

THE STANDING SENATE COMMITTEE ON AGRICULTURE AND FORESTRY

EVIDENCE

OTTAWA, Thursday, October 2, 2014

The Standing Senate Committee on Agriculture and Forestry met this day at 9 a.m. to study the importance of bees and bee health in the production of honey, food and seed in Canada.

Senator Percy Mockler (*Chair*) in the chair.

The Chair: Honourable senators, I welcome you to this meeting of the Standing Senate Committee on Agriculture and Forestry. We will shortly introduce our witness.

My name is Percy Mockler, a senator from New Brunswick and chair of the committee. At this time, I would like to start by asking senators to introduce themselves.

Senator Ogilvie: Kelvin Ogilvie, Nova Scotia.

(French follows -- **Senator Robichaud:** Fernand Robichaud, Saint-Louis-de-Kent...)

(après anglais -- Nova Scotia.)

Le sénateur Robichaud : Fernand Robichaud, Saint-Louis-de-Kent au Nouveau-Brunswick.

(anglais suit) (Sen. Tardif, Claudette Tardif, Edmonton, Alberta...)

(Following French)

Senator Tardif: Claudette Tardif, Edmonton, Alberta.

Senator Merchant: I'm Pana Merchant, Saskatchewan.

Senator Johnson: Janis Johnson, Manitoba.

Senator Oh: Victor Oh, Ontario.

Senator Unger: Betty Unger, Edmonton, Alberta.

(French follows -- **Senator Dagenais:** Jean-Guy Dagenais, du Québec ...)

(après anglais)

Le sénateur Dagenais : Jean-Guy Dagenais, du Québec.

(anglais suit) (Sen. Enverga : Tobias Enverga...)

(Following French)

Senator Enverga: Tobias Enverga, Ontario.

Senator Beyak: Lynn Beyak, Ontario.

The Chair: Before we introduce Mr. Tim Tucker from Tulsa, Oklahoma, the committee is continuing its study on the importance of bees and bee health in the production of honey, food and seed in Canada.

The Standing Senate Committee on Agriculture and Forestry has been authorized to examine and report on the importance of bees and bee health in the production of honey, food and seed in Canada. As we are aware, bees are crucial for the pollination of commercial plant, fruit and vegetable crops. According to the Canadian Honey Council, the value of honeybees to the pollination of crops is estimated at over \$2 billion annually.

We welcome today by video conference, from Tulsa, Oklahoma, Mr. Tim Tucker, President of the American Beekeeping Federation. The American Beekeeping Federation, ABF, represents 1,200 beekeepers in the United States. Thank you for accepting our invitation to share your knowledge and your opinions with us.

I would now invite you to make your presentation. It will be followed by questions from senators. With that said, will you please make your presentation, sir? Again, thank you for accepting our invitation.

Tim Tucker, President, American Beekeeping Federation: Thank you. I am honoured to be here to offer what information I might to the committee.

Again, my name is Tim Tucker, and I am the current President of the American Beekeeping Federation. We are the largest beekeeping group in the United States currently.

I have been a beekeeper for 23 years. At one time in the early or mid-2000s, I ran as many as 800 beehives or colonies during my experience as a professional beekeeper. Today, it has become more difficult to maintain our numbers of total bee colonies; they have fluctuated from a low of 240 hives that we had in the early spring two years ago to as many as around 500 that we are currently operating. We suffer heavy winter losses each year here in the U.S., and I don't believe that's exclusive just to the U.S.; it's going on around the world and in Canada as well.

Each year, our young queens don't seem to manage to produce enough bees to grow colonies to levels where they would be successful the way we saw them in the 1980s and 1990s. These subpar colonies are always a significant percentage of our production units, and during the year, we either combine them together or these colonies just have to be destroyed because they are just not up to production par levels.

It has become almost impossible to get back to the numbers that we operated at 10 years ago because we are continually replacing lost colonies. The commercial beekeeping industry today

really and truly is in crisis. We do need to find answers before more commercial beekeepers such as myself give up our operations.

We have many variables involved in this when we talk about honeybee health, but we feel as a group, most commercial beekeepers involved in the U.S. feel there are three main factors that we continue to address. Those three factors would be what we feel in order of importance are, number one, pesticides.

