agriculture. CCOF has a long history of helping implement organic legislation, and emphasizes public education on the benefits of organic food for our own health, the health of our children, and the health of our planet.

Please help ensure that CCOF continues to be a leader in the organic movement. CCOF offers different supporting membership levels and benefit packages for both individuals and businesses. Please select your membership level, and decide how much you would like to contribute. Become a Supporting Member today. For more information visit our website at **www.ccof.org** or call CCOF toll free at 1-888-423-2263.

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*T-shirt color:* ○ Natural ○ Granite ○ Sage
*T-shirt size:* ○ S ○ M ○ L ○ XL

- ○ Promoting Business $75 to $249
- ○ Contributing Business $250 to $499
- ○ Sustaining Business $500 to $1,249
- ○ Lifetime Business $1,250 and over
- ○ Ag Advisor $50
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longer an issue, perhaps because the insects themselves got confused. "It might also be the biological diversity that comes from not spraying," he says, "but we haven't seen rice weevil since the mid-'80s."

Sills' methods are not new. When he graduated from UC Berkeley and returned to the farm with a goal of sustainability, the innovations came from his partner: 87-year-old Thomas Sills, Ed's father and a local farmer since 1946. Back when he started, cover-cropping and rotation were essential practices.

Likewise, Allen Garcia feels he is only re-entering a system to which the plants belong. While biologists struggle to reintroduce the native grasses that once fed the migratory Sandhill cranes, the birds are subsisting on Garcia's rice fields. He says, "You can integrate the fields so close into the environment that the wildlife actually consider you part of it."

In an ironic sidenote, the reintegration has created a new pest: the local ducks that live in the Valley year-round and are attracted to this new, perfect habitat. During winter it is not a problem; there is no crop in the field. But in spring the ducks' brooding ruins the fields and seedlings, and in autumn they eat the crop. "We've tried everything from slapping pieces of wood together to driving around the fields but we can't get rid of them. They're too smart," Garcia says. "Last year I put out scarecrows with mannequin heads. For the first five days the ducks stayed away, but by the sixth they were sitting on the scarecrows' heads." For now his most effective strategy is going to the fields just as the ducks arrive—knowledge won from patient observation—and flushing them out with noisemakers before they settle in.

In discussing the ups and downs of the whole farm system, Garcia likes to quote Rene DuBos' book *The Wooing of the Earth.* In the book, DuBos writes about ecosystems' ability to heal themselves. He mentions their capacity to reinstate equilibrium, but focuses on another outcome. "More frequently… ecosystems undergo adaptive changes of a creative nature that transcend the mere correction of damage; the ultimate result is then the activation of certain potentialities of the ecosystem that had not been expressed before the disturbance."

In the Sacramento Valley, this is the rice feeding the migratory waterfowl, but it is also the thriving of local ducks. The latter might not feel useful now, but fate can be funny: Before the advent of the short-season rice varieties and fast machinery that got rice harvested by September, the crop was still in the field when the migratory birds arrived. Until the 1970s, the Sandhill cranes and all were major pests, feasting on the soon-to-be-harvested crop. The local ducks might magically develop a taste for watergrass and rice weevils. More likely, though, they will just prove themselves as part of the system, complete with pros and cons, just like the rice itself.

### Nutrition

More than any food, rice feeds the world. It is lower in protein than other grains—milled rice has 7% compared to wheat flour's 10%—but produces more food energy per acre than wheat or corn. For this, it is the main source of sustenance for over half the world. In Myanmar, the average citizen eats more than a pound of rice each day.

Beyond filling the belly, rice's value depends on what kind is eaten. Like all grains, it is a seed with three sections: bran, the protective outer layer; germ, the nutrition stored to support germination; and endosperm, the starch that fuels seedling growth. A whole grain still has all three parts intact, and therefore is a good source of carbohydrates, protein, iron, zinc, magnesium, dietary fiber, and vitamins E and B-complex. As the bran and germ are lost in refining (such as the milling that makes rice white), the grain loses vitamins, fiber, and protein.

The obvious choice for health is whole grains such as brown rice. Its concentrations of B-vitamins help support the nervous system. Its bran contains gamma-oryzanol, a compound whose benefits include lowering serum cholesterol levels. It is better than wheat in terms of available carbohydrates, digestible energy, and net protein utilization. And if you are concerned about energy, look no further: Chinese medicine practitioners use it to increase chi.


*Courtesy of ETC Group and Reymond Page.*

# A Better Way of Doing Things

## Alternatives to Genetically Engineered Crops

Are there alternatives to genetically engineered (GE) crops? When it comes to protecting crops from pests—such as insects and weeds—farmers have many alternatives to GE crops being grown today. But these alternatives are not products that farmers buy. Instead, they are alternative ways of growing our food and fiber, methods that together are often called sustainable agriculture.

Today's GE crops weren't designed to help small family farmers in the U.S. or the developing world. These crops belong to a system of agriculture that views the farm as a factory and farmers as contract labor, where the only goals are to increase yields and decrease costs of production—regardless of the costs to human health and the environment.

By contrast, sustainable agriculture is a system of farming that can produce high yields without destroying the environment and threatening our health. Farmers who use these methods rely on knowledge and experience to work in harmony with the environment, rather than relying on hazardous pesticides, synthetic fertilizers and GE crops. Sustainable agriculture looks at a farm as an "agroecosystem," not as a factory.

### Industrial agriculture and monocultures

Industrial agriculture is based on a system of monocultures—cultivation of one crop at a time in vast fields. While monocultures result in economies of scale that reduce production costs and prices in the market place, they also lead to increased vulnerability to insect pests and weeds and heavy reliance on synthetic fertilizers and pesticides. Genetically engineered crops were developed to fit into this system—to allow conventional farmers to continue growing monocultures and to allow pesticide companies (the corporations that are developing genetically engineered crops) to increase their profits.

### Alternative agriculture and diversification

Farmers who use alternative methods rely on knowledge and techniques based on local conditions. They take advantage of natural processes and naturally occurring biological relationships, such as those between pests and predators. Perhaps most importantly, their farms are diversified. Instead of continuously planting corn or a corn-soybean rotation, for example, these farmers may grow corn, soybeans, wheat, oats, red clover, hay and adzuki beans—plus raise beef and/or milk cows.

Diversified farms tend to be more stable and resilient. Financial risk is reduced and, in general, they provide more protection from drought, pest infestations and other natural factors that might affect production.

### The sustainable approach

Alternative farming practices are a range of technological and management options to reduce costs and enhance biological interactions and natural processes. Descriptions of some of these methods follow.

**Crop rotation:** Growing different crops in succession in the same field is one of the most common and successful techniques used in sustainable agriculture. Rotation can play an important role in pest management since growing different crops interrupts insects' life cycles and can help keep their numbers in check. Planting the same crop year after year provides insect pests with a steady food supply to support a growing population.

**Cover crops:** Farmers plant cover crops such as clover, alfalfa or vetch between cropping periods. These crops can prevent soil erosion, retain moisture, improve soil texture, suppress weeds and provide nitrogen (an important nutrient) for future crops. As a result, farmers using the right crops can reduce or eliminate the need for chemical fertilizers and hazardous pesticides.

**Increasing soil fertility:** In industrialized agriculture, soil is often "sterilized" to kill pests and pathogens, but beneficial microorganisms that play an important part in building and maintaining healthy soil are also killed in the process. Maintaining and improving soil quality is one of the most important factors to ensure the long-term sustainability of agriculture. Farmers need good soil to grow healthy plants that are less vulnerable to pests and that produce high yields. This can be

## CCOF Announces Partnership with Soil Association in England

CCOF has formed a partnership with Soil Association Certification Ltd (SA Cert) in the United Kingdom to provide organic certification services to companies interested in exporting their products to markets in the U.S. and the UK. CCOF and SA are now offering companies on both sides of the Atlantic organic certification services to U.S. standards as well as Soil Association standards, which meet and exceed the European standards. Every company in the U.S. certified by a USDA accredited certifier can now apply for this CCOF/SA Certification service and simplify access to markets in the United Kingdom. Call CCOF toll free at 888-423-2263 for more information.

accomplished in many ways including using animal manure, living plants (such as cover crops) or compost (plant debris) to build up the soil.

**Alternative weed control:** Rotary hoeing, increasing the density of crop plants to crowd out weeds, intercropping, timing of planting to give crops a competitive advantage and transplanting seedling crop plants to give them a head start on weeds are some of the alternative methods used to control weeds.

**Natural pest predators:** Many birds, insects and spiders are natural predators of agricultural pests. Farmers can manage their farms so that they provide an attractive environment for these predators who can then play an important role in keeping pest populations in check.

*Photo courtesy of Ann Baier.*

Sustainable agriculture offers a viable model of a locally based, socially just, environmentally and economically sustainable food system, without the use of hazardous pesticides and synthetic fertilizers. But we must challenge the biotechnology and agriculture industries to realize this vision!

### What about yields?

Many critics of organic and sustainable farming maintain that these methods would dramatically reduce the amount of food produced by U.S. farmers, resulting in higher prices and shortages. But research has found that even though only a small percentage of agriculture research dollars are spent on sustainable practices, yields can be comparable to those grown conventionally.

**Corn** — Comparing conventional and organic corn over 69 seasons, organic yields were 94% of conventional farms.
**Soybeans** — Data of 55 growing seasons from five states showed that organic yields were 94% of conventional yields.
**Wheat** — Over 16 years of research showed organic matched 97% of conventional yields.
**Tomatoes** — At the University of California, researchers found no difference in yields between organic and conventional tomatoes after 14 years.
**Certified organic** refers to crops that have been grown and processed according to strict standards and verified annually by independent state or private organizations. Certification includes inspecting and evaluating long term soil management, buffering between organic farms and neighboring conventional farms, product labeling and record keeping. When you buy organic, you are not only supporting organic farmers, you're also buying food made without genetically engineered ingredients.

*For more information:*
Pesticide Action Network North America
**www.panna.org**
Organic Farming Research Foundation
**www.ofrf.org**
Union of Concerned Scientists
**www.ucsusa.org**
California Certified Organic Farmers
**www.ccof.org**

*This fact sheet was prepared by Pesticide Action Network North America, September 2001. Reprinted with permission.*

> ***"Monsanto should not have to vouchsafe the safety of biotech food. Our interest is in selling as much of it as possible. Assuring its safety is the FDA's job."***
>
> ~ Phil Angell, Monsanto's Director of Corporate Communications
> *New York Times,* 10/25/98

## Organic Farming Influence

**Conducting a case study reviewing** economic, social and environmental benefits of organic agriculture, University of Georgia researcher Luanne Lohr has concluded that even though organic farmers are not a large percentage of U.S. farmers, their influence is felt through their innovative management techniques and leadership. Farmers benefit from retail price premiums for organic averaging 10–30% higher than for conventional. Farm price premiums are 70–250% more than what conventional farmers receive. In addition, counties with organic farms have stronger farm economies, and contribute more to local economies through total sales, net revenue, farm value, taxes paid, payroll, and purchases of fertilizer, seed, and repair and maintenance services. Counties with organic farmers also provide more bird and wildlife habitat, and have lower insecticide and nematicide use. Watersheds with organic farms face less agricultural impact and lower runoff risk from nitrogen and sediment. *Source:* OTA

## Organic Explosion

**According to a new report issued** by the USDA, "U.S. farmland managed under organic systems expanded rapidly throughout the 1990s and has sustained that momentum." The report says that U.S. farmers and ranchers have added another million acres of certified organic cropland and pasture since 1997, bringing the 48-state total to 2.34 million acres in 2001. Pasture and rangeland more than doubled in the period. The number of certified organic beef cows, milk cows, hogs, sheep, and lambs went up nearly four-fold, and poultry showed even higher rates of growth. The U.S. ranks fourth in the world for total organic acreage, but is not in the top ten as far as percentage of crop area—the top six are all European countries. The report noted that many EU countries, and some U.S. states, subsidize conversion to organic farming for environmental reasons. Perhaps this is a factor in the disparity among states; nine actually lost organic acreage (mostly in the Southeast), while others grew rapidly. *Source:* OCA

### EU Biotech Lobby Dismayed At U.S. Challenge

European advocates of genetically modified food expressed dismay at a U.S. challenge to the EU's de facto biotech ban, saying the move was ill-timed and would make it harder to win over wary consumers. The U.S. action at the World Trade Organization (WTO) in May came as the European Union put the finishing touches to legislation that could remove a five-year-old moratorium on gene-modified crops. The European Parliament is due in July to vote on laws to ensure the traceability and labeling of all GE food and feed. Such a system is aimed at informing consumers exactly what they are eating and allowing GE products on shop shelves. The EU has not authorized the sale or cultivation of any new GE products since 1998, when a substantial minority of governments said they would block any new permits pending tougher regulations on testing and monitoring. Only a handful of GE products can be sold in the EU. European Commission figures show 70 percent of the European population do not want to eat GE food while 93 percent of consumers wanted a proper labeling system for GE products. Many farm groups in Europe and the U.S. believe the U.S. action would only increase European consumer opposition to such foods.

