

2001

ANNUAL SEED SCHOOL AND SEED INDUSTRY MEETINGS

The Utah Seed Council and Utah Crop Improvement Association will jointly host the Utah Seed Industry Annual Meetings and Seed School on Tuesday, Feb. 13, 2001 in Provo, UT. We will meet at the Utah County Historic Courthouse, 55 South University Ave., Room 305, starting at 8:30 a.m. with light refreshments. *See next page for complete program.*

Please return the enclosed postage-paid card immediately if you plan to attend so we can make arrangements for the luncheon.

WHITHERGO GMO?

At the Seed School in February 2000, we heard from a panel of experts discussing “Genetically Modified Organisms: What are they, Where did they come from, and Do you dare grow GMO seed?.” The questions of “What are they” and “Where did they come from” were answered quite clearly, but almost a year later the third question is probably more confused than ever.

Forthwith is a brief summary of the panel presentations, followed by information as to where the GMO situation stands currently.

GMO Viewpoint 2000

(A) Dr. David Hole, Associate Professor of Plant Breeding at USU, explained that the GMO definition itself is controversial, because in the strict sense even traditional plant breeding mixes 50% of the genes from each carefully chosen parent, producing an organism that is genetically modified to hopefully exhibit enhanced traits. GMO in the modern sense, however, usually involves gene movement between species using advanced biotechnological methods.

Many, in fact most, genes are the same in all plants and animals and individually control the same proteins, but the genes that are different produce very

different life forms. Using bacterial carriers, “gene guns”, or other technical methods, a specific gene (such as herbicide resistance or toxicity to insects) can be transferred from one organism to another and be fully expressed in the progeny of the recipient organism. As far as ethical concerns, the public seems to accept manipulation of genes within a species or between closely-related species such as wheat and rye, but may be very opposed to moving a gene from fish into wheat. The GMO process should probably be transparent, meaning that the public should be fully appraised about food which is a product of “biotechnical” gene manipulation (i.e., labeling) and have the choice whether to accept it or not. It should be kept in mind, regarding the safety of these methods, that it isn’t usually the anticipated problems that come back to bite you.

(B) Dr. Steven Kimball, a long-time Monsanto employee and consultant presently living in Kanosh, UT, discussed the industry perspective on GM organisms. He said that biotechnology is an essential part of our future. Considering that there is about 6 million square miles of land being farmed worldwide that by 2050 will need to support about 10 billion people, methods of increasing yields and quality of food and fiber from that land is necessary in order to

maintain more marginal lands for recreation, wildlife,
and watershed protection.

**UTAH CROP IMPROVEMENT ASSOCIATION
AND
UTAH SEED COUNCIL**

Seed School and Annual Meetings

*Utah County Historic Courthouse – Room 305 (Ballroom)
55 South University Ave., Provo, UT
Tuesday, February 13, 2001
8:30 a.m. to 3:30 p.m.*

Note: Attendees can park free in the parking terrace (entrance on 1st South) on Levels 5 and 6 only.

- 8:30 a.m. Pre-Meeting Social – Continental Breakfast
- 9:00 a.m. Welcome – Mike McDermott, President, Utah Seed Council
Fred Wagstaff, UCIA Director, District 5
- 9:05 a.m. Organic Certification for Food, Feed, and Seed in Utah – Seth Winterton,
Utah Department of Agriculture, SLC
- 9:20 a.m. Lewis Flax – Native, Exotic and/or Invasive? Stanley Kitchen, USFS Shrub Lab,
Provo
- 9:30 a.m. (1) Invasive Species Management Plans, (2) Weed Control in Establishment and
Production of Grass, Forb, and Shrub Seed – Steve Dewey, Utah State University,
Logan
- 10:25 a.m. Ensuring Proper Seed Origin for BLM Bids – Cindy Fritz, BLM Seed Warehouse,
Boise, ID
- 10:45 a.m. Break – Light Refreshments
- 11:00 a.m. The 2000 Seed Crop in Pictures – Stanford Young, USU, Logan
- 11:45 a.m. General Reports
A. Utah Seed Dealers – Karen Harker, Beehive Seed, Delta
B. Utah Dept. of Agriculture – Dick Wilson, UDA, SLC
C. PS&B Dept., USU – Larry Rupp
D. USU Extension – Tom Griggs, USU, Logan
E. Utah Crop Improvement Association – Stanford Young, USU, Logan
- 12:15 p.m. Utah Crop Improvement Association Business Meeting
- 1:00 p.m. Catered Luncheon – Hosted by USC and UCIA

2:00 p.m. Utah Seed Council Business Meeting

3:30 p.m. Adjourn

The science and methodology of biotechnology is proven, but informed acceptance by the public has not kept pace. While in the U.S. the public has great faith in the FDA, USDA, and EPA to oversee proper and safe food production, the Western European public perceives their governments as being ineffectual while mad cow disease and adulterated Coca Cola, poultry feed, and wine destroyed the health of many. So to them, assurances by governments or multi-national corporations that biotechnology is safe ring hollow. The task of science is to convince society that informed, logical and balanced discovery is preferable to living according to pervasive and enduring myth.

