



# The Value of Neonicotinoids in North American Agriculture:

A Summary of Grower and Agri-Professional Perspectives  
From Regional Listening Sessions in the  
United States and Canada



This report series, researched and produced by AgInfomatics, LLC, is a comprehensive analysis of the economic and societal benefits of nitroguanidine neonicotinoid insecticides in North America. The research was sponsored by Bayer CropScience, Syngenta and Valent in support of regulatory review processes in the United States and Canada, with Mitsui providing additional support for the turf and ornamental studies.

AgInfomatics, an agricultural consulting firm established in 1995 by professors from the University of Wisconsin-Madison and Washington State University, conducted independent analyses exploring the answer to the question: *What would happen if neonicotinoids were no longer available?* Comparing that answer to current product use revealed the value of neonicotinoids.

Robust quantitative and qualitative study methods included econometrics modeling of insecticide use, crop yield data and market impacts; surveys of growers, professional applicators and consumers; regional listening panel sessions; and in-depth case studies.

Active ingredients in the study included clothianidin, dinotefuran, imidacloprid and thiamethoxam.

### **The Value of Neonicotinoids in North American Agriculture**

Reports include:

Estimated Impact of Neonicotinoid Insecticides on Pest Management Practices and Costs for U.S. Corn, Soybean, Wheat, Cotton and Sorghum Farmers

Methods and Assumptions for Estimating the Impact of Neonicotinoid Insecticides on Pest Management Practices and Costs for U.S. Corn, Soybean, Wheat, Cotton and Sorghum Farmers

Value of Insect Pest Management to U.S. and Canadian Corn, Soybean and Canola Farmers

A Meta-Analysis Approach to Estimating the Yield Effects of Neonicotinoids

An Economic Assessment of the Benefits of Nitroguanidine Neonicotinoid Insecticides in U.S. Crops

A Summary of Grower and Agri-Professional Perspectives From Regional Listening Sessions in the United States and Canada

A Case Study of Neonicotinoid Use in Florida Citrus

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Executive Summary

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A Case Study of Neonicotinoid Use for Controlling Silverleaf Whitefly in Ornamentals

Executive Summary

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## Executive Summary

In November 2013 through March 2014, AgInforomatics convened a series of facilitated regional panel meetings throughout the United States and Canada to better understand the perspectives of growers and agricultural advisers about their dependence on neonicotinoids in a range of cropping systems. The sessions focused on how these insecticides were used in current cropping systems and the implications if neonicotinoids were restricted or banned. Information from the grower/adviser panels is intended to augment and complement the data on economic and nonpecuniary benefits identified through other parts of the project.

This report includes statements and conclusions of individuals from the grower/adviser panels that do not necessarily reflect the opinions of the investigators. The investigators have attempted to accurately report and summarize the comments to reflect the individual opinions of the participants.

The main themes from the panel meetings were:

- Growers and advisers on the panels highly valued the systemic protections provided by neonicotinoids. They especially appreciated the precision and effectiveness of neonicotinoid applications as well as their relative ease of use and safety to people, animals and beneficial insects.
- If neonicotinoids were not available, all panel members were concerned about higher operating costs associated with more frequent chemical application, more time required for spraying, and the perceived risks associated with alternative pest controls and if alternative controls were currently available.
- Most panel members stated that loss of neonicotinoids would result in decreased yields and reduced product quality. In some cases, these factors could lead to lost contracts from purchasers.
- There was a very high level of concern that regulatory or political action limiting the use or availability of neonicotinoids would result in less effective pest control and a return of pests growers thought were gone or controlled. They felt that alternative insecticides would kill the beneficial insects they count on as part of their integrated pest management (IPM) programs; and pests, such as whitefly, mealybug, glassy winged sharpshooter and Asian citrus psyllid would have no effective controls or predators.
- Panel members at all meetings pointed out that neonicotinoids are critical components of mode-of-action rotation that limits or slows the build-up of resistance in pest populations. Loss of access to neonicotinoids would reduce the available modes of action, potentially accelerating pest resistance to those insecticides.
- Panel members were concerned that losing neonicotinoids would require them to use alternative chemistries that they thought were more toxic and riskier. There were multiple mentions that returning to dependence on older chemistries would increase risk of negative environmental impacts, with water quality a particular concern.

- Panel members were concerned that more applications of older chemistries would create additional safety concerns and personal exposure risks to their workers, their families and themselves.
- For some specific crops, including citrus, grapes, tomato, cotton, rice, canola, corn and soybean, panel members were concerned that a loss of neonicotinoids would either force production costs excessively high or eliminate the only tools available for controlling specific pests (e.g., Asian citrus psyllid on immature citrus trees). The negative impact would extend to loss of rural community infrastructure associated with production inputs and outputs (e.g., citrus processing plants, cotton gins, rice mills), and these losses, in turn, would have significant negative impacts on rural communities. While a grower may find alternative crops, the local economic impact of those alternatives might not match the economic benefits associated with the current crop production systems.
- Panelists raised the possibility that a loss of neonicotinoids could pose a threat to both domestic food security and family or individual food security and affordability.
- Panelists expressed frustration that emotion rather than science is dominating the discussion about pollinators and neonicotinoids. Panelists were aware of a complex array of factors associated with pollinator health issues, and they noted that neonicotinoids are only one of numerous possible contributing factors. Growers at multiple meetings described their positive working relationships with local beekeepers based on open communication. Panelists also highlighted a significant diversity in the beekeeper community and suggested that complaints appear to be emerging from what was described as “rogue” beekeepers – operators from outside the area who park hives without any communication, attempt to coordinate or consideration of nearby agricultural activities.







## 1.0 Background

*The Value of Neonicotinoids in North American Agriculture: A Summary of Grower and Agri-Professional Perspectives From Regional Listening Sessions* was prepared by Dr. Bret Shaw, consultant for AgInforomatics and associate professor at the University of Wisconsin-Madison and environmental communication specialist for the University of Wisconsin-Extension, and Dr. Ken Genskow, consultant for AgInforomatics and associate professor at the University of Wisconsin-Madison and environmental planning and policy specialist for the University of Wisconsin-Extension. Drs. Genskow and Shaw attended but did not actively participate in the meetings. They were responsible for synthesizing themes identified from listening to discussions at the sessions and from reviewing the formal transcriptions of the panel meetings. The grower/adviser panels were moderated/facilitated by Dr. Fran Pierce, (consultant for AgInforomatics), professor emeritus and former director of the Center for Precision Agricultural Systems at Washington State University, and Dr. Peter Nowak, principal of AgInforomatics and professor emeritus of environmental studies at the University of Wisconsin-Madison.

This report summarizes important themes and insights that emerged from a series of regional panel meetings throughout the United States and Canada. The panels were convened to better understand the perspectives of growers and agricultural advisers about the role of neonicotinoids within their operations and regions, and what impacts they would foresee should, hypothetically, neonicotinoids no longer be available. Information from the grower/adviser panels is intended to augment and complement the data on economic and nonpecuniary benefits identified through other parts of the project.

Please note that this report includes statements and conclusions of individuals from the grower/adviser panels that do not necessarily reflect the opinions of the investigators. The investigators have attempted to accurately report and summarize the comments to reflect the individual opinions of the participants.

Panel participants were identified using producer association, agri-business and local government contacts who identified commercial growers, agricultural professionals, grower associations, local supply dealers and Extension agents associated with the crops being studied. In order to obtain open and independent perspectives, referrals were obtained through local contacts, and efforts were made to avoid direct contact between sponsoring company employees and potential participants. AgInforomatics staff made all contacts with potential participants regarding participation and compensation. Participants were not selected or excluded based on their use of neonicotinoids; in fact, several participants were responsible for organic farming within their overall operation.

These growers were asked to participate on a panel discussing the use of neonicotinoids in their operations or businesses. The panels were designed to identify key concerns and issues by those knowledgeable of the management aspects of crop production systems currently using neonicotinoids, insect and disease pressures associated with those systems, and existing alternative control options. The sessions were moderated to ensure full



**Table 1.** Crops and locations of grower panels.

| Crops  | Location        | Date           | Number of Growers, Consultants |
|--|-----------------|----------------|--------------------------------|
| All crops listed below (from across North America) | Chicago, IL     | Nov. 22, 2013  | 14                             |
| Citrus, Fresh Tomato                               | Lake Alfred, FL | Jan. 23, 2014  | 9                              |
| Cotton, Rice                                       | Memphis, TN     | Jan. 27, 2014  | 8                              |
| Tree Fruit, Potatoes, Vegetables, Grapes           | Prosser, WA     | Jan. 30, 2014  | 7                              |
| Citrus, Vegetables, Grapes                         | San Diego, CA   | Feb. 7, 2014   | 12                             |
| Canola   | Regina, SK      | Feb. 13, 2014  | 11                             |
| Corn, Soybean                                      | Davenport, IA   | Feb. 17, 2014  | 8                              |
| Corn, Soybean, Dry Beans, Wheat, Peas              | London, ON      | March 20, 2014 | 9                              |

participation from all panel members on the key questions, while allowing for discussion and interaction. Each session lasted approximately four hours and was recorded and transcribed for analysis. Panelists were assured that their identity would not be disclosed in any reports and received a stipend of \$500 (\$U.S.) plus travel costs for their time and effort. An exception was the California meeting where they received \$750 plus travel costs.

Each panel began with an explanation of the purpose, the role of AgInfor-matics, and how the information developed during the panel would be used. It was explained that three different types of reports from the ben-efits study would be developed: (1) a report to the registrants sponsoring the study who would use this information in working with regulatory agen-cies, (2) scientific reports to be submitted to peer-reviewed journals, and (3) material to be used by communications professionals within the compa-nies sponsoring the study.

Panelists were asked to describe how they currently used neonicotinoids in their cropping systems and how their operations would change if these insecticides were no longer available. Each panel discussion began by growers and advisers identifying the main pests they had to manage in the crops under consideration. This was followed by a semi-structured set of open-ended questions and discussion focused on the following topics: *How are you using neonicotinoids, what would you do without them, what would the costs and impacts be if they were not available, what other unintended con-sequences may occur if they were not available, and what are important mes-sages you would want to communicate to others not familiar with the issue?*

The following section expands upon and describes those themes that emerged from the regional grower/adviser meetings. An appendix to the section includes quotations from growers in response to the final question posed to each panel regarding the most important messages about the potential impact if neonicotinoids were no longer available.





## 2.0 Themes

Agricultural growers and advisers on all panels stated strongly that they relied heavily on neonicotinoids for producing their crops and that losing neonicotinoids would cause substantial operational changes for many cropping systems. Panelists discussed using neonicotinoids as seed treatments, soil-drench applications and foliar applications, and viewed them as essential components of comprehensive integrated pest management (IPM) strategies. They consistently highlighted the value of systemic protections provided by neonicotinoids and especially appreciated the precision and effectiveness of neonicotinoid applications as well as their relative ease of use and safety to people, animals and beneficial insects.

Panelists reported that losing access to neonicotinoids would lead to higher costs, reductions in the quality of food and fiber they produce, limitations on their ability to practice IPM, increased risk to the environment, increased risk to family and worker health and safety, and in some areas, the potential viability of crops significant to local and regional economies. They also believed that limiting the use or availability of neonicotinoids would increase resistance of pests to other chemistries and, therefore, reduce the effectiveness of other insect controls at their disposal. They also pointed out that the alternatives to neonicotinoids would be more detrimental to pollinators and other beneficial insects. Operational changes identified by panelists differed by crop and are described within each theme below and in the closing comments found in 4.0 Appendix.

### 2.1 Higher costs for growers

Growers stated that the loss of neonicotinoids would increase their costs in three primary ways: direct costs for purchase of materials and services, time for additional management and scouting needs, and increased risk and decreased “insurance” of current insect control. Each is addressed below. Yield loss, potential loss of contracts and markets due to quality, and other concerns were also mentioned as cost increases, but are described separately in other themes.

#### 2.1.1 Direct costs

**Seeds.** Growers would need to purchase additional seeds to account for pest loss prior to emergence, less healthy emergence of young plants, and subsequent loss of yield. As one grower noted, by having neonicotinoids, *“We’ve lowered our seed cost, not a hundred percent, but we’ve got a lot better germination, a lot better vigor than we had in the past, so we’ve been able to lower our seed populations. So if we’re going to have to give some of those seeds to the insects ... which is going to increase seed costs per year.”*

**Equipment.** More and different types of equipment would be needed for alternative chemical applications. The time needed for using the equipment will also change purchasing needs and schedules. One grower noted, *“We share a sprayer with another farm operation. It won’t work. We’ll each have to have our own.”* Another grower, talking about increased wear and tear, made this statement: *“Each of us, when we buy a piece of equipment, has sort of a lifespan to that piece of equipment in mind when we buy ... And the more hours you operate it per year, the quicker it reaches that lifespan. So*





*it would have to be a turnover cost, a replacement cost, you'll have to incur that more often."*

**Fuel costs.** More frequent applications require additional trips across fields with agricultural equipment and for pest scouting.

**Scouting costs.** Additional consultant scouting would be needed due to less effective controls. As one canola grower phrased the issue, *"With my agrologist, we don't scout every acre. If we don't have the seed treatment, we're going to have to start scouting every acre ... we have crop consultants, their charge is \$5.25 an acre. Pretty simple math to figure that one out."* The grower noted that scenario assumes qualified scouts are even available when needed, which may not be the case if demand for their services increased. Similarly, a grower in Ontario said: *"Let's not discount our labor costs, the service calls, going to the field, hand-wringing, worrying ... it all takes time ... you're going to do a lot of assessments practicing IPM and trying to figure out thresholds for the course of action. All that stuff is time and money."*

**Product/chemical costs.** Although the unit prices of alternatives to neonicotinoids may be less expensive, growers identified the need to purchase more volume of chemical product due to greater frequency of application. From one panelist: *"You know what you're going to do – say a couple of pyrethroid shots together. Everything you're going to kind of do - you're looking at either say \$25, \$30 an acre per shot ... you're looking at another five or six applications to do what that one shot of imidacloprid did."* Similarly, from a lettuce grower: *"To give you an idea, before we had Admire® [neonicotinoid product], we could spray fall lettuce 15 to 20 times in a 65-day period, and that was usually all of the materials that we had at our disposal, and now we're lacking a lot of it and that's where the Admire® basically took that out. It knocked that down to 10 to 12 sprays once the Admire® came in; and now with the new chemistry for the worms, we're down to four to five sprays, so you got a major difference."*

This concern was shared across crops. Sharing his rationale for using neonicotinoids despite having higher-per-volume costs than some alternatives, one cotton and rice grower stated: *"I know that there's research going on at Mississippi State ... where they have basically looked at this, because the neonics are more expensive than the other things we're using for plant bug control. But they've done this research where they take the neonics out, and it looks like the results are going to show that it's increased crop damage, more sprays and increased costs because of the frequency of ... pyrethroids and organophosphates that have to be sprayed."*

Grower/adviser panelists were also forthcoming about the practicalities of these potential changes. In regards to balancing costs between chemicals and scouting in areas with known historical pest populations, a grower at the Regina meeting stated: *"With our system, either guys are going to pay for scouting if they have an agrologist on the farm, or what the reality becomes on large farms is, we're going over those fields anyway. We're likely to put it in the tank mix on that first herbicide application, so we get a lot of over-spraying ... Five dollars sounds pretty cheap for scouting to be honest. I hear some consultants are up towards \$10 an acre, depending on what your services are. You're just going to put in that \$4 [per acre] product and go."*



Along those lines, an agricultural adviser from Regina commented that practical considerations would almost require increased use of alternative broad-spectrum chemistries, which also have negative environmental consequences and kill beneficial insects. *"Costs would be just \$18 an acre. Any time that sprayer hits the field, a jug of Decis® or Matador® is being thrown in. The cost of your time and the cost of the machine going over the field is more than the cost of the chemical ... you can't go out there and spray for a fungicide for Fusarium and then go out and spray a few days later for midge ... it's a huge cost to the environment. [If] you want to see a reduction in bee populations, just ban neonicotinoids because every field is just going to get sprayed. And there is no selection. Everything with wings is just going to come crashing down or crawls or whatever. The environmental impact is going to take a huge hit."* A number of panelists also pointed out that balancing crop production aims with environmental concerns would become much more difficult without neonicotinoids.

