

# Ontario Beekeepers' Association

## 2024 Winter Loss Survey Results

July 2024

### Executive Summary

In the spring of 2024, a total of 542 Ontario beekeepers responded to the Ontario Beekeepers' Association's (OBA's) winter loss survey representing 28,174 hives that went into the winter in the fall of 2023. The overall average winter loss reported was 51.6% and the median winter loss was 33%.

Average winter losses were higher among commercial beekeepers (53.1%) in 2024 compared to small scale beekeepers (43.9%). Median losses for commercial beekeepers (29.3%) were slightly lower than small scale beekeepers (33.3%). In 2024 the losses were substantially higher across all regions than they were in 2023. Some large commercial beekeepers reported hives dwindling in the summer or early fall with significant losses before winter.

The top three reasons beekeepers cited as contributing factors to winter losses were fluctuating winter weather, weak colonies going into winter, and high fall mite levels. Compared to responses to the same question in 2023, a higher proportion of beekeepers in 2024 felt that their hives were not doing as well as the previous year.

Beekeepers who felt their overwinter losses were relatively low were most likely to attribute their success to effective fall feeding, effective varroa control, and good population sizes going into winter. Beekeepers who attributed their overwintering success to their education related to pests and diseases had the lowest average overwinter losses.

Ontario beekeepers appreciate the recent funding announcement from the Governments of Ontario and Canada through the Sustainable Canadian Agricultural Partnership's Honey Bee Health Initiative. While these intermittent funding opportunities are welcomed, beekeepers also need improved risk management options. The causes of the overwinter losses reported here will require actions that are beyond the scope of individual beekeepers. The OBA would like to see OMAFRA and its partners re-invigorate the monitoring and testing program for residues found in honey, pollen, wax and bee samples. With ever increasing anecdotal reports of Amitraz resistance in Ontario, and the OBA Technology Transfer Program (TTP) having detected efficacy below thresholds for resistance in two hives in a small study last fall, the OBA would like to see OMAFRA continue and expand Amitraz resistance testing in Ontario. The OBA encourages partners to act on the recommendations developed last time the industry faced high winter losses. These recommendations include sustained funding to TTP and are outlined in the *Report by the Industry-Government Honey Bee Sustainability Working Group on Actions to Improve the Sustainability and Resiliency of the Canadian Beekeeping Sector*.

## Methods

The Ontario Beekeepers Association (OBA) annual winter loss survey was conducted from April 29 to June 2, 2024. The survey was made available to OBA members and non-members through Google Forms. The survey was distributed through the OBA's email list which includes members and non-members. A total of 545 beekeepers responded to the survey. Three responses were from beekeepers who did not have bees in Ontario. Their data was excluded from the results. This response rate was 14.5% higher than the 476 beekeepers who responded to the OBA's 2023 winter loss survey.

Average winter loss results were calculated by dividing the total number of hives that were not viable at the time of the survey by the total number of hives that were put into winter. This produces an average that is weighted by hive numbers rather than an average calculated by beekeeper which would give equal weight to each beekeeper regardless of the number of hives they manage. The median is the middle number in a sorted list and therefore represents the mid-point of the data where approximately 50% of the data falls above and below the median value. Percentage responses were calculated by dividing the number of beekeepers citing a particular response by the total number of Ontario beekeepers who completed the survey (n=542).

