

Honey Bee Incidents Reported to the Pest Management Regulatory Agency – AAFC BHRT update

July 15, 2015

Definition of a bee incident: A bee incident is defined as atypical effects observed in a honey bee colony reported by a beekeeper, and suspected by the beekeeper to be related to pesticide exposure. These incidents are characterized by mortality or sub-lethal effects on colonies that are thought to be related to pesticide exposure. Generally, each bee yard is considered a single incident, and each bee yard may vary in the number of affected colonies.

The numbers presented in the following tables reflect the information that has been reported to the PMRA by the beekeepers. Further analysis will be conducted to determine the causality of each report.

Table 1: Number of bee yards with reported incidents in Canada in 2015 based on month. Data through July 14, 2015

Month	Manitoba	Ontario	Quebec	Alberta (iv)	National
Overwinter (i)	---	31	---	---	31
April	1	3	---	---	4
May	1	40	4	3	48
June	---	11	---	---	11
July		16			16
Total number of bee yards (ii)	2	102	4	3	110
Number of unique bee yards (iii)	2	92	4	3	101
--- means that no reports were received in that month					
(i) Overwintering: reports indicated that overwintering losses were suspected to be related to pesticide exposure and pesticide-related poor colony condition in the fall before overwintering.					
(ii) The total number of bee yards includes counts of yards each time a separate incident was reported; some yards reported more than one separate incident in a season					
(iii) The number of unique bee yards includes counts of the same yard only once, even if the yard reported more than one incident					
(iv) A beekeeper in Alberta reported three bee yards during the planting period; the crop planted was unknown, but was confirmed not to be corn or soy, and the yards were not in corn and soybean regions.					

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Table 2: Number of bee yards with reported incidents in Canada 2012 – 2015 based on month, in the corn and soy growing regions. Data is separated into overwintering, pre-plant, at plant, post-plant and off season.

Province	Season	Month	Number of unique yards per month (i)			
			2012	2013	2014	2015
Ontario	Overwinter (ii)	Overwinter	---	3	36	31
		Pre-plant (iii)	April	---	6	2
	At-plant (iv)	April	125	1	---	1
		May	113	244	50	40
	Post-plant (v)	June	3	17	26	5
		June				7
		July	2	33	26	16
		August	---	91	98	Data only to July 14
		September	---	20	29	
	Off season (vi)	October	---	3	---	
		All season (vii)	---	21	136	
		November	---	---	25	
		December	1	---	3	
Total number of bee yard at-planting (viii)			242 (241)	262 (257)	76 (70)	46 (44)
Total number of bee yards post-planting (ix)			2	168 (163)	289 (266)	23 (23)
Total number of bee yards (x)			244	433	435	102
Number of unique bee yards (xi)			241	395	370	92
Quebec	At-plant	April	8	---	---	---
		May	---	5	7	4
		June	---	3	1	---
	Post-plant	July	---	3	---	Data only to July 14
		August	---	1	1	
		September	---	---	4	
		November	---	---	1	
Total number of bee yard at-planting (viii)			8	8	8	4
Total number of bee yards post-planting (ix)			---	4	6	---
Total number of bee yards (x)			8	12	14	4
Number of unique bee yards (xi)			8	12	14	4
Manitoba	Pre-plant	April	---	---	1	---
		At-plant	April	---	---	1
	Post-plant	May	---	6	1	1
		June	---	3	---	---
		July	---	1	---	Data only to July 14
	All season (vii)	---	---	4		
Total number of bee yard at-planting (viii)			---	9	1	2
Total number of bee yards post-planting (ix)			---	1	4	---
Total number of bee yards (x)			---	10	6	2
Number of unique bee yards (xi)			---	10	6	2
NATIONAL TOTAL number of unique bee yards			249	417	390	98

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FOOTNOTES

--- means that no reports were received during that month

- (i) Number of unique yards per month means a yard was counted once during a specific month. Some beekeepers reported the same yard during more than one month.
- (ii) Overwintering: reports indicated that overwintering losses were suspected to be related to pesticide exposure and pesticide-related poor colony condition in the fall before overwintering.
- (iii) Pre-plant: yard reported with pesticide related symptoms prior to start of planting season
- (iv) At plant: yard reported during the corn and soybean planting season
- (v) Post-plant: yard reported after planting of corn and soybean
- (vi) Off-season: these reports were very late in the season and many of the hives had been or were in the process of being winterized
- (vii) All season: reports indicated effects had been occurring throughout the post-plant season in a bee yard without a specific start or end, and which was not associated with a specific event
- (viii) The total number of bee yards at planting includes counts of a yard each time a separate incident was reported during a specific month; the number in brackets is the unique number of bee yards reported at planting which means that a specific yard was only counted once even if an incident was reported in two or more different months
- (ix) The total number of bee yards post-planting includes counts of a yard each time a separate incident was reported during a specific month; the number in brackets is the unique number of bee yards reported which means that a specific yard was only counted once even if an incident was reported in two or more different months
- (x) The total number of bee yards includes counts of yards each time a separate incident was reported during a specific month; some yards reported more than one separate incident in a season
- (xi) The number of unique bee yards includes counts of the same yard only once, even if the yard reported more than one incident

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Table 3: Number of bee yards with reported incidents in Canada 2012 – 2015 based on month, and associated with pesticide spray events.

