

Research priorities for beekeepers in Alberta



The Alberta Crop Industry Development Fund (ACIDF) is preparing to fund a significant amount of agronomic research in 2014-15. In recent months, we've been asking producers, researchers, agronomists and others which areas they consider the highest priority for that work. As these bee industry stakeholders explain, bee health and nutrition, pest and parasite control and improved bee management rank high.

When Grant Hicks looks to beekeeping's near-term future, he sees a world of opportunity. Whether as pollinators or honey producers, bee demand is increasing and this growth potential extends far beyond hybrid canola seed production.

"The fact is, the blueberry sector *alone* needs four times as many colonies in the next five to seven years," says Hicks, President of the Alberta Beekeepers Commission, who manages bees for pollination and honey near McLennan, Alta. "They could double the crop of blueberries, but right now they have half the bees they need. For us today, it's all we can do just to maintain our colony numbers. We have to find more efficient ways to pollinate with the colonies we have -- or get our colony numbers up."

At one time, increasing colony numbers might have been straightforward. Not anymore. Over the past decade, Alberta beekeepers have been severely tested by a variety of threats to honeybees. These include varroa mite and diseases such as *nosema* and chalkbrood. With bee health hindered by these factors and others, many Alberta beekeepers experienced annual winterkill rates of up to 50% in recent years.

For Hicks, there's no mistaking what should be a priority area for bee-related research in the coming years.

"The number-one issue in Canadian beekeeping is control of varroa mites," he says. "There are also eight or nine viruses that are vectored-in by varroa mite. We need to have a product that can wipe out 95% of mites when it's applied. We're on our third product in the last 15 years. The first lasted three or four years before resistance developed. The next product worked for three or four years, and then you saw resistance developing."

For now, fingers crossed, the third miticide is holding its own. This product is managing varroa mite, in Hicks's estimation, *without* evident signs of resistance. Still, based on past experience, he believes beekeepers may be living on borrowed time. In fact, he'd like to see a *choice* of effective miticides with different modes of action. This would allow beekeepers to rotate their use and avoid resistance pressures.

That points to another issue on Hicks's mind. He believes the industry needs to know more about the complex mix of environmental factors to which bees are exposed.

"Alberta Beekeepers *are* working with governments to ensure we have good bee habitat," he says. "It's only one example, but do we need to be spraying *everything* on our roadside clearances?"

Hicks looks forward to researchers digging into these and other issues. Years from now, he'd like to be able to tell a blueberry grower: *no problem, how many hives do you need?*

Focus on bee health, equal time for leafcutters

Over the past decade, Brian Slenders has watched the devastation experienced in honeybees with great concern. He manages leafcutter bees near Brooks, Alta.

Leafcutter bees are so named because they cut the leaves of plants to make nest cells. They are the only bee capable of pollinating alfalfa, and thus have become indispensable to Alberta's alfalfa seed production industry. Leafcutters can also pollinate canola and blueberries.

While Alberta's leafcutter bee populations have not suffered the way honeybee populations have, Slenders sees no reason for complacency. He's calling for vigorous research into issues affecting the health of leafcutter bees. A key priority is to learn more about the impact of pest and disease control products on bee health – and not incidentally, on the health of beekeepers themselves.

"I'd like to see a holistic approach to making the whole industry safer," says Slenders. "We are spraying poison out there, and we understand that, but what are the effects? How safe is it for bees and for us? Longer term, I'm looking at bee health and anything we can do to improve it."

Parasite and pest control are everyday issues for beekeepers like Slenders. The products that are available can be effective, but are often unpleasant for applicators to use and too few in number to offer producers a worthwhile rotational choice. Slenders believes more study of application timing and rates would also be beneficial.

Assuming these immediate issues are addressed, that might allow beekeepers and researchers to look further into the future. As Slenders sees it, we've barely scratched the surface of how new technology could advance leafcutter health and productivity. Could Near Infrared technology allow for scanning of bee cells? Could bees be used to apply fungicide to a crop?

Slenders thinks it's time to get busy on these issues, and would like *his* bees to get a fair slice of research budgets compared to those *other* bees.