## Results

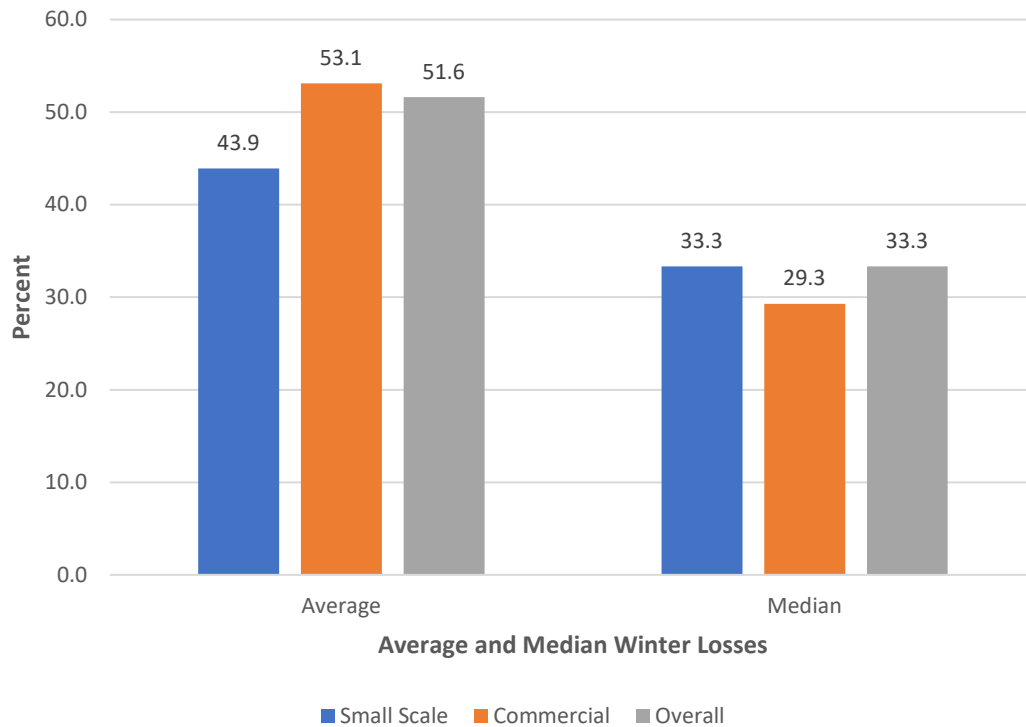
The 545 beekeeper who responded to the survey reported putting 28,174 colonies into the winter. Of these 13,633 colonies were viable at the time they responded to the survey. This represents an average (mean) winter loss of 51.6% (Figure 1). The median winter loss was still very high at 33%. One of the largest beekeeping operations that responded to this survey had a very high winter loss. If that one operation is excluded from the results then the overall average provincial winter loss would be 42.5% and the median would remain 33%. In 2024, 59.8% of respondents reported losses of more than 20% of their hives. This is considerably higher than 2023 when 36% of Ontario beekeepers reported winter losses over 20%.

In 2023 small scale beekeepers (<50 hives) had higher winter losses than commercial beekeepers (>50 hives). In 2024 small scale beekeepers (n=458) reported an average winter loss of 43.9% (median = 33.3%). While commercial beekeepers (n=84) reported an average winter loss of 53.1% (median = 29.3%). If the large operation with very high winter loss is excluded then the commercial beekeepers average winter loss would have been 42%.

Medians and averages help to provide a general sense of the industry but they obscure both the positive and negative extremes of the winter loss experience. These two comments from beekeepers help to demonstrate the full range of experiences:

*Lowest losses I have ever seen in 29 years of beekeeping*—commercial beekeeper with 6% loss