**Worker training costs.** Working with higher toxicity levels of alternative chemistries combined with more foliar and aerial application methods, there would be increased costs associated with the purchase of personal protective equipment and also worker training costs for proper use and safety.

As one Ontario farmer commented: *"The health and safety worker rules are quite rigid. Lots of fines, lots of training, lots of costs involved with it ... you're looking at about \$1,500 to \$2,000 per employee to keep their training up roughly every year, by the time you replace safety equipment and do the training. And you've got to bring them in on regular meetings, which means they're not on the job doing their tasks."*

### 2.1.2 Time

**Management time.** Growers/advisers identified the need for additional time using equipment, changing, setting up and cleaning equipment; time scouting for pest damage; reporting/documenting each pesticide application; and more. For some, the cumulative time demands would limit their ability to plant their current acreage. As one panelist stated, regarding the time involved in changing equipment if neonicotinoid seed treatments were no longer available: *"I just want you to be aware that it's not just the simple dollars and cents of it that should be quantified. There's the idea that if I go from 3-bushel to 1.6-bushel hopper, that's a 46 percent decrease in efficiency that I've got to make up somewhere else. There's still only 24 hours in the day, and sometimes that's what we're doing. But if we want to have the production that we're used to, there's nowhere we can pull the hours out of the day to compensate. That's just a physical, simple reality. It's an extremely competitive market."*

Other panelists raised similar points. From a canola grower: *"If neonics go and there's no option, I would probably cut back my acres of canola just because I know we wouldn't get to it because we're fairly spread out, and if I'm going to run the risk of losing this canola because I can't get to it, because I know that's going to happen. We have one sprayer and one guy doing it. If we risk losing it, then I would have to probably cut back my acres and go to something because we need a balanced approach. Bugs are every month, every time of the season and you can't get them all of the time. So something's got to be in our favor ... "* Also, from another Canadian grower considering implications of replacing a neonicotinoid seed treatment with non-neonicotinoid





spray applications: "We could freeze anytime after the middle of August. So if your crop isn't in by the middle of June, you're susceptible to the fall frost, which produces basically nothing at the end of that ... We seed from the middle of April to the middle of June. That's our season. And we have maybe 100 acres per foot of drill. That's where we're running at. Some guys are pushing more than that on efficiencies, so we have the seeders going. We have burn-off operations going with the sprayer. If we have to come back with that sprayer and pull it out of the burn off to get bugs, we don't have the time to do it. Or you're hiring somebody to do it."

**Reaction time.** Neonicotinoids also provided growers extra "reaction time" for responding to insect pests. Cotton, canola, corn and soybean growers stated that systemic insect control from seed treatments provides confidence that planted seeds are protected through emergence, giving the grower time to focus on other issues. Panelists noted that those protections would be lost without seed treatments, as they felt in-furrow insecticide applications do not provide the same level of pre- and post-emergence protection. As one grower put it, "Neonicotinoids isn't maybe the magic bullet, but it buys me time, so I can get to those fields; and sometimes the flea beetle pressure is high enough that we've got to go out and spray, but, like I said, it just extends that because it's such a tight window because in all reality, you've just got two weeks to get a crop on and off."

Another talked about reaction time by stating, "It's all well and good to say that the crop scout costs \$5 per acre and then after you seed your crop, the crop scout shows up on the day that you want him, that the weather is good and that he can see exactly what he needs to see and that you're not losing a population already before he gets there, and that's not what happens. So you have to be aware that when that plant comes out of the ground, if there's a high population of flea beetles that the plant is already suffering from the effects of the insects, then you have to get it sprayed and you have to get it sprayed on a day that's not windy. So there's several days wait off, and especially if you have any amount of acres, before you can get it sprayed. So you may lose a crop before you can even get a chance to spray it. So it's not just a matter of what you can do, but it's a matter of living in the real world. When you seed with a seed treatment, that seed is treated from the moment that you get it into the ground."

As one of the growers in Prosser summarized the issue, "It would be a mad scramble. Things would change, and it would be difficult."

### 2.1.3 Increased risk

Growers and advisers on the panels identified two themes associated with increased risks. The first relates to the sense of "insurance" that neonicotinoids will protect the crop from insects. The second has to do with a loss of confidence in yield and product quality without neonicotinoids. Several panelists raised these issues for multiple crops.

For example, with canola, "The plant's more likely to be healthy when it comes out, and then you don't have two weeks when you're wondering if the flea beetles take half of it. And then you're trying to hope that it comes back, so there's a whole bunch of things that allow you to have more consistent emergence, a more vigorous crop, and then something that isn't completely beaten down by some insect and has to recover."





*"I think if you had decreased yields, you might start off making \$75 or \$50 an acre instead of \$100 or \$125, and you'd be soon losing money. It would fluctuate that much because margins are so much slimmer. I've already grown more acres to compensate. It doesn't work."*

Also from California specialty crops: *"I don't know the impact on our industry ... right now down there on the stuff that I advise on, it's a blanket application. It's cheap; it's probably the best insurance that we have. There are cauliflower and broccoli fields out there that don't even get sprayed for the season because the Imidacloprid is picking up the aphid on it ... Whitefly and aphid are the big pests we're using it for."*

Justifying the relatively low cost and effectiveness of neonicotinoids as insurance, a Canadian grower commented, *"So I 150 percent agree with [other participant] that it's an insurance policy at that point in time. You could scout your field and that type of thing, but you're paying extra for that and so on. For the extra few dollars an acre to put the neonics, you're saving there, and it's the insurance policy."*

Similarly, from Florida, *"It might be a wash in cost on product, but the consequence of efficacy is very difficult to determine and probably the greatest fear – we are willing to spend \$100, \$200, \$500 an acre if we get control of a product because it'll cost us in the end thousands of dollars an acre if we fail to succeed. So it's the unknown expense that probably is a greater fear than the known expense. But we'll do what we have to do but it'll raise the bottom line. It'll raise my production costs \$100 or \$200 an acre in just pesticide management, I'm sure."*


Noting the differences across fields in crop emergence, a grower from Regina made this comment: *"The cost of the chemical, the cost of the sprayer, isn't half of it yet because of the cost of the risk that you're entailing then. You're going to either do it twice instead, or you're going to just do it. But you're going to have losses likely because with my fields, particularly the type of soil that it is, the plants come up a little bit variable, so they're vulnerable different days. I'm not sure how long the type of insecticides that you spray last. If there's not much growth there yet but there's some, that part of the field's not up yet so two days later you got to go – so it just creates a whole blanket of issues and so logistics, I take reasonable pride, if you will, in the fact that I can manage the acres I have. They aren't as spread out as some, but the amount of labor and logistics to get around ... with risk management it becomes a decision of how many acres of that crop to grow."*

## 2.2 Loss of food and fiber quality and quantity

### 2.2.1 Losing neonicotinoids would decrease yield

Beyond increases in their direct costs, meeting participants also expected that a loss of neonicotinoids would cause a decline in their yields. This would affect not only revenue, but also how many people they could feed both domestically and internationally. Numerous growers across crops and regions noted this increase in yield resulting from treatment with neonicotinoids. Farmers expressed that the yield bump was a combination of both the insecticide protecting the plant from insect pressure and what they described as a plant growth regulator effect.

Related to seed treatment, panelists said neonicotinoids allowed the young plants to emerge healthier and stronger by reducing pressure from pests. This boost in the health of young plants was cited across a variety of crops, such as cabbage, canola and corn. The differences in the health of young plants were visible in comparing those treated with neonicotinoids and



*"Every once in awhile, I'll sit down and figure out our total caloric output of the farm. These are based off of produce receipts we get from our customers. And the last time I did this was a couple of years ago. I was using 2,200 calories per person per day. And during the year, we could feed a little over 600,000 people from our farm. If we lost the use of neonics, we're looking at probably a drop down to about 480,000 people off of the same acreage. We would have to make some serious changes."*

*"They need to realize that they're not going to have the same quality of produce that they have today – they're not going to have the same quality or the look of produce there. That's fine. Just get ready for a change in what you're used to."*

those that were not, and healthier plants are more likely to thrive or survive until harvest. Panel members also said that healthier young plants are able to stave off other potentially harmful influences (e.g., cold weather or cooler soil temperatures) when the young plants are healthy and robust out of the ground, and farmers believed they were more likely to have a successful harvest. One farmer compared neonicotinoids to a penicillin shot when you need it, helping when plants germinate and emerge from the ground, which helps the crop tremendously. He reported having *"done enough tests side by side to see it's worth it."*

Another consistent explanation was that neonicotinoids themselves produced a fertility or growth response. According to farmers, this observed boost in production was not just anecdotal. One participant noted that there have been studies conducted, especially with grain, about the significant yield increase from seed treated with neonicotinoids. One corn farmer said that farmers are seeing 125-bushel-corn ground going to 150 bushels. This increase in yield translates into more revenue, so for the grower, using treated seeds rather than no seed treatment is "easy math."

A grape grower in California projected that his yields without neonicotinoids would go down dramatically. Also, when more of the insects made it onto the grapes, the fruit would be so damaged that it was unmarketable, further reducing the amount of product he brings to market.

### 2.2.2 Losing neonicotinoids would decrease product quality

Many meeting participants expressed concern that if their plants or trees were under added pressure without neonicotinoids, the product quality would drop. For numerous crops, such as lettuce, grapes, citrus, tomatoes, berries and rice, growers cannot sell their products if they do not satisfy high aesthetic standards associated with crop quality. Panelists cited these high expectations across the spectrum from wholesalers, retailers and consumers. Some growers stated that they would not be able to sell their products if they lost the ability to meet these quality standards. This applies to both domestic and international markets. One grower told the story of one of his buyers who would chop open a head of lettuce, pound the cut half on the table, and reject the whole load if any bugs at all came out. He said he was able to find alternate outlets but at a "tremendous cost."

Neonicotinoids are also used to prevent transmission of infection by insect-vectored plant viruses and bacteria of these diseases. This was a serious concern associated with insect control that is rarely acknowledged, yet critical in some high-value cropping systems. Crops, such as cherries or grapes, that become infected with viruses transmitted by insect pests show symptoms and become unmarketable to consumers. With grapes, while some could still be marketed, growers could lose their ability to make a premium for their wine grapes by selling to a reserve or higher-priced label. Fruit and vegetable growers were concerned that losing neonicotinoids would make it less likely that they could meet these higher-quality standards.

Corn growers also expressed concern that without neonicotinoids, their crops would be infested with insects and would not be accepted by the grain elevators or wholesalers. They feared their shipped products would be rejected and sent back because the shipment exceeded an acceptable





*"Everybody's under the impression that you just throw the plants in the ground and they grow, but the consumer expects quality, so we need to use the products that work."*

*"We do a lot of IP [Identify Preserved] soybean contracting. If we don't have neonics to catch that emerging population of bean leaf beetle, then we're dealing with it the first generation, for the foliar feeding and then later on the pod. And if the pods get damaged, we lose our quality market in Japan, and that's \$3 a bushel on soybeans ... so there's your missed opportunity on quality."*

insect load. If they could not gain control of the insects with neonicotinoids, there was concern that their crop would be degraded and not accepted by their buyers.

Rice growers reported that if a load of rice contained too many black grains due to plant bug or stinkbug damage, the entire load would be rejected. Reduced quality also impacts their bottom line in other ways. Rice growers are paid based on both bushels per acre and the quality of the harvest. For example, one farmer reported having his rice significantly degraded by stinkbugs. As a result, his rice milled so poorly that nobody would take the product at all.

As stated by a grower in Florida: *"I was just thinking about the relationship that we have with our buyers, and those relationships are totally different now than they were three years ago, five years ago, 10 years ago – the expectation of consistent product, consistent yield, consistent quality – and there are contracts. It's an unbelievably dynamic relationship in the marketplace, and if we lose the ability to control those types of expectations to our buyers, we'll [snaps fingers] go out like that. Because those relationships will fall and then ... the minute you can't be a reliable provider, you're dropped like a hot potato, so inconsistency that would develop because of the loss of the product would be another one of those quiet killers."*

This quality issue is not just for the domestic market but also for exports. Growers described the export business for soybean, almost half of which are shipped overseas. Each market sold overseas has specifications related to what will be approved. One soybean grower told of 15-20 shipments to China rejected due to quality concerns. Blueberries were also mentioned as another crop in which quality concerns would put it at a disadvantage in terms of their export ability.

The use of neonicotinoids did not just relate to aesthetics, but also the edibility and processing value of the product itself. One farmer described a company he was associated with that went to a semi-organic method, and the lettuce it grew was not edible because of pest damage. Another grape grower shared a story in which some of his grapes grown for vineyards were rejected by wine makers because the taste had been compromised by an infection of Pierce's disease, which could have been prevented with a neonicotinoid application to control leafhoppers responsible for spreading the disease.

Other metrics of quality that would be impacted by the loss of neonicotinoids are the size and weight of their products. For instance, lettuce grown organically is harvested approximately two weeks earlier, so farmers who protect their crops with neonicotinoids and harvest later produce a product with greater size and weight. Finally, one farmer said produce treated with neonicotinoids had lower pesticide residues, which some may consider an important measure of quality. A small minority of farmers were less concerned about quality concerns by consumers *"because they still have to eat,"* and the market would adjust to expectations for lower quality produce.





## 2.3 Loss of effective insect control

### 2.3.1 Limits on ability to practice IPM through less selective targeting of pests – impacting “beneficials” – and resistance concerns

Across meetings and cropping systems, growers raised concerns that loss of neonicotinoids would threaten their integrated pest management (IPM) strategies intended to minimize the use of pesticides. IPM uses crop scouting and knowledge of insect problems to prescribe specific treatment approaches for specific pest control needs. Maintaining populations of beneficial or “friendly” insects is a critical component of the approach. Beyond reducing chemical applications, growers and advisers view IPM as central to their ability to prolong the effectiveness of insecticides and minimize the potential for insect resistance. Growers/advisers stated that neonicotinoids tend to be softer on beneficial insects, which are important to IPM, than many alternatives. They were concerned that losing neonicotinoids would make IPM unrealistic to practice effectively, and would force them to become overly dependent on the same mode of action, thereby, accelerating pest resistance to those insecticides.

One of the often-repeated benefits panelists expressed about neonicotinoids was they allowed for more selective targeting of pests compared to the alternatives. Neonicotinoids were believed to be less harmful to “friendlies,” “beneficials” or other untargeted insects. Panelists described how neonicotinoids allowed them to target specific pests rather than the broad spectrum of insects. One referred to a situation he had faced before neonicotinoids were available when he had boll weevils damaging his crop. He was using “harsh chemistry that was killing a lot of beneficials,” with more flare-ups of the pests, which require more applications than are required with neonicotinoids.

Noting that all on his panel practice IPM, one Ontario farmer commented, “The use of neonics allows us integrated pest management because when we talk about the aphids and the ladybugs, I mean the only reason that we’ve got ladybugs there is so we don’t have to go in and hammer a crop to kill the aphids ... the neonics allows us to practice integrated pest management.” Referring to consequences of a potential loss of neonicotinoids, another grower on that panel followed with, “It’s basically going to turn agriculture back a decade on the cropping side if we lose it completely.”

