

Chemically Speaking

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Glyphosate Tolerant Wheat Detected in OR

The U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) announced in May that test results of plant samples from an Oregon farm indicate the presence of genetically engineered (GE) glyphosate-resistant wheat plants. Further testing by USDA laboratories indicates the presence of the same GE glyphosate-resistant wheat variety that Monsanto was authorized to field test in 16 states from 1998 to 2005. The APHIS launched a formal investigation after being notified by an Oregon State University scientist that initial tests of wheat samples from an Oregon farm indicated the possible presence of GE glyphosate-resistant wheat plants. There are no GE wheat varieties approved for sale or in commercial production in the United States or elsewhere at this time.

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The detection of this wheat variety does not pose a food safety concern. The Food and Drug Administration (FDA) completed a voluntary consultation on the safety of food and feed derived from this GE glyphosate-resistant wheat variety in 2004. For the consultation, the developer provided information to FDA to support the safety of this wheat variety. The FDA completed the voluntary consultation with no further questions concerning the safety of grain and forage derived from this wheat, meaning that this variety is as safe as non-GE wheat currently on the market.

“We are taking this situation very seriously and have launched a formal investigation,” said Michael Firko, Acting Deputy Administrator for APHIS’ Biotechnology Regulatory Services, “Our first priority is to as quickly as possible determine the circumstances and extent of the situation and how it happened. We are collaborating with state, industry, and trading partners on this situation and are committed to providing timely information about our findings. USDA will put all necessary resources towards this investigation.”

With wheat shipments being affected, as well as law suits filed, Monsanto will work with the USDA to get to the bottom of the reported genetically modified wheat detection. The Roundup Ready gene has confirmed food and feed safety in wheat more than a decade ago. The gene, which is widely used in multiple crops and by millions of farmers globally, has also been reviewed and approved by regulatory authorities in every country around the world to which crops containing that gene have been submitted for cultivation or import approval, including Japan, Korea and the EU.

Over the past decade, an annual average of 58 million acres of wheat have been planted in the United States. This is the first report of the

Roundup Ready trait being found out of place since Monsanto’s commercial wheat development program was discontinued nine years ago. The process for closing out the Roundup Ready wheat program was rigorous, well-documented and audited. Current findings are based solely on testing samples from a single 80-acre field, on one farm in Oregon, which overwintered from the previous growing season. As is the normal practice in this part of the country, wheat fields are left fallow following the previous harvest and sprayed with glyphosate to control weeds and to preserve soil moisture. The company noted that this report is unusual since the program was discontinued nine years ago, and this is the only report after more than 500 million acres of wheat have been grown. Accordingly, while USDA’s results are unexpected, there is considerable reason to believe that the presence of the Roundup Ready trait in wheat is very limited. (USDA and Monsanto statements, 5/29/13).

Pesticide Workers Healthier than Most

If chemical exposures are a significant cause of cancer, as some contend, there would be an expectation that individuals who apply pesticides for a living would have higher cancer rates. But a recent study conducted by the U.K.-based Health and Safety Laboratory indicates that’s not the case - at least not for pesticide workers. The study looked at mortality among 59,085 male and 3,875 female commercial pesticide applicators, and found 1,628 deaths within this group between the years of 1987-2005. They found no evidence that these workers suffered from any more cancer than the general

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population. Instead, they found less cancer. Here's the summary:

All cause[s of] mortality was substantially lower among the pesticide users than in the general population (standardized mortality ratio (SMR) 0.58, 95% CI 0.55-0.61), as was mortality for a number of the major disease groups:

All cancers combined (SMR 0.72, 95% CI 0.66-0.78),

Cancers of the lip, oral cavity and pharynx (SMR 0.18, 95% CI 0.07-0.48),

Cancers of the digestive organs (SMR 0.78, 95% CI 0.68-0.90),

Cancers of the respiratory system (SMR 0.55, 95% CI 0.46-0.65),

Non-malignant diseases of the nervous system and sense organs (SMR 0.39, 95% CI 0.27-0.57),

Non-malignant diseases of the circulatory system (SMR 0.58, 95% CI 0.52-0.63)

Non-malignant diseases of the respiratory system (SMR 0.39, 95% CI 0.31-0.49)

Non-malignant diseases of the digestive system (SMR 0.24, 95% CI 0.18-0.32)

Does this mean that working in the pesticide industry reduces your cancer risks? Not really, but it does raise questions about activist claims about cancer risks posed by pesticides, particularly when they suggest that consumers, who have much lower exposures than workers, face substantial risks.

The authors also do note that there "some evidence of excess deaths from multiple myeloma in men and women, and possibly also from testicular cancer." This is statement that media and activists might jump on while ignoring the key findings of this study. However, the authors explain that these involved "relatively small numbers of deaths" with "mostly wide confidence intervals and statistical non-significance," which means "these need to be

interpreted with caution." "With the limited data available, it was not possible to investigate whether these were linked with particular jobs, working practices or pesticides," the authors also noted. In other words, there's little evidence that pesticides are a significant cause of cancer even among some of the most exposed populations. (*OpenMarket*, 6/11/13).