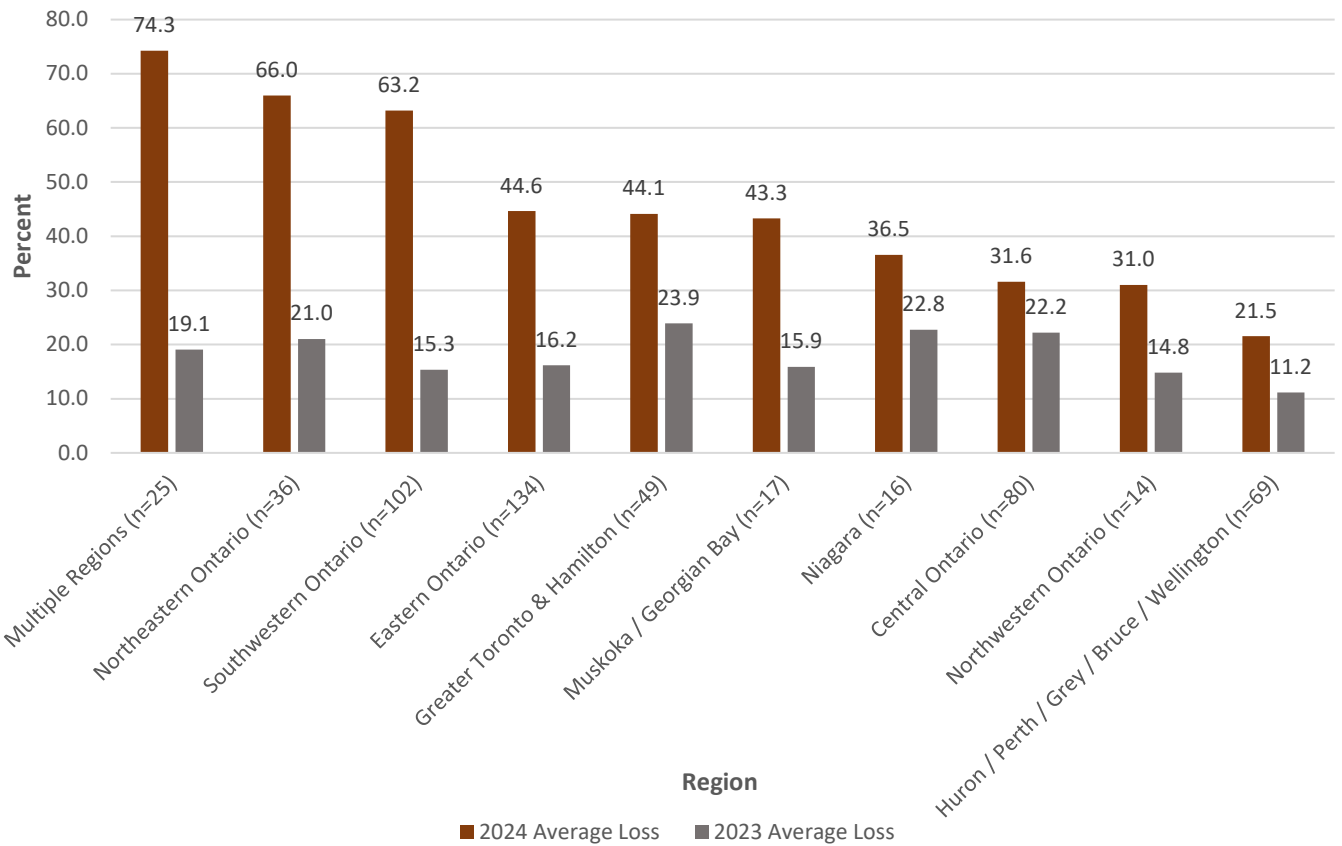
*Something needs to change or else beekeeping will cease to exist*—commercial beekeeper with 98% loss



**Figure 1:** Average and median winter losses reported by small scale (<50 hives), commercial (>50 hives) and all Ontario beekeepers.

The reported winter losses in 2024 were higher than in 2023 across all regions of Ontario (Figure 2). Above average losses in 2024 were reported by beekeepers with hives in multiple regions (74.3%), Northeastern (66.0%), and Southwestern (63.2%) Ontario. The high losses among beekeepers operating in multiple regions reflects the overall higher losses among commercial beekeepers in 2024 because larger commercial operations are more likely to operate across multiple regions.

Beekeepers in the region that includes Huron, Perth, Grey, Bruce, and Wellington Counties reported the lowest winter losses in 2024 at 21.5%. This region also reported the lowest overall winter losses in 2023. Despite this being the lowest regional winter loss reported in 2024 it is still almost twice the winter losses reported in the same region in 2023.