A grape grower from California described how neonicotinoids were preferable in terms of protecting non-targeted insects. Farmers in the Coachella Valley wine district had treated for the glassy-winged sharpshooter in the area. When Admire® (a brand of neonicotinoid) came out, it was “fantastic” and “easy to work with” because doing so “didn’t blow up any insect problems by killing any beneficials whatsoever it’s very soft”

A grower from Florida expressed the resistance concerns echoed at other meetings with this comment: “Neonicotinoids fit into a rotation of products that allows us to avoid development of resistance in the pest populations that we’re targeting. If we start taking more pieces out of that equation, we’re going to have a limited number of products where we will see resistance. Some of the newer products ... they’re all in the same group. So you take away this rotation partner and you’re setting up a scenario that’s not only going to affect citrus



*and tomatoes, but potentially every crop that we grow where we use these chemicals when these pests become resistant to the few chemicals that remain."*

The same theme was mentioned by a panelist at the Memphis meeting: *"Our program is trying to spread out and rotate chemistries so that it prevents resistance. We use neonics in this first bloom and then we go to organophosphates ... If you take neonics away from us, then we're fixing to ride the horse of organophosphates and it's not going to last very long ... you want to talk about the risk of losing that and organophosphates – we're already seeing our pyrethroid activity nosedive already and we're going to put more pressure on that if we lose these, I mean, it isn't going to be pretty."*

Growers also noted that problems with pest resistance would change their increased cost calculations. *"One of the things you spoke about is an economic impact to the grower – we faced resistance in herbicides already. And one thing that the neonics are giving us is another rotational tool in the shed to keep from building up the resistance to other products. ... So economically, impact to the growers, it's going to be a huge impact. When we started seeing a resistance with weeds, our cost per acre on herbicide went from \$20, \$25 to \$80 in some cases. So that's a huge impact."*

One grower summarized the key issues by stating, *"We've gone a long way toward decreasing our environmental footprint, and by layering our different types of chemistry and targeting it with the neonicotinoids were a big part of that in giving us a tool that we could work with."*

### 2.3.2 Return of pests previously controlled, diseases and increased presence of invasive species

Concerns about IPM and resistance were compounded when growers began thinking about the return of additional pests previously controlled by neonicotinoids or a significant resurgence in secondary pest outbreaks. As one corn grower noted, *"We used to always get out in the field to see the seed corn maggot and wireworms, the younger farmers they haven't seen those so they don't know what they're looking for or what the damage looks like."* Pests like stinkbugs, leafhoppers, whiteflies, aphids, wireworms, grubs, seed maggots and mealybugs were mentioned frequently, along with the re-emergence of plant diseases transmitted by these insect pests.

One of the most common themes in the regional meetings was that if neonicotinoids were not available, many said they would return to pyrethroids and organophosphates, which they believed were worse for the environment, pollinators and human health. Several growers, across multiple meeting locations, noted that some of the older chemistries are also no longer available for purchase or use, in part because neonicotinoids had made them unnecessary, so growers would be facing pests not seen for a while without the benefit of neonicotinoids or some of the older chemistries relied upon in the past.

It was also noted that farmers sometimes have to control pests that are invasive species, which by definition do not have local natural enemies. Neonicotinoids were cited as being particularly useful for controlling new invasive insects where growers' options were limited to slow the spread of those invasive insects via other means.





*"It may be counter intuitive to environmentalists, but it's [using neonicotinoids] actually a sustainable practice, it reduces our total output of insecticides and the impact that we have on the environment."*

### 2.3.3 Reduction in regional insect control and increasing concerns about the viability of organic operations

An interesting issue that also emerged at every panel is the regional insect suppression benefit of neonicotinoid use and the ancillary benefits to organic agriculture. Several of the growers/advisers associated with vegetable and fruit crops also managed some acreage certified as organic. These panelists pointed out that commercial-scale organic production often occurs as an "island" surrounded by conventional agriculture. They claimed that the use of neonicotinoids has resulted in regional control or management of pest populations that would otherwise make organic production very difficult.

This issue was also highlighted by a grower in California: *"We do grow organics in the desert. How we can control the mealybugs without Admire® [a neonicotinoid-containing product] in the desert is because everybody in the desert [in neighboring conventional farms] is using Admire® whether we have mealybugs or not. If everybody didn't have Admire®, you wouldn't even be able to do conventional!"* The grower continued the point by stating the pest control products approved for use in certified-organic crops are effective for very short periods of time (24 hours) at very high cost. In contrast, with a neonicotinoid, he could expect a single treatment to last 30 days and have the effect of suppressing pest populations that would otherwise make near-by organic operations infeasible.

### 2.4 Increased environmental health risk


Many of the concerns about the effects of losing neonicotinoids on growers' ability to control pests overlapped with concerns about negative impacts on the environment. Growers and advisers broadly expressed that losing neonicotinoids may result in unintended consequences that would be worse for the environment than with the status quo. One of the reported benefits of neonicotinoids was that they could be applied more strategically than alternatives. If they could no longer use neonicotinoid products, panel members said they would likely return to more extensive ground and aerial applications of older chemistries, used more frequently and in higher application rates per acre. Nuances related to this concern are highlighted below.

#### 2.4.1 Return to more frequent, less precise, foliar and aerial application of more broad-spectrum chemistries

Consistent with the concerns about effects on IPM, one of the most common themes in the regional meetings was that losing neonicotinoids would cause growers to return to more extensive use of pyrethroids and organophosphates, which they believed were worse for the environment and human health. Several farmers referred to neonicotinoids as being "softer chemistry" as compared to the alternatives they were aware of. One grower, who has become accustomed to using "softer" neonicotinoids in place of those alternatives that he previously had depended upon, expressed a commonly held sentiment when he said, *"Thank God the good old days are gone."*

A common theme was that spraying of these broader-spectrum chemistries would have to happen considerably more often to protect crops because alternatives were not as effective and did not last as long as neonicotinoids. A farmer from the Memphis meeting said the neonicotinoids protected





*"Increased insecticide use should be something that consumers should be thinking about."*

*"If you use more pesticides ... you're going to have to make more applications with harsher chemicals."*

*"Losing this is going to increase pesticide use. It's going to increase pesticide use across the board."*

*"I really think that you're not moving ahead, you're going backward when you lose this product ... When you get back to it ... your only alternative is to put the airplane or the tractor in the field and that's almost counterproductive to what we're trying to do. You know, getting the field men educated, softer chemistries, everything like that – we're defeating our progress here."*

his crops for 12 to 14 days, while the alternatives he used would result in a five-to-eight day schedule or less. One lettuce farmer said he used to spray his crop 15-20 times in a 65-day period, which was reduced to 10-12 sprays with neonicotinoids. Another participant from California reported he would need to do another five to six pesticide applications to substitute for one application of imidacloprid (a neonicotinoid). Another West Coast farmer said the pyrethroid labels called for applying every seven to 10 days, but the neonicotinoids were applied on a 10-to-15-day day schedule, noting those additional applications would carry additional economic and environmental costs. Farmers pointed out that there would be higher total pounds of pesticides per acre used on their farms with more frequent spraying.

As shared by a grower in Ontario: *"Would spraying increase? Yes. Astronomically. Because if we go back to what was happening in 2003 with aphids as an example, we had a major infestation, I mean there was hundreds of thousands of acres sprayed, and if we go into last year where you had aphid sprays and I'll speak to seed companies for a second – when we offered out fungicide-treated seed this year, we expected that we would see the fungicide treatment go way up and spraying go way down ... but insecticide sales went way up because the guys that had CruiserMaxx® [a neonicotinoid containing product] treatment on their soybeans they didn't have to spray but everyone else did. So the volume of spray would go way up. If I had to look at my own farm, I'm going to have to budget two leafhopper sprays minimum, right off the bat, guaranteed. Compared to none today. Soybeans, I'm going to have to, guarantee, probably put a spray in my aphids, which I don't today, because ladybugs build their population and away they go. So, astronomical impact."*

The root uptake of neonicotinoids afforded by seed treatment and soil applications was thought to be preferable to the foliar and aerial application methods required with other alternative pesticides. With a loss of neonicotinoids, most participants said they would have to return to less precise application methods, such as micro-jet sprinklers, hand spraying by workers or aerial application. Without seeds treated with neonicotinoids for commodity crops such as corn and soybean, panel participants said that farmers would return to older chemistries that would be sprayed more often, using pesticides that would affect non targeted insects and would be worse for the environment and human safety.

Panelists raised concerns about the collateral damage to nearby ecosystems and wildlife that would occur if they returned to more foliar applications with more toxic chemistries. One farmer from California shared an experience from the past in which he was trying to fight whiteflies before imidacloprid (a neonicotinoid) was available. He believed neonicotinoids represented a significant step forward in protecting ecosystems and wildlife compared to previous chemistries.

Following a loss of neonicotinoids, the specter of a return to more frequent, less precise, foliar and aerial application of non selective insecticides was pervasive in the panel meetings. Growers and advisers on the panels consistently agreed that increased use of alternative, non-neonicotinoid chemistries would have a negative impact on the environment.



*"It's a lot safer on the laborers involved with the seed cutting and the potato planters. It's just knowing that you're working with a safer product."*

## 2.4.2 Potential negative impacts on cover crop and soil health initiatives

Grower/adviser panels suggested that losing neonicotinoids would also have an unintended and negative impact on adoption of cover crops and related practices thought to promote soil health. Cover crops, such as red clover, are used to protect soils, improve soil health and add nutrients; but they also increase the presence of pests. The increased soil organic matter, an outcome of cover crops, is also a conducive habitat for a number of insect pests. Growers stated that without the neonicotinoid seed treatment and its pre- or early-emergence protections, those insects would have no effective controls, and growers would avoid or discontinue the cover crop practice.

As one grower explained: *"We have a movement now for cover crops. I love red clover. We do know that when we plant a crop like red clover we get a lot of insects. You get rid of the neonics pretty well guarantees we're going to lose our cover crops. We have been trying now for years to get our cover crops to grow, we've finally got a lot of acres – winter wheat – we could have 900,000 acres of winter wheat, could have 800,000 of red clover – you get rid of the neonics and the farmers are going to say, 'When I planted corn after that red clover ... my corn, I had so many holes missing because of insects, I'm not going to plant red clover anymore.' And the red clover benefit, we were probably looking at \$40, \$50 an acre, nitrogen, if we can keep it. Get rid of neonics – goodbye red clover, goodbye all of the potential nitrogen savings to the farmers. That's a big one."* Another punctuated the comment by adding, *"Twenty-five years ago someone told me my corn looked really crappy ... I used to use a cover crop and I had to stop using it until I got the neonics. You get rid of neonics you get rid of cover crops, and that's going to set us back a long way."*


## 2.5 Increased human health and safety risks

### 2.5.1 Concerns about human safety

If neonicotinoids were removed from the market, grower/adviser panelists would return to chemicals they believed were worse for human health. Neonicotinoids were considered preferable for worker safety along with personal and family exposure to higher toxicity alternatives. Saying they were more convenient and safer to use, the panelists viewed neonicotinoids as being a step forward compared to previous, more toxic products that "affected a lot of people." An Iowa farmer recalled using older pesticides prior to using neonicotinoids and said, *"I've seen products get safer for us ... With these products now, I'm sure they're safe to us ... I hope we can continue to use them, but I'm concerned about the environment too."* This sentiment was expressed by nearly every panelist, with most having strong negative reactions to potentially losing neonicotinoids and returning to alternative chemicals.

Foliar applications using older chemistries would require more safety precautions and also have additional associated costs. For instance, one said that putting on a respirator to go out in the fields after a foliar or aerial application means every worker has to be fitted with a respirator, which is time and overhead. Furthermore, if workers are wearing respirators, they have to be checked by a physician every year to make sure they are healthy enough to use a respirator, which is another added expense. Also, if a worker reports being sick, the employer has additional paperwork related to health care, insurance and legal issues to deal with.





*"The workers on my farm are my family, and I've got kids that's involved. I think that's a good thing but a big concern in my opinion is to go back to some of those more dangerous insecticides. And also I think there will be a lot of people that have reduced yield because they don't put anything on and it's too late after the fact."*

Farmers stated that with "softer" chemistries like neonicotinoids, workers do not need to wear protective suits or respirators, nor do they have the same concerns about re-entry intervals for themselves or workers returning to the field after chemical application. Participants also brought up the "worker fear factor," which one illustrated as, "Wait, the boss wants me to go out into this field and I have to wear a Tyvek suit, put on gloves and boots and a respirator? Why isn't he going in there and doing this?"

Expressing frustration at the potential of reintroducing these threats to his family and workers, an Ontario farmer commented, "On the other side of it, we have the neonics, we eliminated all of those problems we just talked about for the last 10 minutes, and we don't have those problems because of the neonics." Many participants expressed beliefs that losing neonicotinoids would be a significant setback for protecting human safety compared to their alternatives.

### 2.5.2 Unobtrusiveness of application method and risk perception by public

Several growers/advisers alluded to another benefit to seed treatment and root uptake systems: They were not only safer for people, but also made people living nearby their fields less anxious because of the unobtrusiveness of the application method.

For example, one participant shared his view that "Anytime you put an airplane or a spray rig on a field and you see it – you have no idea whether you're spraying water or fungicide – it creates opportunities for misinterpretation. So public perception would probably go down because this is a pretty unobtrusive way of delivering a very effective low-rate insecticide to a lot of acres."

Canola farmers also mentioned how some of their operations were near homes, and spraying made their residential neighbors anxious. Similarly, another panelist from the Prosser meeting said having less obtrusive application methods was safer, plus the ground application methods appeared to ease concerns by people passing by his farm. "Where I'm at, we have joggers running down the road and then you have someone right on the side of the road wearing their moon suit, and then you get people calling up and saying, 'Oh I think I smelled something running by your orchard.' It's kind of nice when you can say, 'Oh that was just my fish hydrolysate [a liquid fertilizer] that I was spraying.'"

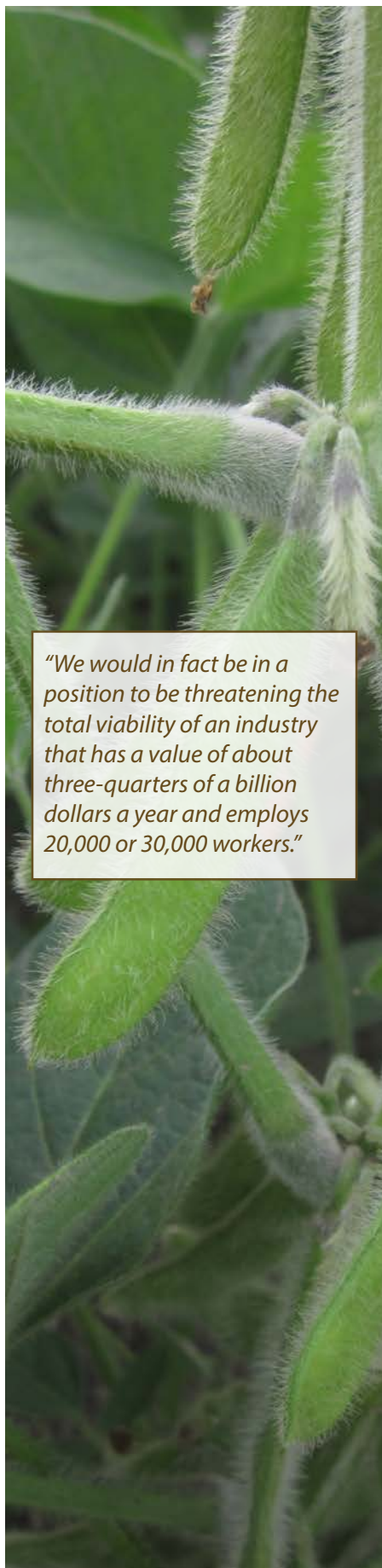
Panelists from multiple meetings recalled times when foliar applications of pesticides elicited complaints by people driving past fields. As one grower in Ontario noted, "There's a perception that if we're out there spraying, regardless we could be spraying just fungicide and nothing else, but the perception is that we're out there spraying these toxic poisons."

## 2.6 Industry viability and related regional economic impacts

### 2.6.1 Concern about ability to run profitable operations and decisions to change crops or exit farming

For some crops (particularly Florida citrus and tomatoes as well as Mississippi Delta cotton and rice), growers expressed concerns that a loss of neonicotinoid chemistries for insect control would threaten their ability to produce these crops. Some feared going out of business, while others suggested they would shift to other crops. The specific insect/pest issues





*"We would in fact be in a position to be threatening the total viability of an industry that has a value of about three-quarters of a billion dollars a year and employs 20,000 or 30,000 workers."*

varied across crops, but concerns about the ability to grow a crop at all or profitably (especially given international competition) were consistent.

