**ADVISORY COMMITTEE ON BIOTECHNOLOGY AND**

**21ST CENTURY AGRICULTURE**

***Size and Scope of Risks Working Group Conference call—January 17, 2012***

*Conference Call Summary*

A two-hour conference call was held, with Working Group (WG) members Lynn Clarkson, Michael Funk, Latresia Wilson, Josette Lewis, Isaura Andaluz, Keith Coble, Adrianne Massey, Don Cameron, Douglas Gurian-Sherman, and Chet Boruff participating. Michael Schechtman, Executive Secretary, AC21, facilitated the conversation. Five AC21 members who were not members of the working group, Angela Olsen, David Johnson, and Jerry Slocum also listened in on the conversation, as did the AC21 Chair, Russell Redding. The goals of call were to: discuss the status of current information-gathering efforts on size and scope of risk as well as prospects for getting additional information; discuss available data as of the conference call in terms of factors such as reliability, confounding factors, and conclusions that can be reached so far; and assess progress of the WG’s efforts vis-à-vis the WG plan of work.

The WG first discussed the status of outreach efforts to obtain additional data on rejections based on GE presence. As agreed to at the previous WG meeting, one WG member had prepared, distributed for comment to WG members, and then sent out to 13 State Seed Improvement Associations letters requesting information on results of testing for GE content in seed samples. The information requested was to be treated in such a way that no confidential business information about individual companies would be disclosed. So far only three replies were received. All indicated that they had no information to provide. Another WG member indicated that she had been reaching out to local extension agencies but had no information as yet. One other member noted her outreach to the Biotechnology Industry Organization, whose technology provider members may also be seed companies, but who in any case license their technology to many other seed companies. She continued outreach to a representative of the American Seed Trade Association, who noted that their members generally do not collect data on the percentage GE content in non-GE seed. One other WG member noted outreach to the testing service for the Non-GMO Project and to project participants. A number of members in that project declined to provide information citing the need for confidentiality, and he is not optimistic that his efforts in this regard will yield meaningful information. He did note, however, that he had managed to obtain testing information regarding GE content from a Canadian canola company, and inquired whether WG members felt this information would be useful. Members of the WG felt this data, even if not U.S. data, would be helpful, since the general practices and conditions of commodity production in Canada are similar to those in the U.S. He offered to provide a document to the WG soon outlining GE testing results from the company in canola production and all through the relevant supply chain.

There was discussion of current GE standards that are being applied in the marketplace. One WG member noted that he had inquired of a leading non-GE seed company about the GE level at which non-GE seed is rejected and they indicated that shipments above 0.2% GE content are rejected. They did not provide information about how often such rejections occur. It was noted that companies are reluctant to divulge any data for fear it would alert “non-GE” customers to the presence of GE materials when they think they are getting zero GE content materials.

One WG member noted discussions at the last AC21 plenary session, in particular a study alluded to by Dr. Nicholas Kalaitzandonakes which is as yet unpublished and unavailable, and also data cited by a committee member from the Organic Trade Association (OTA). It was noted that the OTA data on GE content in organic seed and products was derived primarily from two companies. Some WG members expressed interest in following up with Dr. Kalaitzandonakes on his progress in writing up his study for publication, and Dr. Schechtman indicated that he would do so in a few weeks, waiting a little while to give time to Dr. Kalaitzandonakes to get some work done.

It was noted that the tightest non-zero non-GE standards are set at 0.1% content, and those standards are difficult to achieve, even with repeated testing. There was discussion of the source of unintended GE content in non-GE and organic commodities, and the multiple steps at which unintended GE presence can be introduced, including the seed source, grower mishandling, neighboring crops, harvesting procedures, downstream handling, etc. When there is unintended GE presence, it is generally difficult to figure out where it came from, and it is also difficult to track the presence of GE materials down the supply chain. Some unintended presence can occur from actions outside the control of the producer, some in his control. This fact can affect the potential triggering of a comp mechanism, which will need to distinguish between instances that were outside the control of the farmers and those that were a result of inadequate farmer management. Crop-specific pollen biology, growth habit, market sensitivities, and use pattern differences were noted, as were the complications posed by the use of rented harvest machinery. The need for having procedures that will apply beyond current GE crops was also stressed, and specific consideration of other crops coming into production now, such as GE alfalfa and sugarbeet, was also noted.