There is no longer any doubt that pesticides have been implicated in the deteriorating health of many species, and our honeybees are no exception. The recent international Task Force on Systemic Pesticides has concluded, after reviewing over 800 scientific reports, that the amount of pesticides being used and the manner that they are being utilized are affecting the environment. Individual studies by the University of Guelph have demonstrated that when bees have long-term exposure to these neonicotinoids pesticides, they are much less effective at foraging for pollen.

Nigel Raine, who holds the Rebanks Family Chair in Pollinator Conservation, recently noted in the study that bees have to learn how to navigate in their area. They have to utilize sources when and where they are available at the times of day that they are available, and they have to adapt to the changing conditions in their environment. His conclusions from this recent study were that "exposure to these neonicotinoid pesticides seem to prevent bees from being able to learn these essential skills" and adapt quickly to their environment.

It is not merely coincidental that over the past 20 years, with the increase in the use of these compounds, that many species, from marine invertebrates to insects and birds, have had large population declines. Some species are being so critically affected that they are reaching levels that may make their survival questionable.

The second factor would be varroa mites. This is a widely discussed problem in our field. We have been subjected to the varroa mite now for almost 20 years in our area of southern Kansas and northern Oklahoma. This particular parasite is responsible for a continuous health drag on the honeybee through the damage that it does by attaching itself to the bee's body, but also through the many viruses that they vector.

Viruses can seriously impede the ability of honeybees to thrive as they once did, like we saw in the early 1990s and back into the 1980s, for those beekeepers who have been keeping bees that long. Once affected with one or several of these viruses, honeybee colonies become more susceptible to other diseases and environmental stresses that can dramatically compound the overall effect on the health of the colony.

Third is habitat destruction. Much of the American Midwest has been repurposed from farms that were once small and that employed a variety of livestock and crops to very large monocultural-based or focused mega-farms, where these farms are employing GMO varieties and treating fields with herbicides that destroy most of the competing species that once might have provided a bit of forage for honeybees growing in among the corn, soybeans or other crop.

Before this wide use of Roundup, many species of these plants competed with crops and provided a bit of nutrition not only for honeybees but for other pollinators, as well. Most crop fields today are pristine and totally devoid of anything other than the planted crop that will bloom for a very short period of time.

There is little doubt that the time has come for a proper assessment of what can be done to restore populations of affected species and restore their health. Anyone who has kept bees for 20 or 30 years, or more, will tell you that bees no longer have the resources to display the vitality and the vigour they displayed many years ago.

It is time for all affected parties to work with government to arrive at strategies that will provide for more sustainable practices in agriculture. Governments' involvement is necessary due to the fact that food production is vital to national security and our continued economic growth.

Government must help by discovering better forms of risk assessment for new technologies. Honeybees are super-organisms that do not survive as individual bees; they have to survive at the colony level as this super-organism. Good science will explore the long-term impacts of colonies and not just individual honeybees. Field studies are a critical step in evaluating the long-term effects that may not be lethal to bees in the short-term.

We also need to provide for better management strategies for crop protection where methods other than applications of pesticides in a prophylactic manner are used every year on the same fields, allowing for the build-up of pesticide compounds and their degrading compounds, which need to be evaluated, as well. Utilization of integrated pest-control techniques, where the common goal of all parties is to deploy fewer pesticides into the environment while maintaining economic integrity for the farmer or rancher, is critical.

Government can help to provide strategies for improving habitat so that honeybees have safe areas or zones where they can forage throughout the season, utilizing a variety of flowering sources for nectar and pollen. It will take a defined program of providing farmers with economic incentives to develop these safe havens for pollinators of all types.

Modern agricultural practices are producing large deserts where there is nothing available for pollinators to utilize once the crop has completed its flowering. Safe zones need to be planted with flowering plants that will provide season-long nectar sources for all pollinators, as well as bees. We will benefit by the return of a variety of food sources; a variety of nectar sources is what is vitally critical to the health of the honeybee.

Government should help provide incentives to researchers to find long-term answers to varroa mites or any other pests of honeybees and beneficial species. This research is expensive and does not provide for the economic return necessary to provide incentives for private industry to carry them out. Our industry over the past 10 years has been fighting varroa mites with very few tools, and these compounds are pesticide in and of themselves, and they cause us to put more pesticide and compounds into our hives. We need to provide alternative controls that minimize this issue of contamination of the bees' environments.

