

The Traveling Beekeeper



AN INTERVIEW WITH DR. MEDHAT NASR ABOUT BEEKEEPING IN ALBERTA, CANADA

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As the Provincial Apiculturist in Alberta, Dr. Medhat Nasr brings to the province a wide range of professional beekeeping experiences. Born and educated in Cairo, Egypt, Nasr did his graduate work at the University of California at Davis under Dr. Christine Peng, but also worked closely with Drs. Harry Laidlaw Jr., Robert 'Rob' Page, Jr. and Robin Thorp. Prior to moving to Alberta eight years ago, he worked in Ontario with the bee breeding program (searching for resistance to both tracheal and varroa mites) and at Rutgers University, New Jersey, USA.

Describe beekeeping situation in Alberta

The Canadian Province of Alberta ranks second in the size of the beekeeping industry behind California. For the past 10 to 12 years, the number of colonies has increased 5-10% each year; in the past twenty years the colony count has gone from 135,000 to 255,000 in 2006.

During the past three years there has been harsh winter weather, with about 30% of honey bee colonies dying, which coincided with CCD in USA. However, in Alberta the losses were due to three factors—the general failure of chemical controls against varroa mites, the problems of Nosema and very harsh winters. This caused a reduction in colony numbers to 225,000 in 2007, but with various proactive programs, the colony numbers are expected to reach 265,000 in 2010.

There are 700 beekeepers registered in the province, of which 113 are rated as commercial—having 500 hives or more. This makes up 225,000 hives or an average of 2,000 colonies per commercial beekeeper. The remaining beekeepers are rated as sideliners and hobbyists. Hobbyists usually have less than 100 hives. There are fewer than 50 beekeepers operating between 100 to 500

colonies and they are considered sideliners. This distribution gives a bimodal distribution with one peak around 10 colonies, and the other around 2,000. The smaller beekeeping operations are concentrated around the two large cities in the Province, Calgary and Edmonton.

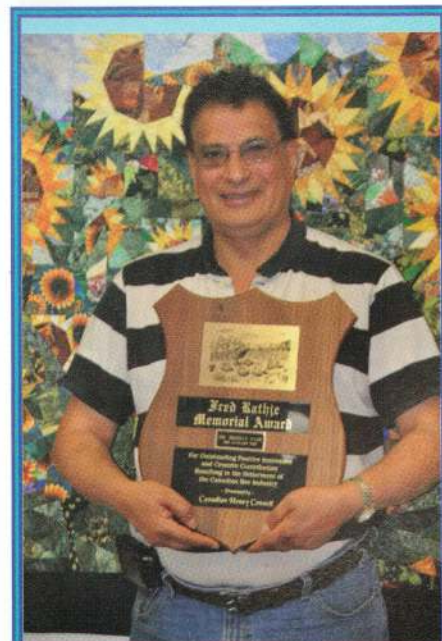
What is the economic value of the industry?

During the past five years the total income from beekeeping has been 50 million Canadian dollars per year. There were and additional 10-15 million Canadian dollars per year paid for pollination services to the beekeeper for rental for hybrid canola certified seed production. Between 65,000 to 75,000 hives are rented for this pollination, and the beekeepers are paid based on colony strength, between \$110 to \$165 per colony. For the top payment, a beekeeper has to provide a colony with 16 frames of bees and a minimum of 10 frames of brood. The pollination season for canola is from the third week of June to the end of July. It is possible for individual beekeepers to make over a million dollars a year from canola seed pollination.

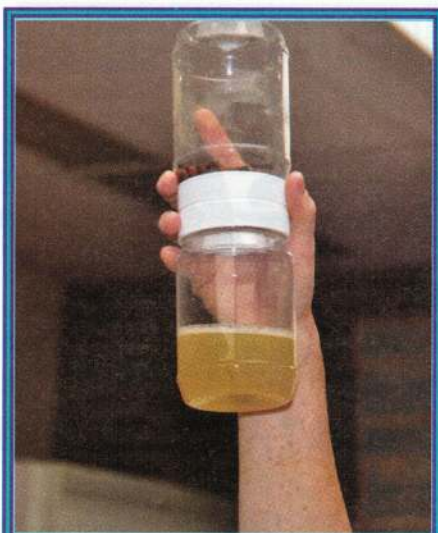
Certified hybrid canola is a specialty crop developed by several high tech companies, including Bayer, Pioneer Hi-Bred, Monsanto and Hytech. The crop has been genetically modified for both herbicide, disease resistance and high yield. The seeds are treated with imidacloprid for crop protection during development. In other parts of the world this compound has been linked with Colony Collapse Syndrome, but in Alberta, the winter kill on bees moved to canola pollination has been less than 15% per year, compared to 30% for colonies not placed onto pollination. Some of this difference is undoubtedly due to the better beekeeping practices, stronger and healthier colonies

used for this seed production, plus the milder climate found in central Alberta. The winterkill increases as you head north to the Peace River, where there is 45%. We have evidence that stronger hives are able to deal with stressful field conditions better than weak hives.

