Canadian Association of Professional Apiculturists
L'Association Canadienne des Professionels de l'Apiculture

CAPA Statement on Honey Bees Losses in Canada (Spring 2008) – Final Revision

On average, losses in Canadian commercial beekeeping operations this spring exceed one-third of the number of colonies that were wintered, or more than twice the normal rate of mortality. More colonies were lost compared with the same period in 2007, and some provinces and localized regions have suffered extreme rates of colony loss.

Based on producer surveys, gross Provincial losses have been reported as follows:

Province	Number of Colonies Wintered	Number of Colonies Dead[1]	Wintering Losses (% of Provincial Total)
British Columbia	45,648	17,346	38
Alberta	250,000	110,000*	44
Saskatchewan	95,000	25,080	26
Manitoba	81,000	22,860	28
Ontario	75,000	24,563	33
Quebec	30,000	5,676	19
Nova Scotia	18,600	3,422	18
New Brunswick	9,434	2,765	29
PEI	3,641	1,328	36
CANADA	**608,323**	**213,040**	**35% (of National Total)**

[1] Overwintering losses and spring dwindling as of 30 May 2008.
* In Alberta, spring dwindling component defined as number of weak colonies having three frames of bees or less. Total losses for Alberta included 30% wintered dead and 14% spring dwindling.

In the years subsequent to the introduction of *Varroa destructor* into Canada, normal long-term overwintering mortality is regarded as being 15%. This year, mortality due to wintering losses and spring dwindling is 35.0%, or 2.3 x the normal rate. These losses also exceed the 2007 mortality figure of 29% and remain a grave concern. Successive annual losses at levels exceeding the long-term average are unsustainable by Canadian beekeepers and are likely to lead to decreased honey production and shortages of colonies available for pollination. Indeed, more demand than supply was evident for pollination in British Columbia

during the spring of 2008, where some blueberry pollination contracts were not entirely fulfilled.

Though high losses for individual producers may occur in any given year, high regional losses are of potentially greater concern. Areas suffering high regional losses during the spring of 2008 included Vancouver Island (43%), the Peace River District of British Columbia (70%), the Peace River District of Alberta (56%) and a cluster of producers in Northeastern Saskatchewan (50%).

Across the country any unusually high losses have been investigated by provincial apicultural specialists. Initial indications suggest that these losses may be attributed to the three principal causes, listed in descending order of importance:

1. Ineffective control and mismanagement for the parasitic mite, *Varroa destructor*. In many regions, mite populations have developed resistance to the chemical compounds fluvalinate and coumaphos. Many producers did not detect mite control failures before winter, leading to very high levels of mites and high losses by spring. The stress caused by high densities of varroa mite feeding also has the potential to activate or spread the distribution of several honey bee viruses, which exacerbate losses.

   Apart from the previous two active ingredients used against varroa mites, the efficacy of remaining registered control options available to beekeepers are highly temperature dependent and require more intensive management. Late nectar flows and inclement weather in some areas also resulted in delays for treating colonies during the fall. This lead to corresponding reductions in the realized efficacy for these and other types of mite control products.

2. Inadequate Nosema Control. Many beekeepers do not have the ability or the extension support necessary to sample or diagnose the two species of internal Nosema parasites, *Nosema apis*, and the newly-introduced *Nosema ceranae.* These organisms, if not controlled before winter months, will significantly increase rates of mortality. Moreover, little is know about effective management of *Nosema ceranae*, which was only discovered in Canada in 2007 and for which control strategies are still being developed.

3. Starvation. Inadequate nectar flows and fall feeding in areas such as Vancouver Island and the Maritimes prevented colonies from storing sufficient nectar or sugar syrup to survive the duration of the winter.

Overwintering Losses in the U.S. (Spring 2008) [2]

The information for U.S. losses is derived from surveys commissioned by the Apiary Inspectors of America (AIA) and the USDA-ARS Beltsville Honey Bee Lab in 2007-08.

A total loss of 36% for managed honey bee colonies in the U.S. was recorded, representing a 4.1 point or a 13.5% increase in total losses compared with figures for 2007. Clearly producers in the U.S. continue to experience very high levels of loss this year, similar to those of Canadian producers.

The survey commissioned by the AIA was not able to differentiate between true cases of Colony Collapse Disorder (CCD) and colonies lost due to causes that share the "absence of dead bees" symptom, typically associated with CCD. At least 71% of all operations had no CCD-like symptoms in any of their colonies that perished, underlying the need for research, not only into CCD, but into pollinator health in general.

Is CCD in Canada?

The symptoms by which CCD is being characterized in the U.S. have not been diagnosed by professional apiculturists in Canada. Though Canadian bees do not seem to be experiencing CCD-like symptoms, it is important to realize that higher levels of wintering and spring mortality in Canada may be related to the same casual factors as CCD losses in the U.S. Because longer winter conditions preclude the active brooding and flying of colonies found in early-season pollination areas of the U.S., colonies in Canada may not exhibit similar colony-level symptoms. Instead, it is conceivable that Canadian producers may simply see these effects as higher numbers of dead colonies coming out of winter or those described as dwindling during the early spring.

Most scientists in the U.S. and Canada would agree that what is being described as CCD in the U.S. and the high winter losses seen in Canada are likely being caused by several common interacting stress factors acting on honey bee colonies. Researchers in both countries are examining similar root causes of these stresses and their effects on bees.

What is being done in Canada?

Researchers in Canada remain in close contact with principal scientists assigned to the U.S. Working Group on CCD. Members of CAPA have also been actively monitoring the status of bee health across the country and are sharing scientific information.

Samples of adult honey bee samples from across the country have been collected for the detection of the parasite, *Nosema ceranae.* Based on these efforts in 2007, it was determined that the parasite was present in all Canadian provinces, with *N. ceranae* and *N. apis* found in approximately similar proportions. This is in contrast to the U.S. where *N. apis* is now seldom found in samples. In addition, infections of *N. ceranae* and *N. apis* can also be found in the same colony.

The impact of *N. ceranae* on honey bees is not well understood and it is likely a factor in the survival of colonies already under multiple stresses. Currently, CAPA members employed by federal and provincial governments, as well those in Canadian universities, are undertaking

research projects to better understand this parasite. Aims include determining the seasonal occurrence of *N. ceranae* in Canada, developing strategies for effectively managing this parasite as well as evaluating the use of novel therapeutic agents. Early indications suggest that *N. ceranae* is susceptible to fumagillin, the only registered therapeutic agent against *N. apis*. Nevertheless, much work is needed to determine best management practices to control this organism.

Researchers within CAPA are also evaluating alternative control options for varroa mites, methods of integrated pest management for honey bee colonies and the breeding of honey bee queen stock more tolerant of diseases and mites. Members of CAPA, in cooperation with the Canadian Honey Council, are also pursuing the registration of alternative products for varroa control in Canada.

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[2] Information obtained from: van Engelsdorp, D., Hayes, J. and J. Pettis. 2008. Preliminary results concerning the loss of honey bee colonies over the winter 2007-2008. A survey conducted by the Apiary Inspectors of America and the USDA-ARS Beltsville Honey Bee Lab. (*Personally Communicated to Author)*.