We also need to strive for better communication between farmers, pesticide applicators and beekeepers. We should all seek to work together on resolutions to our challenges. Government should begin a forum for these discussions on a regular basis to resolve issues that are beyond the level of beekeepers. We are not scientists or toxicologists.

Protecting honeybees, and all species present in our environment, is in the best interest of all persons everywhere, and protecting the public is the role of governments everywhere.

I thank you for your time this morning, and I will try to answer any questions that you might have.

The Chair: Thank you, Mr. Tucker. We will begin questions.

Senator Tardif: Thank you, Mr. Tucker, for a very informative presentation.

The committee has heard from witnesses about the lack of available forage for bees' nutrition and habitat in a number of regions -- not only in the U.S. but also in Canada. This week, as a matter of fact, we heard from the [Almond Board of California](#). They stressed the importance of diversifying habitat for bee nutrition and health. In your presentation you also mention that the government has to help providing strategies for improving bee health.

Can you speak about the initiatives that are currently in place and how are farmers reacting to these initiatives?

Mr. Tucker: Recently, the USDA made monies available to farmers to increase the forage quality in their pastures by providing them with dollars to purchase seed mixes that will provide for legumes and flowers that would bloom throughout the season to meet the needs of honeybees as well as butterflies and all the species that might exist in and around those fields during those seasons.

It is a five-state program right now for North Dakota, South Dakota, Minnesota, Nebraska and Iowa. Farmers are able to draw on resources that the USDA has provided in order to replant their pastures and improve habitat and forage.

One of the things that came out this year that I was able to participate in this year was a [presidential initiative](#). Our president has ordered all agencies of government from top to bottom to be involved in attempting to minimize the exposure to pesticides and provide better planting areas that will minimize the amount of damage to the environment and also improve habitat for all pollinators around government buildings; around Corps of Engineers sites, which include large dams and reservoirs in our country; and even down to the office-building level, where we can provide for season-long varieties of forage.

Cities have a lot of season-long varieties and shrubs that bloom. So cities provide good forage for pollinators because it is varied. This can even go on to levels where we are talking about individual buildings.

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Comment [1]: <http://www.almonds.com/consumers/about-the-almond-board/overview>

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Comment [2]: <http://www.whitehouse.gov/the-press-office/2014/06/20/presidential-memorandum-creating-federal-strategy-promote-health-honey-b>

Senator Tardif: I want to make sure that I understand correctly. You are saying that there has been a presidential memorandum to create a national strategy to promote bee health; is that correct?

Mr. Tucker: Yes, that is exactly correct.

Senator Tardif: The other point is that farmers are getting subsidies in order to buy seeds that would promote more diversified habitat in five states. Is that right?

Mr. Tucker: Yes, in five states. It is an experimental program. This year, I believe there was \$2 million provided for seed. I do not any how extensively farmers have utilized this resource. That will only play out maybe in another year or two, but we hope they utilize it so that the program can be expanded. We hope that it's a successful program.

Senator Unger: I will start off with a supplementary to the previous question, and then I have another question.

The state of Arizona is primarily desert. In many areas there is irrigation, which creates new communities and many, many golf courses. Is this a viable option for improving the honeybee habitat or would it be cost prohibitive? Would it be something that could be done in conjunction with each other?

Mr. Tucker: Your question is whether golf courses and areas that are aerated would provide the potential for bee forage?

Senator Unger: I am wondering if irrigation, which is so successful when creating new golf courses, could be a solution for these tracts of flowers that need to be planted or if it is too cost prohibitive?

Mr. Tucker: Irrigation is always a high expense item. Most of the initiatives that we are talking about are in areas that are just natural and don't require irrigation. I don't know how beekeepers keep bees alive in Arizona; it is a desert.

However, there are areas in New Mexico that have irrigation like you talk about where they plant a lot of alfalfa, and there are beekeepers that survive on these irrigated areas of the desert.

We have so much land available throughout our country and yours that does not require irrigation, so I think there are probably other areas to divert our attention to and invest our dollars toward.