**Figure 2:** Average winter losses reported in 2024 compared to 2023 by region of the province.

There were 886 responses to the question *Based on your observations and experience, what would you say caused your overwinter losses?* Beekeepers were allowed to select as many responses as were relevant (Figure 3). Winter weather fluctuations was the most frequently reported cause of overwintering losses (29.7% of respondents), followed by colonies being too weak/small going into the winter (28.0% of respondents), and an overload of Varroa mites (26.2% of respondents). Only 22.1% of respondents reported that the question was not applicable because they had no significant losses. Beekeepers who reported that they suspected pesticides had weakened their hives (13.5% of respondents) or that small hive beetles caused their winter losses (0.7% of respondents) reported the highest average winter losses at 70.1% and 71.7%, respectively.

Several beekeepers addressed the question of what caused their overwintering losses when they were asked if they had any other interesting observations or comments. As expected, many comments acknowledged that mites and the challenge of managing them effectively remain the primary cause of losses. Comments included:



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*I recognize the management mistakes I made last season regarding staying ahead of/ managing mite populations in a timely manner and plan to learn and adjust my management this year – commercial beekeeper*

*Apivar works sometimes but not well in every hive!! Organic acids etc work but we spend too much time with applications and management. Often they are weather/temperature and humidity dependant – commercial beekeeper*

*Virus are a major cause of winter losses and to prevent spread mite levels must be kept low all year round – commercial beekeeper*

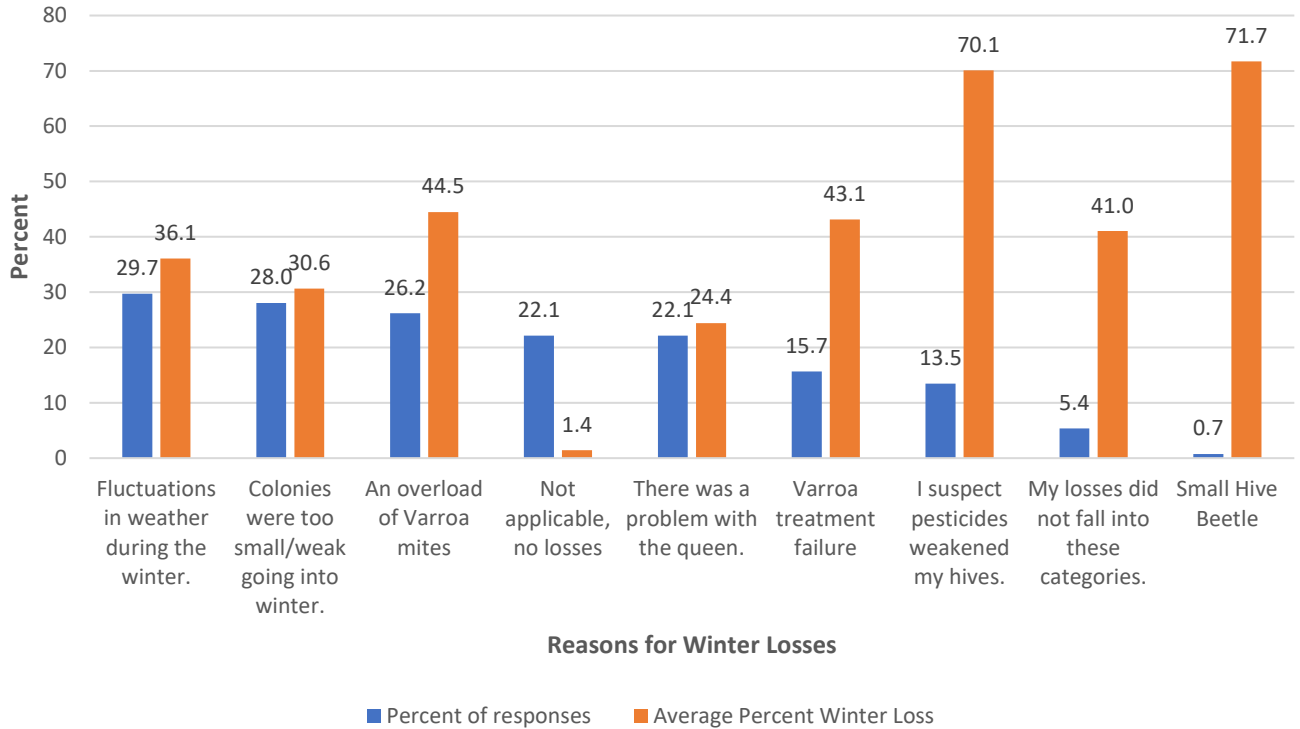
Other comments questioned the role of mites as the driver of significant losses in some operations. These comments included:

*Four years in a row, I have lost the entire yard in one location and nearby pesticide use is highly suspected – commercial beekeeper*

*I treat with Apistan one spring and this spring with Apivar. I do 3 treatments with Oxalic Acid in the spring and treat with Oxy-tet and Fumidil-B. In the fall I use 3 treatments of Formic and 3 treatments of Oxalic Acid. I do not find many mites at any time. There is something beyond my control going on with the bee. I did send in samples of the dead bees and Bifenthrin showed up at .46 ppm. I suspect it may be contributing to the losses. – commercial beekeeper*

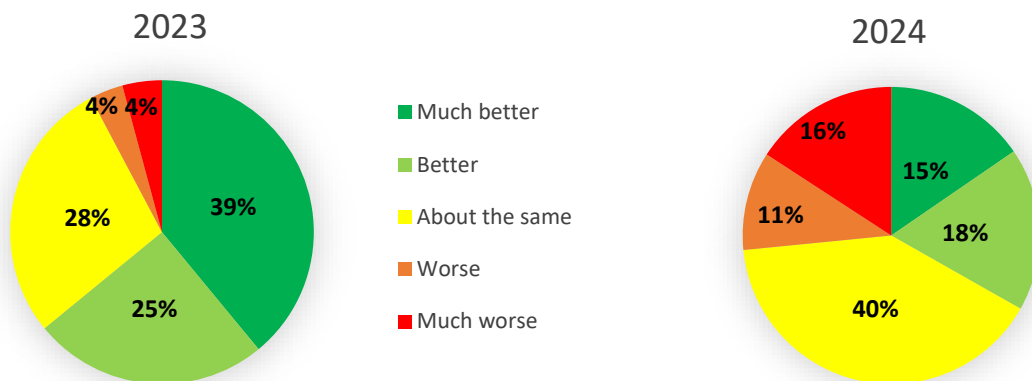
*Treated in spring and fall as usual but was seeing hives dying by mid-July. Even had inspectors out on the 1st of June and found very few mites. Suspect other factors such as spraying on crops of chemicals. – commercial beekeeper*

*We began losing hives in mid-august. In June they were inspected by the bee inspection in June very low varroa mites. – commercial beekeeper*



