

### **CAPA Statement on Honey Bee Wintering Losses in Canada (2013)**

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In 2013, the Canadian Association of Professional Apiculturists (CAPA) National Survey committee developed a core set of questions that the Provincial Apiarists' surveys could use to report on honey bee wintering losses in their province. The following report is a summary of the reported winter losses from the provincial surveys.

Over the winter of 2012 – 2013, the average level of wintering loss of honey bee colonies (i.e. colony mortality or colonies too weak to be commercially productive) across Canada was 28.6% (Table 1). This level of winter loss represents another year of high winter loss for most Canadian beekeepers at approximately double the acceptable level, as described by beekeepers, of 15%. The level of winter loss varied between provinces and within each province.

Table 1. Gross Wintering Losses by Province, 2012/2013

<b>Province</b>	<b>Number of Colonies Wintered Fall 2012</b>	<b>Number of Dead or Unproductive Colonies Spring 2013</b>	<b>Percent Wintering Loss (%)</b>
<b>British Columbia</b>	46,746	8,414	18.0
<b>Alberta</b>	282,000	67,116	23.8
<b>Saskatchewan</b>	125,000	33,750	27.0
<b>Manitoba</b>	84,000	38,976	46.4
<b>Ontario</b>	96,384	36,529	37.9
<b>Quebec</b>	50,000	12,000	24.0
<b>New Brunswick</b>	9,348	3,496	37.4
<b>Nova Scotia</b>	19,462	3,316	17.0
<b>Prince Edward Island</b>	6,413	1,788	27.9
<b>CANADA</b>	<b>719,353</b>	<b>205,385</b>	<b>28.6</b>

#### **Factors Cited by beekeepers:**

Weather was seen as a major factor contributing to winter loss for many beekeepers in the Prairie Provinces (Alberta, Saskatchewan and Manitoba) as well as Quebec. The winter of 2012/2013 was long in duration and the spring weather was cold and wet in many areas creating unsuitable conditions for colonies to develop. There are concerns that the early spring across Canada in the previous year may have contributed to the early build up of varroa levels. Other concerns cited by beekeepers included nosema (Alberta and Saskatchewan), poor queen health (Manitoba, Ontario, Quebec and Nova Scotia) and weak colonies in fall (Nova Scotia, Quebec, Manitoba and Ontario). In Ontario, many beekeepers cited acute and chronic pesticide damage as a contributing factor in winter mortality. It is worth noting that although varroa is still understood to be a serious

problem in beekeeping, there were fewer concerns cited by beekeepers in some regions indicating that many of the treatment options can work well when properly applied.

### **Varroa control:**

The vast majority of beekeepers in Canada are managing varroa levels at regular intervals through chemical and cultural means. The continued management of varroa in honey bee colonies is widely recognized as one of the primary goals with respect to maintaining honey bee health. Apivar®, when used properly, provided effective management of varroa infestations. Beekeepers in Canada are still regularly using organic acids as part of the rotation of chemical treatments, but continue to rely heavily on synthetic treatments. Although there are a variety of chemical options available to beekeepers, all have their advantages and disadvantages. This includes timing of treatments, pattern of use, temperature dependence and the development of resistance in varroa mite populations. The use of new methods of varroa control in an integrated pest management framework is therefore essential to the sustainability of mite control for this industry. The promotion of monitoring and using effective control options continues to be the focus of many extension and education activities promoting honey bee health. Beekeepers awareness of these principles and the adoption of best management practices that incorporate good food safety practices are regarded as the future direction for this industry.

### **Nosema:**

Nosema is still considered a serious pathogen in Canada that may be influencing colony survival. In Alberta, nosema was cited as one of the major reasons for colony mortality in a few operations. In the past, nosema disease was recognized primarily as a winter disease. It has long been established that *Nosema apis* increases in severity throughout the winter months, peaking in early spring. Fumagilin treatments have been demonstrated to suppress levels of *Nosema apis*. With the discovery of *Nosema ceranae*, the seasonal relationship between nosema disease and honey bee health is less clear. Furthermore, there may be regional variations that may underlie the severity of nosema disease. Although nosema is often cited as a concern for colony health the actual virulence in colonies is not fully understood. Current strategies to address nosema disease include research projects that address the impact of the disease on the health of colonies. Novel treatment options must be developed along with programs that promote monitoring disease levels as part of the management strategy for this disease.