Senator Unger: That's true.

My next question concerns varroa mites. Honeybees and other pollinators can eventually develop immunity to these chemicals. How long has the current set of treatments been used and how long does it take for the resistance to develop? Are there any alternatives to these chemicals, perhaps new ones that are being developed?

Mr. Tucker: That is a good question. We have been through a variety of treatments and miticides over the past 15 years. The mites always quickly develop immunity to these miticides because they are at such levels that they don't harm the bees. It's a fine line that we walk, but the mites do quickly develop resistance. We only have a couple of effective treatments currently and we question whether or not they are as effective as they were just a year or two ago.

There is a real need for more varied treatments. As you know, if we hit mites with the same pesticide in the spring and fall for two or three years, that even develops a resistance faster than using a variety of different treatments. Maybe different methods of integrated pest management, different tools other than pesticide themselves to help combat the mite and slow the rate of resistance that you are talking about would be helpful.

Senator Unger: There is a research lab in Tucson. I believe that this is some of the work that they specialize in.

Mr. Tucker: Yes.

Senator Unger: Are you aware of anything new or any good news in this regard?

Mr. Tucker: No, I'm not. There is a lot of work being done continually and our honeybee lab in Tucson is occupied by several dedicated scientists who are working to these ends, but it is a complex issue. It takes time and the miticides used by beekeepers are in a small market, so there is little economic incentive for large producers to invest their monies in this. It has to be done at government facilities and it seems to be a slow process.

Senator Unger: Thank you very much.

Senator Merchant: Other than the crops we grow, these pesticides are used by farmers and growers of ornamental flowers. You spoke about the use of Roundup to clear up weeds. It would seem to me that the use of pesticides is everywhere.

First, what can governments do? It is actually the federal government that can impose different restrictions on the use of these pesticides. How do we start when these things are everywhere?

Mr. Tucker: One of the first steps would be education. There is a real need amongst pesticide applicators, farmers to understand that it's best to utilize amounts of pesticides that are the minimum necessary to control the problems.

These new seed-treated pesticides that are systemic in nature are a prophylactic use. In other words, every stalk of corn or soybean field is completely treated with pesticide even though there may not be a need for that treatment that particular year due to infestations of pests.

At the ABF, we have not called for a ban on these pesticides because we recognize the importance of protecting crops. Prior to my beekeeping experience, I was in the pest control industry for a dozen years, eight years with my own pest control company. We recognize that we

can't totally do without these tools, but we have to use them wisely. We have to educate the applicators on how to use them effectively and work toward minimizing their use instead of treating every nursery plant that comes outside of the nursery with these pesticides that will bring protection for a year or two. That is overkill in our examination of the problem. We need to return to more sound and practical applications to minimize all species that are out there in the environment because these pesticides are being expressed in pollen and nectar, and we believe that is a large part of our problem.

Senator Merchant: Second, you mentioned some of the studies that have been carried out. We had a guest here last week, an assistant deputy minister from the province of Saskatchewan, and she made reference to a study that is being carried out by people in Saskatoon and at the University of Saskatchewan. She dismissed their findings. They found that wetlands in Western Canada were contaminated by neonicotinoids and the resulting drop in bug population was bad news for the birds that eat them. They have even found that the neonicotinoids are affecting earthworms. All species, all animals seem to have difficulty because of the pervasive use of neonicotinoids. She dismissed the study because she said it was to have been a four-year study but they released their study after only one or two years.

The studies that you have made reference to, how long do these go on before we can accept their findings?

Mr. Tucker: That is a good and valid point. I think you are referring to the main **Headley Peru study** done on the wetlands of Canada. With all things involved in the environment, I would agree that one year is a limited scope to be examining things with regard to pesticides and neonicotinoids but it is a start. These things should be explored long-term.

One of the problems is that the beekeeping industry doesn't have a long-term picture anymore. We are losing professional beekeepers every year. I think in the long term, the honeybee and most of these species will survive this deluge of pesticides and loss of habitat and climate change. There are a dozen variables involved. They are very adaptable and long-term they will survive, but what is not surviving well is the commercial beekeeping industry. If we lose this industry, it will be very difficult to pollinate all the almonds in California. It will be very difficult to produce the seed that we need internationally to feed a world.