"There's been a huge amount of focus on sickness in honeybees, but they're a completely different species than leafcutter bees," he says. "The entire honeybee genome has been sequenced, but we still don't know the best nectar for leafcutters."

Building institutional expertise for bee research

Based at Agriculture and Agri-Food Canada's Lethbridge Research Station, Shelley Hoover has been working closely with Alberta beekeepers for the past three years. Her position was created and is funded by a one-of-a-kind collaboration involving the Alfalfa Seed Commission (Alberta), the Alberta Beekeepers Commission, Alberta Agriculture and Rural Development (ARD), seed companies and ACIDF.

"In terms of beekeepers, the number-one issue for the last 20 years is, they need better mite control," says Hoover. "They need a new miticide, and they need to make effective use of other options for mite control."

Hoover identifies parasites, pathogens and bee nutrition as research areas that would benefit beekeepers. She advocates attention on which crop mixes, in the field or as buffers between fields, could help support managed bees and wild pollinators alike.

More broadly, however, Hoover wonders who's available to do all this work. Despite the importance of pollination and honey to Alberta, qualified academics are thin on the ground. Just as important, Hoover believes Alberta lacks sufficient qualified personnel for technical support of research projects and the capacity for training people for these critical roles.

Whatever issues need to be solved within managed bee production, in Hoover's view, the province's shortage of bee-related academics, researchers and technicians will need to be addressed as well. Greater exchange of information between Alberta and other jurisdictions – within and outside Canada – would help.

It's no secret that honeybee populations have been severely stressed in recent years. Queen bees have been imported from places like Hawaii and New Zealand to help fortify bee numbers. This is a short-term remedy for what Hoover sees as a longer-term need.

"Personally, I'd like to see a return to the bee breeding program that used to be in Beaverlodge," she says. "The bees we're importing are relatively pathogen-free, but along with that, they are also

relatively susceptible to disease here. A breeding program could select for stock that works well in our environment, even if that stock ends up being propagated overseas.”

The bee industry normally doesn't get much media attention. In recent years, however, the crisis affecting honeybee populations has been taken up by mainstream media, bringing bee issues to a mass audience. As Hoover sees it, the bee industry should seize this moment and make the most of it.

“We need to capitalize on the fact that bees have been in the media a lot,” she says, “not only to gain support and research dollars for the industry, but for proper recognition of what the industry contributes.”

Beekeepers or bee-ranchers?

The challenges faced by Alberta beekeepers in recent years have been well documented. Even so, take a few steps backward and it's clear the industry has a lot going for it.

“Alberta beekeepers are a lucky group,” observes David Drexler, principal of Calgary-based Researchman Consulting. “Alberta has about 40% of Canada's beehives, with canola being a big part of this, as well as some excellent researchers and infrastructure.”

In 2013, one study estimated the economic impact of canola in Canada at \$19.3 billion. Without a strong population of managed bees, hybrid canola seed production would not be possible.

As one priority, then, Drexler believes the relationship between bees and canola must be recognized, studied and strengthened in the future.

“The contribution of beekeepers in Alberta has been extraordinary,” he says. “Canola is a reasonably good forage for bees and it is a really good honey crop. What we need is a greater understanding of the special stresses that pollinators of canola experience.”

Specifically, Drexler advocates a more systematic focus on issues of bee health and nutrition. He proposes that a baseline of bee health in Alberta be developed, implemented and monitored over time.

“The best investment for beekeepers is control of parasites, in particular varroa,” he says. “The second-best investment is understanding and improving bee nutrition.”

Finally, he'd like to see greater attention paid to developing and communicating best practices for bee production. This would enable smaller producers to emulate the successful management approach of the industry's larger operators.

“Beekeeping in Alberta is the definitive 80-20 rule,” says Drexler. “You have most production coming from commercial producers with 300 or more hives, and they operate their businesses similar to a livestock operation. On the other hand, you can be a beekeeper without any training. You can become a commercial beekeeper without a license. As a result, nobody does things the same way as the next guy.”

Alberta has many built-in advantages for bee production. According to these industry stakeholders, sharper focus on bee health, nutrition and parasite management, greater academic depth and more systematic training for beekeepers, among other issues, could help Alberta maintain or extend its position as the dominant player in