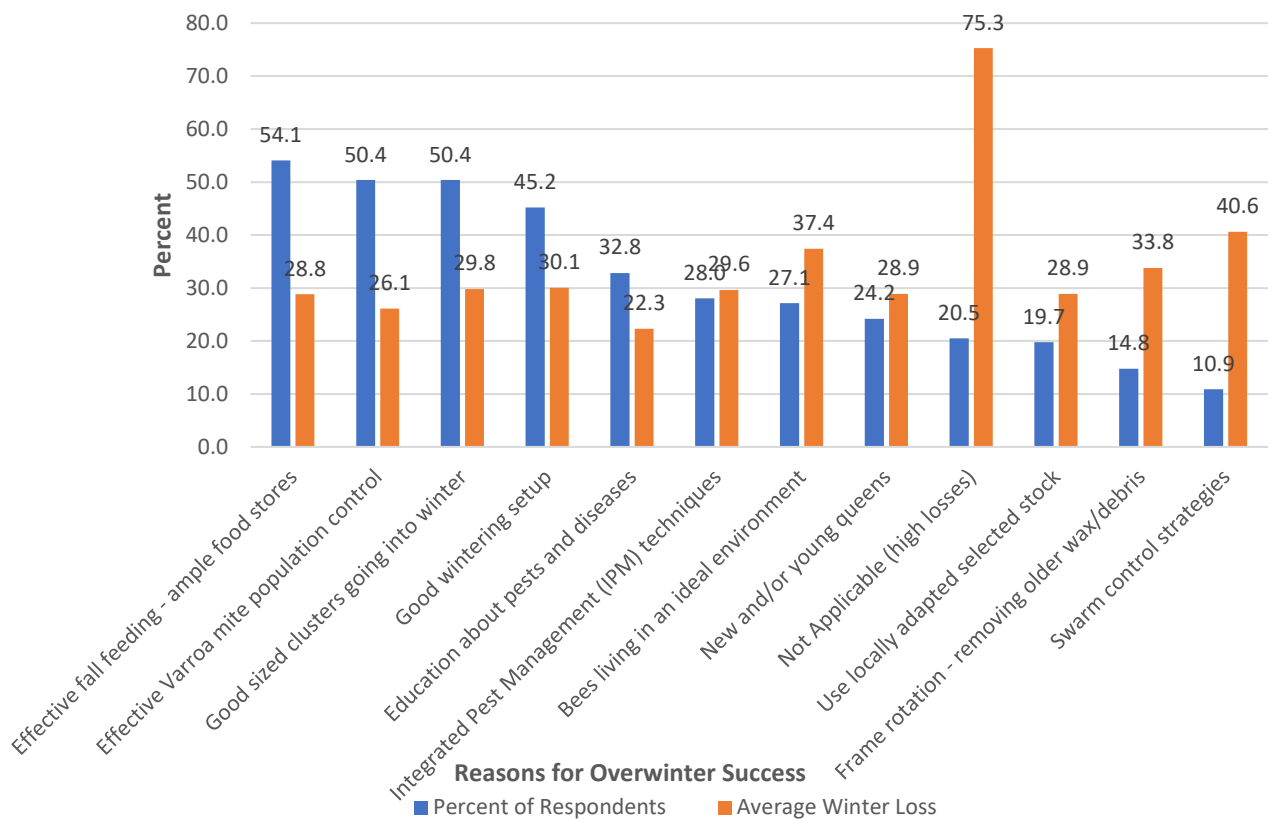
**Figure 3:** Reported reasons for winter losses and the average percent winter loss reported by beekeepers who cited that reason for losses. Beekeepers were able to provide as many reasons as they felt were relevant.

In 2023 more than half of respondents (64%) reported that their bees were doing better or much better than the previous year (Figure 4). In 2024 only 33% of respondents felt their bees were doing better or much better than last year. In 2023 only 8% of respondents felt their bees were doing worse or much worse than last year while 27% of respondents in 2024 felt that their bees were doing worse or much worse than last year.



**Figure 4:** Survey responses from 2023 and 2024 to the question *How are your bees doing this year compared to the same time last year?*

Beekeepers were asked the question “based on your observations and experience, what would you say helped you be successful at keeping your losses low?” In 2024 the response rates for this question were lower than in 2023 probably in large part because fewer beekeepers felt their overwinter losses were low (Figure 5). Among beekeepers who responded to the survey the most common reasons cited were effective fall feeding (54.1%), effective varroa mite population control (50.4%), and good sized colonies going into winter (50.4%). The lowest average overwinter loss was reported by the 32.8% of respondents who identified education about pests and diseases as a factor in their success at keeping their losses low. Only 10.9% of beekeepers felt that their swarm control strategies contributed to their low overwintering losses and they reported the second highest average overwintering loss of 40.6%. The highest average overwintering loss (75.3%) occurred among beekeepers who responded “Not Applicable” to this question mostly because they did not consider their overwintering losses to be low.



**Figure 5:** Responses to the question “based on your observations and experience, what would you say helped you be successful at keeping your losses low?” including the reported average overwinter loss percentage for beekeepers citing each success factor.