So commercial beekeepers are necessary to provide the numbers of bees to make our food source available to us, and we can't really stand by and let this industry go down the drain. We have to consider studies that have been done for a year, and we need to have these scientists reproduce these results. That's a good point.

(French follows -- **Senator Dagenais:** Je vous remercie, monsieur Tucker. Vous me...)

(après anglais -- good point.)

Le sénateur Dagenais : Je vous remercie, monsieur Tucker. Vous me corrigerez si je me trompe, mais je crois que le département américain de l'agriculture a mis en place un programme d'aide, entre autres, pour les apiculteurs en cas de catastrophe. Je crois qu'ils avaient jusqu'au

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Comment [3]: <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0092821>

30 septembre 2014 pour s'inscrire. Est-ce que vous êtes au courant si certains de vos apiculteurs ont profité de ce programme d'aide et en quoi ce programme consiste t-il?

(anglais suit) (M. Tucker : Well, it's a very good program for reimbursing ...)

(Following French -- consiste t-il?)

Mr. Tucker: Well, it's a very good program for reimbursing beekeepers for losses. It's kind of an insurance program, and while I have not participated in it, I know several beekeepers that have and that are utilizing the resources available, which has been provided to them to replace and rebuild the hives that they've lost. It's another valuable tool that the USDA is providing to beekeepers. There's no doubt that areas of the country that are experiencing extreme drought this year, with high temperatures that are making it difficult for the bees to reproduce and find honey sources need assistance. There's no doubt that this is a good program.

I'm not aware of the total beekeepers or even what a percentage would be, but it's a significant amount of commercial beekeepers that do utilize that program.

Senator Enverga: Thank you for the presentation. I know that your government has this program. Have you seen any results lately, just a small result that would indicate this program is good or it could be doing a better job for bees? Have you seen any small benefit or anything particularly positive that is being achieved by the program?

Mr. Tucker: Well, I wish I could answer that with a resounding "yes" and here is what it is, but most of the initiatives that are coming into play have been very short term. I think the ELAP, or the emergency assistance program has been in play for other commodities and it's a good program. I think it will be a good program for beekeepers.

I think the pasture improvement, the seed program that will allow farmers to re-establish stands of clovers and beneficial legumes in their pastures will be of good assistance to our industry, even to their cattle. I don't see how it could be a losing program for anybody involved.

Senator Enverga: Okay. I know that the U.S. has wild bees and Canada doesn't. Basically, our bees are more like temporary foreign workers because they are just temporary.

On your end, have you seen any differences between the losses of the wild bees and cultured bees that you have been using, the commercial bees? Is there any comparative analysis on that?

Mr. Tucker: Well, in the 1990s, the varroa mite and the tracheal mite virtually eliminated wild bees in the U.S. There are very few of what we call feral colonies, but we have noticed in the last couple of years that there seems to be a few around, where in the early 2000s, 2001 to 2005, there were almost no feral bees. We are getting calls now from people who are having swarms in their yards and in their buildings far more than we did for 10 years. There's a little bit of a rebound in that. I don't know what that's attributed to.

In our operation, we have seen a total almost disappearance of the tracheal mite. We are seeing very few tracheal mites compared to what we saw in the 1990s. We also see with the varroa mite that they don't seem to be as virulent or as destructive. This is called varroa destructor because in the 1990s when we first saw it, it totally eliminated beehives. At this time of the year, we would have very healthy hives that would collapse under this varroa stress. We are not seeing that to a large extent every year now.

So there may be a natural rebound in hives that are escaping from kept bees, bees that are maintained by commercial beekeepers and hobby beekeepers. Then those are, in turn, swarming in the spring and maybe having a little bit better odds of survival because of this lack of existence of the tracheal mite and what we see as maybe a decreased virulence of the varroa mite.

Senator Enverga: Could I conclude that it looks like wild bees have sort of adapted to mite infestations?

Mr. Tucker: Sort of. It's difficult to say whether bees are going to be here next year. They're a very fragile organism, and what bees may be there this year and able to swarm may not be there next year. Studies have concluded that in the long run, if you don't treat bees and you don't take care of them, in three to five years they will all be dead. It takes a lot of input.