### **Pesticides:**

There are still many concerns amongst beekeepers regarding the potential chronic and sub-lethal impact of pesticides and agrochemicals (particularly systemic insecticides such as neonicotinoids). Documented incidents of pesticide exposure and colony damage during the regular season in recent years (2009 to 2013) in the provinces of Quebec and Ontario have contributed to these concerns. There are concerns amongst some beekeepers, particularly in Ontario, that exposure to neonicotinoid insecticides during the regular season may lead to increased stress to colonies contributing to winterloss.

**Further Work:**

CAPA continues to be in close contact with scientists from various countries around the world including the U.S. working on colony losses and bee decline. Members of CAPA have also been actively monitoring the status of bee health across the country and are sharing scientific information. Researchers within CAPA are active in evaluating alternative control options for *Varroa* mites, methods of integrated pest management (IPM) for honey bees and the breeding of queen stock more tolerant of diseases and mites. In several regions of Canada workshops have been conducted to promote IPM practices to beekeepers with particular attention given to surveillance programs to monitor pests and diseases, with emphasis on *Varroa* and *Nosema* spp. Attention has also focussed on proper disease identification, winter management, rotation of treatments and discouraging off-label use.

Members of CAPA, in cooperation with the Canadian Honey Council, are also pursuing the registration of alternative products for *Varroa* control in Canada. Other areas of research that CAPA members are currently pursuing include studies of honey bee immunity, honey bee viruses, genetic expression of honey bee responses to disease, the impacts of neonicotinoid pesticides on the short and long-term health of honey bees, the biology of new and emerging bee pests and best management practices to promote the health of colonies.

**Conclusion:**

The mortality level for honey bee colonies over the winter of 2012/2013 was high (28.6%). This follows a year of decreased colony mortality. It should be stressed that it is important to look at the long-term, multi-year trend of winter mortality in Canada (figure 1). Although it is also important to consider variation, by region and between beekeeping operations it is clear that the level of colony mortality has been at a high level for several years.

Responses from provincial surveys indicated that weather, poor queens, weak colonies in fall, nosema and ineffective varroa control were reasons that beekeepers are suspecting for the high wintering losses. Clearly the impacts of pest, pathogens and environmental factors continue to be a challenge to commercial beekeepers across Canada. There are a variety of strategies that have been pursued to address these challenges including applied and basic research, pest and pathogens monitoring, responses to pesticide incidents through incident reports and data collection, regulatory authority to address bee pests and pathogens that may threaten the industry, advisory and extension services to beekeepers promoting best management practices. It has become obvious that the future of beekeeping will depend on a multi-factorial approach to address the risks associated with honey bee health and wintering honey bees in Canada

For more information about CAPA activities, please contact the CAPA executive:

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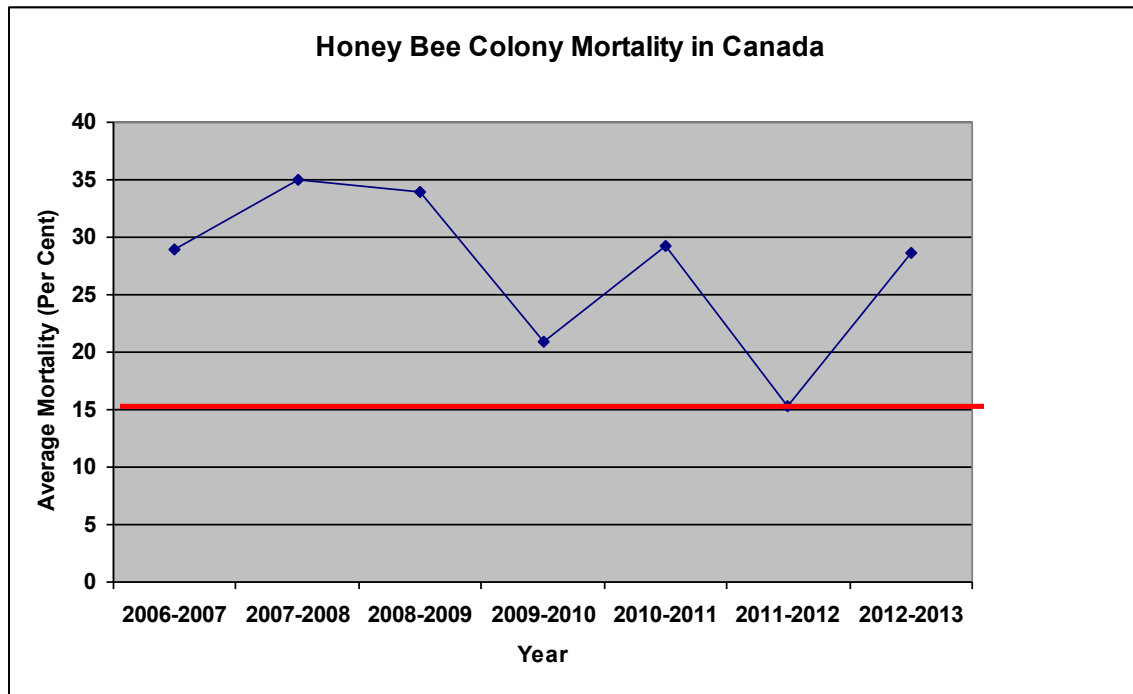
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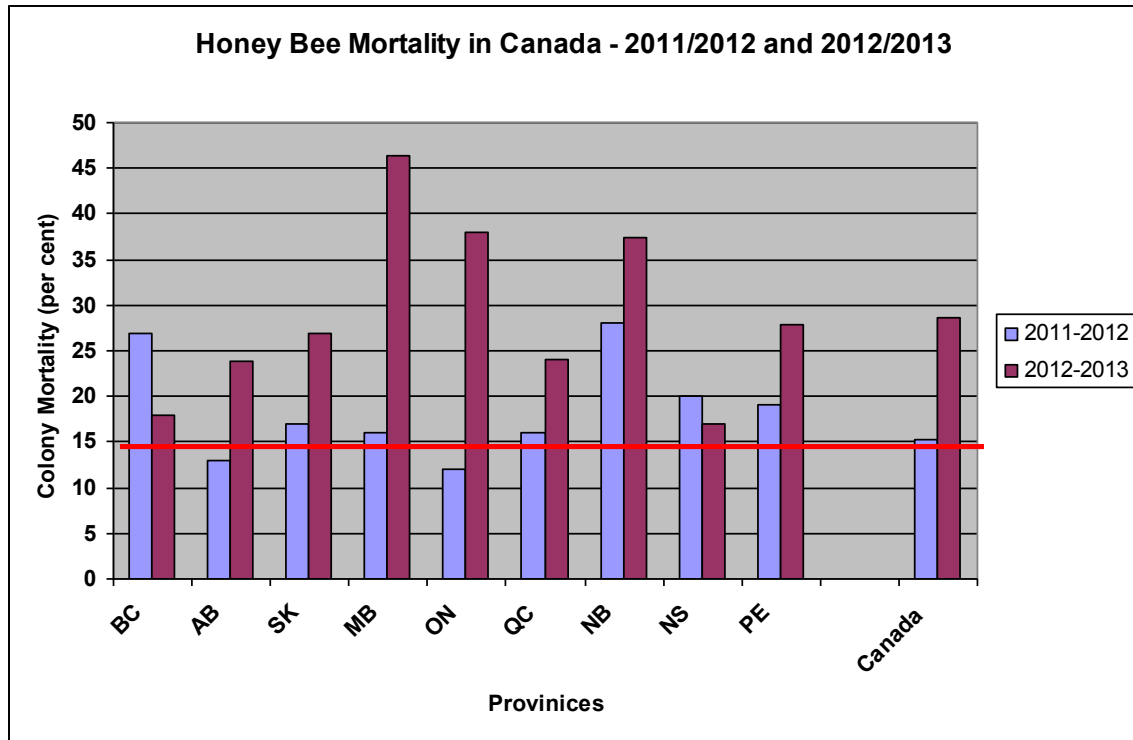
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**Figure 1. Average National Wintering Loss rates in Canada 2007 -2013**



**Figure 2. Average Percent Wintering Losses by Province 2011/2012 and 2012/2013**

**References:**

Guzman-Novoa E., Eccles L., Calvete Y., McGowan J., Kelly P. and Correa-Benitez A. 2010. *Varroa destructor* is the main culprit for death and reduced populations of overwintered honey bees in Ontario, Canada. *Apidologie*. 4 (4): 443-451.