Fungal Telephone Lines

Instances of plant communication through the air have been documented, in which chemicals emitted by a damaged plant can be picked up by a neighboring plant. But below ground, most land plants are connected by fungi called mycorrhizae. A new study demonstrates clearly that these fungi also aid in communication.

It joins an established body of literature which has suggested that the mycorrhizae can act as a kind of information network among plants. Researchers in the UK devised a clever experiment to isolate the effects of these thread-like networks. The team concerned themselves with aphids, which pierce the plants with tiny stylets. Many plants have a chemical armory that they deploy when aphids attack, with chemicals that both repel the aphids and attract parasitic wasps that are aphids' natural predators. The team grew sets of five broad bean plants, allowing three in each group to develop mycorrhizal networks, and preventing the networks' growth in the other two. To prevent any through-the-air chemical communication, the plants were covered with bags.

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As the researchers allowed single plants in the sets to be infested with aphids, they found that if the infested plant was connected to another by the mycorrhizae, the un-infested plant began to mount its chemical defense. Those unconnected by the networks appeared not to receive the signal of attack, and showed no chemical response. “Mycorrhizal fungi need to get [products of photosynthesis] from the plant, and they have to do something for the plant,” explained John Pickett of Rothamsted Research. “In the past, we thought of them making nutrients available from the [roots and soil], but now we see another evolutionary role for them in which they pay the plant back by transmitting the signal efficiently.”

Prof. Pickett expressed his ‘abject surprise that it was just so powerful - just such a fantastic signaling system.’ The finding could be put to use in many crops that suffer aphid damage, by arranging for a particular, "sacrificial" plant to be more susceptible to aphid infestation, so that when aphids threaten, the network can provide advance notice for the rest of the crop. (*BBC News*, 5/10/13).

Dirty Dozen Fizzling

This year’s release of the Dirty Dozen List produced by the Environmental Working Group (EWG) is beginning to shed its sizzle because of a full-court press by agricultural interests to focus on science-based information. Each year the EWG comes out with a list that ranks fruits and vegetables according to pesticide residue levels. For years the list has been a constant issue to agriculture because it gives the impression that conventional fruits and

vegetables contain unsafe pesticides and suggests consumers buy their produce from organic sources. These unfounded claims were usually reinforced by widespread media coverage each year. After the EWG list became the vehicle to dissuade consumers from buying any fruits and vegetables at all because they didn’t trust conventional produce and didn’t want to spend the extra money paying for higher priced organic foods, studies began to show that fewer fruits and veggies were being purchased by a growing number of the consuming public who had been influenced by the Dirty Dozen List.

In 2010, agriculture ramped up with an aggressive challenge and effectively countered EWG’s list. Spearheaded largely by the Alliance for Food and Farming based in Salinas, CA, the group sought the input of experts in the areas of toxicology, nutrition, risks analysis and farming and placed its findings on its website at safefruitsandveggies.com and held webinars. The experts, who saw the Dirty Dozen List as an unfair and misleading attack on healthy fruits and vegetables, spoke out by mentioning all the flaws contained in the annual report.

According to Matt McInerney, executive vice president of the Western Growers Association and AFF board chairman, 2013 actually witnessed a significant decline in media coverage across the country when the list came out earlier this year. “Our goal is to have facts, not fear, guide consumers’ shopping choices,” he reportedly told one media outlet. Both the USDA and the EPA have clearly stated that residues do not pose a health risk. It’s heartening to know that at last the media outlets are finally taking their word for it. (*Western Farm Press*, 5/9/13).

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Pesticide Registrations and Actions

Food Related Actions

- Based on a request by IR-4, the EPA has approved tolerances for the herbicide glyphosate (Roundup⁷). Tolerances of importance to the region include teff forage and hay as well as oilseed crops (group 20). (*Federal Register*, 5/1/13).
- Based on a request by IR-4, the EPA has approved tolerances for the plant growth regulator 1-naphthaleneacetic acid on multiple crops. Tolerances of importance to the region include avocado, mango, orange, potato, rambutan, mamey sapote, and tangerine. (*Federal Register*, 5/22/13).
- Based on a request by IR-4, the EPA has approved tolerances for the insecticide spirotetramat (Movento⁷). Tolerances of importance to the region include blueberry, citrus fruit, fruiting vegetable, bulb vegetable, and watercress. (*Federal Register*, 5/15/13).
- Based on a request by Dow AgroSciences, the EPA has approved tolerances for the insecticide sulfoxaflor (Closer⁷). Tolerances of importance to the region include snap bean, cauliflower, citrus, cotton, small climbing fruit, leafy greens leafy petioles, green and bulb onion, soybean, brassica/cucurbit/fruiting vegetable, root and tuber vegetable, leaves of root and tuber vegetables, legume vegetable, watercress, and wheat. (*Federal Register*, 5/17/13).
- Based on a request by Syngenta Crop Protection, the EPA has approved tolerances for the seed treatment fungicide sedaxane (Vibrance⁷). Tolerances of importance to the region include field/pop/sweet corn, pea and bean, sorghum, and foliage of legume vegetable except soybean. (*Federal Register*, 6/5/13).
- Based on a request by the Florida Dept. of Ag. and Consumer Service (FDACS), the EPA has approved a time limited tolerance for streptomycin use on grapefruit to combat citrus canker. The tolerance expires at the end of 2015. (*Federal Register*, 5/17/13).