Florida citrus growers explained in some detail how neonicotinoids were the only treatment available for protecting young trees from "citrus greening" (i.e., Huanglongbing or HLB disease introduced by the Asian citrus psyllid) during their first few years of growth. HLB is spread by the psyllid when feeding on a citrus tree. Without neonicotinoids, growers are confident that these "reset" trees would not produce any edible fruit. One stated, *"You take out a citrus grove, you're talking about a \$15,000 an acre investment just to get your first piece of fruit off of it. And for us to sit there and say 'Oh well we can replant.' It's not going to be that easy."* Referring to decisions about replanting citrus trees damaged by HLB, a Florida citrus grower stated, *"With the greening – that's a very large gamble to go put \$15,000 an acre planting a new grove and without neonicotinoids that's a very large gamble. There's no way I'd do it. Still even with them it's a large gamble."*

Similarly, tomato growers stated that without neonicotinoids, whiteflies would have a dramatic effect on their crop, making their business uncompetitive and ultimately not viable. One participant on the Florida panel commented that many other specialty crops grown with tomatoes would also decline, as tomato production drove those systems. *"If we couldn't produce the quality of tomatoes that we produce in this state in a reliable fashion the way we do with neonicotinoids and today's technology, we would in fact be in a position to be threatening the total viability of an industry that has a value of about three-quarters of a billion dollars a year and employs 20,000 or 30,000 workers. And the reality is that the United States would lose the ability to produce tomatoes from November to May and would be totally dependent on imports because the profitability of this industry is so narrow. Because we operate at a tipping point and if we don't maintain reliable production programs that are consistently dependable – the margins in this business are so close – it would topple the industry. ... if the United States wants to continue to produce tomatoes for over half the year in the continental United States, we've got to have the tools to do it, and the loss of these compounds would threaten that viability."* Expanding the issue to the region, he added, *"And the same problems that we have in Florida will occur in Georgia and South Carolina and Tennessee and North Carolina and Virginia and all of the states up and down the Eastern Seaboard as well as California. So that whole system of tomato production is at risk without adequate tools to make it economically viable in today's world."*

In other crops, the loss of neonicotinoid seed treatments would require farmers to reduce their total acreage. *"In the canola industry – if someone were to come along and tell me 'seed treatments are out,' I mean, we've got no option. My first thought is I mean I would cancel 50 to 75 percent of my canola seed because I cannot manage the alternative effectively."*

A panelist from the Memphis meeting commented on cotton: *"I'm going to be more drastic, because looking at my cost of production I'm going to switch crops, I can't stand any more costs of production, so I would go to another crop more than likely. If I planted any cotton at all, I would cut back even more severely than I have already now. And then in the long view, maybe five years time, we would've lost the whole infrastructure for cotton in the area and I definitely doubt if cotton would ever come back again."*



Commenting on the price variability, another panelist stated, *"When I was farming cotton back in the 1990s, you could make money in 600 pound cotton, today it's taking 1,100 pounds to make money, you're going to be talking about two-and-a-half bales per acre to break even ... and I don't think you can get loans at that rate."* Another continued, *"Twelve months ago we were talking about 90 cent cotton, \$7 corn, \$14, \$15 soybeans. Today you're talking about \$11 soybeans, \$4 corn and probably 80 cent cotton and none of those have very much potential to go the other way. Right now the bottom line is that farmers are price takers not price makers. We don't set the price we take the price that the markets offer. So if we had this conversation a year ago we might not be so close to the tipping point, but we've seen cotton acres in our area reduce by 10, 15 percent last year and 40 percent the year before. Next year they could go back up ... but we're right on the tipping point."*

Growers also raised the national impact on corn and soybean commodity prices if all of the Delta's rice and cotton acres shifted to corn and soy. As stated by one grower in Memphis, *"If neonics were taken out tomorrow, it's going to hurt the cotton industry tomorrow. I think it would hurt it worse than it would the rice. I think the rice, we have a little bit more chemistry ... but what's going to happen is – you all are going to jump into beans or corn and flood that market with highly productive grain. Next day, it's hard for them to jump straight into rice, but they can jump into beans ... What happens when the cotton goes down? And what happens to commodity prices? They're going to get flooded."*

### 2.6.2 Negative impacts on local and regional economies

Beyond individual operations, growers were worried about the loss of neonicotinoids potentially threatening the viability of key crop production systems in their region along with other associated agricultural services and processing. They were concerned about implications of negative multiplier effects for their regions and how the closure of processing facilities, packing plants, and cotton gins, would harm the rural/regional economy.

Growers in Florida were clear that many areas currently growing citrus had no viable agricultural alternative. Stating concern for regional economic impacts and loss of processing facilities, one Florida grower made the following comments: *"There are eight or nine processors – the amount of fruit that they're saying we'll get this year could be done with three processors. Rather than the nine that are out there ... We're teetering and we talk about it every day in our industry – who's going to go down first? ... that's common talk."* With the loss of citrus comes the loss in packing, processing, servicing, transportation and other associated jobs. *"You got towns that are just going to go away. Florida without agriculture is going to be a shell on the coast up to Orlando. There literally is no crop to replace the citrus – we've already been looking for that crop. Two hundred fifty thousand acres of citrus has gone away over the past 10 years ... any person who comes up with an alternative crop will be a hero."*

Commenting on the difference in economic impact between cotton and alternative crops in the Delta region, a Memphis grower stated: *"When I raise a bushel of corn, I take it a mile and half to the elevator and it leaves the community, ... Cotton goes to the gin, somebody's got to haul my cotton seed to the oil mill, someone's got to move my cotton bales, the warehouse has to hire*





employees. My dollar turns over seven times with cotton in my county.” Another panelist added, “You know you’re talking about ghost towns, the low cotton price in the past few years has made some ghost towns in the Mississippi Delta. So I think ... people are not going to grow cotton if there’s a chance the remaining gins are going to be shut down. You’re looking at a huge local economic impact. A gin is 25-35 people without jobs.”

A grower at the Memphis meeting noted, “If we lose the rice industry, there’s no jobs of any kind. The base in eastern Arkansas right now is rice. And if you start losing the neonics and you lose the quality of rice and whether it’s in yield or in milling quality, we lose lots of jobs.” In addition to direct loss of jobs, Memphis farmers commented on the effect of crop changes on land rents, and the related impact on local spending and potential of landowners to sell to outside investors: “Everybody in here rents land ... and you look at the landowner himself and now he’s about to be affected. Growing soybeans is not going to pay the rent that he’s getting. It’s not going to even come close.”

## 2.7 Food security and affordability

### 2.7.1 Domestic food security

At nearly every regional meeting, participants reflected that North American agriculture is excellent at providing affordable and high-quality food. Growers at multiple meetings suggested that removing neonicotinoids would decrease the capacity to do that because other countries (e.g., market competitors like Brazil and Mexico) will not face those same constraints. For some crops (tomatoes and vegetables), growers suggested this could create a dependence on imports to meet demand for fresh food.

A grower at the meeting in Prosser stated the issue bluntly: “One of the greatest benefits to the United States is our internal food supply. So you know, we have a certain amount of security because we can grow a lot of food in this country. So why are we using bad science to limit our ability to keep providing the food that we have?”

Another grower at the San Diego meeting also raised the point. Referring to neonicotinoids, “The difference though is that our competitors in Mexico will be able to use it, and that’s going to put us at a big disadvantage. In the Coachella Valley, our competitors are not our grower down the street, our competitors are Mexico where they’re still using chemistries and different chemicals that we’re not allowed to use. If you take this one away, it even gives them a bigger advantage over us. When we all have to deal with labor and everything else.”

### 2.7.2 Family/individual food security and affordability

One potential impact mentioned consistently by farmers across multiple crops was that if they lost neonicotinoids as a pest management tool, food prices would rise and the quality of that food would suffer. This is a result of higher labor costs, higher volumes of pesticides needed more often, higher fuel costs from repeat sprays and increased capital equipment costs. Farmers said as production costs went up, increased prices would ultimately be passed on to consumers.

At multiple meetings, the point was made that those hit hardest by higher food prices would be those least able to afford the increase. Growers at the



*"The guy who farms 40,000 acres of land and the guy who's got hives throughout those 40,000 acres, they're partners, so they buy each other supper, they don't take each other to court."*

discussion in California raised the national concern with "food deserts" and the disproportionate challenges facing poor people living in communities and neighborhoods isolated from access to fresh and inexpensive food. They believed that higher costs, less insect protection and lower quality product would exacerbate those individual food security concerns.

One grower summarized the issue with this statement: *"Because we grow organic, I see people at the higher income spectrum willing to pay more for the organic fruit because they think it's better. What I would say is without this pesticide [neonicotinoids] everybody's going to have to pay higher prices, period. You're going to have to pay a lot more money for food than you do now. A lot more. And I don't think anybody can even calculate how much."*

## 2.8 Misunderstandings and uncertainties about neonicotinoids, pollinators and growers

Every farmer panel expressed frustration with what they perceived to be public misunderstandings about the connections between neonicotinoids and bees.

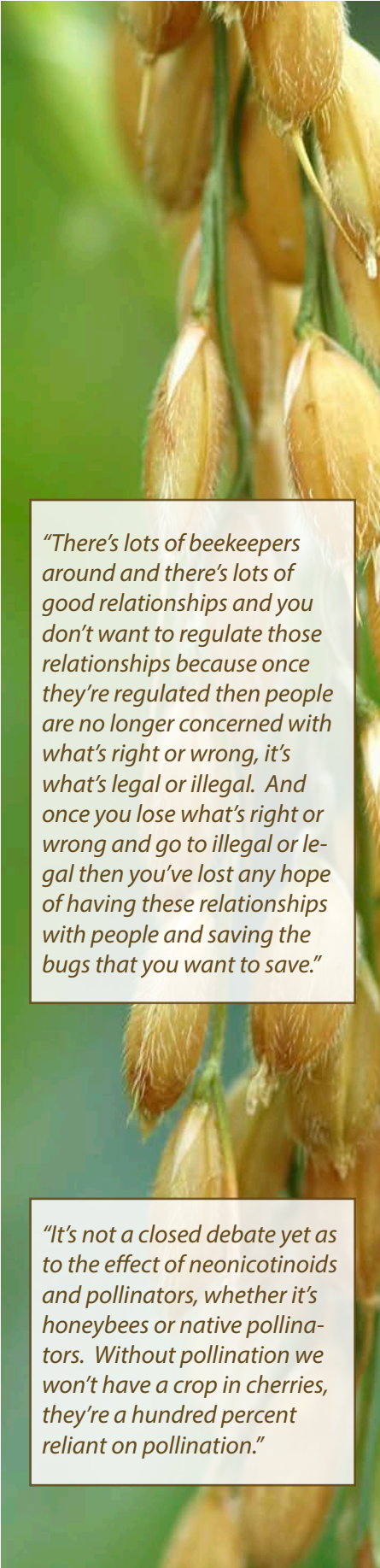
Many panelists indicated they had positive relationships with beekeepers and believed there were a number of possible explanations for why some beekeepers were experiencing losses. Many said bee populations were healthy where they do their work. Some also noted that the general public did not realize that neonicotinoids are the same chemicals people use to prevent fleas on their dogs, which then play with their families and children. Panelists broadly expressed concern about the health of pollinators and wanted to find science-based solutions for addressing their decline in some areas. As stated by one grower at the Ontario meeting: *"I think the biggest thing is that we're all in this together. We're all working toward a solution, farmers included. We know how valuable bees are as pollinators and so on and so forth. We need to get through it together, we don't need to point fingers and point blame on certain things. We need to be logical about it."* Key themes that emerged examining the connection (or lack of connection) between neonicotinoids and pollinators are highlighted below.

### 2.8.1 Positive relationships and collaboration between farmers and beekeepers is common

A significant number of meeting participants indicated that they have positive relationships with beekeepers in their areas, and they actively coordinate with those who place beehives near their operations. They reported doing this for a variety of reasons, including that some crops are dependent on pollinators and they wanted to be good neighbors with beekeepers. Farmers also reported a strong stewardship ethic and genuine concern about the sustainability of pollinator populations.

One participant from the Memphis meeting reported that the beekeepers he has interacted with are very easy to work with. They approach him and ask, *"Can we please put our hives beside your crops?"* he said. *We warn them what we're using and they say, 'That's not a problem' because they know we use drift control measures, and we're considerate of their presence and we appreciate them being there."*





*"There's lots of beekeepers around and there's lots of good relationships and you don't want to regulate those relationships because once they're regulated then people are no longer concerned with what's right or wrong, it's what's legal or illegal. And once you lose what's right or wrong and go to illegal or legal then you've lost any hope of having these relationships with people and saving the bugs that you want to save."*

*"It's not a closed debate yet as to the effect of neonicotinoids and pollinators, whether it's honeybees or native pollinators. Without pollination we won't have a crop in cherries, they're a hundred percent reliant on pollination."*

In contrast to beekeepers who let growers know when they are placing their hives near their fields, one topic brought up several times was the issue of "rogue" beekeepers who do not communicate with growers, but instead place their hives and disappear. Sometimes contacting the names identified on those hives in order to schedule a spray takes days and causes costly delays for growers if the communication happens at all.

Some farmers expressed that certain application methods, such as aerial and foliar applications of neonicotinoids, could affect bees, just as any pesticide would. These farmers said that better coordination and communication with beekeepers could prevent unintended effects on honeybees. One solution mentioned in Florida was putting GPS units in beehives that would help farmers time their applications more strategically in coordination with beekeepers, avoiding unintended mortality in bee hives that are nearby, but that farmers do not know are there.

Some crops, such as citrus, are not dependent on bees but are beneficial for pollinators and for honey producers. A citrus farmer from Florida noted this dependency and the irony of the potential loss of the citrus industry in Florida if neonicotinoids are removed from the market, stating *"As citrus goes, so does citrus honey."*

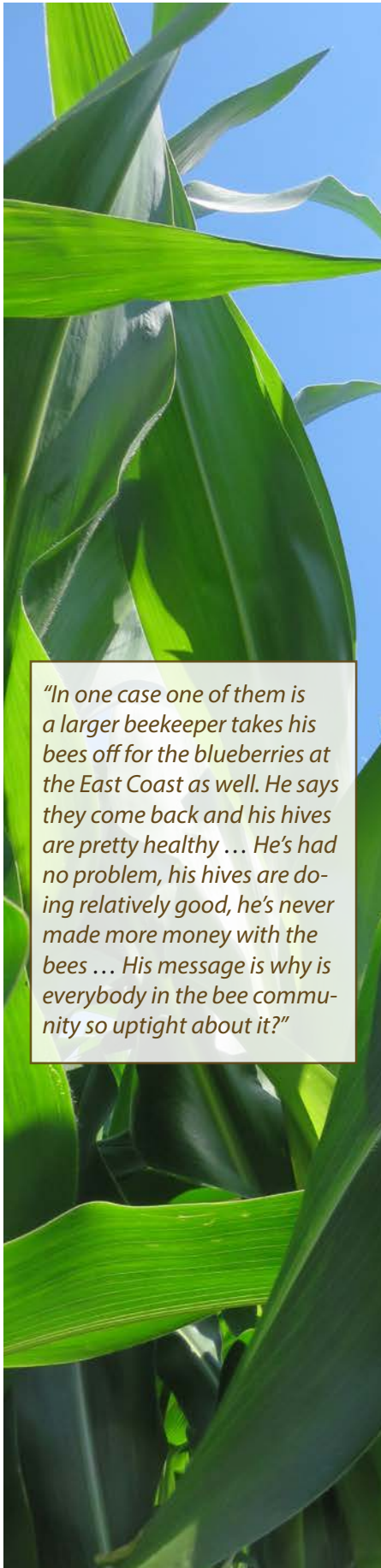
Expressions about positive relationships with beekeepers and the desire to maintain these relationships were commonplace.

### 2.8.2 Beekeepers they work with are not faulting neonicotinoids for colony collapse disorder

A significant number of grower panelists said the beekeepers they know did not blame neonicotinoids for colony collapse disorder and likened them to being "a silent majority." A few expressed the belief that it was a vocal minority of beekeepers who identified neonicotinoids as a problem. A farmer from the Memphis meeting believed a minority of beekeepers was screaming loudly, and the agricultural industry needed good beekeepers on farms to speak up because *"They're basically sitting on the back fence and not speaking up."* A few mentioned there was little voice given by the media to beekeepers who disagree with the movement to ban neonicotinoids.