### Biotech Firms Look to Crack EU Markets

Taking the European Union at its word that the biotech ban is about to end, seed companies are testing the waters by submitting new applications for genetically modified corn, cotton, canola and other plants. Even as some EU countries signal the 5-year-old moratorium on biotech crops could be over in a matter of months, others are raising new objections. New EU legislation that took effect in October was intended to end the ban by strengthening decade-old rules on testing and licensing genetically modified organisms as crops or ingredients. Since January the new procedure has attracted 18 applications, the first of which are expected to reach the decision stage this autumn. U.S.-based Monsanto, whose Roundup Ready corn, canola rapeseed and other products account for 10 of the new applications, is not getting hopes up too high. Opposition exists in Italy, France, Greece, Austria, Luxembourg, and Denmark, where parliament in January demanded a study on whether the country could go completely GMO-free.

### American Consumers to Sue U.S. Government over GE Crops

A coalition of U.S. environmental and consumer groups has threatened to sue the U.S. Agriculture Department unless it places a moratorium on planting biotech crops genetically engineered to produce medicinal and industrial products. At issue is the worry that some new kinds of bioengineered pharmaceutical crops could inadvertently contaminate corn, soybeans and other nearby crops grown for human and livestock food. A coalition of 11 groups, including Friends of the Earth, Greenpeace, and Center for Food Safety, accused the USDA of allowing the experimental crops to be planted without conducting required environmental risk assessments. Without such analyses, the USDA "is risking permanent contamination of the environment and our food supply with numerous drugs and chemicals," said Peter Jenkins, attorney for the Center for Food Safety. Last year, about 300 acres of American farmland in Hawaii, Iowa and other states were planted with experimental pharmaceutical crops. The groups said they will file a lawsuit against USDA unless the government imposed a temporary ban by early May.

### U.S. Not Prepared to Monitor Approved Biotech

The U.S. government's oversight of biotech crops once they have been approved is inadequate and has potential vulnerabilities, according to a new report from the Pew Initiative on Food and Biotechnology, a non profit research organization. The post-market oversight of biotech crops is intended to ensure compliance with restrictions that agencies might impose to protect public health and the environment. The current regulatory oversight system, write the authors of "Post-Market Oversight of Biotech Foods: Is the System Prepared?" is poorly equipped to carry out this mandate. The report finds that biotech crops are regulated through a patchwork of laws—three federal agencies use at least 10 different laws and a range of regulations and guidelines to address biotechnology products. Each of the laws currently used was developed before the advent of biotechnology products and reflects widely different regulatory approaches and procedures, explained Taylor and coauthor Jody Tick, also with Resources for the Future. The reports address holes in regulations by the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS), the U.S. Environmental Protection Agency (EPA), and the U.S. Food and Drug Administration (FDA).

### EPA "Ignoring its Advisers" Over BT Maize

A strain of maize that is genetically modified to fight rootworm has won approval from the U.S. Environmental Protection Agency. But scientists who were consulted before the February 25th decision say that the agency ignored their advice and is doing too little to ensure that insects don't develop resistance to the insecticide produced by the plant. Last October, a scientific review board recommended that the strain should only be grown if farmers plant an equal area of non-transgenic maize next to it. Such a stipulation would have undermined the commercial viability of the strain, however, and the EPA has rejected it, saying that a 20% "refuge" of non-transgenic maize will suffice. The decision has drawn immediate fire from members of the review board. Whereas established Bt maize varieties produce high doses of toxin, the new variety kills only about half the root-

worm larvae, according to data provided by Monsanto to the EPA. With such a low mortality rate, resistance is certain to arise, the strain's critics say—the only question is when. Farmers can delay resistance by planting larger refuges. Members of a scientific review board that looked at Monsanto's application urged the EPA to require a refuge size of at least 50% of the total area planted with corn. In its ruling, however, the EPA sided with three dissenting review-board members, and sanctioned the 20% refuge size that Monsanto had requested.

### USDA Mulls Rules for Monsanto Biotech Wheat

The U.S. Agriculture Department said last March that it may impose strict requirements on Monsanto to ensure it was abiding by its pledge not to sell biotech wheat until foreign markets accepted it. Monsanto's "Roundup Ready" wheat, which would be the first genetically modified wheat in the world, is under review by the U.S. and Canadian governments and could be approved for commercialization within the next two years. Critics have said consumer attitudes about genetically modified wheat are so negative that both domestic and foreign buyers are likely to shun all U.S. wheat if it is sold. Even if the wheat is approved by the United States, Monsanto has promised not to sell it until at least Canada and Japan accept it. The USDA said Monsanto may have to meet certain requirements if and when the government approves the product. U.S. wheat exporters currently sell their wheat to foreign markets with a USDA-approved statement saying no biotech wheat is commercialized in the United States.

### U.S. Will Subsidize Cleanup of Altered Corn

The U.S. Agriculture Department's settlement with a Texas company that mishandled gene-altered corn, portrayed three months ago as a stringent crackdown designed to send a message to other potential violators, actually involved a no-interest $3.5 million government loan that means American taxpayers will effectively subsidize cleanup efforts. The payment terms, worth as much as $500,000 in interest and other savings to the company over the next three years, are contained in a document newly uncovered in government files by the Washington-based Center for Science in the Public Interest. The concern is that the Agriculture Department did not release the information at the time it announced the settlement with ProdiGene Inc. of College Station, Texas. The story explains that when it outlined the settlement last fall, the government said it was fining ProdiGene $250,000 and requiring it to reimburse the cost of destroying a warehouse full of potentially adulterated soybeans in Aurora, Nebraska. Buying, transporting and burning the beans ultimately cost $3.5 million. Under the arrangement, the government paid for the cleanup. The company is not required to begin making payments for a year, and it will have two years to pay the money in quarterly installments, owing the government no interest on either the fine or the cleanup—totaling $3.75 million.

### Agribusiness Takes Most Seats on USDA Biotech Panel

Agriculture Secretary Ann Veneman in April gave agribusinesses and farm industry groups most of the seats on a federal advisory committee responsible for examining the future of biotech crops. The 18 committee members will meet as USDA implements new restrictions on the planting of experimental pharmaceutical plants and reviews Monsanto's application for the commercialization of the first biotech wheat crop. Monsanto, Cargill, DuPont, General Mills, Procter & Gamble, BASF Plant Science, CropTech Corp. and the North Mississippi Grain Co. were each given one seat. The National Corn Growers, American Seed Trade, and the National Association of Wheat Growers also have members on the committee. The remaining seven seats were given to academic experts, consumer groups and an international plant research center in Mexico. The Union of Concerned Scientists and the Center for Science in the Public Interest were each given a spot. USDA spokeswoman Alisa Harrison would not elaborate on what biotech issues the committee will examine.

*Sources:* Aine Gallagher, Reuters; The Associated Press; Stuff Online, New Zealand; Environment News Service; Jonathan Knight, *Nature* 422, 5 (2003); Randy Fabi, Reuters; Justin Gillis, *Washington Post;* Reuters.

*GE Report* compiled by **Brian Sharpe,** CCOF's GE point-person and Chapter Resource Coordinator.

# GROWING A RELATIONSHIP: ADVICE FOR RETAILERS

*By Mark Mulcahy*

WE ARE OFFICIALLY IN THE PEAK of the local growing season throughout California and much of the United States. Along with amazing produce flavor that has taste buds dancing, there is evidence that produce departments everywhere are embracing the idea of supporting local growers. I've seen growers' photos and profiles on produce department walls, farm tours being offered, and in-store produce tastings becoming the norm, much to the customers' delight.

While you are enjoying displaying and selling this season's produce, I suggest that it's time to start thinking about next year. Why, you ask? Well, let's look at some valuable information you might have available right now:

- Early Moon and Stars watermelons don't have enough sugar the first two weeks of the season.
- The KY beans are most tender on the first pick.
- Contact Yuba River whitewater tour guides about using Foxfire Farm's giant zucchinis for canoes.

The quality conditions of each produce item and each farm you deal with are a lot to keep track of throughout the season, let alone remember in the winter when you have next year's grower meetings. It would be like trying to remember every farmer in the CCOF handbook. Realistic? Not even with the best of memories.

So where do you begin? Start by keeping a buyer's journal. Take a few minutes each delivery and record everything that is going to make a difference next year. Keep a section for each grower, and list all the different categories that make a difference to the success of your program.

For example:

- **Delivery and order schedules**
  *Your note:* Growers keep calling during peak business hours. The apricots sat at the farmers' market all day and were delivered at 3 P.M. instead of 10 A.M.
- **Post harvest handling, good and bad quality standards**
  *Your note:* Farmer A has got to stop packing zucchini in banana boxes; they get squished and are too heavy for the crew. The arugula bunches need to be larger for the price the grower wants.
- **Sales and weather**
  *Your note:* The purple Cherokee tomatoes sold two times better than expected July 4 weekend. The hailstorm on August 2 really hurt the corn crop, and we had to switch to conventional, which cut sales in half.
- **Surprises**
  *Your note:* We brought in Kadota and Calimyrna figs, and we increased our Black Mission and total figs sales. Selling mixed colors and varieties of cherry tomatoes by the pound was better for the customer and easier for the grower. Green tomatoes sell with a good recipe.

The delight of making these notes is the detailed information you will be left with. These examples show some benefits to keeping a journal for the winter's grower meetings. This does not have to all fall on your shoulders; get the crew involved, have them enter their observations in the journal. As a matter of fact, I suggest that you have your growers do the same.

What's next? Take this information and review how you can make each other's lives easier. Create a set of grower guidelines that document the best order and delivery times. For example: We take orders between 9 A.M. and NOON, Monday through Saturday, because then we have the best grasp of our inventory and are fully present in the ordering process (not doing three other things while trying to order).

Explain your bunching and packing needs for optimum sales and have clear quality standards and post-harvest techniques. For instance: Zucchini needs to be firm, 6 to 8 inches long, packed in 20# boxes with all field heat removed.

Everyone knows what's expected, and you will be amazed at how much chaos this will take out of both your and your grower's daily routines. Now when you sit down to draw up a grower-retailer agreement for next season, you both can expect very few surprises and you can concentrate on selling the amazing, local food.

If you are just getting started and need help setting up guidelines to build your local grower relationship, consider using some or all of these suggestions below.

### GROWER GUIDELINES FOR SELLING TO RETAIL

**BOXES:** {your store name} will save/return all labeled boxes to grower. All produce delivered in grower-supplied boxes must have farm name label and follow standard size conventional guidelines {attach packaging guidelines as necessary}. Boxes must have lids/tops so that they can be stacked. Delicate produce (e.g. tomatoes) will need to be layered in the case (unless sold as bulk). Product must be accurately pre-weighed by the grower and will need to allow for box weight. All wet produce (e.g. lettuce) will need to be delivered in closed waxed boxes. Boxes may be reused if they previously contained organic produce and are lined with clean paper or plastic. Boxes previously containing conventional produce are not allowed for organic produce.