One member noted that two different types of standards for unintended GE content need to apply: the one discussed thus far, a market standard addressing consumer preferences and the other, a standard relating to those traits the presence of which can change the functional characteristics of the unmodified commodity. Management standards to keep out the latter type of trait would vary from trait to trait, but might need to be many-fold more rigorous. Another WG member, while agreeing with the general point, noted that the AC21 could not hope to develop those specialized standards, but could perhaps develop the logic for a narrative discussing how to address such crop-trait combinations.

There was discussion of the current situation with respect to the source of unintended GE presence. WG members agreed that pollen drift was not a significant source of unintended GE presence in soybean, but there were differences of opinion as to its relative significance as a factor in corn production versus problems with GE content in the starting seed. The problems of producing open-pollinated heirloom corn varieties were noted, including the need for 2-5 mile isolation distances.

The lack of availability of suitable non-GE seed was discussed, and members noted that when non-GE or organic farmers complain about this lack, they generally mean the lack of a particular hybrid variety they would like to use, not a lack of non-GE seed in general. For organic farmers in particular, sometimes there are additional considerations that make variety selection more important for the success of the resulting crop. Members agreed that seed companies typically need to make business decisions that result in more widely applicable products, and because of development costs it is much harder for small markets to get market-specific products. Some members noted the transition that has occurred in seed variety development from the public to the private sector, and noted that there is a continuing need for public sector involvement to fill some of these needs. However, today even some land grant institutions are increasing commercial interest in varieties that they have developed.

The WG then turned to an analysis developed by one WG member, Lynn Clarkson, on the scope and market scale of GE adventitious presence in corn and soy (summarized in Appendix I, attached, with the calculations as an accompanying Excel document). He indicated that the analysis started with general data from USDA and noted that his calculations may overstate the level of problem somewhat because not all non-GE crops are raised for non-GE markets. He noted that he had run his and assumptions calculations by Dr. Catherine Greene, Economic Research Service, for her informal comments. In general, he noted that less unintended GE presence was seen than he had expected. A few notable findings included:

* A 0.25% rejection rate for non-GE soy shipments with 0.9% GE as the threshold for rejection.
* A rejection rate of about 1 load in 50 for non-GE corn at the same market threshold as for soy.
* Current premiums paid for non-GE soy generally stable, but have recently risen a bit, to about $1.95/bu.
* Current premiums for non-GE corn varied last year from 25cents to 80 cents, and this year averaging 60 cents.
* Premiums paid for organic corn and soy are significant, and contracts may now have “non-GMO” clauses. For organic soy, the current price is about $18/bu versus $11.20-11.50 “for regular” GE soy.
* For organic corn, the typical price is currently $12.00-$12.50/bu, versus $6.00 for “conventional” GE corn.
* There is significant demand for organic corn and soy. When an organic shipment is rejected in one market because of GE content, it may sometimes be possible to find a new market for it, but the new market may be so far away that the premium is lost.
* Losses calculated based on loss of premiums from shipments rejected after testing were compared with losses in value as calculated for the premiums lost by having to plant an adequate number of buffer rows in order to achieve the desired level of purity. The two calculations yielded similar numbers for corn, but a significant disparity for soy (suggesting that buffers for non-GE soy could be shrunk without affecting product quality).
* Total unintended GE presence-related losses for all corn and soy per year are less than $40 million.
* For organic soy, the relative rejection rate is the same as that for non-GE soy. For organic corn, the rejection rate is much higher than for non-GE corn, about 11.5% of shipments. This suggests that pollen drift is a significant factor, because organic farms tend to be smaller, and pollen effects are greater around the edges of fields (and are hence more pronounced on small fields).
* Overall costs for routine GE testing of non-GE and organic shipments exceed losses by a factor of 2 to 2.5-fold.

Mr. Clarkson also clarified some of the assumptions he made for his calculations and some weaknesses in the data, including:

* He assumed that organic productivity per acre is about 82% of that for conventional production (there are varying studies on the relative productivity of organic versus other production methods).
* Data on productivity of organic productions is not as up-to-date as data on non-GE and conventional production.
* The data on organic shipment rejections comes from the Organic Trade Association and is based on data from his company and one other.
* In figuring our needed buffer sizes, he assumed that GE crops would be present on 2 of the 4 sides of a non-GE or organic field.
* He used EU data on buffer sizes needed to attain specified levels of purity in order to figure out buffer related losses.