As stated by a grower at the Memphis meeting: *"I want to speak just a little bit too on the behalf of my beekeeper that I talked to quite a bit this weekend. He says if there's any products that are issues it is not the neonics. He said the pollination that goes on between the cotton blooms and taking it back to the hives are really never ingested in the intestinal tract of the bee itself. And his issue is if there are products out there that are causing problems, they're targeting the wrong problem, according to him."* Another participant from the Memphis meeting agreed farmers are beneficiaries of pollinators and that protecting bees is important – but said, *"I just don't think that neonicotinoids are the root cause."*

Another cotton farmer from the Memphis meeting shared an experience with a large commercial grower in his area who had several thousand hives and used his gin yard to place the beehives. He described how this person set hives up beside his farm for years, and the beekeeper claims he hasn't had a problem with the use of neonicotinoids on the farm. If neo-



*"In one case one of them is a larger beekeeper takes his bees off for the blueberries at the East Coast as well. He says they come back and his hives are pretty healthy ... He's had no problem, his hives are doing relatively good, he's never made more money with the bees ... His message is why is everybody in the bee community so uptight about it?"*

nicotinoids are responsible for problems with bees, another wondered why bee populations are thriving in some areas that use neonicotinoids extensively, such as canola fields in Canada.

A nuance brought up at the meetings was that all pesticides have the potential to kill insects. As one said, the question is *"Are bees dying because of neonicotinoids? And the answer is clearly 'Yes' if you pour neonicotinoids on bees, you're going to take them out,"* and *"Any pesticide will kill bees if it lands on it."* He and other growers reinforced the importance of proper use. He suggested that soil injection with neonicotinoids was the safest current option, which is what most farmers were doing in his area. Many growers were concerned that moving back to foliar or aerial application of pesticides with older, more toxic chemistries would be a step backward if protecting bees was a priority. One participant referred to the largest beekeeper in his state who believed neonicotinoids could kill bees in some contexts but were not causing colony collapse disorder.

### 2.8.3 Some crops are self pollinating, and neonicotinoids are not applied when honeybees are present

Growers noted that certain crops, such as tomatoes and citrus, are primarily self-pollinating and not dependent on pollinators. Growers recognize that pollinators may still be attracted to the plants, yet they have not observed the presence of pollinators when neonicotinoids are applied. For example, grape growers said honeybees are not really present in their eastern Washington vineyards, so the impact of neonicotinoids related to their crop on pollinators should be minimal. Another participant said he very rarely sees bees in his corn and soybean fields, and the hives in his area have been fine as far as he is aware. As a result, he wondered how the use of neonicotinoids could be adversely affecting honeybees on his farm or in his area.

There was also uncertainty about how neonicotinoids could affect pollinators if applied to plants before the flowers have bloomed. The farmers wondered how this could harm bees if there was no pollen to collect and there were no bees present in their fields. Farmers with crops, such as citrus, pointed out that because such a small percentage of their trees are treated with neonicotinoids, they have doubts about the potential effect on bees. In the Florida citrus industry, one of the primary uses of neonicotinoids is on young trees to protect them from citrus greening disease before they are blooming, so they can survive until they bear fruit. According to one citrus grower, the percentage of blooming flowers from trees exposed to neonicotinoids is a fraction of a percentage of the total.

### 2.8.4 Growers are aware of multiple factors contributing to declines for some honeybees

Broadly, meeting participants were open to the possibility that there could be a relationship between neonicotinoids and pollinators, yet they were not aware of adequate scientific support for the link. Their understanding about the interrelationships between their crops and bees was generally at odds with the arguments for banning neonicotinoids found so frequently on the Internet. Meeting participants expressed that scientists and beekeepers





point to multiple factors, including nutrition, lack of habitat, storage during wintering, parasites, diseases, viruses and pesticides. Growers raised all of these issues during the regional meetings, emphasizing the factors below.

**Overwintering: The way bees are kept over winter can make them less healthy.** One grower heard from one of his beekeepers that he had been experiencing big problems with bee kills, but saw this trend reverse when he overwinters his bees in cold storage rooms or under a controlled climate. He also said that nutrition plays a role, stating, *"It's all about how healthy and strong those bees are going into the winter."*

**Transportation: Shipping among commercial beekeepers is a major source of stress.** Another said that when bees are transported all over the country by commercial beekeepers, *"They're running on the ragged side."* A San Diego participant suggested beekeepers move the bees *"at their whim."* Another participant differentiated two bee markets: one, which is a smaller producer selling his honey into a local market and the other market made up of larger commercial concerns. Commercial bees are exposed to stressful travel schedules, for example, starting in Florida for the citrus honey, shifting to California for almonds, and possibly to the Northwest and Midwest after that. One grower said, *"My perception is the commercial ones are the ones that are stirring the pot the hardest."*

**Viruses and parasites in commercial hives because of their population - intensive living conditions.** It was also expressed that the bee industry is struggling with pathogens and viruses that cannot be controlled and that have nothing to do with neonicotinoids. Growers suspected that large beekeepers are looking to find a fix or a cure, and it's easier to look at pesticides that are being used rather than viruses that are being transmitted through pollen or other means. As a participant at the Memphis panel noted, lay-people tend to be searching for *"one thing to hang their hat on,"* though the problem is more complex than that.

**Bees are worked too hard.** Another theory expressed at the regional meetings was that commercial bees were working too hard – more than is natural or healthy – as they are transported around the country. One participant from the Memphis meeting shared the story of a beekeeper telling him that bees from these hives that move from California to Washington, Wyoming and then Arkansas are being *"worked to death."* He said the beekeeper told him that there is not enough rest time for the bees because they are working them year-round.

**Trace levels of neonicotinoids in honey are minuscule (parts per billion).** It was also mentioned that the levels of neonicotinoids found in honey are so minuscule, they wondered how much this could affect bees. One described how the bee association can assess honey, putting it through an inspection, and they can tell what is contained in the honey. For honey produced by pollinators collecting pollen from agricultural crops, he believed the level of neonicotinoids in the honey was measured in parts per billion. He wondered if such minuscule traces in bees could contribute to their disappearance.

**Problems with neonicotinoids associated with gross violation of application instructions.** A participant from the Prosser meeting said he thought one aspect of neonicotinoids having potentially negative impacts



on pollinators was misuse. A number of participants referred to an incident in Oregon that received wide media attention, in which the people involved had used a foliar application when bees were present, which was flagrantly in violation of instructions on the label.

As summarized by a panelist from Ontario: *"I guess my thoughts are the bee health working group released their report yesterday, and they were a partnership with everyone concerned – I think it was a wonderful partnership to have everyone at the table – and they released 13 recommendations and the bottom one was to consider a ban. Well there's 12 recommendations here that all we need is time to work on, and there's some really good stuff, so why are we automatically jumping to the very bottom recommendation ... if we go to that bottom recommendation, there's consequences that not everybody is considering."*

### 2.8.5 Need for trusted, objective science

Meeting participants repeatedly indicated they were open to exploring the connection between neonicotinoids and pollinators, but they wanted the debate to be informed by facts over emotions, mostly fearing the unintended adverse economic, environmental and human safety consequences of a ban compared to the alternatives. Broad concerns were expressed about "junk science" dominating national discussion.

An example of this uncertainty and desire for more objective science was expressed by a panelist from eastern Washington who indicated he would like to keep using neonicotinoids but, while he was concerned about possible impacts on pollinators, he stated it would be nice to have better evidence of why he should not be concerned. However, he was concerned about the prospects for science-based decision making because of the heated debate with the environmental community, combined with the beekeeping community being upset about the possibility that neonicotinoids are harmful to bees. He also noted that it's difficult to get good research because it takes time to do robust, externally valid studies, as they can be complicated.

Participants did not dismiss studies suggesting neonicotinoids may have negative impacts on pollinators out of hand, and some expressed that these researchers may have their heads in the right place. However, they expressed doubts about the credibility of the existing science on the issue. One said he had read articles that he deemed poor in design – not germane to the real world or just *"a guy who goes out and sprays something or doesn't spray something."* Several participants brought up the European ban on neonicotinoids, and it was suggested the ban was driven by politics over science. This criticism was based on the methodology of lab tests. Growers noted if you expose bees to high enough doses, you are going to get harmful effects, and the tests did not represent field-realistic doses.

A participant from Regina was vocal about the need for objective scientific research. Even if it was just perceptual, he thought it would be better if the research was sponsored by a third-party, such as the government rather than by industry. One bluntly stated, *"No offense to these chemical companies, but as soon as somebody knows that a chemical company did that it is not credible whatsoever to a lot of people when you're having this discussion. You can go, 'Well these people found this,' and they go, 'Who did it?' Well it's Bayer,*





*Regarding the challenges of growing organic food, "It's easy to think of organic when you grow a seed on your screen porch, and you have something you pick a few tomatoes from, but that's a home garden. But when you talk about the costs of production and all of that, it's very difficult to be profitable in an organic deal ... it's a tough deal."*

*they're going to go, 'Nope, it doesn't count!'"* Expanding on this topic, participants were asked if it mattered whether the research was sponsored by industry but conducted by university researchers, who are viewed as more objective, and another participant said when he has had discussions with others, *"as soon as they see a chemical company on there it's over."*

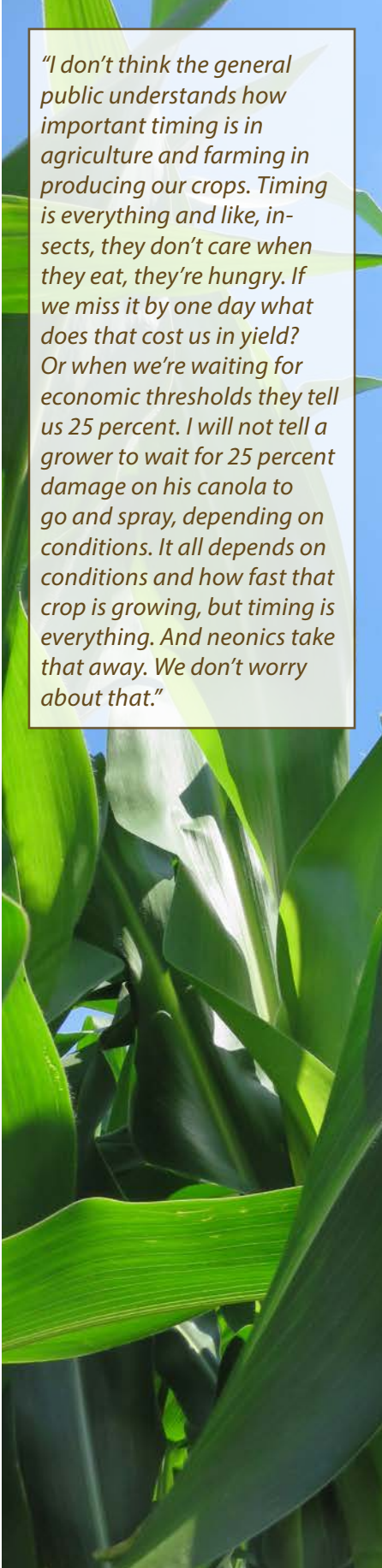
This long statement from a panelist in Regina captures much of the sentiment shared by panelists expressing a desire for more science on the connection between neonicotinoids and pollinators: *"I live in an environment where I want to see honeybees ... so I'm willing to tell people about the importance of neonicotinoids to our farms and the financial benefit to us. And I want to make sure that when there's stories about hundreds of thousands of dead bees that are outside hives that we do actually have the science. Any picture of dead bees looks awful, but let's face it, insects die in mass amounts all of the time, and you could take pictures of those things and make a traumatic story. But if in fact we never did enough research about the time that the dust comes up – if the dust flies up and onto dandelions and other plants along the hedgerows and that the pollen in those places is actually affecting the bees and harming the bees – I want to know that so that I can defend that. Because we're talking about science – science is based on what's actually happening, not on what we want to have happen both from an environmentalist standpoint or from an industry standpoint. And that's what I look for is the truth of these matters. And if we have to figure out how we can get something on the planter so that the dust doesn't go out, I want to have that out there so that we can say, 'Yeah, we discovered a problem, first of all the problem wasn't as bad as the picture looked like ... and we're doing our best to make sure that doesn't happen because we love bees and bees love us.' That's the story that I want to tell. But I need to make sure that the back row there has the facts straight and that I don't look like an idiot when I start defending somebody. So I'll be there and I'll talk the talk but I need to know that what I'm saying is true."*

## 2.8.6 General misunderstanding about growers

**Growers as environmental stewards.** Commonly across regional meetings, panelists felt misunderstood about their use of neonicotinoids, and they expressed a sense of responsibility toward the environment and stewardship toward their land. Several panelists were members and leaders of regional trade associations and conservation groups focused on minimizing agricultural impacts on ecosystems.

A recurrent theme was that farmers do not indiscriminately apply pesticides, both due to their desire for environmental stewardship and because everything they put in their fields costs money. A participant from Memphis stated, *"We don't want to spray. That's money, and we don't want to pollute the environment."* As another farmer from the San Diego meeting noted, he had *"never met a farmer who woke up in the morning and got excited about pesticides."*

Echoing previously mentioned themes, one farmer considered his use of neonicotinoids as part of his stewardship of the land, stating that any chemical should be used judiciously. Referring to neonicotinoids, he stated, *"I think that we would all be willing to do a better job of how we manage our guiding chemistry, but it's an extremely efficient, low-dose rate, very targeted, efficacious product, so let's make sure that we use it wisely."* Several growers/



*"I don't think the general public understands how important timing is in agriculture and farming in producing our crops. Timing is everything and like, insects, they don't care when they eat, they're hungry. If we miss it by one day what does that cost us in yield? Or when we're waiting for economic thresholds they tell us 25 percent. I will not tell a grower to wait for 25 percent damage on his canola to go and spray, depending on conditions. It all depends on conditions and how fast that crop is growing, but timing is everything. And neonics take that away. We don't worry about that."*

advisers were aware of concerns over the potential long-term persistence of neonicotinoids in soil and suggested that product manufacturers create some way to accelerate material degradation to address those concerns.

Another participant from Iowa emphasized the importance of proper use of neonicotinoids on the farm. He had received application training at Iowa State University, where he said, *"They actually spent quite a lot of time discussing this very treatment, the fact that we as farmers need to be responsible to make sure that all of the seed gets covered out in the field, that we don't leave it exposed, to the population."* And the lessons he learned not only applied to honeybees, but also pheasants and other birds. He went on to say, *"Educating producers in how you manage these products is probably very key."*

**Differences in farming systems, what farmers do and where food comes from.** Panelists commented throughout the regional meetings on a general lack of knowledge among the population at large about agriculture. Comments ranged from inability to distinguish between different types of equipment or different farming systems, to a basic lack of understanding of how food gets into a grocery store.

### 3.0 Closing

This report summarized a series of eight regional panel meetings throughout the United States and Canada to better understand the perspectives of growers and other agricultural professionals about potential impacts from the loss of neonicotinoids to a variety of cropping systems. In considering regulatory and policy choices limiting use of neonicotinoid insecticides, it is critical to consider these key stakeholders in the debate, as they have the most direct experience in using the products and are among the groups that would be most affected by their loss.

As many are farm business owners and managers, their decisions in response to any future regulatory or policy actions could impact employees and their families, the local environment and local economies. Most participants relied heavily on neonicotinoids and cited their benefits in terms of being cost-effective, offering selective pest control that preserve beneficial insects for IPM programs, decreasing resistance of pests to other chemistries, protecting human health, improving food quality and increasing yield.

Participants broadly expressed concern about the environment and pollinator health. However, they also perceived that the current discussion in the media was being driven by emotions over science. In particular, they were worried about the unintended negative consequences of banning neonicotinoids on human health and the environment. Participants were aware that pollinator health issues are associated with a complex array of factors and that neonicotinoids are only one of numerous possible factors to be studied. Many had positive relationships with beekeepers operating in and around their farms.

In short, agricultural professionals were concerned about a rush to judgment on the issue, given the wide disparity in benefits of neonicotinoids over currently available alternatives.



## 4.0 Appendix: Regional Meetings

As described under 1.0 Background, the regional meetings/listening sessions each lasted approximately four hours and covered a range of topics introduced by a meeting facilitator. At each session, the final question posed to panelists was a variation of, *What is the most important message that needs to be communicated about the potential loss of neonicotinoids?* This appendix provides panelists' responses to the closing question at each meeting. The meetings are presented in chronological order (see Table 1 for more information).