**ORDERING:** It is {your store name}'s goal to have all orders placed by {state time} for next day delivery. Our plan is to use the {time

## *Organic Retail Revival Seminar*

Please visit our web site at **www.ccof.org** to find more information about the ***Organic Retail Revival Seminar!*** This retail training workshop is sponsored by CCOF and New Hope Natural Media and will take place in Southern California, October 2003.

period} for inventory, planning, and ordering for the next day. You may want to do the same. We plan to take/make phone orders during this time. By using pre-determined packaging standards, we will be able to order by the case rather than by the pound. The amounts delivered will then more accurately reflect the amounts ordered. Unless under special circumstances (a heat spell that produced more product sooner, and we change our agreement etc.,) {your store name} will only accept produce of the amounts ordered.

**RECEIVING:** Under normal circumstances, {your store name} will receive local deliveries from {time period}, seven days a week. Our goal is to eliminate all afternoon and evening deliveries. We may feel the need to entertain a one night per week delivery (example: Tues. 5–8 P.M.). Deliverer will need to meet with produce staff on duty to identify, inspect quality of produce and sign invoice for produce ordered.

**INVOICE:** Duplicate itemized invoices must include company name, date, produce, amount, cost and total. These need to accompany all deliveries, and a {your store name} produce department employee must sign each duplicated invoice.

**QUALITY STANDARDS:** {your store name} and local growers should follow standards already established by the organic industry in terms of category of product by size, count, weight and variety. For example, all bunch basil, parsley, spinach, etc. is of some size and weight and sold by dozen. Large zucchini and small zucchini are packaged separately, as are cucumbers. Varieties of tomatoes need to be kept separately, etc.

**ORGANIC STANDARDS:** If you are supplying {your store name} with organic produce, you must be in compliance with {whatever applicable state and/or federal law} and provide documentation of third-party certification if requested {and whatever else is required in your region or state}.

**LABELING AND SIGNAGE:** This can tremendously increase sales of your product. Currently, {your store name} uses a {whatever type—e.g. particular color} label for all organic produce. We would like to encourage each grower/company to develop its own logo. Together with our marketing department, we can make a unifying special promotion of our local growers program, while still calling attention to each individual grower/company. It is our intention that we will provide space (where space is available, done on a first come first serve basis) to each interested vendor for a large "Producer Profile" including the grower/vendor's logo, a photo of the vendor and his/her/their farm or operation, and a brief description of the operation. {Your store name} will cover the cost of the framing and matting, and inclusion of the logo and description of our choice for the photo, the producer is expected to cover the cost of the photo itself, done by a professional photographer to be arranged by {your store name}'s marketing department. {Your store name} will invoice, or deduct from a vendor's invoice, the cost of the photo itself. (If your store does not have a marketing department then design and costs could be negotiated between the grower and store.)

**PRE-ARRANGED TOUR OF FARM AND/OR DEMO:** {your store name} would like to encourage all growers to be available for one tour of the farm and one product demo at {your store name} during the season, {your store name}'s produce department can assist in tours and our marketing and food demo department will assist you with an in-store product promotion. This is extremely beneficial to both parties to teach the department's crew about the farms they support and for the farmers to generate customer excitement for your products at the beginning of a particular season

**PROJECTIONS:** {your store name} will meet with each grower in January. By using the previous season's purchase and sales reports and growing conditions, we will plan together the season to come, including estimated season longevity of product, estimated amount purchased weekly by {your store name}, and estimated price per case of each product. {your store name} will also be responsible for drafting a means of getting feedback from each vendor on the success of the relationship throughout the season, which will most likely be a "grower satisfaction survey." If at any point during the growing season, either a vendor or {your store name} is having difficulty fulfilling either the agreement, or any of the guidelines, either party can pre-arrange a meeting to resolve the issues.

**PURCHASE AGREEMENT:** Once a successful pattern of business has been established by {your store name} and the grower of a specific product, it is {your store name}'s goal to sign a purchase agreement with the grower for the specific product designated, giving the grower priority in supplying {your store name} with the product. {Your store name} has purchased produce from local growers successfully for many years and listed below are some examples of our agreements:

(Grower Name): apples, apple cider
(A Different Grower): raspberries, strawberries
(And Yet Another Grower): organic basil, herbs and red bell peppers

One last thing to remember is documenting growers who are exempt from certification. Farmers who gross less than $5,000 annually in total organic sales are not required to certify to the National Organic Program (NOP) standards. I recommend that you keep a detailed affidavit of each grower's organic growing practices on hand. While it isn't required, it does come in handy.

Good luck with your local programs. And remember that whatever you decide to do with your local growers that the relationship you build should be "a good deal is always a good deal for both parties."


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# Succeeding Beyond Their Wildest Dreams

*By Keith L. Proctor*

**The 1980s** dawned on a 7-year old CCOF with new organic legislation that offered a large measure of protection for organic growers and their consumers. In addition to the *California Organic Food Act of 1979* (COFA), organic garnered more validation during the first summer of the new decade. A study authorized by the USDA officially established the existence of "organic" farming. The federal government had finally recognized what CCOF and other growers around the country had been doing for many decades before and since "better living though chemistry."

Although relatively small in 1980, CCOF would not remain so for long. The organization and the movement were growing strong and fast. In 1981, the **Mendocino Chapter** became the third chapter in CCOF. Boilerplate chapter bylaws already created by CCOF President **Barney Bricmont** and **North Coast Chapter** member **Sy Weisman** allowed for the smooth entry of future chapters. Following Mendocino came **Yolo, Big Valley,** and **North Valley** chapters in 1982.

This same year, Weisman noticed that no one had stepped up to remove the "sunset clause" from *COFA '79.* None of the organizations involved in writing the first organic law was completely satisfied with the outcome, so it had a built-in clause to terminate the legislation in January 1983. The impending end of the little-enforced but much-needed legislation was brought to the attention of a new State Assembly member from Carmel named **Sam Farr.** The effort to repeal the sunset clause had found a sponsor, but more help was needed. **Stuart Fishman,** a retailer at Rainbow Grocery and a master of organic integrity, contacted **Bob Scowcroft** at Friends of the Earth (FOE) asking the organization to endorse the continuation of the organic law. FOE, however, was reticent to support the perceived "counter-culture" of organic farming. After a member of the FOE advisory board wrote a "visionary piece" in support of organic farming and *COFA '79,* the Board of FOE allowed Scowcroft to write a letter of endorsement. Fishman, Weisman and other CCOF members and friends were also seeking help from other organizations and individuals. With adequate endorsements, the clause was repealed, and Farr had marked himself as the legislator for organic.

◀ *Bob Scowcroft*

The law now firmly in place, CCOF continued to develop itself and the organic trade while keeping a watchful eye over fraudulent claims. In 1984, Fishman discovered a Southern California operation that was blatantly repackaging and selling non-organic carrots as organic. Without the willingness of the State to enforce the organic law, it was up to CCOF, and people like Fishman, to ensure that organic claims were truly organic.

▲ *Mark Lipson and Brian Baker*

Welcoming more growers to CCOF, the **Fresno-Tulare, South Coast,** and the **Pacific Southwest** chapters were established that same year, which also saw the resurrection of the *California Certified Organic Farmers Statewide Newsletter* under the editorship of **Kate Burroughs**. CCOF was growing to a point where it once again needed a forum for internal dialogue. The original incarnation of CCOF in 1973 produced its first newsletter the following year, but ceased production in late 1974 when the organization was decentralized. Ten years later, CCOF was set to centralize again, this time with a sturdy foundation of growers organized all over the state. The Board of Directors authorized a new grower fee—one-half of 1% of gross sales—to fund marketing and a part-time staff position to handle the increasing paperwork. In addition to these structural changes, organic received an unexpected boost at a very unexpected time.

July 4th, 1984—people around the country were celebrating Independence Day with baseball, hotdogs, apple pie, and Chevrolet—and watermelon. What should have been a satisfying and thirst-quenching slice of the red fruit of the summer sun turned out to be a delectably near-deadly dose of Aldicarb, otherwise known as Temik. A non-organic grower in Southern California had used the pesticide on his potato crop the year before, and, in violation of the product labeling, planted watermelon in the same field the following year. Unbeknownst to the grower, the melons took up the pesticide from the soil. With widespread sickness, the issue of poisons on and in food was raised in the public's consciousness—along with a small, but gaining, agricultural model—organic farming.

In March 1985, Barney Bricmont stepped down as president and turned the gavel over to **Warren Weber.** The **Humboldt-Siskiyou Chapter** appeared this year, adding a northern neighbor to Mendocino Chapter. With the influx of new members and new interest in organic in the wake of the watermelon incident, the hiring of **Mark Lipson** as CCOF's first staff member was well-timed. Mark had moved to the Molino Creek Farming Collective outside of Santa Cruz in June 1983. He became familiar with CCOF while researching organic certification for Molino Creek. Active in the **Central Coast Chapter**, he held a few different positions—chapter president and board representative—while also a staff member. The first CCOF office space was 80 square feet in a building in downtown Santa Cruz.

Membership continued to increase into 1986, reaching more than 160 growers. Four new chapters entered CCOF this year: **Inland** (LA), **Kern, San Luis Obispo,** and **Sierra Gold,** underscoring the need for two additional staff members: **Phil McGee** as Administrative Assistant, and **Brendan Bohannan** as Certification Coordinator. Additional changes and improvements followed. Inspectors now received more formalized training and the state certification committee was given the authority to review and invalidate chapter certifications that were not in compliance. The continuing goal was to improve the overall efficiency and technical sophistication of the certification program. However, the approval or prohibition of various materials had still been left to the chapters, causing confusion around the state. There was a growing demand for a uniform certification handbook and materials list for CCOF growers to follow, and a growing realization that the CCOF structure was rife with real and perceived conflicts of interest. Policies and procedures were sorely in need.

▲ *Phil McGee*

Expressing support for CCOF while detailing the problems retailers had with the lack of a solid, transparent certification process, Stuart Fishman wrote in the *Statewide Newsletter,* "While I believe that, as of this date, CCOF's certification process is weak, I know that the overwhelming majority of CCOF farmer members are honest and dedicated to the principles of organic agriculture as defined by CCOF." It was time to streamline the certification process. At a Board of Directors retreat at Sy Weisman's, CCOF hammered out a set of goals, with the ambition to be the premier certification agency in California. When all was said and done, a stronger certification process was established. "It was a crucial foundation piece for the growth that happened afterwards," said Lipson.

▲ *Warren Weber*

Although the State had refused to enforce *COFA '79,* when the apple maggot infested portions of the state, the California Department of Food and Agriculture (CDFA) approved of alternate treatments for the maggot on organic farms. This first recognition by CDFA was thanks to the efforts of CCOF grower **John LaBoyteaux.** Acceptance was growing.

Legislation and cooperation also increased during the mid-1980s. CCOF joined OFPANA (the Organic Food Production Association of North America), an association of U.S. and Canadian organizations. OFPANA would later become **The Organic Trade Association** (OTA). Given the benefits of making contacts with other sympathetic organizations, networking became one of CCOF's goals. The *Agricultural Productivity Act* was signed into law in 1985 as part of the Farm Bill that year. It called for research comparing three types of farming systems: conventional, farms in transition, and farms using alternative methods. The Act, originally introduced in 1982 as the *Organic Farming Act*, was drafted to implement major recommendations of the 1980 report on organic as prepared by USDA.

Settled into a larger office space complete with a new computer, 1987 was the year in which growers finally saw the publication of the first *CCOF Certification Handbook* and *Materials List,* and the first *Farm Inspection Manual,* as well as the first series of Farm Inspector Trainings. Livestock standards were proposed this year, but it would take several more years for the USDA to recognize an organic claim for meat.

The **Desert Valleys Chapter** appeared in 1987, adding more members in the southern part of the state. At 15 chapters, CCOF was building a solid structure for itself, growing rapidly, and in need of someone who could take the reins full-time. The next three years were going to be both exciting and exhausting for the adolescent organization.