Other Actions

- The EPA is announcing a new resource for the Section 18 Emergency Exemption Program under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Section 18 of FIFRA authorizes the EPA to allow an unregistered use of a pesticide for a limited time if it is determined that an emergency condition exists and risks from the proposed use are acceptable. The primary goal of this online resource is to assist state and federal agencies in determining situations where it is appropriate to request a section 18 emergency exemption and, when doing so, how to submit a complete and accurate application to facilitate a timely and effective review by the EPA. The multimedia resource focuses on the following four types of exemptions available under section 18 of FIFRA: specific,

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quarantine, public health and crisis. The training was developed through the Pesticide Regulatory Education Program cooperative agreement with the University of California-Davis Extension, with funding provided by the U.S. EPA. For more information on the new online tool, please contact Dea Zimmerman at zimmerman.dea@epa.gov. For information on section 18 exemptions, please contact Tawanda Maignan at maignan.tawanda@epa.gov. (EPA Release, 6/18/13).

Pesticide Potpourri

- In May, Syngenta announced the launch of Clariva™, a proprietary seed treatment nematicide based on the Pasteuria technology acquired in 2012. Clariva™ consists of naturally occurring soil bacteria with a unique, direct mode of action on nematodes. Syngenta Chief Operating Officer, John Atkin, said: “Soybean growers in particular have long been searching for additional tools to manage the widespread cyst nematode problem, which in the U.S.A. alone causes more than a billion dollars of annual yield losses. Clariva™ will take nematode control to a new level and reinforce our global leadership in seed treatment innovation.” Multi-year field trial data demonstrate that Clariva™ delivers immediate and long-lasting protection of plant root systems resulting in significant yield benefits. Clariva™ will be available in the U.S.A. for the 2014 growing season. It

will be combined with other leading Syngenta seed care compounds as a complete solution for soybeans. (Syngenta Press Release. 5/27/13).

- Dow AgroSciences announced in May that it has received registration from the U.S. EPA of its in-plant, three-gene insect protection trait in cotton. The next generation will be offered exclusively in germplasm developed by PhytoGen cottonseed. Dow AgroSciences is the first company to provide the three-gene trait - two Cry proteins and a vegetative insecticidal protein (Vip3A) from *Bacillus thuringiensis* (Bt) - for enhanced, in-plant protection in cotton against a wide spectrum of key lepidopteran cotton insects, including cotton bollworm, budworm, armyworm, loopers and others. With multiple modes of action, the three-gene package provides superior protection throughout the cotton plant from damaging worms, in addition to improved resistance management benefits. The technology will be named this summer and offer the insect protection technology exclusively in PhytoGen brand varieties starting in 2014 pending regulatory import approvals. PhytoGen’s current offering, WideStrike, is a two-gene, in-plant trait that provides broad spectrum, season-long control of lepidopteran insect pests, such as fall armyworms, loopers, cotton bollworm and budworm. (Dow AgroSciences Release, 5/24/13).
- A small, remote-controlled helicopter successfully applied a test spray to the University of California Oakville Experimental Vineyard, June 6, as part of a public demonstration. The concept is

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nothing new, having been used for 20 years in Japan to treat rice fields. The motorcycle-sized chopper is being tested in the United States to see if it's safer and more efficient than tractors to apply pesticides. UC Davis is one of the few universities in the nation with a Federal Aviation Administration permit to test unmanned aircraft. The testing at Oakville began in November 2012. The site was chosen because it's a working vineyard and meets FAA requirements for flight zones for remote-controlled aircraft. Experienced Yamaha flight instructors from Japan trained UC Davis researchers Ken Giles and Ryan Billing to fly the remote-controlled chopper, which is similar to smaller ones hobbyists fly. In Japan, about 2,500 of the RMAX helicopters are used to spray about 40 percent of the rice fields. Currently, the researchers are only applying water and are using water-sensitive paper to gauge application accuracy. The craft can carry up to 16 liters, or slightly more than 4 gallons, of liquid and the recommended spraying speed is about 15 MPH. Results of the study, expected later this summer, will help guide where and how the mini-choppers may be used in U.S. agriculture. (*The Grower*, 6/6/13).



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