Senator Enverga: Thank you. I have one last question that is more about the mites. Have you tried biological pesticides to kill mites? Have you used any biological weapons against these mites?

Mr. Tucker: No. That would be a good thing to explore, though. I don't know if there's any current research along those lines. There are people using a variety of essential oils and integrated pest management techniques that would involve screen bottom boards, the paint colour on the hives, trying to elevate the temperature to make the mites' reproduction rates slow. There are a lot of theories out there that some beekeepers are finding that work for them in their areas.

One of the truest statements about beekeeping is that all beekeeping is local; what works in Indiana may not work in Arizona or Utah or Florida. The differing environments and the availability to nectar sources and pollen sources vary in 50 miles. We have bees that are spread out over about 70 to 80 miles, and we see a difference in the health and in the colour of the honey and the amount of pollen in the hives just over a short distance of 30 to 50 or 60 miles.

It's a very complex problem, and what works for some beekeepers in the United States may not work in Eastern or Western Canada. It's very specific.

Senator Enverga: Are you saying that moving bees from one place to another is not a good idea because the bees are local? I've heard about bees moving from one state to another or from one location to another. Is it not viable or less productive to do that?

Mr. Tucker: Well, moving bees is a stress on them. There's no doubt that it provides problems for the queens and it provides problems for the bees in reorienting themselves when they get to

the new location that they're going to, and it's a definite stress. The thing is, we've been moving bees around the country to pollinate crops for 50 years, and we've not seen the problems that we're seeing just in the last 10 to 14 years. So something has changed, and that's not a factor. You mention a good point, but it's a very small consideration. In other words, do you have any experience with raising beehives near crops in which the application of the pesticide was other than through a coated seed?

Mr. Tucker: Oh, yes. Anybody who's been in the beekeeping industry for 25 years was in that exact position prior to about 2003, 2004 and 2005 when imidacloprid began its widespread use and clothianidin in Kansas. We kept bees close to agricultural fields, especially on soybean and cotton as long as we were notified that they were going to do a foliar application and could move the bees or not be there, or maybe delay the treatment until after flowering and get our bees out. We worked very well with farmers and ranchers.

Now, escaping the seed coating is nearly impossible in the Midwest. Last spring we had a corn planting season where the corn came up three or four inches tall, froze out. We had a late freeze, and they replanted corn. Almost 80 per cent of our hives were affected dramatically by that second corn planting.

Senator Ogilvie: Right. I'm familiar with the last 20 years, but I was referring to the last, say, 10 years and specifically to the application of neonics. Prior to the neonics, pesticides were generally sprayed, but I'm looking at a contrast in the actual use of neonics.

In other words, the reason I'm asking is -- and I'm not going to go into it in detail -- there's a unique application of talc to pre-coated seeds and there's evidence that talc carries off neonics in a high concentration from the seeds. I'm not going to get into that part with you. I will save that for experts we have coming.

My question to you, from a practical experience, is in the last 10 years have you raised any beehives near major crops in which neonics were applied in, other than a pre-coated seed form?

Mr. Tucker: No. I don't know where that condition exists in Kansas or Oklahoma where we keep bees.

Senator Ogilvie: Thank you very much.

Senator Oh: Mr. Tucker, my question will probably touch on some of the previous ones. You have 32 years of experience as a professional beekeeper. When we are moving the colonies around, sometimes we hear that it's from state to state or province to province. The nutrition and the variety of bee health diets have also been identified as a stressor. Can you tell us a little bit more about losing the nesting place and resources for bees as a stressor? And of course the bee management of moving the colony from place to place is also part of the stressor.

Mr. Tucker: Yes, it is a definite stressor on the bees. However, we have been doing that for a long time, and by providing supplemental feeding, such as sucrose syrup and pollen or protein supplements, bee health has in the past been maintained. There's no doubt that when we move

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Comment [4]: <http://www.animalhealth.bayer.com/4894.0.html>

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Comment [5]: <http://scientificbeekeeping.com/a-new-large-scale-trial-of-clothianidin/>
<http://www.bioone.org/doi/abs/10.3954/1523-5475-24.4.177>

bees we'll lose a percentage of the queens, so beekeepers that move bees have to go through very quickly after moving their hives to examine queen loss and make sure that the brood cycle is not interrupted by replacing those lost queens with new queens very quickly. It takes a lot of management to perform this task of pollinating different crops. But some of the crops, such as almonds, in some years provide ample supplies of pollen and nectar to really bring the bees up very quickly.