**Location:** Chicago, Illinois

**Crops:** Corn, soybean, canola, cotton, wheat, rice, vegetables, fruit, beans



### "How do you communicate the benefits of neonics to the public and impacts of loss?"

Each bullet is a panelist response to the closing question:

- ▶ *"Rice is talking about it, and that's why we're here today. The federation committee that I chair was directed to come and to be involved with this. If you can tell me how to educate the people out there, I will try to do it. And that's a difficult thing about agriculture. I mean it's got to come through the associations but it's hard to get them to listen and until you say 'well we don't have it anymore.' That's when they listen."*
- ▶ *"We'll trade our corn planters in and either get seed boxes back on our planters and not go with bulk seed. We'll be back to the traditional rows where you're dumping a bag at a time. Or you can add a liquid insecticide at a cost of about twenty thousand dollars a planter, and the extra costs of the materials is going to be an extra fifteen, twenty dollars an acre for the material."*
- ▶ *"The first thing that I would do is return all of the seed, because I just couldn't manage the alternative – which would probably be a scheduled minimum of passes with Lorsban®. Definitely increasing the other insecticides that I'd be using and the cost associated even to do that – would probably need another high-clearance sprayer, and a new one is four or five hundred thousand."*
- ▶ *"In Canada for a few years, the only thing that made any money was canola. You lose that one and we'll go back to those financial times. Other growers would be doing the same thing. We're running on such thin margins up there, we're not flush with equipment, we're not happy with aerial application; they won't give us any water."*
- ▶ *"I think it's pretty obvious growers would have to control the pests, so they'd look for alternative chemistries, probably a lot would go with the pyrethroids. Is that a good thing? I don't think so. I think that'd be disruptive to any IPM systems that are out there. I'd say that there are some newer products now that are on the market that some growers would turn to and they are more expensive so that would hurt their profitability in that regard."*
- ▶ *"In cherries right now there's a new virus moved by mealybugs, and one of the controls is a neonics and without that acres of cherries will come out in*



Washington. There is a cost to take them out – they will replant with apples so there's an added cost for that – about ten to fifteen thousand dollars an acre to put in a new orchard. In pears, I think if the neonics were gone, there are other chemical classes that we use right now that would be rotated in. We'd rely on those so they'd lose their effectiveness fairly shortly. So there's a cost that's going to take awhile to really see of the loss of insecticide efficacy and so that one's a hard one to put a number on, but it would probably take three or four years and we'd see that. In apples we'll see an aphid because the neonics are the one material we use to control aphid in apples, and that is a cosmetic effect. They do move some viruses but it's not too bad in apples, so it's really more of a cosmetic effect."

- ▶ "In cotton, it would be pretty simple – within a week after emergence we'd start spraying Orthene® and pyrethroids, and I'm not sure that we'd go two weeks during the growing season. You start to do that and do that early in the growing season, using that broad spectrum, it leads to more sprays, higher worm pressure, more aphids, spider mites, like we talked about. I think it would just be endless spraying."
- ▶ "A lot more trips to the field. More chances of getting drift or something where it's not supposed to be since timing is so important with most of these sprays. And most of all, it takes one thing out of the toolbox that is very indispensable at times for all of the other crops. It just doesn't make sense to take it away. You might be able to live without it but it's nice to have it there if you really need it."
- ▶ "I just wanted to say that from my point of view one of the great traits or characteristics of these products is the soil uses and how effective they can be at controlling pests in the soil. I don't really know if there can ever be drop-in replacement for something like that. There would have to be a lot of research on how they would be replaced."
- ▶ "In table grapes, we have a lower threshold of pain than they do in wine so there would probably be more treatments I would have to do to keep things cleaner. But we have a lot of invasive pests and they're really an important tool for those things. If we lose neonics, it's just one more tool that's not there for us."
- ▶ "Could we plant trees without neonics? Yes we could, but you'd be relying completely on aerial sprays. Right now we don't have a lot of products. Right now to replace neonics for growing off young citrus trees – I don't see anything on the horizon. And the one thing that's important with the neonics is the psyllids won't feed on a tree that's treated with this. So it's not that it's acting as an insecticide, it's also acting as a repellent, and that's what's keeping them from getting infected. Psyllid starts to probe, detects something, flies away."
- ▶ "In the U.S. I think we have not done a very good job of telling our story and how important these things are to us. We have to find some way to get our story together that we're good stewards, we always have been, we're not doing this for the fun of it, spraying these things, we're doing it for a good reason."

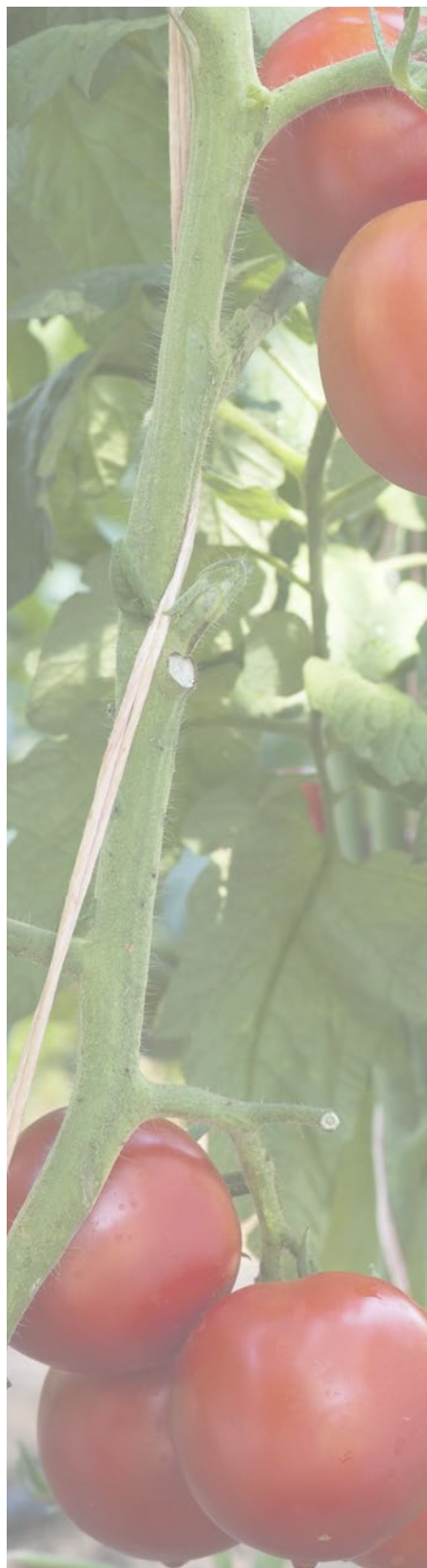


**Location:** Lake Alfred, Florida

**Crops:** Citrus, fresh tomato

## **“What is the most important message that the report needs to communicate about the impact if neonics were lost?”**

Each bullet is a panelist response to the closing question:



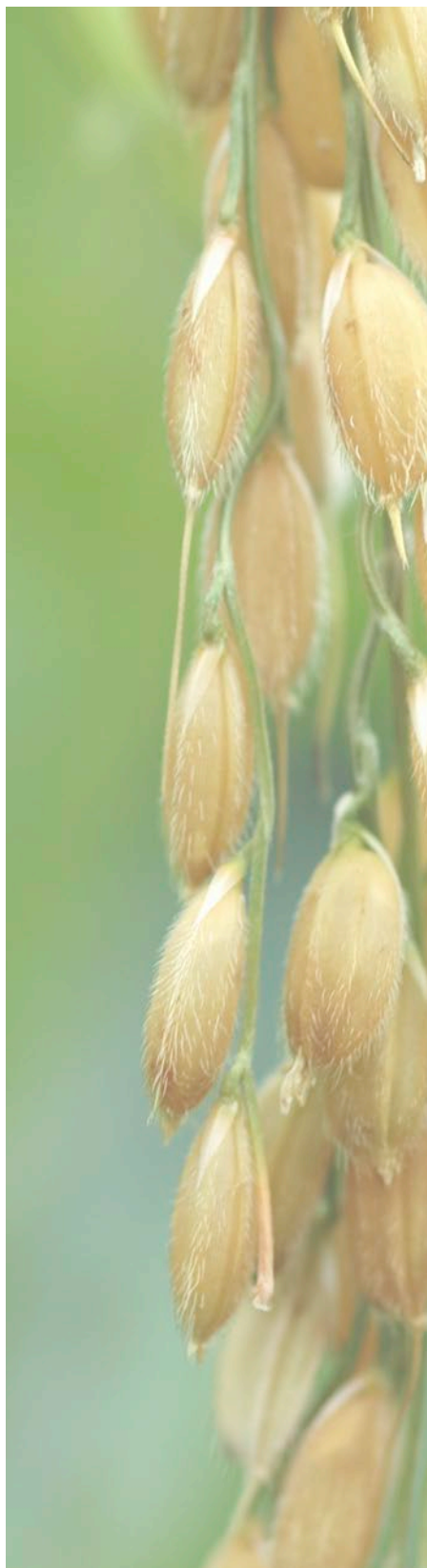
- ▶ *“One of the big ones for me is one that I mentioned about what we really use the neonics on, which is our young trees that are not even flowering. So you know the fact is the bees exposure to neonics cannot be that big in the citrus industry when used on these young trees.”*
- ▶ *“In the case of tomatoes, [in this area of Florida] not even when they do bloom do they get visited by bees. And the pressures that neonicotinoids set aside and allow us to produce are absolutely debilitating to the industry if they’re not controlled and without the neonicotinoids they can’t be controlled. Uncontrolled our industries will not be here very long.”*
- ▶ *“In the case of tomatoes I would say that it’s the fact that the tomato is not a bee-worked crop, period. We do not have bees associated with the production of tomatoes in any way.”*
- ▶ *“I guess it would go back to what [he] said about the use of what we’re applying it to, it’s a small percent [of small citrus treated] it should not be affecting them anyway. It may be producing a quarter box of fruit compared to three or four boxes of fruit. So there aren’t 200,000 flowers on it like there is with a mature tree.”*
- ▶ *“My comment is that if we lose the neonics we’re going to lose a product that is precision applied to the soil in low volumes and replace it with highly toxic, surface-applied, ground-sprayed products.”*
- ▶ *“If you think about what we do, I think you can put 28 ounces now ... figure 28 ounces over 43,560 square feet and you’re taking that and you’re directing that directly to that plant – so it’s not like it’s spread across the whole thing. It is pinpointed, it’s precision and it’s over a large – take 1 acre – take 6 inches of soil and put it in a dump truck or whatever and see how much dirt that is, soil that is, and see how much 28 ounces is compared to that. I mean it gets back to this measurement of parts per trillion and stuff like that – so the amounts being used are just so minimal. The bee is one thing but this is going to people who think the crop protection stuff is bad anyway. We’re putting in a circle this big around a tree where it’s going to your roots and you’re not watering for 24 hours to allow it to uptake and bind, I meant, we take a measuring cup every time we go and set up our rigs to reach a desired amount. They push a button, it’s not out there counting one, two, you push a button I put 8 ounces that’s it – 8 ounces every time. We need it in that spot, it’s not like we’re going everywhere with it. It’s a precision dose.”*

**Location:** Memphis, Tennessee

**Crops:** Cotton, rice

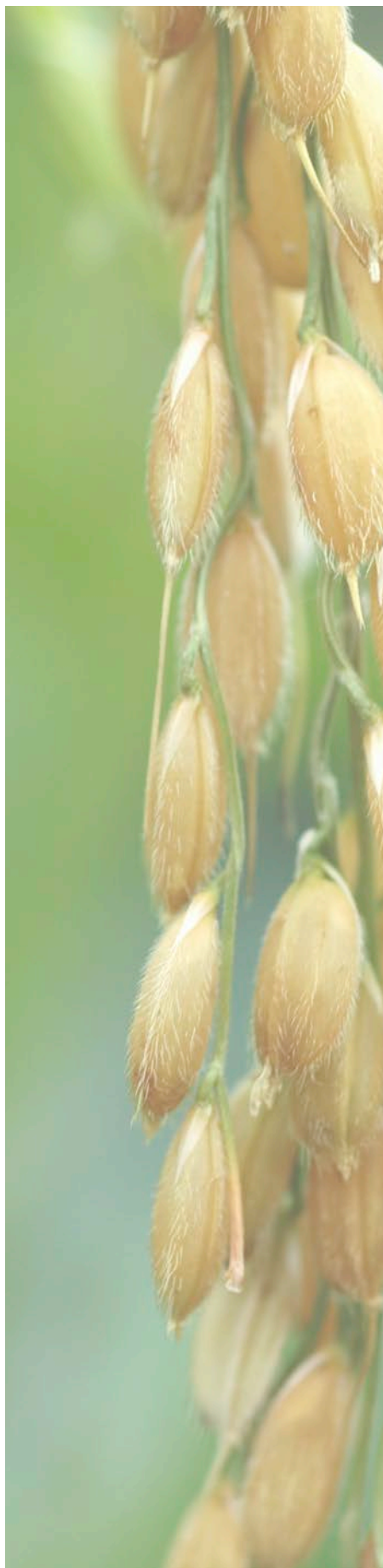
## **“What is the most important message that should be communicated about neonicotinoids?”**

Each bullet is a panelist response to the closing question:



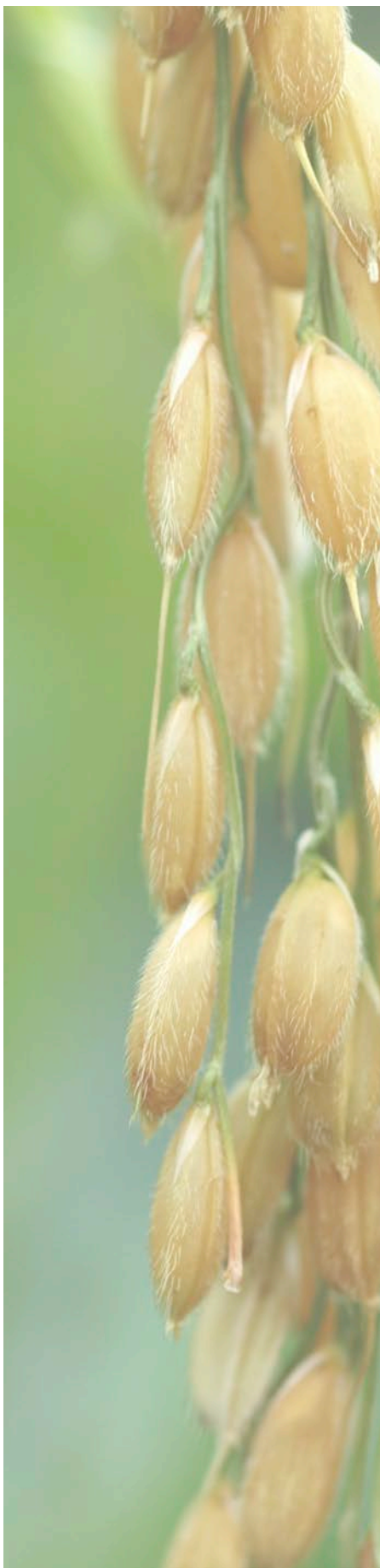
- ▶ *“I have two little girls, and the land in our operation means more to me than anything else and how we take care of it. I have become more involved with what’s going on with our nitrogen runoff because that affects something else that I’m passionate about and that’s saltwater fishing. When you look at that marshland and delta, there is billions of dollars being spent right now on runoff to the Louisiana Delta, as far as treatment and getting us to catch it and filter it. The list goes on and on, but the bottom line is this – how much impact are we gaining from our work versus the impact on bee keepers? The difference in money spent and the difference in impact is even greater. I think it’s the biggest waste of air spent through the mouth. The reason we’re able to implement these programs right now is because of dollars being spent one at a time, when you take away this chemical and rice and cotton you’re fixing to take away a huge environmental impact that we’re trying to fix.”*
- ▶ *“I think the whole reason why the beekeepers are going against us and this insecticide is for money. They’re not going against the environments, they’re not going against anything else that could hurt the bees, they’re strictly going toward the easiest culprit to point fingers at.”*
- ▶ *“This particular chemical structure, when you and I put it out on our farms, it is an extremely low dosage, and it is one of the lowest dosage per acre that I can ever remember using to get a 10-plus day extended period of control. And they just overlook the value of a chemical like that to make a point. Without using scientific data is what they’re doing and that just burns me up. There’s no one that makes us stand back and actually prove what they’re trying to tell us. So we have to prove every iota of everything that we do on a daily basis. I’ve been in precision for 20 years and here we are in precision ag doing those things that tell us – we have data out there, we mine our data, a farmer does, whether it’s yield rate or fertilizer. Yet we don’t get any credit for doing that in agriculture. And here we are busting our buns to do those things that [he] just said for his children and grandchildren to make sure that they have good drinking water and good food supply and we’re preserving the land for their future use.”*
- ▶ *“This kind of comes back to what I was trying to say earlier on, but when we start talking about the impact that is happening, there’s a lot of, just rumor, floating around out there that nothing is based on and it’s a sad day in the world when you go to the EPA with just speculation mostly and you turn most of agriculture right on its ear over something as trivial as some bees are dying. We haven’t seen it. Everybody that I’ve talked to that’s dealt with any beekeeper whatsoever, where are we getting this breakdown in communication? It sounds like there are just a couple of people out there screaming to get attention. Why can’t scientific data speak to what’s going on?”*
- ▶ *“Name me a business in the United States of American that has to first present a plan to an office before they can go act on the business they want to run, then they have to agree to that plan 100 percent, then they have to*





succumb to an audit at any time and prove that they followed that plan to a T, and at the end of the day are still conserving everything that is being forced upon us and we're still using it and keeping the records exactly like they want us to do. My question to the bee association - has anybody put them under a microscope like that, like we are? If I had a question - how much scrutiny are they being put under to prove that this is THE problem, let's just don't do it by the United States, let's break it down by area. Some areas might have laws that are less effective. To make it a global issue off of just some statements of 'neonics are killing bees,' I want to know how much scrutiny they've been put under and how much scientific proof they have and at what levels it's an issue."