Colonies used for hybrid canola production only average 40 lbs of honey per colony where there may be a colony density of two to three colonies per acre. This is compared to the average honey production of 140 lbs



Dr. Medhat Nasr was recognized by the Canadian Beekeeping Industry with the Fred Rathje Memorial Award.



Shaker jar with bees in the upper jar and alcohol or other fluid in the lower part, where mites collect.

per colony in all of Alberta. The highest production is experienced in the Peace River region of northern Alberta with a 220 lb colony average.

Hybrid canola pollination is a four-way hybrid plan utilizing two 2-line crosses—AB and CD. AB can be a male donor and CD can be a female recipient of pollen. They are planted in rows in a ratio 1:3 or 1:4 male to female plants, depending on the company crop systems. This system acts like a dioecious plant, and becomes dependent on insects for pollination. There are some leafcutter bees, some flies and the rest honey bees. Nasr observed a 90% increase yield when comparing open pollination with bees vs. closed screened cages. Many consider canola grown in fields as a crop to be wind pollinated.

Honey production in the northern part of Alberta is high is due to having strong, healthy hives; that will match the two peaks of nectar flow from canola and alfalfa/sweet clover (hay crops). Consider 17 hrs. daylight in Edmonton at Summer solstice and 18 hrs. in Peace River.

Where do you think Alberta beekeepers are going with queen rearing (I was invited to teach basic queen rearing)?

I think beekeepers in Alberta have learned the value of locally adapted queens/stock that are suitable for their management system. Beekeepers actually ask for the teaching—they wanted classes on queen production at all levels. Understand that there is a demand for queens in Alberta of between 100,000 to 150,000 queens in the next five years, even to 250,000 queens as the rate of growth increases 5-10% per year. Currently we rely on Hawaii, the continental USA, Australia, New Zealand and Chile to supply 120K queens per year. Hawaii is the largest supplier, providing more than half of

our needs. Beekeepers are looking for ways to diversify their production (honey, pollination) and they understand the restrictive short season for queen production.

We are looking at stocks developed in USA, Canada and Europe with potential disease and mite resistance, high honey production, with a baseline of good wintering—these must form the basis of a new locally adapted stock. Since the Canadian border was closed in 1987 to United States packages, Alberta producers have relied on wintering their own bees and making splits. They also import some packages from Australia and New Zealand at the rate of 40,000 to 50,000 per year. There are a few thousand packages imported from Chile. They usually come in April and May. After that it is too late for the Southern Hemisphere producers.

In general, our objective is not to replace currently available queen supplies, but to develop a diversified queen supplier market and help meet the need for queens in our growing honey production and pollination industries. Demand will continue for early and quality queens supplied in spring. We have 20-25,000 queens produced in Alberta every year. Those beekeepers have never used imported queens.

Tell me about your program since you arrived in Alberta.

When I started in 2002 as Provincial Apiculturist, the employment mandate was to take on three areas of responsibility—regulatory, research and extension program. This basically meant that I was doing three jobs with only one Medhat. The focus was on updating regulation programs that would help provide growth of the industry. Research focused on applied research, helping solve day-to-day problems in a long-term sustainable fashion. Extension duties were focused to help the industry to understand the fast pace of changes in bee health, food safety, consumer expectations, and honey markets.

Which have required the greatest effort?

There was a huge need for new research and extension. Beekeepers have had limited resources for mite control, although we have been promoting Integrated Pest Management. Unfortunately, beekeepers were allowed to use one single miticide at a time with no other options for alternation of molecules.

The second challenge came with the fast rate varroa developed resistance to these molecules. With the challenges of honey-bee nutrition and the discovery of *Nosema ceranae* we experienced these overlapping problems as shown in 3 yrs of harsh winter conditions, long winter, less than -45 °C for long periods of time. Extensive surveys were done to define management practices for what works and does not work in the field. This was combined with sampling of thousands of hives for varroa and nosema levels to explain possible causes of winter kill. We needed to deliver recommendations to stop bee losses. Beekeepers suffered big

losses. It is not easy to go home; sleep and ignore it.

Have you seen CCD in Alberta?

We have had losses. We have not seen anything that fits the criteria being defined by USDA.

Where have your efforts been focused?

We learned from the surveys that we need to move the program into a proactive surveillance program. That means that we ask beekeepers for an answer to one simple question: *Are your bees healthy to survive the winter?* That is the bottom line.