Most present GM crops involve factors that enhance agronomic production such as Bt insect toxins, Roundup herbicide resistance, etc. The next generation of GM crops will include factors that enhance benefits to consumers such as more healthy oils, increased protein and Vitamin A content, etc. Hopefully this will turn the tide towards public acceptance of GMOs.

Dr. Kimball admitted, however, that unintended transference of GM traits to related crop or weed species through pollen is a huge potential problem. Nobody wants a Roundup-Ready Johnsongrass that could be produced by outcrossing if RR genes were put into sorghum. Methods are available to prevent such transference through "terminator genes" that render any unintended hybrids sterile, but the public at first reaction abhors such a concept, so again more education and reasoned explanation of overall benefits are needed.

(C) Dr. Susan Werthele of the EPA in Denver, CO, stated that she is a risk assessor by profession and her job entails looking at the glass half empty rather than half full.

The EPA neither promotes or condemns GM

In the year since the panel discussion at our 2000 annual meeting, things were probably moving in favor of GMO acceptance by at least the U.S. public when the StarLink corn contamination fiasco unfolded. StarLink is the name given by Aventis to GMO technology to place Bt toxin genes into corn

technology. However, there are real scientific concerns, not just European emotional concerns, that need to be addressed. Public concern is not so much about biotechnological methods per se, but the ramifications of movement of genes from very dissimilar organisms such as petunia to soybeans. Utilizing DNA fragments from petunia is in fact part of the methodology of getting the Roundup-resistance gene into soybeans and promoting trait expression. It is assumed that no deleterious proteins are being produced by the attendant foreign petunia genes. But it is almost impossible to rule out the possibility that other genes may be activated and produce an unintended product that may cause allergies in some people or perhaps induce susceptibility to a hitherto harmless or latent virus or bacteria.

The EPA is still trying to determine how to look at living organisms that produce toxins such as Bt. It really doesn't fit the definition of a chemical pesticide, and in fact the food industry is anxious that they are not classified as pesticides (maybe "plant-expressed protectants"?). However, a chemical pesticide breaks down eventually in the environment.

A living organism, on the other hand, can perpetuate itself. When a gene or portion of a chromosome is transferred purposefully into one species, it may eventually prove unstable and alter other portions of the genome, or may spread into other related species. Both scenarios could cause possibly disastrous ecological results. So the stance of the EPA is that GMO safety, according to scientific and political protocols, has to be proven satisfactorily for each product for food, agricultural, and environmental impacts. That is not easy to do in a time period acceptable to both GMO developers and the general public.

GMO Viewpoint 2001

varieties for insect resistance. The EPA had approved StarLink for livestock feed use, but not for human consumption due to concerns over the potential allergenicity of the Cry9C protein. With tests able to detect as little as one kernel of StarLink among 400 regular kernels it was found that mixing to varving

small degrees had occurred in 1998 and 1999, but perhaps not in the 2000 crop. The USDA suspects either drifting pollen or careless handling of seed, but as StarLink continues to appear throughout the grain and food system (from home baking mix in Japan to taco chips in the U.S.), the estimates of Aventis' liability approaches \$1 billion. Aventis seeks to obtain temporary food approval from the EPA, which would greatly reduce liability. In fact, no cases of human allergic reactions have been substantiated by the FDA, but the integrity of the EPA and FDA and GMO industry have taken a hit.

Whether this is a temporary hit or a severe blow to GMO acceptance remains to be seen. However, some global food issue watchers remain confident the hit is not even close to fatal. Dennis Avery, director of global food issues for the Hudson Institute of Indianapolis, Indiana, points out that higher yields, better nutrition, pest resistance, and acid tolerance of crops have all been accomplished through biotechnology.

In an address at the recent Produce Marketing Association convention in California, as reported in the January 1, 2001 *Good Fruit Grower Magazine*, Avery contends that genetically engineered crops are good for consumers and the environment. He says they will permit fruits and vegetables to be marketed with more freshness, quality, and nutrition; and by increasing yields, biotech crops will allow farmers to feed the world while using less land.