As CCOF's first Executive Director, Bob Scowcroft was hired to be responsible for all aspects of the organization—management of staff, oversight of the certification program, fundraising, and media contact. Scowcroft had already made many friends within CCOF from his years at FOE and the Eco-Farm conferences. Shortly after Scowcroft's hiring, CCOF received a $10,000 gift from the Grateful Dead, thanks to Mark Lipson's relationship with a few well-placed individuals. In part with this gift, CCOF was able to hire **Brian Baker** to replace the departing Brendan Bohannan as Certification Coordinator.

The CCOF name garnered a boost in 1988 when it pursued the investigation, in cooperation with the California Department of Health Services (DHS) of Pacific Organics, a distributor that had been selling conventionally-grown carrots as organic. The fraudulent activities of the business were brought to the attention of the *San Jose Mercury News,* complete with photographs.

A sensational front page story appeared. In the *Statewide Newsletter,* Scowcroft wrote, "I believe that others looking back at the history of organic agriculture will treat the Pacific Organic case and CCOF's role in it as a historic event. Not only did we expose the faulty labeling practices of this company in particular but the resulting publicity made the State enforce the law and put into place programs to institutionalize that enforcement in the future."

In 1979, an unwilling CDFA refused to assume regulatory enforcement of the first state organic law. Instead, *COFA '79* was placed under DHS. After the Pacific Organics incident, CCOF asked the State once again to enforce the law. DHS refused, saying it was an agriculture issue, making it CDFA's job. CCOF growers asked themselves and an embarrassed state bureaucracy, "Are we a health issue or are we farmers?"

▲ *Bill Brammer*

Partially in response to the Pacific Organics case, a bill to further regulate organics in California was created and introduced in the Assembly, again without input from organic farmers. The bill as written would have given all control to CDFA to create and enforce organic production standards. CCOF had to stand up for organic and take control. "We weren't going to hand it over to CDFA, that was clear," Lipson states emphatically. Under a new board president, **Bill Brammer,** CCOF went into action, creating a special committee to deal with the proposed law. Lipson was the staff person to that committee and would see several versions of the law through to its signing. Ten years after *COFA '79,* CCOF was asserting itself in Sacramento again. With CCOF resources focused at home, a national event was about to shake the entire country.

All agricultural practices came into question in Spring 1989 when *CBS 60 Minutes* aired a story based on a report by the Natural Resources Defense Council (NRDC), titled *Intolerable Risk: Pesticides in our Children's Food.* Although the report focused on 20 pesticides, the *60 Minutes* segment addressed only one. Known as Alar, it was used on apple trees to force them to hold fruit longer and improve appearance. When it was reported that Alar was carcinogenic, families all across America were stunned. Parents, schools, and retailers rejected all apple products. While the federal government tried to reassure a panic-stricken public, apple growers suffered losses in the hundreds of millions of dollars. The event, still debated today, would later become known as "the Alar scare." In the Spring 1989 *Statewide Newsletter,* Lipson reported, "The historic coincidence of events over the last 10 weeks has left us in a completely new position. Like it or not, things will never be the same."

Two weeks after the *60 Minutes* show, cyanide was purported to have been found in Chilean grapes imported into the United States. *Newsweek* and *Time* magazines asked, "Is our food was safe? Who can you trust?" Meryl Streep, Hollywood spokesperson for the NRDC report, went on the *Donahue* show, supporting local farms and organic foods as a viable agriculture model that Americans could trust. As one of the largest organic organizations in the U.S., people and businesses, allies and adversaries from all over the country were looking to CCOF for information and direction. For weeks following the *60 Minutes* story, the phones at CCOF rang off the hook. Calls numbered around 150 per day with reporters, retailers and consumers all wanting to know where they could get organically grown food. "We literally broke the phone from so much use," says Scowcroft. In the two months following the program, CCOF mailed out nearly 400 application packets. But thanks to earlier work by CCOF to solidify its certification process, the organization weathered the storm of scrutiny that followed Alar and continued well into 1989.

With organic thrust onto the national stage, a wider variety of players was entering into the fray that was the redrafting of the *California Organic Food Act,* submitted for CCOF by an old friend, Assemblyman Sam Farr. Mainstream agribusinesses and lobby groups, national consumer and environmental organizations, and government agencies were many of the interested and influential parties involved. Initially the reception in Sacramento was almost hostile towards CCOF. It was a widely held assumption that organic was not real agriculture, but rather an environmentalist hippie phenomenon. However, by its growth, process, and people, CCOF defied the stereotypes. **Homer Lundberg,** a founding member of CCOF in 1973, was on the legislative committee of CCOF. Lundberg was viewed by Sacramento as a real farmer, not an ex-hippie. In addition, Mark Lipson was on the Santa Cruz County Farm Bureau board of directors. Examples such as these, coupled with determination, helped to establish CCOF's reputation as a legitimate agricultural organization. CCOF asserted itself as the primary interested party in crafting the organic law. Although that did not mean they had total control, since politics is all about negotiation and compromise, CCOF was in a good position

to determine the process. "**Barry Epstein,** CCOF attorney for rewriting the state law, knew how to operate in the Sacramento environment with integrity," Lipson extols. "His presence gave us credibility; his demeanor gave us a lot respect as well." Everyone from CCOF who worked on the law—the board, staff, members, and supporters—had a hand in improving the reputation of and respect for CCOF and the entire U.S. organic trade.

In the middle of re-writing the state organic law, the Loma Prieta earthquake hit the Bay Area, and nearly destroyed the CCOF Statewide Office. Staff was given three hours to enter the office and take all that they could before the entire building was demolished. CCOF operations once again retreated to a private home, that of Bob Scowcroft. For several months, UC-Santa Cruz offered a small space with a telephone. Phil McGee would answer the phone, ride his bike to Scowcroft's, pull a file, make copies, and then ride back to the UC. The latter half of the 1980s was an amazing and arduous period in CCOF's history.

On September 25, 1990, California Governor George Deukmejian signed the *California Organic Foods Act of 1990*, closing a 20-month marathon effort by CCOF. The 42-page bill was passed 29-4 by the full State Senate on August 31, the last day of the legislative session. The Assembly unanimously ratified the final version. Included in the law were requirements for all organic producers and handlers to register with the State, for all growers to pay a stepped-scale fee to fund an enforcement program, obligatory record keeping and disclosure, a materials review by CDFA, the creation of an advisory board, land transition rules, and requirements for treated seeds and sprouts. With CCOF's blessing, third-party certification was still voluntary under the new law.

While in Washington, D.C. in early 1989, Mark Lipson made a cold call to the Senate Agriculture Committee. He met with was a staffer named Kathleen Merrigan, who had just joined the committee staff. Lipson explained all about organic and CCOF, offered the certification handbook and materials list, and suggested a future need for federal standards. Some states had standards, but if organic was to continue to grow, something would be needed at the national level. It was the beginning of the *Organic Foods Production Act* (OFPA), completed in 1990 as part of the Farm Bill that year. CCOF's standards were used as the foundation for *COFA '90,* which was in turn largely incorporated into the federal law by Merrigan.

1989 and 1990 proved to be pivotal for CCOF. Between 1989 and 1990, total operations increased 38%. 1990 saw the most growth in total acreage, with a 67% increase in the total number of CCOF acreage. The growth, a large portion of it caused by the Alar scare and a stronger state organic law, also caused problems within the organization. So many farmers wanted to enter the program and add more acreage that at times chapters were swamped with new applicants and inspections in some areas were greatly delayed. "CCOF systems and process are strained to the limit," wrote Bob Scowcroft in the Summer 1990 *Statewide Newsletter.* "While we are regarded by many as the premier certification and organic advocacy organization in the country, we have arrived at that position at no small cost to our staff, volunteers, and finances. In a sense we have an organization which is ruled by statutes designed in 1985 and amended piecemeal, year by year to deal with problems as they appeared. We never had a concrete plan in place to deal with growth, lines of authority, and the strain of a consumer uprising demanding organic products. In other words, we succeeded beyond our wildest dreams and reality has caught up with us."

Although there was a new state law in place that was stronger than its predecessor, it would take more time to get the law functioning as it was designed. In the 1990s, CCOF would meet its growing needs to the benefit of the entire organic trade; the creation of the **Organic Farming Research Foundation** (OFRF), and a central materials testing facility, the **Organic Materials Review Institute** (OMRI). CCOF had met each challenge it encountered, breaking down stereotypes people held about organic, building a strong reputation, and gaining widespread respect—for itself and organic everywhere. It had truly succeeded beyond its wildest dreams.

▲ *Sam Farr visiting with Phil Foster of Foster Ranch*

*CCOF is indebted to Brandon Lee, Sy Weisman, Ron Neilsen, and Tammy Hansen for their prior writings on CCOF's history. Sincere appreciation is extended to Bob Scowcroft, Mark Lipson, Kate Burroughs, Brian Leahy, Carl Rosato, and Jeff McAravy for their time, dedication, and achievements.*

# News Briefs

## News of the Glassy-winged Sharpshooter

Recent Glassy-winged Sharpshooter (GWSS) discoveries:

- *Butte County:* No viable GWSS since June '02. Preventative treatments within the infested area tentatively scheduled to begin on May 28.
- *Imperial County:* On May 9, nine adult GWSS were trapped. One male in Bashford's Spa, three males and one female in Imperial Spa, and two females and two males in Fountain of Youth Spa. Fifty-eight properties were treated in Bombay Beach on April 16–17. Treatments of Corvina Estate and Fountain of Youth Spa on April 29–30. Applications consist of foliar and/or soil drench of Merit (Imidacloprid).
- *Sacramento County:* Working on delimitation plans in the infested areas of Foothill Farm & Rancho Cordova.
- *Santa Clara County:* On May 12, visual surveys yielded one viable egg mass in Calle Alondra (Blossom Hill), San Jose. The county treated 16 single-family homes and 2 commercial properties in the Branham area on May 1–2. Treatment plans for Blossom Hill are underway. Treatments consist of foliar and soil injection of Merit (Imidacloprid).
- *Tulare:* Treatments in the Porterville area scheduled to begin on May 20. Applications consist of Merit (Imidacloprid) to selected residential properties adjacent to citrus groves currently undergoing GWSS control treatments.

Please visit **www.cdfa.ca.gov/phpps/pdcp** for links to other important and useful information for growers and the general public regarding the GWSS, Pierce's Disease, and treatment options.

*News Briefs Sources:* CDFA; OCA; Horizon Organic; OTA; Növényvédelem 39(1) 25-32; HortTechnology 12(4) 597-600; **www.clemson.edu;** *Field Talk,* a weekly e-newsletter of Rincon Publishing; EFA; Cal-DPR News, 4/2/03.

## Other News from California, the Nation, and Around the World

### Weeds after Ten Years of Organic Management

Research carried out at the organic pilot farm at Kishantos, Hungary proved that agronomic and mechanical methods are suitable for minimizing or at least decreasing to a tolerable level the harmful effect of weeds. Weed control of cereals was easily and simply carried out by a single pass of weed harrow. Maize and sunflower fields were maintained weed-free with mechanical operations and additional hoeing. However, weed infestation in peas was not eliminated by cultural means. The strategy was to employ hoeing that targeted only certain weed species considered particularly troublesome, such as *Cirsium arvense, Ambrosia artemisiifolia, Datura stramonium,* and *Sorghum halepense.* After ten years of organic farming, the number of weed species was still low in every field and there was almost no difference in the composition of weed species compared to the adjacent, conventionally managed areas.

### Managing Pests in the Transition to Organic

An abrupt transition from conventional to organic may be risky if pest numbers are high and alternative practices are not yet in place, concludes research carried out by the University of Florida at Gainesville. Hybrid systems, involving decreasing levels of conventional tactics and increasing levels of organic tactics, may be needed before the transitional period begins, in order to bridge the gap and lessen the impact of crop losses during the transitional period. As an agroecosystem makes the transition from conventional to organic practices, changes in the pest management tactics used are often apparent. In a paper presented during a workshop on 'Pest management during transition from conventional to organic farming', held in Sacramento in July 2002, it was argued that although many conventional systems rely on reactive strategies to deal with pest problems, an alternative approach is required in organic systems. Systems need to be designed so that plant health is maximized, regardless of pest numbers, although this approach takes planning and time. The design of cropping systems with minimal pest impact requires a much more extensive and specific knowledge base than needed for reactive strategies.