The impacts of even stricter commercial standards on U.S. corn market opportunities, such as the British standard of 0.1% GE, were discussed. It is possible to supply corn at the 0.1%, commercial threshold, but if a shipment is rejected, a load would need to be dumped because of demurrage costs. (Supplying such sensitive markets often requires suppliers to “cherry-pick” their farmers for inclusion in such shipments.) Under such circumstances it is necessary to sell to the first market that will take it—typically at a loss of 30-40% of landed value. Farmer don’t see such losses directly. The typical course of contract development may involve a buyer requesting a very low GE concentration in a non-GE or organic shipment, and often there are conversations between buyer and seller about what is a reasonable level of purity to be provided. It was noted that some other countries, such as Japan, have higher official thresholds (in Japan’s case, it is 5%), but even in those places, the market standards are much tighter (usually 0.9% GE content).

Some members requested that Laura Batcha, AC21 member from the Organic Trade Association, be queried for further details on the data that they had provided than Mr. Clarkson had used, and about the availability of any additional data. Dr. Schechtman agreed to make such inquiries.

Members noted that at this point, there may be only limited additional data that may become available—perhaps only the additional canola data from Canada. That might mean that only one more conversation about new data would be required, followed by conversations about conclusions and summaries. The possibility of additional useful data from Dr. Kalaitzandonakes, however, was noted. It was noted that while losses are currently small, the increased use of GE crops with altered function traits could result in very much larger losses.

All members complimented Mr. Clarkson on having done a great job with his analyses.

The next meeting of the WG is scheduled for February 14, 2012 from 10 am- noon, Eastern Standard time.

**APPENDIX I: From Lynn Clarkson**

Scope and market scale of adventitious presence of GMOs in corn and soy

Monday, January 09, 2012

10:25 PM

**Situation:** Markets for farm crops display varying degrees of sensitivity to biotech events. Today's "conventional" markets typically accept biotech events as long as they do not affect functional properties. Organic and non-GMO markets generally refuse to accept biotech events and set thresholds for GMO acceptance, rejecting deliveries that exceed those threshold levels. Such markets typically reject deliveries of grains and oilseeds carrying more than 0.9% adventitious presence. A recent approval of a biotech amylase corn greatly complicates corn markets because its adventitious presence can change the functional properties of other corns at levels as low as 0.01%, one part in 10,000, a threshold 100 times smaller than that being accepted by cultural filters. AC21's working group on scope and scale is charged with investigating the degree to which adventitious presence of biotech events has damaged or may damage farmers wanting to serve markets with thresholds for adventitious presence.

**Questions:**

* Are farmers being damaged by the adventitious presence of biotech events?
* If so, how and to what extent have they been damaged?
* What damage might be expected from functional properties created through bioengineering?

**Summary answer:**

* Some farmers are being damaged because their deliveries are rejected by buyers due to adventitious presence of GMOs exceeding reasonable contract expectations - generally 0.9%. Rejection means the loss of the premium. Such premiums generally combine one factor designed to cover the extra care required to deliver an identity preserved product with another factor designed to cover any yield drag expected from the selected variety. The overall loss in premium in cases of rejection can be significant.
* For 2011, the annual losses to farmers in the US due to market rejection caused by adventitious presence likely amounted to less than $40,000,000.
* The cost of "strip testing" crops for compliance with buyers' GMO tolerance limits at the first point of sale easily exceed the actual losses to the farmer.
* The advent of functional properties which can be transferred via adventitious presence at levels much lower than the 0.9% is so new that we do not yet have any history on which we can measure losses. If not very well managed, such introductions can cause damages far exceeding anything we have experienced to date. Moreover, the damages would not be limited to farmers producing under contract for IP markets. They would extend to farmers raising commodity grains for established markets such as those represented by the North American Millers Association and the US Export Grains Council.

**Specific issues:** What are the losses from adventitious presence? What are the premiums that are being lost? What is the standard for market rejection? How many acres and bushels are at risk? Where can we find relevant information?