Avery predicted the political wrangling and public debate over biotechnology will continue for a time, with Europe making the most objections. But biotech will eventually be accepted, he said, because the benefits will be recognized and because some countries like China are going ahead with development without concern for European sensitivities.

Avery said China is emerging as a key to biotech farming's future.

"The Chinese are currently the world's most avid agricultural biotech researchers," he said. "They have a big domestic market that wants to eat better, and a severe shortage of land and water. They have little concern about exports to Europe and almost no concern about Greenpeace taking over their government news outlets. It may even be that Europe

and North America will end up paying biotech license fees to Chinese research labs."

Avery said no health problems have ever been related to biotech crops. While some people think biotechnology could introduce new allergens, others say gene modification could eliminate allergens from products like milk, peanuts, and wheat.

But he believes some environmentalist concerns about biotech are justified. Genetically-engineered plants could pose a threat to the environment if they escaped into nature, he said. The obvious solution is to make the plants sterile.

"Oddly, the eco-activists say we can't make the biotech sterile because that would force Indian peasant farmers to buy seeds every year from big monopolistic corporations," he said. "Never mind that most of the world's good farmers already buy hybrid seed every year because the hybrid seed gives much higher, and thus more profitable, yields."

Avery predicted that activists could delay world progress in engineering foods by a decade before public acceptance is finally achieved.

UCIA FIELD SUPERVISORS

As of December 31, 2000 we have had a complete turnover in our field and seed conditioner inspection crew. Daren Blanchard retired as the mainstay in the Box Elder County area after 13 years. I'm sure all will agree he has done a terrific job promoting, encouraging, inspecting, and in general keeping track of certified seed production in the field and conditioning plants. He and his blue Jimmy and dog Rusty will be fondly remembered.

Taking his place is Michael Bouck, who has just finished his BS degree in Agronomy at USU and will be working towards a MS degree as time permits. Michael is from Weston, ID, where he grew up on a hay and grain farm and later built houses for a few years before returning to college. He now lives in Amalga. We anticipate him redirecting his building skills to building the certification program in the north end of the state. He also will have some responsibilities for Foundation grass seed production, cleaning, and inventory maintenance in cooperation with USDA-ARS Forage and Range Laboratory.

In the central part of Utah, Roger Anderson

resigned in September due to family considerations and other employment opportunities. We appreciate the job he has done with both field and wildland seed

We feel lucky to have found Wayne Andersen, who lives in Spanish Fork, to fill this position. Wayne has broad experience in the agriculture industry and was the owner of Andersen Farm Service Center in Spanish Fork for many years until the planting of houses instead of crops forced closure of the business. He still owns a couple of farms that are mostly rented out. Wayne has been a quick study getting up to speed in the seed certification and wildland plant identification mode, and we anticipate continued growth in agronomic and wildland certified seed production in Central Utah.

UCIA DISTRICTS REDEFINED

At the 2000 Membership Meeting, members agreed to re-define the UCIA Districts to allow for more representation on the Board of Directors for growers in northern Utah, where the major portion of Certified seed production has shifted. Following are the old and new district boundaries:

District 1 (old): Box Elder County (north of the line defined by the Deweyville-Bothwell-Thiokol road and thence west to the Great Salt Lake).

District 1 (new): Box Elder County north of the Deweyville-Bothwell-Thiokol road plus the portion west of the Great Salt Lake.

District 2 (old): Box Elder (south of the line defined by the Deweyville-Bothwell-Thiokol road and thence west to the Great Salt Lake) and Cache Counties.

District 2 (new): Cache and Rich Counties and Box Elder County east of I-15 and south of the Deweyville-Bothwell-Thiokol road.

District 3 (old): Weber, Davis, Salt Lake, Tooele, and Utah Counties.

District 3 (new): Box Elder County west of I-15, south of the Deweyville-Bothwell-Thiokol road and east of the Great Salt Lake.

District 4 (old): Rich, Morgan, Summit, Wasatch, Duchesne, Daggett, Uintah, Carbon, Emery, and Grant Counties.

District 4 (new): Summit, Wasatch, Duchesne, Daggett, Uintah, Carbon, Emery, Grand, and San Juan Counties.

District 5 (old): Juab and Millard (north of the line defined by State Hwy 6 and 132) Counties.

District 5 (new): Weber, Morgan, Davis, Salt Lake, Tooele, and Utah Counties.

District 6 (old): Beaver, Iron, Millard (south of the line defined by State Hwy 6 and 132), and Washington Counties.

District 6 (new): Juab, Millard, Beaver, Iron, and Washington Counties.

District 7 (old): Sanpete, Sevier, Piute, Wayne, Garfield, Kane, and San Juan Counties.

producers and his botanical knowledge of wildland plants will be missed.