### Turning the Light on Nematodes

Clemson University (S. Carolina) scientists have made a breakthrough discovery in the management of the root-knot nematode, a parasite that reduces crop yields worldwide by diverting nutrients from the plant's shoot to the roots. The parasite affects major food and fiber crops—such as tomato, soybean, peanut, corn, cotton, and tobacco—and is difficult to control without pesticides. Researchers found that using red plastic mulch altered the light environment of the plants and allowed them to produce their crops in spite of the nematodes' presence. The reflected red light stimulated the plant to send nutrients to the shoots, overriding the nematodes' signals to feed the roots. This finding, along with an integrated management system that uses crop rotation and plant resistance, reduces nematode damage without heavy reliance on pesticides.

### More Mexflies Found In San Diego County

Three Mexican Fruit flies were recently trapped in the Fallbrook and De Luz areas of San Diego County, outside the Valley Center quarantine zone. The finds—two males and an unmated female—add to the 177 flies and 15 larval sites in the quarantine zone. No new quarantine area has been announced but spraying with spinosad-based pesticide has begun. Visit: **www.cdfa.ca.gov/phpps/pe/MexicanFF**

### New Prostate Cancer Study Points to Pesticides

A new study published in the *American Journal of Epidemiology* claims that "farming is the most consistent risk factor for prostate cancer," according to its lead researcher. Studies of 55,000 farmers and nursery workers in

North Carolina and Iowa between 1993 and 1999 show that the risk of developing prostrate cancer was 14% greater in them than the general population. Chlorpyrifos, coumaphos, fonofos, phorae, permethrin and butylate exposure all show increased risk in farmers with a family history of the disease. Methyl bromide exposure increased the risk to all men in the study.

### Airborne Pesticide Pollution Regularly Exceeds "Acceptable" Health Levels

A new report released by Pesticide Action Network, California Legal Rural Assistance Foundation, and Pesticide Education Center, reveals that current regulations ignore 80-95% of airborne movement of hazardous drift-prone pesticides, putting the health of many hundreds of thousands of Californians at risk. The report finds that for four of the six commonly used pesticides evaluated, their concentrations in air at significant distances from fields greatly exceeded the "acceptable" short-term "reference exposure levels" (RELs) for both children and adults. RELs are the concentrations of pesticides in air below which the EPA or Cal-DPR considers adverse health effects unlikely. Ongoing, background exposure to pesticides in air in high pesticide use areas also poses considerable long-term health risks, the report reveals. More than 90% of pesticides used in California are prone to drifting away from where they are applied, and 34% of the 188 million pounds of pesticides used in 2000 were highly toxic to humans, capable of triggering asthma and causing immediate poisoning, other respiratory illnesses, cancer, birth defects, sterility, neurotoxicity, and/or damage to the developing child.

### DPR Announces Restrictions to Protect Compost

The California Department of Pesticide Regulation will restrict sales of the herbicide clopyralid ("clo-PEER-ah-lid") to lawn and turf professionals, instruct those licensees to assure that green waste stays onsite when the herbicide is used, and require dealers to provide written notice of the restrictions when they sell some clopyralid products. DPR will immediately begin drafting regulations to enforce those restrictions, based on concern that clopyralid residue in grass clippings could make compost toxic to non-target vegetation.

### Proposed New Diesel Engine Standards

EPA has proposed tough new standards for diesel engines in farm and construction industry equipment aimed at improving the nation's air quality. The standards would address the sulfur content of diesel fuel as well as adding pollution-reducing technology to diesel engines. According to EPA, off-road diesel engines account for 44% of particulate matter and 12% of nitrogen oxide emissions that produce smog nationally. In California, off-road diesels produce 644 tons of nitrogen oxides daily compared to 528 tons from cars, vans, and light trucks. Under the proposed rules, sulfur levels in diesel fuel would be lowered from the current 3400 ppm level to 500 ppm by 2007 and down to 15 ppm by 2010. (CA air quality standards already call for no greater than 500 ppm in diesel fuel.) New emission control devices would become mandatory on diesel engines as the standards are lowered. Ag industry officials fear the cost of these air quality improvements will be passed down to farmers as higher equipment and fuel costs.

### Certified Organic Infant Formula

Horizon Organic Holding Corporation recently unveiled the first and only USDA certified organic infant formula, offering parents who use formula an organic choice that is the next best thing to breast milk. Set to launch this fall on the west coast as a USDA-certified organic option to formula brands currently on the market, Horizon Organic Infant Formula with Iron meets all of the FDA requirements for complete infant nutrition for full-term, healthy infants and is produced without the use of antibiotics, growth hormones and dangerous pesticides.

## CCOF Organic Forum

**The CCOF website, www.ccof.org,** has a new online feature designed to facilitate communication among members of the organic community—the CCOF Organic Forum. Here you can post a topic of discussion or a question, reply to discussions and questions, and post basic information about yourself once you register.

Use the CCOF Organic Forum to communicate with other CCOF members, consumers, and the entire organic industry. Share organic information, buy or sell organic ingredients/products, or discuss your point of view.

To register, visit the CCOF website and click on the link called "Organic Forum" listed under CCOF Foundation. After you enter the Forum, you will find a link and instructions at the top left of the page to register as a member of the Forum and join in the discussions. The Forum is available for viewing to the general public; however, only registered members will be able to post and reply to discussions.

Thank you for joining us in the dialog. We hope you enjoy this online connection to the organic world!

# READER QUESTIONS

*By Amigo Cantisano, Organic Ag Advisors*

In this issue, Amigo responds to several reader questions. Keep sending them in!

## Question 1

I just read Amigo's column on how to control gophers. I'd like to ask Amigo the million dollar question: How do I control ground squirrels on a certified organic fruit tree farm? The critters are killing us! Thank you.

## Answer 1

I believe the best organic option for controlling ground squirrels is the use of the propane and oxygen explosive devices as described in the gopher management article in the Fall 2002 issue of *The Newsletter of CCOF* (Vol. XIX, No. 3, p. 28— archived online at **www.ccof.org**). The concussion action of the explosion of a mix of propane and oxygen is a very effective tool for controlling ground squirrel populations. The mixture needs to be injected for a longer period than with gophers or voles, in order to reach the deeper levels of squirrel burrows, thus making the tool somewhat more dangerous than when hunting for gophers. Numerous growers are successfully reducing ground squirrel populations with the propane torch method.

Ground squirrels can also be trapped using humane or kill traps. Both Conibear and box-type kill traps can be used to control small populations of squirrels but must be regularly monitored to get maximum success. Baiting with the same foods that the ground squirrels are feeding on improves the trap success. Common baits are melon rinds, walnuts, almonds, or grains. The Black Fox Repeating Live Squirrel Trap is an impressive, relatively easy to use tool, popular with many growers.

The best time to control ground squirrels, no matter what the method chosen, is late winter and early spring, when the squirrels have left hibernation but have not yet begun reproduction.

Great Horned Owls and Red Tail Hawks prey on ground squirrels. Provide habitat, roosting poles and nesting boxes for these winged allies in and around the perimeter of the orchard to increase the natural predation of the squirrels.

*Resources:*

**Rodentorch Propane Oxygen Devices:**
Rid-A-Rodent, 800-743-7177
**Rodex 5000 Propane Oxygen Devices:**
Rodex Co., 800-750-4553
**Black Fox Repeating Live Squirrel Trap:**
The Trap Maker, 530-529-1910,
**www.trapmaker.com**

## Question 2

Here's a question for Amigo Cantisano regarding ACQ pressure treated lumber. I want to put up a desk next to my backyard organic garden. It seems that I can either use redwood or ACQ pressure treated lumber for the joists, beams and posts. I am concerned about the effect that the ACQ treatment might have on the vegetables that I get out of my garden. Do you have any information that might be able to help? Thanks, Mark.

## Answer 2

It appears that there is conflicting information about the safety of ACQ pressure treating of wood. Until, if ever, this controversy is settled, the powers that regulate organics have declared ACQ as a prohibited material. The limited choices for legal and safe organic lumber include untreated redwood, cedar and recycled plastic "wood".

## Question 3

When/where should I use zinc in my farming? How do I know when I need to use zinc? What kind(s) can I use?

## Answer 3

Zinc is used in many crops as a soil and foliar applied micronutrient. Zinc plays important roles in plant nutrition and is essential for the transformation of carbohydrates and regulation of the consumption of sugar in the

plant. It is also part of the enzyme systems that regulate plant growth.

Some crops such as almonds, citrus or peaches may show a visual zinc deficiency known as "little leaf" if foliar zinc levels become very low. Generally, however, crops do not show visual symptoms of zinc deficiencies until a severe condition exists.

To determine if your crop may benefit from zinc applications, check the following: A basic soil mineral analysis will help determine if the soil is naturally low in zinc; many soils in California are. Soil levels below 1.5 ppm generally will indicate a benefit from ground application of additional zinc.

If the soil analysis indicates a marginal or low level of zinc, this should be followed up with a combination of visual observation and foliar leaf analysis. The norms for zinc in crops vary quite a bit, but foliar zinc numbers below 50 ppm would prompt action by growers of many crops.

We have experienced numerous examples of increased yield and quality through foliar application of zinc to the crop at the proper rate and timing, even though the visual and tissue tests would not indicate the obvious benefit of the foliar application of zinc. Foliar applications of zinc just before bloom increase the yields and set of grapes, olive, citrus, tomatoes and others. We are reevaluating the thresholds we use to determine the need for foliar zinc applications. Growers often note a significant benefit to additional zinc, usually applied as a foliar spray to crops such as grapes, strawberries, tomatoes, peaches, almonds, cherries and more. We often recommend a broadcast application of zinc powders or granules when planting a field to assure high levels of this important micro-element right from the planting date of the crop.

Allowed sources for zinc include zinc acetate, zinc carbonate, zinc gluconate, zinc oxide, zinc sterate and zinc sulfate. Zinc sulfate and zinc oxide are the two most common zinc sources, likely due to their relatively low cost. Both foliar and soil applied grades of these products are offered by many companies and farm supplies.

## Question 4

Do you ever recommend applying manure instead of compost?

## Answer 4

I cannot think of a situation where manure would be preferable over compost, other than perhaps in organic rice production, a unique cropping system using anaerobic growing conditions. Compost is a superior source of nutrients, microbiology, organic matter, humus, water-holding capacity and more. Manure is best used as an ingredient in the production of compost.

Thank you to the readers who sent in their questions. If you have any organic crop-related questions for Amigo, please send them to: ***Ask Amigo***

c/o CCOF, 1115 Mission Street
Santa Cruz, CA 95060,
or e-mail to *keith@ccof.org*
or fax to: 831-423-4528

Amigo Cantisano, Organic Ag Advisors
P.O. Box 942 • No. San Juan, CA 95960
530-292-3619 office • 530-292-3688 fax

**Addendum to Ask Amigo! Reader Questions, *CCOF Magazine,* Vol. XX, no. 2, pp. 34-35 (Summer 2003).**

**Answer 2:**
It would also be legal to treat wood yourself with a boron-based treatment, and it also is okay to set any treated posts that go into the ground in concrete to prevent the arsenic from coming into contact with the soil.

**Answer 3:**
Zinc chloride is prohibited. Because of the annotation in the NOP rule, there has to be at least a soil or tissue test showing deficiency. Growers cannot use zinc as a preventative measure without documenting deficiency. Zinc is prohibited for use as a defoliant or herbicide.

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**Articles begin on even-numbered (left-facing) pages.**

# REMINDERS TO REMEMBER

*By Brian McElroy, Certification Services Manager*

**CCOF RENEWAL & INSPECTION YEAR CYCLE**
Beginning this year CCOF will combine the inspection year and the renewal cycle. This statement likely seems so obvious as to be strange to many of you, what do I really mean? What I mean is that your operation must be inspected annually within the time frame of your renewal year.

- If you renew in January 2003, then you must complete your inspection in 2003.
- If you renew in April 2003, then you must complete your inspection prior to April 2004.
- If you renew in July 2003, then you must complete you inspection prior to July 2004.