When I went to almonds in 2007, our bees came out of the almonds just busting. They were very healthy. When we got them back to Kansas, we made two and three splits out of each hive. They were very healthy that year.

But again, it's the season. We heard that some bees came out of almonds this year in good shape. Some came out in horrible shape, so this moving is a stress on bees.

Senator Oh: How far is the longest distance you move the beehives?

Mr. Tucker: I have a friend who moves bees from Florida all the way across the country, in excess of 3,000 miles, to pollinate almonds. I believe they're on the road for three or four days.

Senator Oh: That's a lot. That's a pretty long distance.

Mr. Tucker: It's a long trip for anybody.

The Chair: Mr. Tucker, as we conclude, the chair will recognize Senator Dagenais.

(French follows -- Senator Dagenais: M. Tucker, je crois comprendre....)

(après anglais – The Chair -- the chair will recognize Senator Dagenais.)

Le sénateur Dagenais : M. Tucker, je crois comprendre que les pesticides contenus dans les semences ne sont pas toujours nécessaires en aussi grande quantité. Sur une base économique, est-ce que les agriculteurs favorisent l'utilisation des semences qui contiennent moins de produits chimiques? Si ce n'est pas toujours une question de coûts, est-ce qu'il s'agit de la disponibilité de ces semences?

Le sénateur Robichaud : Vous posez là une bonne question.

Le sénateur Dagenais : Merci, sénateur Robichaud.

(anglais suit) (Mr. Tucker: As far as I'm aware, the vast ...)

(Following French -- Senator Dagenais -- Merci, sénateur Robichaud.)

Mr. Tucker: As far as I'm aware, the vast majority, way in excess of 80 to 90 per cent of seed provided today by our seed supplying companies, are treated seed. It's very difficult to get a hold of seed that's not been treated, but this needs to be made available because as I think you're discovering in Canada, with the accumulation of these neonicotinoid pesticides, as they build in

the soils, there may be enough protection there without the seed coating this year to provide protection for that plant for the season.

It needs to be looked into and see what kind of soils, under what kind of conditions that these pesticides persist and where that field would provide a level of protection without the seed coating and putting more pesticide on top of more pesticide.

That's a consideration we need to look into. How long are they persisting and what types of soils? What areas of your country and ours? And do testing to see if those treatments are even necessary, and then the seed companies need to provide seed that's not treated.

The Chair: That said, we hear, Mr. Tucker, there's a scientist in the United States by the name of Noah Wilson-Rich who studies bee diseases and has suggested a possible solution to bee health decline, and that would be urban beekeeping.

The committee would like to have your comments on whether you think it is possible that the United States and Canada could develop urban beekeeping industry and/or if this would enable to outweigh our losses? What would be your comment on that?

Mr. Tucker: If I understand your question, you are saying that urban beekeeping would be a solution to our losses by keeping more bees in urban areas?

The Chair: Right.

Mr. Tucker: Non-agricultural areas?

The Chair: According to a scientist by the name of Noah Wilson-Rich from the United States.

Mr. Tucker: I'm not familiar with Mr. Rich. I can only tell you there need to be strategies developed that will allow for the replacement of all of these lost hives every year. And do so at a more economical cost. Because of the demand, we just can't provide enough colonies to replace all these that are lost. We need to focus part of our industry on that aspect and replacing these hives, whether we do it in an urban environment or on wild native lands. Our government owns a lot of wide open spaces that are non-agricultural.

The Chair: On behalf of the Senate of Canada, the Standing Senate Committee on Agriculture and Forestry, we want to thank you for you taking the time, which I have been informed by the clerk is a couple of hours -- an hour from where you are and another hour to set up. Thank you very much for sharing your thoughts and also your knowledge with the committee.

Honourable senators, I now declare the meeting adjourned.

(The committee adjourned.)

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Comment [6]: https://www.ted.com/talks/noah_wilson_rich_every_city_needs_healthy_honey_bees?language=en