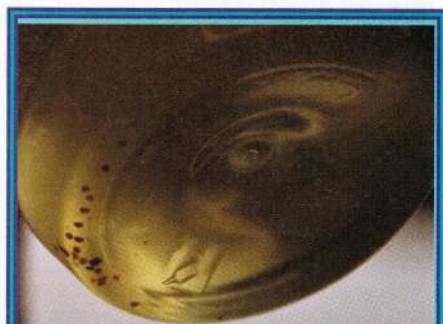
To do this we worked to develop a program in partnership between the Alberta Beekeepers Commission (the provincial beekeepers association), the pollination companies (such as the big firms mentioned earlier), Alberta Agriculture and the Alberta Crop Industry Fund (funding agency and corporation from government and foundation funds).

The program has three objectives:

1. To develop honey bee pest surveillance /monitoring system for both varroa and nosema including immediate delivery of results to beekeepers so they can take action to insure healthy bees going into the winter.
2. Screen and evaluate new molecules for varroa control and other management practices for varroa control.
3. Conduct outreach educational program to facilitate implementation of a developed management system for IPM pest control.

The program was highly accepted by beekeepers in the first year, with 75% participation (voluntary). During the first year (2009) 15 operations out of 75 had high mite levels that could cause more than 50% winterkill. These beekeepers already treated their hives with what was available and thought they had been providing control. The emphasis here is on monitoring.

Nosema samples – no beekeeper monitored for nosema before 2008 due to the requirement of the microscopes, etc. But our



The shaker jar Nasr helped develop collects the mites in the alcohol or other fluid in the jar after the mites are dislodged from the body of the bees.

Dr. Nasr and the polystyrene nucs being used in Alberta to overwinter five-frame colonies with success in the very cold Canadian winters.



survey was an eye opener for them, with some operations with more than 6 million to 15 million spores PER BEE!

As a result, recommendations were delivered to the beekeepers and we followed up with further inspections. In the 2007 and 2008 surveys, we found 10% of tested operations had healthy bees entering winter (i.e. less than 1% varroa mites and less than 1 million noseema spores). In 2009, 78% of the beekeeping operations entered the winter healthy. Preliminary 2010 surveys show winter kill in Alberta is about 17% (vs. 30% in 2008). The long-term winter kill over 20 years is 15%. Our monitoring system was successful in predicting winter kill and beekeepers have become aware of the value of monitoring. **The bottom line for this program is monitoring, monitoring and more monitoring.** Then, take action on a timely basis to insure healthy bees going into the winter. Monitor in spring and in mid/late August to allow enough time for treatment. Monitoring does not mean one snap shot of sampling. It is required to monitor more than once each season. Monitoring also is not only to identify the problem, but also to insure the treatment to control the pests and protect the bees, and on time.

What have been your other research projects?

1. Provide alternatives for pest control, and add more tools for mite and noseema control. This area is still being worked on. The program is basically going back to basics and remembering to protect your bees at the right time and applying our knowledge first—such as with varroa and noseema.
2. We do not underestimate the role of viruses, but our model is developed after malaria control—you go after the vector to protect the host.

What was the last book you read?

A book on host/parasite relationships. It was pretty intense.

Who had the greatest influence on your career and why?

Harry Laidlaw and Rob Page. Their vision of looking at science dealing with numbers to support their conclusions. Their

development of the closed population bee breeding program was a simple idea that changed the bee breeding system of honey bees.

You used this in Ontario when you ran the bee breeding program there?

Yes. And I used it in developing a device used in monitoring mite populations, a simple system that may be used by beekeepers in the field that became the backbone of mite control and IPM implementation.

You are talking about your shaker?

Yes, for 20 some years people developed good means of mite control, but beekeepers did not adapt them because they are too expensive, time consuming or required modification of the hive (like screened bottom board).

Where do you see yourself and the Alberta beekeepers in five years?

The industry in Alberta is progressive and demanding and looking for substantial increase in colony numbers and honey exports, providing high quality honey for the world market, such as Japan. Beekeeping in Alberta is the only industry increasing 5 to 10% per year. We saw yesterday (on a tour outside Edmonton) how the honey houses, equipment and management are state of the art, which gives us the fundamentals of growing in the future.

The industry is demanding. They are always looking to improve practices and take care of bee health; though it costs them money. They are not afraid to provide financial support for good research that will meet their objectives through the Alberta Beekeepers Commission.

For myself, it was challenging when I came to Alberta. There is a fundamental change in the philosophy of running this program from previous years. That challenge did not stop me from working to navigate the program to achieve what we currently have. Since coming to Alberta, over one million dollars have been raised to support these programs.

Last year the industry gave me an achievement award, the Fred Rathje Memorial Award for service to Alberta and betterment of the Canadian bee Industry. Usually, this

award goes to someone who is about to retire. Alberta does not have mandatory retirement.

June 22, 2010 Interview with Medhat Nasr by Larry Connor. For the latest information from Dr. Connor, check www.wicwas.com.

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