In the past CCOF sought to complete all inspections within the calendar year, no matter when your operation renewed, so even in you renewed in April your calendar year inspection was from January to December.

*Last note on this:* CCOF will seek to inspect your operation within the first six months after your renewal date. So please, work with the inspector to schedule your inspection as soon as possible. If you delay the inspection it may delay your ability to renew in a timely manner.

**BRAND NAME MATERIALS REMINDER**
CCOF producers must provide evidence that all brand name products used on the farm meet the NOP requirement, including the inert ingredients. This issue has been addressed in previous certification corner articles and Certification updates available at **www.ccof.org/certifiedclients/usda.html.** Each producer may comply using the following scenarios:
***Easiest:*** Use only brand name products that are listed on or approved by one of the following:

1. OMRI Brand Names List (**www.omri.org**)
2. Washington State Department of Agriculture Materials List (**www.wa.gov/agr/FoodAnimal/Organic/MaterialsLists.htm**)
3. US EPA listed pesticides that are labeled "For Organic Production"—see the February 2003 Certification Update (*CCOF Magazine,* Vol. 20, No. 1, p. 34.)

***Easy:*** If the product is not approved by one of the three programs listed above then you may be able to obtain a letter or affidavit from the manufacturer that their product is compliant with all applicable sections of the National Organic Program Standards. This statement needs to include the inert ingredients.

***Not so Easy:*** Obtain full disclosure of all of the product ingredients including the inert ingredients and verify that the product meets all the applicable sections of the National Organic Standards.

Clearly the "easiest" thing to do is tell suppliers that they need to get their product on one of the approved lists, or you do not want to buy it.

**TREATED SEED REMINDER**
Every CCOF producer has been notified and re-notified that treated seed is not allowed for use in organic production. All I can say at this point is **Do not use treated seed.** If you do use treated seed, you may lose the organic status for the crop, the land, and even the operation. (See the February 2003 Certification Update for details —*CCOF Magazine,* Vol. 20, No. 1, p. 34.)

**PESTICIDE USE REPORTING**
CCOF continues to find anomalies in pesticide use reporting records maintained with the County Agricultural Commissioner's Offices as part of the California Department of Pesticide Regulation, Pesticide Use Reporting Program. CCOF producers are encouraged to take the time to make sure that organic fields are clearly identified by site identification numbers that do not include conventional applications. Producers are also encouraged to request historical records in order to ensure that use reports for prohibited materials are not mistakenly associated with an organic field or operation. Contact you County Agricultural Commissioner's office to review the records for your organic locations.

*If CCOF Certified Operations have questions regarding any of these topics, please contact your local Regional Service Representative (RSR) or the CCOF Home Office Certification Staff.*

# CLEANING UP THE CHLORINE ISSUE

*By Janning Kennedy*
*Director of Handler Certification*

THE NATIONAL ORGANIC STANDARDS Board (NOSB) recently voted to recommend to the USDA that the National Organic Program (NOP) rule reinstate the original reference to "residual chlorine levels in the water in direct crop or food contact" that was part of their original recommendation in 1995. The Board also suggested that the Question and Answer section of the NOP website should be rewritten to focus on monitoring chlorine levels in water that last contacts organic products rather than chlorine levels in the waste water at the point of discharge. They further suggest that chlorine as an allowed substance be re-reviewed in light of new information about chlorine in aspects of food and worker safety, health effects, available alternatives, and other criteria. Their recommendation does not address the NOP language as it pertains to using chlorine to sanitize equipment.

The use of chlorine, commonly called bleach, in organic processing has long been a contentious issue. Chlorine is a sanitizing agent used to kill pathogens either on the raw food itself by adding it to the wash water, or on food processing equipment. Prior to the NOP standards, certifying agents used various private or state standards that often specified the upper level of chlorine allowed in wash water for organic food, though there was little uniformity among those standards. CCOF's standard, prior to the NOP regulation, allowed up to 50 parts per million (ppm).

The USDA's NOP rule was written to bring a single, uniform standard to the United States. Through an apparent misunderstanding by the USDA of the 1995 recommendation, the chlorine issue has been clouded by the language used in the NOP regulation. Currently there is confusion among regulators, certification agencies, inspectors, and processors about how to interpret and comply with the chlorine requirement.

The NOP language on chlorine for processors is found in NOP section 205.605(b)(9) under Synthetics Allowed:

"Chlorine materials disinfecting and sanitizing food contact surfaces, Except, That, residual chlorine levels in the water shall not exceed the maximum residual disinfectant limit under the *Safe Drinking Water Act.* (i) Calcium hypochlorite. (ii) Chlorine dioxide. (iii) Sodium hypochlorite."

In 1995 the NOSB reviewed chlorine and recommended its use, with provisions, in organic food processing. The NOSB is a body of certified organic producers, handlers, consumer and environmental representatives formed by the original *Organic Foods Production Act* to review materials and make recommendations to the USDA regarding which ones should be allowed or prohibited in organic production. The USDA, when it printed its NOP regulations, amended the NOSB's recommendation to the current language above. The original NOSB recommendation for allowing chlorine read:

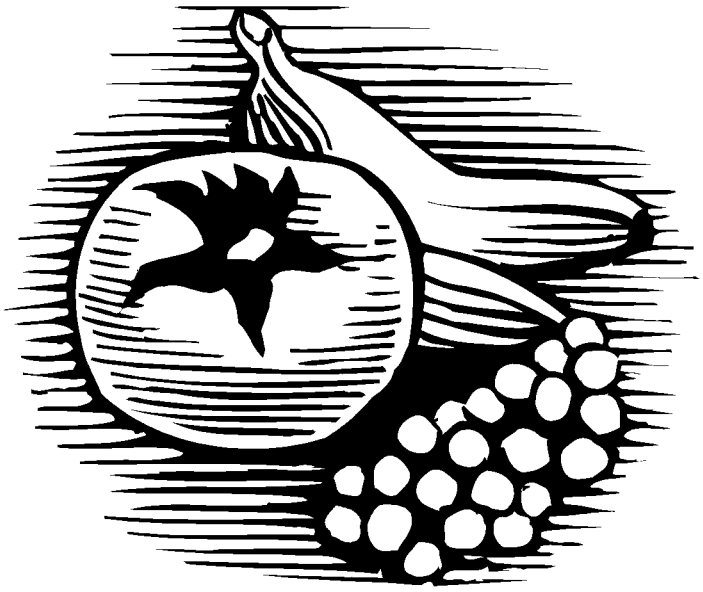
"Annotation: Allowed for disinfecting and sanitizing food contact surfaces. Residual chlorine levels *for wash water in direct crop or food contact* 'cannot exceed the maximum residual disinfectant limit under the *Safe Drinking Water Act.*'"

The italicized words were not included in the NOP language. The maximum residual disinfect limit under the *Safe Drinking Water Act* is 4 ppm.

The missing words indicating that "residual chlorine levels for wash water in direct crop or food contact" has apparently led to the confusion. Rather than measuring the levels of "residual chlorine" (residual chlorine is normally a technical term, not an indication of where it is measured), the NOP language seems to require measurement of chlorine at the discharge point. In response to questions, the USDA has used both the Preamble to the NOP regulation and its Question and Answer page on the NOP website to try to clarify the meaning of this language. But both have reinforced the concept that the chlorine level is to be measured in wastewater where it is discharged from the processing plant.

The Chlorine Task Force, formed by the Processing Committee of the NOSB to review the chlorine issue, notes that the *Organic Foods Production Act* was enacted to protect organic integrity rather than regulate wastewater. They suggest it would be more relevant to measure the level of chlorine in water as it contacts food or crops. The Processing Committee presented the recommendations from their Chlorine Task Force to the whole NOSB at its May 2003 meeting in Austin, Texas in a document titled "Measuring Effluent: Clarification of Chlorine Contact with Organic Food." The information in this article is largely from that document.

The Chlorine Task Force members are Dr. Joe Montecalvo, Professor of Food Science at California State Polytechnic University San Luis Obispo, Emily Brown Rosen, Policy Director of the Organic Materials Review Institute (OMRI), and Jim Riddle, member of the NOSB and expert on certification standards.



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# OMRI Brand Name Products List Update
## May 2003

| Brand Name Of Product | Supplier | Generic Material | OMRI Status |
|---|---|---|---|
| **Crop Products** | | | |
| Agreaux Organics All Natural Organic 3-3-3 Slow Release Plugs | Agreaux Organics Inc | manure, processed | R |
| Agreaux Organics All Natural Organic 5-5-5 | Agreaux Organics Inc | fertilizers, blended, regulated | R |
| Agreaux Organics All Natural Organic 6-2-4 Fertilizer | Agreaux Organics Inc | fertilizers, blended, regulated | R |
| Agreaux Organics All Natural Organic 6-2-4 Slow Release Plugs | Agreaux Organics Inc | fertilizers, blended, regulated | R |
| Agri Coat Natural II | Agricoat LLC | seed treatments, allowed | A |
| Bio-Genesis High Tide SeaWeed | Green Air Products Inc | kelp extracts | A |
| Biolizer Boost | California Liquid Fertilizer LLC | fertilizers, blended, allowed | A |
| Brown Rice | Sonoma Compost Co | compost—windrow | A |
| Cheep Cheep 4-3-3 | North County Organics | manure, processed | R |
| CSC Dusting Sulfur | Continental Sulfur Company LLC | sulfur, elemental | R |
| Custom-Organic B5 | Custom Biologicals Inc | microbial products, allowed | A |
| Cyd-X | Certis USA | biological controls | A |
| DiTera DF | Valent BioSciences Corp | biological controls | A |
| Dutch Treat Natural Fish Fertilizer (Canada) | Global Recycling and Research | fish products, stabilized | R |
| Early/Vineyard Mulch | Sonoma Compost Co | mulch, nonsynthetic | A |
| Fish/Seaweed Blend 2-3-0.5 | Neptune's Harvest Fertilizers/ Ocean Crest Seafood | fish products, multi-ingredient | R |
| Garden Safe All Purpose Plant Food 5-3-3 | Schultz Company | manure, processed | R |
| Garden Safe Azalea & Rhododendron Plant Food 4-4-2 | Schultz Company | manure, processed | R |
| Garden Safe Bulb Food Plant Food 4-4-3 | Schultz Company | manure, processed | R |
| Garden Safe Citrus & Palm Plant Food 4-3-3 | Schultz Company | manure, processed | R |
| Garden Safe Evergreen & Shrub Plant Food 5-4-3 | Schultz Company | manure, processed | R |
| Garden Safe Rose & Flower Plant Food 3-5-3 | Schultz Company | manure, processed | R |
| Garden Safe Tomato & Vegetable Plant Food 5-5-3 | Schultz Company | manure, processed | R |
| Golden Harvest 5-3-3 | Deutrel Industries | fish products, multi-ingredient | R |
| Gold-N-Gro 9.6-0-0 | McGeary Organics Inc | corn gluten | A |
| Ground Dolomite | Ash Grove Cement Company | dolomite, mined | A |
| Limestone Flour | Ash Grove Cement Company | limestone | A |
| Mallard Mulch | Sonoma Compost Co | compost—windrow | A |
| Matran 2 | EcoSMART Technologies Inc | herbicides, nonsynthetic | R |
| Micro Sulf | NuFarm Americas Inc | sulfur, elemental | R |
| Microlizer | Agromar Inc | microbial products, allowed | A |
| Mineral Matrix Micronutrient | Green Air Products Inc | micronutrients, synthetic | R |
| Mycorise ASP | Premier Tech Inc | inoculants | A |
| Myke Lawn 10-3-3 | Premier Tech Inc | fertilizers, blended, allowed | A |
| Myke Lawn 3-3-8 Organic Fertilizer | Premier Tech Inc | fertilizers, blended, allowed | A |
| Myke Lawn 9-4-2 Organic Fertilizer | Premier Tech Inc | fertilizers, blended, allowed | A |
| Myke Organic Evergreen Food 7-3-5 | Premier Tech Inc | fertilizers, blended, allowed | A |
| Myke Organic Flower Food 6-8-4 | Premier Tech Inc | fertilizers, blended, allowed | A |