## Discussion

Ontario's 2024 winter losses are one of the highest reported since the OBA began conducting winter loss surveys. Consistent with previous years, the OBA winter loss survey results are consistent with the initial results of the OMAFRA winter loss survey even though the two surveys have slightly different methodologies. Reported winter losses were higher in every region of Ontario in 2024 compared to 2023.

On average winter losses among small scale beekeepers are often higher than commercial beekeepers. This is thought to be due in part to the larger proportion of new and inexperienced beekeepers in the small-scale category. The higher average winter losses among commercial beekeepers in 2024 is a cause for concern. This suggests that the reasons for the 2024 winter losses were unable to be adequately managed by some of Ontario's most experienced beekeepers.

Beekeepers in Ontario recognize that the causes of winter losses in Ontario are due to multiple factors. This year's winter loss results underscore this challenge. Both quantitative and qualitative responses indicate that beekeepers suspect a broad range of factors are contributing to the overwinter mortality experienced in Ontario. Causes of mortality vary between operations and even within operations. Addressing overwinter mortality will require considerable effort to understand and address the range of stresses that are contributing to high overwinter mortality.

The higher proportion of respondents indicating that their bees look worse or much worse than 2023 suggests that rebuilding may be more challenging and costly for beekeepers in 2024.

Following the high winter losses reported in the spring of 2022 the OBA participated in the creation of the *Report by the Industry-Government Honey Bee Sustainability Working Group on Actions to Improve the Sustainability and Resiliency of the Canadian Beekeeping Sector*. This report identified a number of recommendations to improve the sustainability and resiliency of the Canadian Beekeeping Sector. To date little progress has been made in implementing these recommendations.

## Conclusions and Recommendations

The OBA would like to thank Ontario beekeepers for participating in the survey. The high response rate helps to ensure that the survey results are as representative as possible of the industry.

Ontario's beekeepers have experienced one of the highest winter losses since the OBA began conducting surveys. Higher winter losses reported among Ontario's very experienced commercial beekeepers suggests that the causes of this year's winter losses may require new approaches, new research, and significant outreach and extensions work. In 2022 the OBA participated in an industry-government process to identify actions to improve sustainability and





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resiliency of the Canadian beekeeping sector. Little progress has been made on implementing this report's recommendations.

The OBA recognizes and appreciates the recent funding announcement from the Governments of Ontario and Canada that allocated additional funding to the Honey Bee Health Initiative of the Sustainable Canadian Agricultural Partnership. This will help some individual beekeepers with some of the costs associated with rebuilding after such significant overwinter losses. The OBA has been in working with Agricorp to try to improve risk management options for beekeepers. This winter loss report underscores the urgency of this work.

Many of the stressors facing honey bees in Ontario cannot be addressed by individual beekeepers alone. Reports from this survey of large scale hive losses in the summer months following apiary inspections by bee inspectors that found low mite levels raises questions about whether new and emerging stressors are impacting hive health. The OBA calls on the Provincial Government to re-establish its monitoring and testing program for residues found in honey, pollen, wax, and bee samples.

Varroa mites continue to be an important cause of overwinter mortality in Ontario. Anecdotal reports of reduced efficacy of Apivar in Ontario may be contributing to higher than average winter losses as beekeepers work to detect and adapt to emerging resistance. The OBA calls on OMAFRA to prioritize and expand its Amitraz resistance sampling and testing ahead of the typical fall treatment window to make sure the beekeeping community is aware of Amitraz resistance when and where it occurs.

The OBA calls on partners to implement the recommendations of the *Report by the Industry-Government Honey Bee Sustainability Working Group on Actions to Improve the Sustainability and Resiliency of the Canadian Beekeeping Sector*. Consistent with the report's recommendations Ontario needs a well-funded Technology Transfer Program to carry out the research and extension work that beekeepers need to help us understand and respond to the new and evolving stressors that contributed to these extraordinarily high 2024 winter losses.