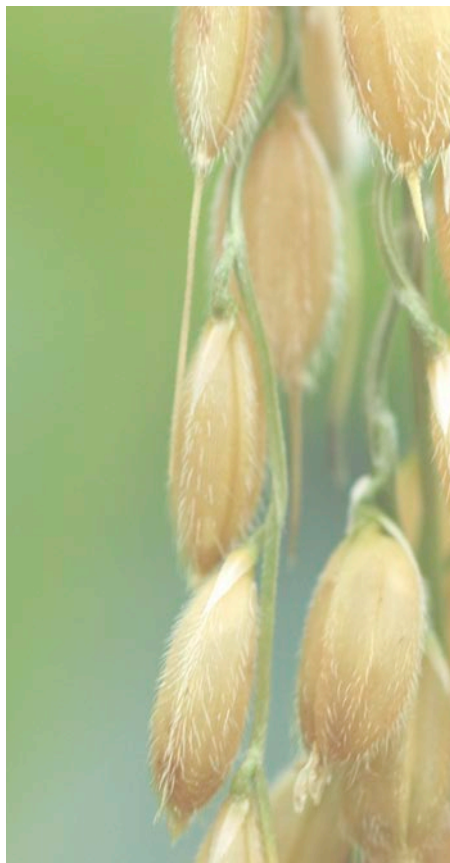
- ▶ "I'll start with a little story first. My mamma's a teacher and she's been a teacher for 30 years now and she went to continuing education ... she got to go to a free course here in Mississippi with the wildlife department, she got to go to a week-long class and one of the days was about bees. And of course you got to realize we're farm people, we're familiar. My mama she's been around chemicals all her life and the first thing that comes out that day about bees is from a little old woman who said 'Monsanto is killing our bees.' The people who are screaming the loudest have the least education. Yes bees are in decline, there's some problems with bee populations and there's several studies that show that the number one reason for bee decline is the Varroa mite. Not only do they attack them but there's viruses and parasites that come with them. The bee association did a study a while ago and they put pesticide as 1 percent of the problem and then five years later - it's not about the facts, it's more of an agenda. [He] said this week that he thought the EPA might give into agenda versus facts. I wonder if we had an agenda, if we wanted one of our good old chemicals from the old days back - it doesn't work like that. My fear is that it won't be about science. The only other thing I would say is there's a few beekeepers screaming loud and we need good beekeepers on our farms to speak up because they're basically sitting on the back fence and not speaking up. There's not as much movement of beekeepers who disagree with the movement."
- ▶ "Typically, most farmers are good stewards to the land. That's the reason we're farming besides we want to make a living. In the profit margin in any area of ag right now, we're not wasting our chemical intentionally putting it on beehives. Our area of contact is our field. I just think farmers are getting the bad end of the deal. There's more economic impact to the good than to the bad."
- ▶ "It needs to be conveyed to the general public that we're good stewards to the land. Like [he] said, we're both on a conservation committee in our county and we're doing everything that we can to preserve the land, much better than my father did 50 years ago. Or I did 10 years ago. So the farmer just always gets the brunt of anything. We're the easy punching bag."
- ▶ "The beneficial insects that are in the field, we don't want to hit anything off target anymore than they want us to. There are insects out there that we're trying to preserve by using this chemical - that's why we're using this because it doesn't hit the off-target insect it hits the pest alone."
- ▶ "We say 99 million acres of corn have seed treatments on it this past year and we have a few instances where we thought a few bees got killed, that's



not even a tenth of a percent of a problem. I mean if we were killing 20 percent, 5 percent every time we put it out then 'Oh wow, we got a problem.' One thing you have to do in a drift situation or anything that happens, it has to be proven by an outside source. If theirs get killed out it's neonicotinoids, there's no proof."

- ▶ "We don't want to spray, that's money, and we don't want to pollute the environment and I would hope that these people that are going to make these decisions make it on good sound science not emotion. And it's not just going to economically impact the farmers but all the way up to the factory workers in the Midwest building the tractors and equipment. We're trying to be better stewards of the environment and they're going to push us back 30 years. It's going to have a great impact on the environment also."
- ▶ "If you use more pesticides that are more harsh chemicals, you're going to have to make more applications with harsher chemicals. So we're going to look at how many different regions there are in trying to quantify this. It's regional. You can't just come up with a single number and say everything in the Mississippi Delta is the same. So the geospatial impact is very important."
- ▶ "If I had a 45-second message you could put out there if you wanted to educate or form the discussion – the buzz word out there in the environmental groups and worldwide is 'sustainability' and I think you might want to try to tie the neonicotinoids to sustainability just economically and environmentally, just like with the Bts and the boll weevil eradication – we got a lot of push-back in the front end but look at the dramatic reduction in pesticide load in the environment that we've achieved by using Bt technology and the boll weevil eradication program. The neonicotinoids have had the same effect by reducing what we were doing previously, what we're discussing going back to, not that we're going to use more, but we're using less than we did previously because it's a low-use pesticide, it's in the seed treatment, we're not putting foliar applications out and it's safe ... it's safe for our employees and it's safe for the environment. It may be counterintuitive to the environmentalists, but it's actually a sustainable practice, it reduces our total output of insecticides and the impact that we have on the environment."
- ▶ "I think they're coming up with every bad thing they can say about this. Nobody's looked at the beneficial side of this family of chemicals, what they've replaced and how we've gotten to this point to begin with and what we have pushed out the door by using these chemicals."
- ▶ "You could go back to what we were using 10 years ago and look at what we were doing just five, 10, 15 years ago, we didn't have these selective chemicals. With boll weevil eradication we've taken away the need to use the really harsh broad-spectrum insecticides and now we're using these selected pesticides that leave our beneficials and allow us to target these specific pests. It's not even where we're going to go with it if they take them away but gains we're going to lose. 'Sustainability' is a key buzzword. It really rings a lot of bells for a lot of people now – the idea that agriculture needs to be sustainable – and this to me, the neonicotinoids are a large part of what's helping us be sustainable."





- ▶ *"I think what we covered on rice today – if we lose the neonicotinoids our cost of production is going to go up, our quality of harvested crop is going to go down, both in yield and milling quality, because some farmers to switch from rice to other alternative crops that wouldn't produce income and if that happens it would severely damage the infrastructure of rice milling in the state of Arkansas and in the same way severely economically damage the Mississippi Delta."*
- ▶ *"Let me tell you about how I met [x], the beekeeper on the farm. He came up to me and said 'I'm looking for a place to put my bees' and I thought it's going to be more trouble than it's worth. And to this day five years later I have not had one incident at all. That honey grown regionally, it doesn't sell here because people just like honey. People have a lot of allergies here in this area and if you take honey from somewhere else it's not going to help, but if you take honey that's grown locally it helps allergies. If there was some way to get word out to the beekeepers that would be excited to have a place. If this goes much farther than it already is, how many farmers are you going to have who even want a beekeeper on their farm."*
- ▶ *"Unless people understand the financial issues of the Mississippi Delta, being a poor area of the country that has little industry – if you take out rice and cotton gins there's no industry in the Mississippi Delta. Zero."*

**Location:** Prosser, Washington

**Crops:** Tree fruits, potatoes, vegetables, grapes

### **"What is the biggest misunderstanding about neonics right now?"**

Each bullet is a panelist response to the closing question:



- ▶ *"That neonics are responsible for beehive colony collapse."*
- ▶ *"Ditto. Bee decline, it's chemistry that's been attacked. And perhaps in some cases for very good reasons, it's misused. There are three principles, one - identify problem, two - select best control mechanism for the problem, and then the third is you implement number two at the right time. And if you can't function on the third then what's going to happen. And it's guys that don't read labels, it's people who don't understand the chemistry they're applying."*
- ▶ *"Yes. Yeah, I agree with the misuse thing. That sparked a huge debate this summer in the [x] program – saying 'well if it's banned in Oregon now we should just ban all neonics in our program and not allow people to use them. And I was one of few people who stopped and said 'That is stupid. The person who did that, that is just a complete misuse and it's nothing to do with how we use the product or how it's used in grapes.' But the people in our program and outside of our programming and marketing and stuff, they didn't see it that way - they saw it as 'it's a neonic, it's bad for bees, you shouldn't be using it period. If you're trying to be sustainable.' I mean the [x] program is sustainable, so as soon as they see something like*



that they think that we're not being sustainable. Another point is, it's just misinformation and mistakes by people in the media. I was just reading a book the other day, and they talked about how important honeybees are to the global economy, which they are, but one of the crops they listed that wouldn't exist in there was grapes, and that drove me crazy because all it takes is somebody reading that and finding out, 'oh what, you mean the wine that I'm drinking is killing honeybees?!' And I'm not saying I disagree with environmental publications that come out, I think that maybe their head is in the right place, but I read some of articles from some publications and you can tell that it's bad science – it's not science, there's just a guy who goes out and sprays something or doesn't spray something. That's hard for us to answer I think."

- ▶ "I think this is just the whole idea of neonics and bees is just an example of a continuing debate and challenge in agriculture which is a general lack of understanding by the public as to how their food is produced, where their food and fiber comes from. And I think the neonic issue is a hot button issue because it's one of the issues related to pesticides that people can understand sort of. What I mean by that is that every kid in every school across the United States both public and private has a couple of lessons on honeybees. And everybody loves honeybees. And so when something comes out that says that a pesticide which people already automatically assume are evil and that if one drop touches them they're going to drop dead even though they drop it on Fido to keep the fleas off their dog and when their kid rolls around on the floor so it's the irony. But regardless, it's the situation we face, in that they automatically have a negative assumption and finally they can make a real world connection with honeybees. And it's a convergence of emotion with a somewhat understanding and you get some crackpot science out there that says there's a hundred percent certainty that this is the cause and it's a real challenge for us in ag. And we saw that, it's a fine example of what, you know you just need that spark to ignite the debate and we had that in Oregon with a store parking lot. And now we're needing to have meetings in Florida and Chicago and here – because that was the spark that we needed to really get things flipped up. It tugs at the heartstrings because everyone knows what honeybees are. I don't think that it's beekeepers that are talking about it as much. You have biased science coming out – and I'm not saying that we won't eventually find that there is an impact of neonics on bees – there very well could be. But right now you can't say that there is, scientifically, I think. And right now you have scientists coming out saying that bees are affected and you know beekeepers have never been embraced by the general public, they're eccentric characters. They operate at night and are kind of the shadows of ag, you never see them in the public eye, but it's just somebody from an environmental organization saying 'Well now it kills bees and boy now we can really drive this home!' and I think that's what really drives it home. Because even a reporter who doesn't even know where their milk comes from or that bees don't make their wine – they think they know everything about honeybees because they studied it in elementary school and so they hear that something's killing honeybees and think 'Oh, that will be a great story!' Because everybody loves honeybees, so that's what I think is the challenge. It's hard to argue against a lack of evidence and a lack of logic."





- ▶ *"I think the thing with the neonics is we're sitting here talking about agricultural products and if you talk to the homeowner, she can go ahead and buy some food elsewhere. I think the other thing is you could've had a couple other people on this board, one being a landscaper – I was talking to one individual today and he said it's amazing the amount of neonics used in landscaping. And now you're starting to even affect the person that's buying the small plants for their condominium. And the other thing you find in the condominium is the little dog. And this product, if it was that detrimental, I mean, it IS for flea collars – a lot of chemistry that we're working with right now, thank God the good old days are gone. And we're working with some new chemistry that we call 'soft chemistry.' And I think that that's just kind of the focus – it's not really on the bee kill. The products that we're using here in the United States are not the products that are being used abroad."*
- ▶ *"To answer the question of whether the use of neonicotinoids affects organics the answer is yes. It's not anecdotal. In our situation we don't farm the bottom with a lot of canyons, so we have kind of layers of alluvial out there. And anyway we're generally, at least on two or three sides surrounded by conventional crop and we have a little canyon or production gap there and for instance, in the carrots. If we're two weeks away from harvest and we have some leafhoppers and aphid out there, we'll generally knock those down because when we harvest those carrots they've got to go someplace. They're going to fly. So we generally knock those down not only to protect the adjacent conventional crops but also the organics that could be in the neighborhood."*

**Location:** San Diego, California

**Crops:** Citrus, vegetables, grapes



### **"What's the most important messages that need to be communicated relating to the potential ban on neonicotinoids?"**

Each bullet is a panelist response to the closing question:

- ▶ *"The pounds of AI is going to increase – we're going to use more pesticides and our production is going to go down eventually."*
- ▶ *"We're listening to junk science and ignoring real science."*
- ▶ *"I'd have to echo the increased pesticide use – be prepared to see an increase in pesticide usage just to get where we're at from point A to point B. Our food supply is safe, clean and there are some things that happen and we just can't ignore."*
- ▶ *"This group of chemicals, this neonicotinoid group, if it's banned, there's a socioeconomic impact on agriculture. It's an impact on everyone and not only the agricultural but as it reaches out there, the length of time that we've had this that it's been effective, in the past 25 years we've become dependent on this to the point where we have these far-reaching ramifications. And how much longer will it be effective? If resistance does rear its head, there would be a socioeconomic impact on everyone."*



- ▶ *"They need to realize that they're not going to have the same quality of produce that they have today – they're not going to have the same quality or the look of produce there. I'm not – that's fine, just get ready for a change in what you're used to."*
- ▶ *"I guess I'd go with the change in the amount of AI. I think that's the biggest one. We're going to have the quality produce and we're going to have to pull it out of the sky from someplace and the only way I know is to spray."*
- ▶ *"Having a citrus tree in your garden is part of the California lifestyle – that might go away."*
- ▶ *"I think someone asked the question – what if there's a pesticide that would replace the 20 most toxic pesticides in the world and would become the number one most used pesticide, replacing all of the other toxins that's less toxic than table salt and safe enough to spray on your pets. Would you support it?"*
- ▶ *"Because we grow organic I see people at the higher income spectrum willing to pay more for the organic fruit because they think it's better. What I would say is without the pesticide, everybody's going to have to pay higher prices, period. You're going to have to pay a lot more money for food than you do now. A lot more. And I don't think anybody can even calculate how much."*
- ▶ *"More pesticides, food prices are going to go up and loss of jobs."*

**Location:** Regina, Saskatchewan

**Crops:** Canola

### **"What is the most important message that you think needs to be communicated to those considering a ban on neonics?"**

Each bullet is a panelist response to the closing question:



- ▶ *"My message is that we recognize that there is a problem in some bee colonies and that we as an industry have taken measures to address that issue. My next point is that we need to point out that the environmental costs of removing neonicotinoids are far greater than those costs of maintaining them."*
- ▶ *"I think the message is very similar but I would put another caveat on there that until there is a better alternative, neonicotinoids should not be banned due to the consequences both environmentally and financially that growers would have upon them by a ban."*
- ▶ *"A crucial conversation needs to be had and that starts with facts, not stories, and there needs to be dialogue in the middle and we need to be the voice of that dialogue. And we're getting the facts from the professionals, the scientists, it's not an emotion and that's why we look at the numbers and at financial economics to support it."*
- ▶ *"I think things are covered and I believe farmers are the stewards of the land, and we respect the future more than what most people recognize because we know the value of tomorrow and without them having an alternative, without them, it is paralyzing, it will be paralyzing to some"*





degree – we all thought it was the end of the world when we lost Counter® (a non-neonicotinoid product - OP) but we had other solutions. I don't see another solution other than doing more damage to the environment than what we are today."