| | | | |
|---|---|---|---|
| Myke Organic Rose Food 5-3-8 | Premier Tech Inc | fertilizers, blended, allowed | A |
| Myke Organic Seeding Mix | Premier Tech Inc | transplant media, nonsynthetic | A |
| Myke Organic Tomato Food 5-6-8 + Ca | Premier Tech Inc | fertilizers, blended, allowed | A |
| Myke Organic Vegetable Food 8-4-5 | Premier Tech Inc | fertilizers, blended, allowed | A |
| Myke Potting Mix For Organic Growing | Premier Tech Inc | transplant media, nonsynthetic | A |
| Nature's Best 5-1-1 | Deutrel Industries | fish products, multi-ingredient | R |
| Novagib 10L | Fine Agrochemicals Ltd | gibberellic acid | A |
| Open All Plus 4-1-1 | Deutrel Industries | fish products, multi-ingredient | R |
| Orchard Mulch | Agri Service Inc | mulch, nonsynthetic | A |
| PDM-7 Nutrient | Phase III Inc | microbial products, allowed | A |
| Premium Bioash | Roseburg Forest Products Co | ash | R |
| Pro-Mix Ultimate Organic Mix | Premier Horticulture Ltd | transplant media, nonsynthetic | A |
| Safer Brand All-Purpose Fertilizer with Fish Emulsion | Woodstream Corporation | fish products, stabilized | R |
| Safer Brand Moss & Algae Killer & Surface Cleaner Ready to Spray (lot #H23000 or higher) | Woodstream Corporation | soap | A |
| Safer Brand Moss & Algae Killer & Surface Cleaner Ready to Use (lot #H23000 or higher) | Woodstream Corporation | soap | A |
| Spray Oil 653-0055 | Petro Canada | oils, narrow range | R |
| SuperBio SoilBuilder | Advanced Microbial Solutions LLC | manure tea | R |
| Superzyme 1-0-4 | JH Biotech Inc | fertilizers, blended, allowed | A |
| Synergy | Green Air Products Inc | kelp extracts | A |
| The Answer Potting Soil | Answer Garden Products Ltd | transplant media, nonsynthetic | A |
| Top Coat 100 for Dust Control | Cascade Organics Inc | lignin sulfonates | A |
| Virosoft CP | Biotepp Inc | virus sprays | A |
| Zinc Coposoil 15-30 Dust | Agro Valley Enterprises | zinc products | R |
| **Livestock Products** | | | |
| AgMaster Corn Silage Inoculant | Agtech Products Inc | microbial products, allowed | A |
| AgMaster Pro Max | Agtech Products Inc | microbial products, allowed | A |
| Conlic | Grotek Inc | probiotics, regulated | R |
| Culbac Animal Liquid | TransAgra International Inc | microbial products, allowed | A |
| Culbac Hay and Silage Treatment | TransAgra International Inc | microbial products, allowed | A |
| Healthy Start | TransAgra International Inc | microbial products, allowed | A |
| Penergentic-t | Planistics Management Ltd | calcium carbonate | A |
| PyGanic Crop Protection EC 1.4 II | MGK Company | pyrethrum | R |
| PyGanic Crop Protection EC 5.0 II | MGK Company | pyrethrum | R |
| **Processing Products** | | | |
| Urnex Urn & Brewer Cleaner | Urnex Brands Inc | detergents | R |



† = see IFOAM appendix in the April 2002 OMRI Generic Materials

A = Allowed; R = Regulated

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Phone: (530) 865-4015 ▪ Fax: (530) 865-7931 ▪ Contact: Marcie Baugher

# CCOF Certified Operations

## February 1 – May 21, 2003

### Newly Certified Members

**A'ROMA ROASTERS** (PR)
Dayna Irvine
95 Fifth Street
Santa Rosa, CA 95401
707-576-7765
Certified Product: Organic Coffee

**A. VOLPI & SON INC.** (BV)
Nancee L. Volpi
P.O. Box 58
Holt, CA 95234
209-464-0508
Certified Crop: Asparagus

**ARROWHEAD CO.** (YO)
Randy Salveson
850 Market Street
Colusa, CA 95932
530-458-4000
Certified Crops: Beans (dry), Grapes (wine), Rice, Walnuts, Wheat

**CALIFORNIA-SINALOA ORGANIC FARMS** (AL)
Wayne Parks
Av. Independencia No. 936-A
Centro Sinaloa C.P. 80129, Mexico
52-66-7714-5381
Crops Certified: Broccoli, Cucumbers, Peppers, Squash (summer & winter), Tomatoes (fresh market)

**CAPRICORN COFFEES, INC.** (PR)
Craig Edwards
353 Tenth Street
San Francisco, CA 94103
415-621-8500
Product Certified: Roasted Coffee

**CARSTENSEN FARMS** (NC)
Neal & Sally Carstensen
484 Ely Rd.
Petaluma, CA 94954
707-778-8934
Crops Certified: Cucumbers, Flowers, Melons, Squash (summer), Strawberries, Tomatoes (fresh market), Watermelon

**CHATEAU FRESNO NURSERY** (FT)
Ibrahim & Marie Abuhilal
3805 Howard St.
Selma, CA 93662
559-896-4225
Crop Certified: Tomatoes (greenhouse)

**CLARK VALLEY FARM, INC.** (SL)
Eric Michielssen
2310 Clark Valley Rd.
Los Osos, CA 93402
805-528-7395
Crops Certified: Blueberries, Cranberries, Fruit Trees, Mixed Vegetables, Potatoes, Strawberries

**DRAKE LARSON RANCHES** (DV)
Drake Larson
P.O. Box 355
Thermal, CA 92274
760-399-5494
Crop Certified: Grapes

**FRUITA DEL SOL** (FT)
Ryan Metzler
2421 S. Judy
Fresno, CA 93727
559-905-2706
Crops Certified: Nectarines, Peaches

**HORACE LEE HILLARD** (CC)
Jeffery, Joan & Lee Hillard
8831 Fairview Rd.
Hollister, CA 95023
831-635-9956
Crops Certified: Walnuts

**JACOBS DAIRY** (HT)
Jeff & Chris Jacobs
P.O. Box 595
Loleta, CA 95551
707-733-5603
Certified Crop: pasture
Certified Livestock: Dairy Cattle
Certified Product: Milk

**JAMES & MICHELLE McINTYRE** (PS)
James & Michelle McIntyre
11164 Calle Oro Verde
Valley Center, CA 92028
760-742-3639
Certified Crop: Grapefruit

**KALLO FOODS** (PR)
Andy Stride
Coopers Place, Combe Place, Wormley
Surrey, UK GU8 552
142-868-1289
Products Certified: Peanuts, Peanut butter
Services Certified: Manufacturing (peanut products)

**LLOYD'S PRODUCE** (YO)
Lloyd Johnson
1801 Chapman Place
Davis, CA 95616
530-753-3299
Crops Certified: Mixed Vegetables

**NEW LEAF COMMUNITY MARKET** (PR)
Sarah Miles
1537 Pacific Ave., Suite 201
Santa Cruz, CA 95060
831-429-1480
Product Certified: Apple Juice

**O. LIPPI & CO., INC.** (PR)
Dennis Martin
2050 Jerrold Ave.
San Francisco, CA 94124
415-647-6743
Product Certified: Bananas

**POSEIDON FARMS LLC** (CC)
Dean Shiroyama & Steve Bassi
P.O. Box 4070
Salinas, CA 93908
831-455-2950
Crops Certified: Cantaloupe, Garlic, Lettuces, Melons, Mixed Vegetables, Peppers, Spinach, Tomatoes (fresh market), Watermelon

**PREMIER ORGANICS** (PR)
Jason Mahon
2342 Shattuck Ave. #342
Berkeley, CA 94704
415-279-4053
Products Certified: Almond Butter, Cashew Butter, Macadamia – Cashew butter, Almonds, Macadamias, Soy nuts, Pecans, Filberts, Brazil nuts, Walnuts, Cashews, Pistachios, Sesame Seed, Pumpkin Seed, Sunflower Seed, Flax Seed, Rice, Wild Rice, Honey, Granola products, Cereal products, Sage, Cinnamon, Garlic, Oregano, Ginger Root, Burdock Root

**RATTO BROS., INC.** (BV)
David Silveira
6312 Beckwith Rd.
Modesto, CA 95358
209-545-4445
Crops Certified: Basil, Beets, Bok Choy, Cabbage, Carrots, Celeriac, Chard, Chicory, Collards, Cilantro, Daikon, Dandelion, Dill, Endive, Fennel, Herbs, Kale, Kohlrabi, Leeks, Lettuces, Mustard Greens, Parsley, Radish, Spinach, Turnips, Watermelons

**STEVE L. CALVER** (PS)
Steve Calver
49750 Three Pts. Rd.
Neenach, CA 93536
661-724-0525
Crop Certified: Cherries

**STRAWHOUSE** (PR)
Donald Ellis
457 Hwy. 299
Junction City, CA 96048
530-623-1990
Product Certified: Roasted Coffee
Services Certified: Grinding, Packing, Roasting

**SUNRAY'S HARVEST LLC** (YO)
Raymond & Christine Belcher
7616 Locke Rd.
Vacaville, CA 95688
530-304-1626
Crops Certified: Microgreens

**TUFTS RANCH LLC.** (PR)
W. Stanley Tufts
27260 State Hwy. 128
Winters, CA 95694
530-795-4144
Services Certified: Cold Storage, Packing, Processing

**VOLCAFE SPECIALTY COFFEE LLC.** (PR)
Alan Nietlisbach
7 Beyer Court
Novato, CA 94945
415-848-2588
Services Certified: Green Coffee Trading, Green Coffee Import Service

### Inactive

**GARDEN EXPRESS** (CC)
John Van Diepen

**GRIFFITH AND PARKER** (NV)
Doug Parker & Tom Griffith

**MARMOT MEADOWS FARM** (SG)
Steve Martin

**OCEAN SONG GARDENS** (NC)
Fred Beeman

*Withdrawn and Decertified Operations for these dates are included in the online version of this Magazine.*
**www.ccof.org/magazine.html**

**CCOF Certified Operations addendum – *CCOF Magazine*, Vol. XX, no. 2, p. 42.**

Due to space limitations, we could not include decertified and withdrawn operations in the print version of *CCOF Magazine*, Vol. XX, no. 2, p. 42 (Summer 2003 issue). Codes in parentheses refer to CCOF Chapters, http://www.ccof.org/chapters.html

## Decertified

ALEX R. THOMAS & CO. (pr)
Tom Thomas

BAER ORGANIC (ft)
David Baer

CORNELIA VINEYARDS, INC. (ft)
Lance Jackson

JONES FARM (ft)
Dave R. Jones

## Withdrawn

ABUNDANCE FARM (nc)
Anudeva Stevens

BREZNOCK RANCH (yo)
Gene & Ann Breznock

CALBERI, INC. (pr)
Mack Ramsay

CONNELL GROVES (ps)
Eva M. Connell

COUNTRY SWEET (ke)
Catarino Martinez

DAVID C. MOSTIN (me)
David Mostin

DENNISON VINEYARDS (me)
Peter & Will Dennison

DHALIWAL RANCH (yo)
Tarlochan Dhaliwal

EMANDAL, A FARM ON A RIVER (me)
Sue Morganti, Fred Marshall, Clive & Tamara Adams