District 7 (new): Sanpete, Sevier, Piute, Wayne, Garfield, and Kane Counties.

ADDRESSING NATIVE PLANT SEED TESTING PROBLEMS

by Stanley Kitchen, USFS Shrub Lab, Provo, UT
(Presentation at the Utah Seed Council
Business Meeting, Feb. 11, 2001)

By law, all seed must be quality tested before or at the time of sale. Consistency in test results is the objective behind uniform procedures, such as the seed testing standards or rules published by the Association of Official Seed Analysts (AOSA). However, rules are lacking for numerous species in commerce. In response the US Forest Service, Shrub Sciences Laboratory, Provo, and the Utah Division of Wildlife Resources, Great Basin Research Center, Ephraim, began a program in 1985 for developing reliable testing standards for species (primarily natives) used in wildland revegetation and restoration plantings. Partial funding for this five-year project was provided by the Utah Department of Agriculture (UDA). The project was resurrected in 1996, again with UDA support, and with additional support from members of the Utah Seed Council. As of this meeting, testing protocols have been developed, and rules adopted, for 15 shrubs, eight forbs, and five grasses, many of which are among the most common species used in wildland plantings. Rules for two species were revised. Work continues on an additional 12 species. Seed testing for many species has been improved, although certainly not perfected, as a result of this work.

As a participant of both phases of this project, I was invited to attend a workshop designed to examine problems in seed quality evaluation using the tetrazolium chloride (TZ) staining test. The workshop was held in May 1999 at the Idaho State Seed Lab in Boise, Idaho. Analysts from several western states with extensive experience in TZ seed testing were present. For three days, hands-on experience was mixed with instruction as we searched to identify and remedy inter-lab and inter-analyst sources of variation in test results for a variety of

candidate species including Indian ricegrass, sagebrush, winterfat, and forage kochia, and four-wing saltbush. Instruction was also given addressing the challenges associated with testing the very small and dormant seed of rushes and sedges. We also spent some time evaluating the sampling and dividing

The AOSA recently (2000) finished a complete overhaul of the "Tetrazolium Testing Handbook". The new handbook has specific instructions for 98 plant families, complete with drawings. Although the new handbook will not take the 'art' out of TZ seed tests, it will be a valuable tool for improving the accuracy of results for many species.

Because of the nature of the species and the volume of seed sold and tested, sagebrush seed clearly presents one of the greatest challenges to western seed analysts. The potential causes of difficulty in rendering an accurate seed test are many. Seed are small at about 2 million per lb. Due to circumstances of seed collection and processing and the needs of users, sagebrush seed is generally marketed with purities of 12 to 25 percent, with the remaining inert material composed mostly of flower, fruit, leaf and stem fragments. This commercial grade seed does not flow well and can be quite heterogeneous in the bag. Because of this and because the required working sample for laboratory evaluation is just 1.5 g, the probability of obtaining a representative sample for evaluation is questionable. Often, a substantial percentage of seed does not mature properly, resulting in numerous shriveled seed that are easily fragmented when handled. If intact, these are counted as seed and thus included in the viability test. If fragmented, they are considered inert matter. Sagebrush seed is sensitive to water content percentages higher than 10-12 percent and can lose vigor or viability when stored at high humidities and temperatures for relatively short periods of time. In light of these and perhaps other barriers to the accurate testing of sagebrush seed, it should come as no surprise that test results reported from different seed labs for the same seed lot often differ significantly. Clearly better methods for conditioning, sampling, and/or testing sagebrush seed are needed. Possible solutions to improved testing

procedures used to determine which seeds are actually included in the analysis test. It became evident that further work is needed to develop guidelines for what constitutes a viable embryo in forage kochia, winterfat, and similar species.

could include:

1. Developing a uniform blowing procedure to remove light inert and shriveled seed. This would require a clarification of what is considered a seed unit. The accepted definition would have to exclude the light immature seed that would be blown out by this procedure. Because of the time savings when compared to a hand separation, this would allow the use of a much larger working sample reducing the probability of sampling error.

2. Develop protocols for determining the number of live-seed-per-bulk-lb to be reported in addition to results of purity and viability, providing a more accurate basis for valuing sagebrush seed lots. Pure-Live-Seed fractions can vary substantially depending on the condition and classification of immature seed during purity evaluation; these differences are minimized when live-seed-per-bulk-lb values are used.

The seed quality project of the Shrub Sciences Laboratory and the Great Basin Research Center, in harmony with AOSA policies, continue to seek answers to these problems and adoption of improvements in seed testing protocols as they are developed.