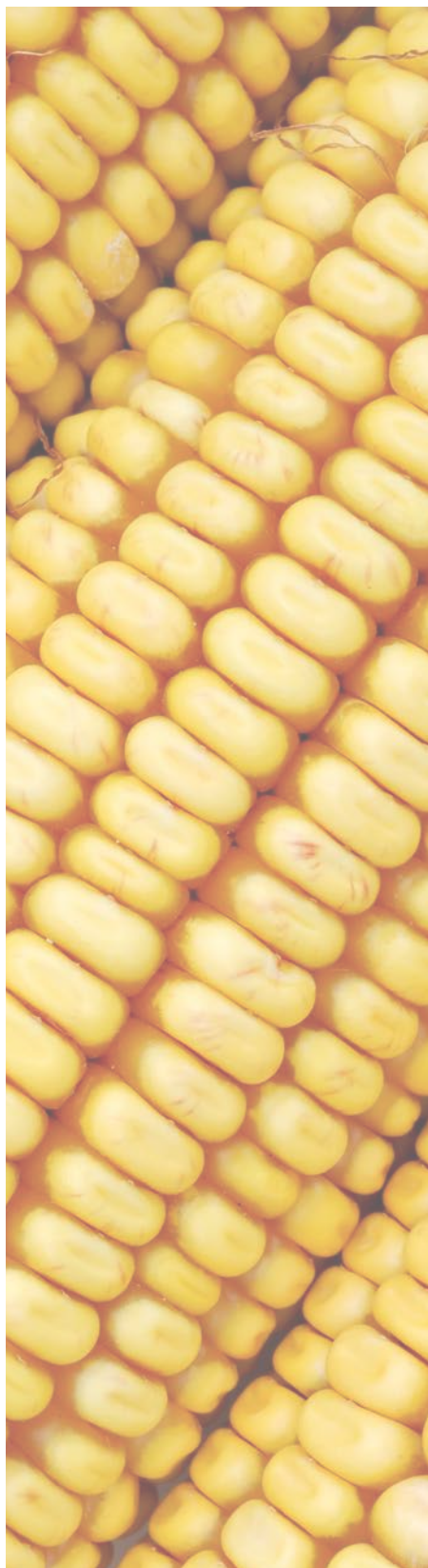
- ▶ "I guess the first thing is that I think, kind of put yourself in your shoes and recognize that there is a problem and focus on facts and research and working to find a solution. There's a risk to having neonicotinoids and recognizing that there are risks, but the benefits far outweigh those risks so I think that I would just recognize that there was a problem and if I was in their shoes and my industry was faltering, that there needs to be more research done, more facts discovered, and then finding solutions to those."
- ▶ "I should've went first because this is really tough now. How it always goes straight into bad mode and you've got to get rid of it and it's more a communication thing between two different groups and making sure that everybody's working together, not straight to ban. We've got to get rid of it because we need the research and all of that stuff. From our end we've got the management – and I'm still young and that's one thing I loved about being on this was learning from you guys, and I actually really value that part, the same with us working together with everybody here. And that's so key in the world, you've got to work together and sometimes it's tough but you've got to battle through it, that's the easiest way it's 50-50."
- ▶ "Many modern day adages come to mind. Be careful what you wish for, the cure may be worse than the disease, and beware the law of unintended consequences. You just can't change one thing without impacting other things, not that it's not all going to be changed some day. But we might agree that it's not the long-term solution or a panacea for control, but we can work toward changing things. As farmers, we believe not only in science but that the scientific society can come up with solutions given time."
- ▶ "We have to make sure that when you say 'The people that are thinking about imposing this ban,' you have to break that out – you have to say, is that the government, is it the environmentalists, is it the mom and pop at the corner store, and the message has to be different to each one of those groups so you have to be careful, but overall, everything has to be transparent, so everybody knows what's going and we have to make sure that the science is honored in its proper place but we have to recognize that nobody makes a decision on science – everybody says they make a decision on science but nobody does. Everybody makes a decision on, like, you might go out and buy a car that has the highest gas mileage but it's red and that's actually the reason you bought it. So you have to be aware that the people who are doing these things have other things involved and if you say 'science-based' people immediately think you're a materialist and you have no soul. And you have to be very aware that these questions evolve around very emotional issues and the science alone is not going to be – you'll be attacked for saying you're scientific. So you have to understand that the values that people make decisions based upon are often things other than simply science. So be transparent so everybody knows what's going on, don't hide anything, and then make the argument based on the idea that you're making a better world."

**Location:** Davenport, Iowa

**Crops:** Corn, soybean

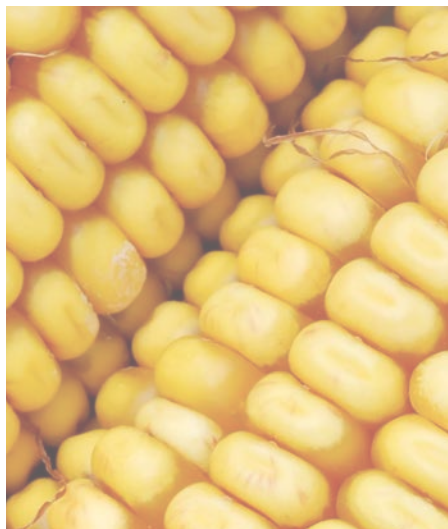
## **“What are the most important messages that need to be communicated?”**

Each bullet is a panelist response to the closing question:



- ▶ *“The benefits are beneficial to the consuming public because they’re probably our best management practice that we have to use. I would say it’s sustainable, yes. It’s our best practice right now for our economics and return on investment and keeping our yields where we want them to be. It’s better than the alternatives. That’s how I feel. It’s probably a lot safer for us to use what we’re using now than go back to the old way. The old way has worked but we don’t want to go back to it.”*
- ▶ *“I guess I don’t totally know that we have proof that we are [killing bees]. It’s really up in the air. Especially in our part of the country, in the corn and soybean area, like I said when we plant corn in the spring the likelihood of seeing a bee in the field is very low. And I scout all summer long, very rare to see one in a cornfield later. And we have hives in our neighborhood and they’ve stayed. There’s a big producer not within 10 miles of us, and he has thousands of hives and he feels that he has to work with us being farmers because he has to use our farms to put them on. So there’s never been a problem.”*
- ▶ *“I know, if you’re talking about when this came out, I’ve known [him] quite awhile and he came out and said they have this new product called Poncho® and it’s going to be a new rootworm insecticide. Well it didn’t turn out to be the best rootworm product on the market but boy, it’s sure a nice tool and I’d hate to go backward on that. When that product came out we were scouting for wireworms and grubs and trying to figure out why corn was missing in the field and we don’t do that anymore.”*
- ▶ *“I don’t know what you do there because you could talk to them for hours and hours about how safe this product is and how much safer it is than the products we used to use and then the headlines in the media would be this product may hurt bees, doesn’t have to prove it, it just has to say ‘May hurt bees’ and then we’re back to the beginning again. Has anybody tried to go through the media for this? Well it’s the same thing that it’s always been – they’ll bring stuff to the farmers and the people in agriculture and they might put it in the farm magazines and everything else but the everyday person that’s causing most of these problems don’t read farm magazines, might read the New York Times or something else, but you don’t see anything positive in there.”*
- ▶ *“What I would say to the people that are questioning it is that I’d like to uncover the facts, hopefully we’d get to the point where we would say that there is truly a cause effect, or [his] comment that there’s no documented connection, and we need to sort through that and then let’s look through that and then let’s look at the facts because if there is a cause-effect then can we manage around that wisely, manage that stewardship responsibility, we don’t prefer that this goes down the path of Furadan (a non-neo-nicotinoid product) which was maybe an overreaction to a very efficacious insecticide and it’s gone – now did we manage through that today without Furadan – we are today growing the crops that we grow without that prod-*





uct. I hope that maybe it would go down the path of the voluntary nutrient management strategy that we're trying to push into the industry today in the state of Iowa, which is managing your nitrogen and your bees on a voluntary basis. We believe all of us are stewards of our business. It's not in our best interest to create a non-sustainable or an ending point for our industry or our business. I think we need to focus on facts or remove some emotion from it and that takes time."

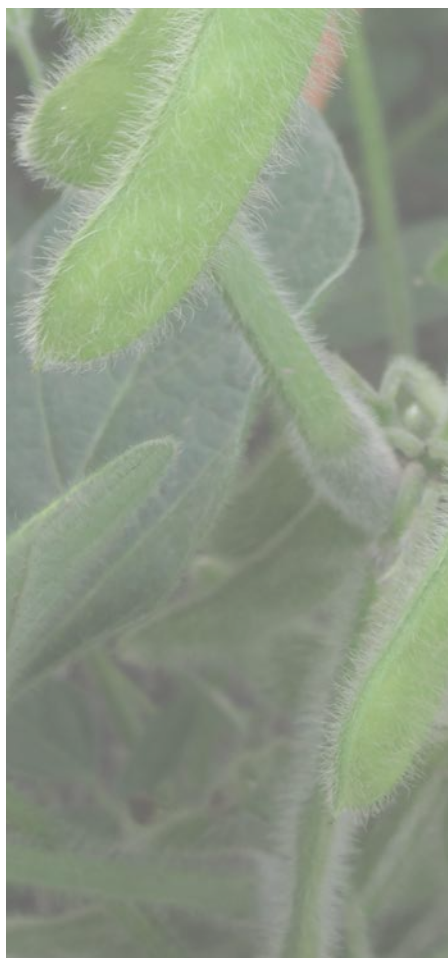
- ▶ "First off, I would say to those individuals that no one cares about the environment more than a farmer does. Secondly, if you take away neonics on my farm where I raise corn and soybeans and cattle, you're going to increase my costs of production and eventually that will be handed down to every single person that derives food from what I raise. On the commodity boards we deal with this all of the time, and one of the things that we really hang our hats on is sound science."

**Location:** London, Ontario

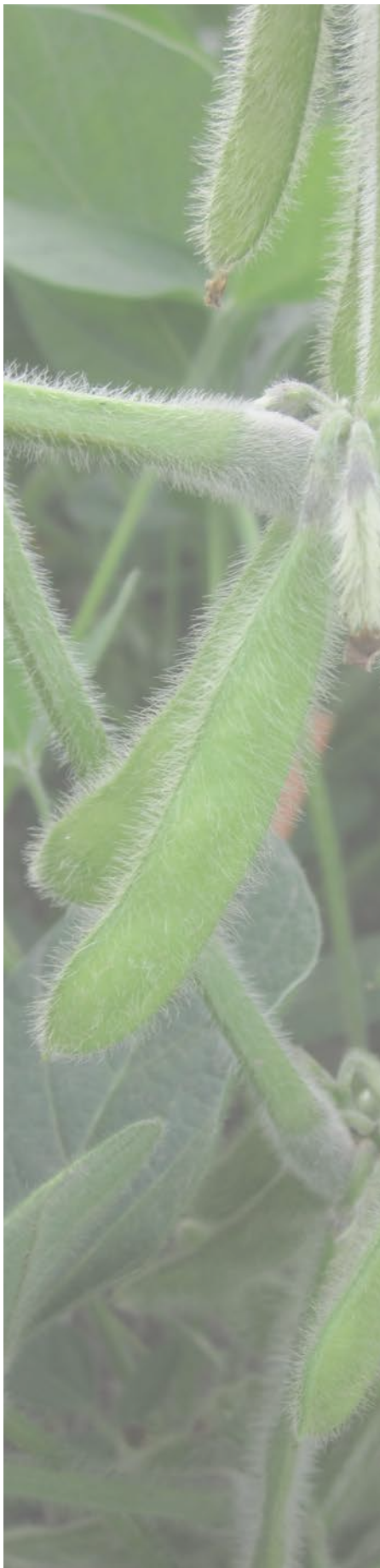
**Crops:** Corn, soybean, dry beans, wheat, peas

### "Those who are interested in banning neonics, what's the message they need to hear?"

Each bullet is a panelist response to the closing question:



- ▶ "If they're eliminated I think the message they should receive is that we're going to see increased use of foliar application of insecticides. And this isn't the way we want to go but it's just what's going to happen. We as farmers don't get up at 5:30 in the morning saying 'We want to get out there and kill those insects!' That is not something we do. It is a last resort we have. But in this case it may force our hand."
- ▶ "At the end of the day I would like to see a lot more genetic resistance to the pest that we're dealing with, whether it's a disease or an insect or whatever, but we're not there yet. So in the interim we need to preserve neonics so we don't go back to what [he] had mentioned and until we get to the next stage where we have internal genetic resistance."
- ▶ "There's always going to be unintended outcomes every time you make a reaction and I guess it comes down to – is this a problem or a dilemma? And problems can be solved – yes or no, get rid of it, keep it. Dilemmas have no answer – you can only flip a dilemma and look for opportunities. And I think for politicians it's a problem, for our critics it's a problem, but for us it's a dilemma and the question is how are we going to flip it. With social media, it's a numbers game, if you have 10,000 people against you then you need 10,000 people with you and so you can't give up on social media."
- ▶ "I think the biggest thing is that we're all in this together. We're all working towards a solution, farmers included. We know how valuable bees are as pollinators and so on and so forth. We need to get through it together, we don't need to point fingers and point blame on certain things. We need to be logical about it."



- ▶ *"We're kind of robbing Peter to pay Paul here, in a certain sense, if you want to get rid of neonics than you're going to kill more bees with the sprays. That's almost a hundred percent for sure. So it makes no sense to me at all to do that, the neonics, I'm sure there's a certain percentage of bees that are dying because of the neonics but I'm sure it's very, very small. And the media has blown it all out of proportion and we need to get the gloves out here and stand up for ourselves and say 'Hey, you guys are wrong. Prove to us with science that we're killing all of these bees first.' And they're not doing it, as far as I can see."*
- ▶ *"I would say if it gets down to a panel vote on this – which I guess it will eventually – but I would challenge that each individual take a good look at themselves and their lifestyle before they pull the plug on it."*
- ▶ *"I guess my thoughts are the bee health working group released their report yesterday and they were a partnership with everyone concerned – I think it was a wonderful partnership to have everyone at the table – and they released 13 recommendations and the bottom one was to consider a ban. Well there's 12 recommendations here that all we need is time to work on, and there's some really good stuff, so why are we automatically jumping to the very bottom recommendation. If we go to that bottom recommendation, there's consequences that not everybody is considering."*
- ▶ *"I think one of the biggest things to pass on is that we're all stewards of the land, we all want to see it improve, we all have family and want to see them be healthy, but I think we all agree that the neonics are still the best solution for all in the community. So, why are we losing them? I think we need them for financial reasons, as well as social, and there's a responsibility here to be safe to our workers and the public and everyone else. To me it seems preposterous that we're facing the possibility of losing them."*
- ▶ *"One thing I can say as farmers is we're challenged with feeding the world and there's a ban on neonicotinoids and production goes down 15 percent, who decides which 15 percent of the population starves to death? We need a science-based solution."*
- ▶ *"The segment of society that's big on promoting this ban is big on the term 'precautionary principle' and there is a corollary to that and it has to do with the challenge of abundance, and it's easy to say that. Basically, we have to promote that side of the conversation."*
- ▶ *"Speaking on the behalf of farmers in Ontario – we produce the best food on the planet on this province and we, the beans that [he] grows, we ship those to Japan and all because a certain portion of that is because of the neonics that we can grow those high quality crops."*