EMMET PENNEBAKER (nv)
Emmet Pennebaker

FARM HOUSE GOODS (ft)
Fred & Diane Gaalswyk

FARMCO PARTNERS (ke)
Jacque Cook & Robert Taylor

GUICEL FARM (sc)
Celia B. Suarez

HOLLAR SEEDS (pr)
Myron Svoboda

KHAWAR FARMS (ke)
Khalid and Imran Khawar

LACROIX (DAVID & JANICE) (nv)
David & Janice Lacroix

LAGANZA (ps)
Pedro Torres & Ronald Chilcote

MANSOUR MALEK (ps)
Mansour Malek

MANUEL & MICHELI (nv)
Bert Manuel

MCCURDY (RAY) (me)
Ray McCurdy

MORGAN VALLEY ST. JOHN'S WORT (me)
Keith & Vicki Riggin

MT. OSO TRADING CO. (pr)
Darby A. Buchele

NATURE FARM, THE (sc)
Russell Lugli

O'HARA GROVE (ps)
Kay O'Hara & Ron Gates

OCCIDENTAL MUSHROOMS (nc)
Don Lareau

PINE GROVE FARM (nv)
Mike McDougal

RAINBOW ORGANIC GARDENS (ps)
John Hogan

RAINBOW VALLEY ORCHARDS (pr)
Richard Hart

SINGING NETTLE FARM (sg)
Mary Schnaufer & Steve Elias

SITES RANCH (nv)
Phil and Betsy Sites

SKYVIEW COOLING (pr)
John Studer

SMITTY'S VINEYARD (me)
Smith Williams

SPIRIT GT- PS143 NOW (ps)
Jerry & Annie Benefield Lawrence

TALBOT FARMS (ps)
Karen Talbot

TERRANOVA MANAGEMENT CO. LLC. (ft)
Don Cameron & Dave Kelly

THOMAS RANCH (cc)
Moises & Jose Magana

WOOLEY FARMS (nv)
Dan & Loretta Baker

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**Articles begin on even-numbered (left-facing) pages.**

# Business Resources

### New and Updated ATTRA Publications

- *An Organic & Sustainable Practices Workbook & Resource Guide for Cropping Systems* (new) **http://attra.ncat.org/attra-pub/summaries/cropsworkbook.html**
- *An Organic & Sustainable Practices Workbook & Resource Guide for Livestock Systems* (new) **http://attra.ncat.org/attra-pub/summaries/livestockworkbook.html**
- *Growing Your Range Poultry Business: An Entrepreneur's Toolbox* (new) **http://attra.ncat.org/attra-pub/summaries/poultrytoolbox.html**
- *Efficient Agricultural Buildings: An Overview* (new) **http://attra.ncat.org/attra-pub/summaries/agbuildings.html**
- *Organic Greenhouse Herb Production* (updated) **http://attra.ncat.org/attra-pub/summaries/gh-herbhold.html**
- *Downy Mildew Control in Cucurbits* (updated) **http://attra.ncat.org/attra-pub/summaries/downymildew.html**
- *Flea Beetle: Organic Control Options* (updated) **http://attra.ncat.org/attra-pub/summaries/fleabeetle.html**
- *Strawberries: Organic and IPM Options* (updated) **http://attra.ncat.org/attra-pub/summaries/plum.html**
- *Poultry Nutrition* (new), funded by Heifer Project International. (Available in print only, not on the Web.)

Visit our website, **http://attra.ncat.org/publication.html,** to read or download all our publications, or call toll-free 1-800-346-9140 for your FREE print version.

### Books

*The Organic Decision: Making the Transition to Organic Dairy Production.* Cornell Cooperative Extension specialists in consultation with the Northeast Dairy Producers Alliance developed this workbook, which examines the stability and trends of the organic milk market, the cost of making the transition (includes budget worksheets), forage yield reductions (includes inventory balance calculator), and herd health considerations (cull rate, disease incidence, veterinary costs). Those completing the workbook will have a business plan, a budget, and an action plan for the transition. 40 pages, 2002, Cornell University Small Farms Program, $12. Contact Faye Butts at (607) 254-7412 or e-mail *fsb1@cornell.edu.*

*Weeds — Control Without Poisons*
by Charles Walters
"Low biological activity is inherent in each weed problem…Each weed is keyed to a specific environment slotted for its proliferation." So says *Weeds — Control Without Poisons* author Charles Walters. Further, calcium, magnesium, potassium, and other elements in equilibrium are likely to roll back more weeds than all the available herbicides on the market. Specifics on a hundred weeds, why they grow, what soil conditions spur them on or stop them, what they say about your soil, and how to control them without the obscene presence of poisons. All cross-referenced by scientific and various common names, and a pictorial glossary. 352 pages. **www.acresusa.com**

## The Safe Seed Sourcebook
## Your Resource for GE-Free Seeds

Agriculture and seeds provide the basis upon which our lives depend. We must protect this foundation as a safe and genetically stable source for future generations. For the benefit of all farmers, gardeners and consumers who want an alternative, we pledge that we do not knowingly buy or sell genetically engineered seeds or plants.

**www.gene-watch.org/programs/safeseed/ sourcebook.html**


### Websites

**The Organic Agriculture Information website,** developed by the Organic Agriculture Consortium, has been launched at **www.organicaginfo.org.** The sites includes information on production, economic data, research results, farmer anecdotes, certification information, transition strategies and other subjects related to organic agriculture.

**The PAN Pesticides Database** is your one-stop location for current toxicity and regulatory information for pesticides. To find out more about insecticides, herbicides and other pesticides, visit **www.pesticideinfo.org/index.html**

# For Sale to Clients and the General Public

***Application Packet*** *$25.00*
(Grower/Processor/Handler/Retailer/Livestock)

***Certification Handbook*** (Manuals 1–4) *$20.00*
***Organic Directory*** *$10.00*

***Supporting Members and General Public***
***Supporting Member Sign*** *$25.00*
***Organic Cotton CCOF T-shirt*** *$15.00*
(Colors: sage, natural, blue • Sizes: S,M,L,XL)
***Baseball Hats*** *$15.00*
***Bumper Sticker:*** *$.50 each or 3/$ 1.00*
**"Support Organic Farmers"**
**"Support Yourself: Eat Organic"**
**"¡Viva La Agricultura Organica!"**

***CCOF Certified Clients Only***
***CCOF Logo Stickers*** (1000 per roll)
- "Certified Organic by CCOF" *$10.00*
- Logo only *$ 6.00*
- Transitional (grower only) *$10.00*

***CCOF Rubber Stamp***
- "Certified Organic by CCOF" *$20.00*
- Logo only *$15.00*

***Twist Ties*** (per 900/case 10,200)
*6" — $6.00/$35.00 • 12" — $8.00/$55.00*
*18" — $11.00/$90.00*
***Certified Grower/Processor Signs*** *$26.00*
(24" x 18" plastic or aluminum, w/NOP wording)
***(Please) Do Not Spray Signs*** *$16.00*
(2 styles, black on yellow, 12" x 18")

***To Order, Call Toll Free 888-423-2263, ext. 10 or visit the CCOF Store at*** **www.ccof.org**

# Classifieds

### For Lease

26100 sq. ft. L&B **greenhouse** + 5 acres on county road, climate control, 75 50 ft. redwood tables, municipal & well water, organic certifiable, Boulder Creek, 650-321-5302.

### Services

Lewis and Carlsen: An independent **insect monitoring service.** Serving the Central Coast. We'll find what's bugging you! Call (831) 728-3190.

### For Sale

**ROCK DUST!** Remineralize soil FAST—Activate a microorganism explosion on your farm. 70+ elements - Single application lasts decades! 1-2 ton/acre recommended. Only $190/ton delivered, SC County. Call Vincent at "Glacial Goddess" (831) 763-3848, *permasc@sasquatch.com*

**Farmall M tractor** - Classic! and bulletproof, 4-cylinder rebuilt engine with only 30 hours. PTO and belly pump, but no 3-point. Runs great! $1800, Vincent, 831- 763-3848.

### Seeking Land

Looking for **farm land to rent** in the Carmel Valley up to 5 acres certified organic, John, 559-694-0017.

# Calendar

**June 21–25**
**American Seed Trade Assoc. Convention,** Henderson, NV, **www.amseed.org**

**June 23–25**
**The Sacramento Ministerial.** Ministers from 180 nations have been invited to this event for the U.S. to discuss industrial agriculture, pesticides, irradiation, and biotechnology to the third world in a positive light. During this event there will be public awareness events to help explain the other side of the story, 415-918-6205, ext. 383, **www.biodev.org/sacramento**

**June 23–28**
**Bio-Logical Organic Gardening Workshop,** Organic Planet Farms Learning Center, Fallbrook, CA, 760-731-1238, *Farmerguru@aol.com*

**June 24**
**Fresh Produce & Floral Council Expo,** Anaheim, CA, 714-739-0177.

**July 2**
**Strawberry Culture and Veg Disease in Coachella Valley,** Indio, CA, *ceriverside@ucdavis.edu*

**July 13–25**
**International Short Course on Agroecology 2003,** Santa Cruz, CA, contact Joji Muramato, *shortcourse@agroecology.org*

**July 16–18**
**Short course on growing organic wine grapes,** Valley Oaks Ranch, Hopland, CA, 707-272-1152.

**July 18**
**Women in Ag Conference,** Tucson, AZ, 602-659-7008.

**July 20**
**Medicinal plant walk,** Occidental Arts and Ecology Center, Occidental, CA, 10:30AM–1:30PM, $25, 707-874-1557, ext. 201, *inquiry@oaec.org*

**August 7–10**
**Northeast Organic Farming Association's 29th Annual Summer Conference:** "Harvest the fruits discover the roots," Amherst, MA, contact Julie Rawson, 978-355-2853, *Julie@mhof.net*

**August 8–10**
**Organic Gardening Class:** "Winter Gardening and Seed Saving," Occidental Arts and Ecology Center, Occidental, CA, $300 for the class, 707-874-1557, ext. 203.

**August 11–16**
**Bio-Logical Organic Gardening Workshop,** Organic Planet Farms Learning Center, Fallbrook, CA, 760-731-1238, *Farmerguru@aol.com*

**August 12**
**Avocado Grower Seminar,** Ventura, CA, *pamauk@ucdavis.edu*

**August 14**
**Avocado Grower Seminar,** Escondido, CA, *pamauk@ucdavis.edu*

**Agriculture, Hunger and Biotechnology: A Debate**
***What Role Do GE Crops Have in Developing Countries?***
**Monday, June 23rd, 7 PM**
The Crest Theater • 1013 K Street • Sacramento, CA
Directions at **www.thecrest.com/directions/index.cfm**
*Come and hear diverse viewpoints on the international controversy over GE crops and food. Speakers will include scientists, policy makers, activists, and industry representatives.*
**Requested donation: $5.00**

**August 16**
**Medicinal plant walk,** Occidental Arts and Ecology Center, Occidental, CA, 10:30AM–1:30PM, $25, 707-874-1557, ext. 201, *inquiry@oaec.org*

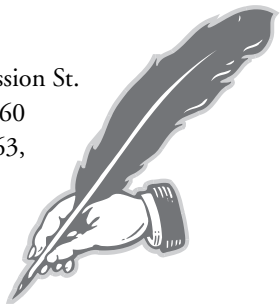
**September 4–7**
**Natural Products Expo East,** Washington D.C., 303-390-1776, *tradeshows@newhope.com*

**September 6–7**
**Fall and Winter Garden Sale and Open House,** Occidental Arts and Ecology Center, Occidental, CA, 9AM–5PM, 707-874-1557, ext. 201, *oaec@oaec.org*

**September 26–28**
**25th Annual Prairie Festival,** there will be speakers, dancing, and sustainable food, Salina, Kansas, 785-823-5376, e-mail: *theland@landinstitute.org;* web: **www.landinstitute.org**

**October 13–18**
**Bio-Logical Organic Gardening Workshop,** Organic Planet Farms Learning Center, Fallbrook, CA, 760-731-1238, *Farmergurg@aol.com*

**Send Calendar Submissions to:**
Lisa Stutey
- e-mail: *lisa@ccof.org*
- U.S. Mail: 1115 Mission St. Santa Cruz, CA 95060
- Phone: 888-423-2263, ext. 10



# Last Word

***"An organic farm, properly speaking, is not one that uses certain substances and avoids others; it is a farm whose structure is formed in imitation of the structure of a natural system; it has the integrity, the independence, and the benign dependence of an organism."***

**~Wendell Berry**

## Regional Service Representatives (RSRs) for CCOF Chapters

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and outside California)
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(See Pacific Southwest)

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***View the CCOF Chapter Map at***
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