**Perspective:**

* Very little data on losses due to adventitious presence have been developed by either government or academic researchers. Most available knowledge belongs to commercial grain traders and testing laboratories serving IP markets. Many of these are reluctant to share relevant information for fear of market repercussions and potential violation of client confidentiality.
* My practical experience with AP is limited to supply chains for corn and soy. My company has served IP markets sensitive to adventitious presence of biotech events since such events were first introduced to US farmers. This includes markets paying premiums for conventionally produced non-GMO as well as certified organic grains and oilseeds. In supplying corns and soybeans to IP clients, we respect various tolerances for adventitious presence (AP). Every load received under such IP supply programs is checked for biotech traits using modern strip test kits. The most common threshold for rejection is 0.9% GMO. Composite samples are taken to laboratories for PCR testing as required to satisfy client inspection protocols. My company also operates a barge station which has for years loaded non-GMO corn and soy for shipment to Japanese markets sensitive to AP. Although such grain may not be handled for our account, we are very aware of rejections.
* At least one other grain company has cooperated in sharing its relevant testing data for corn and soybeans going back several years. It also serves both non-GMO and organic markets, runs a rigorous inspection program and rejects deliveries exceeding client thresholds.

**Approach in calculating damages - steps**

1. Determine the acres and bushels at risk of losing a premium. Use published USDA data to establish:
   * Acres of non-GMO corn and soybeans
   * Acres of certified organic corn and soybeans
   * Average yield of conventional corn and soybeans
   * Average yield of certified organic corn and soybeans
2. Determine a threshold level to use in rejections
   * Based on most common commercial standard in personal experience
   * Based on published review of various national standards
3. Determine premiums being paid and lost to the farmer when deliveries are rejected due to AP.
   * Based on personal knowledge of competitive programs across the US Midwest
   * Based on discussions with other companies offering IP programs
4. Calculate potential farmer losses based on two approaches
   * Rejection rates based on all available commercial data
   * Loss of premiums on acres needed to provide sufficient spatial segregation to avoid rejection
     1. From personal experience
     2. From seed company standards requested for varietal purity
     3. From EU studies on spatial segregation needed to meet various threshold levels of AP in corn production
5. Estimate cost of one time testing being used to screen farm deliveries for AP
6. Provide perspective as to damage by estimating
   * Cost per bushel spread over all production acres of subject crop
   * Cost per bushel spread over just the potential IP acres
   * Cost per acre spread over all production acres of the subject crop
   * Cost per acre spread over just the potential IP acres

Notes

1. USDA data: I have used USDA data for total acres of non-GMO corn and soybeans as well as USDA data for overall yields. Using gross acres may overstate the damages because not all non-GMO acres are intended for premium non-GMO markets. Some farmers prefer to raise non-GMO seed because they regard it as a better value than GMO seeds. Using the USDA yield may understate the damages if premium markets seek varieties/hybrids that yield less than average. From my experience, most IP programs seek specific varieties/hybrids that yield with or better than the average.
2. Lack of current organic data from UDA: I have used USDA data for 2011 to establish acres and yield for "conventional" non-GMO production. Unfortunately, the most recent USDA acreage data for organic corn and soybeans is form 2008.
3. Published report on market rejections due to adventitious presence: I have attached page 25 of the recently published OTA GMO White Paper. Although reported levels of rejection correspond well to my commercial experience, I used rejection levels slightly different than those indicated in the white paper. That is because commercials tend to reject anything that exceeds 0.9%, not the 0.99% indicated in the white paper. See <http://www.ota.com/pics/documents/OTA-GMO-White-Paper.pdf>.
4. High level of adventitious presence in organic corn: Why would levels of adventitious presence be higher in organic corn than conventional non-GMO corn? Probably because organic fields tend to be smaller than conventional fields. The smaller fields suffer greater percentage exposure to wind drift.
5. Buffer distances to meet threshold levels for adventitious presence: I have attached a page from the recent presentation to AC21 by Dr. Nicholas Kalaitzandonakes. It presents the results of an EU study with recommended spatial separations required to meet various thresholds for adventitious presence. Best management practices to meet a 0.9% threshold range from 15 to 50 meters. That is reasonably easy to do. To meet a 0.1% threshold, best management practices suggest an isolation distance ranging from 105 to 500 meters. That is difficult to do. To distance needed to meet a level of 0.01%, the threshold for functional change for amylase corn, was not studied. It could be so high as to be economically impossible.