Province	Month	Number of unique yards by month			
		2012	2013	2014	2015
Manitoba	June	1	---	---	---
					Data only to July 14
Total number of bee yards (i)		1	---	---	---
Saskatchewan	June	8	---	---	---
	July	3	---	---	Data only to July 14
	August	5	---	---	
Total number of bee yards (i)		16	---	---	---
Alberta	May	2	---	---	Data only to July 14
Total number of bee yards (i)		2	---	---	---
Ontario	July	1	---	---	Data only to July 14
	August	---	---	9	
Total number of bee yards (i)		1	---	9	---
Quebec	May	9	3	7	Data only to July 14
Total number of bee yards (i)		9	3	7	---
Nova Scotia	July	2	---	2	Data only to July 14
Total number of bee yards (i)		2	---	2	---
NATIONAL TOTAL number of bee yards		31	3	18	---
--- means that no reports were received during that month					
(i) The total number of bee yards is equivalent to the number of unique bee yards as for spray incidents no yard was reported more than once.					
Pesticides: dimethoate, phosmet, carbaryl, chlorpyrifos, diazinon, clothianidin, permethrin, pyridaben, spinosad Crops: canola, alfalfa, cereal crops, cranberries, strawberries, apple, soybean, wheat					

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Table 4: Summary of the symptoms associated with the corn and soy honey bee incident reports

Province	Indicator	Number of unique yards by indicator			
		2012	2013	2014	2015 (i)
MB	low #	No reports received	4	1	1
	high #		0	5	1
	colony effects		6	0	0
ON	very low #	15	10	45	16
	low #	87	167	92	17
	medium #	56	59	18	7
	high #	62	105	25	13
	colony effects	7	142	231	10
	unknown	15	49	12	10
QC	very low #	0	0	0	1
	low #	0	5	5	3
	medium #	0	6	1	0
	high #	8	1	4	0
	unknown	0	0	4	0
Number of total bee yards per column (ii)		250	554	444	79
Number of unique bee yards (iii)		249	414	359	67
Indicator Descriptions: Very low #: classified as < 100 dead bees per colony Low #: classified as 100 – 500 dead bees per colony Medium #: classified as 500 – 1000 dead bees per colony High #: classified as > 1000 dead bees per colony Colony effects - one or more of the following symptoms observed: colony not developing as expected, colonies dwindling, low population, low number of foragers, loss of population but generally no large number of dead bees, queen loss, on-going effects in yard.					
Note that overwintering reports were excluded from this summary of symptoms.					
(i) as of July 14, 2015					
(ii) The total number of bee yards includes counts of a yard each time a separate incident was reported within the specific indicator classification; incidents were reported more than once in some yards throughout the season					
(iii) The number of unique bee yards includes the same yard only once, even if the yard reported more than one incident.					

Table 4b: Summary of the Ontario symptoms associated with the corn and soy honey bee incident reports by season in 2015.

Province	Indicator	overwinter	Pre-plant	Planting	Post-plant
ON	Overwinter loss	31			
	very low #		2	14	
	low #			17	
	medium #			4	3
	high #			1	12
	colony effects			6	4
	unknown			6	4

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Table 5: Summary of the symptoms associated with pesticide-spray-related honey bee incident reports

		Number of unique yards by indicator			
Province	Indicator	2012	2013	2014	2015 (i)
MB	high #	1	No reports received	No reports received	No reports received (as of July 14, 2015)
SK	High#	16			
AB	high#	2			
ON	very low #	0	No reports received	1	
	low #	0		5	
	medium #	0		2	
	high #	1		1	
QC	low #	0	1	0	
	medium #	0	2	2	
	high #	9	0	5	
NS	high#	2	No reports received	2	
Number of total bee yards per column (ii)		31	3	18	
Number of unique bee yards (iii)		31	3	18	
Indicator Descriptions: Very low #: classified as < 100 dead bees per colony Low #: classified as 100 – 500 dead bees per colony Medium #: classified as 500 – 1000 dead bees per colony High #: classified as > 1000 dead bees per colony Colony effects - one or more of the following symptoms observed: colony not developing as expected, colonies dwindling, low population, low number of foragers, loss of population but generally no large number of dead bees, queen loss, on-going effects in yard.					
(i) as of July 14, 2015 – no spray related reports have been received in 2015 to date					
(ii) The total number of bee yards includes counts of a yard each time a separate incident was reported within the specific indicator classification; incidents were reported more than once in some yards throughout the season					
(iii) The number of unique bee yards includes the same yard only once, even if the yard reported more than one incident					

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Table 6: Number of bee yards and colonies reported with incidents across Canada (2012 - 2015), in the corn and soy growing regions.

Province	2012		2013		2014		2015(i)	
	# of bee yards (ii)	# of colonies (iii)	# of bee yards (ii)	# of colonies (iii)	# of bee yards (ii)	# of colonies (iii)	# of bee yards (ii)	# of colonies (iii)
ON	241	5750	391	10120	339	10700	64	2450
QC	8	780	12	260	14	160	4	80
MB	---	---	10	305	6	90	2	40
Total	249	6530	414	10685	359	10950	60	2570
<p>--- means that no reports were received</p> <p>(i) Data through July 14, 2015. The reporting of mortality events could occur throughout the summer and fall as in previous years, therefore, numbers for 2015 may increase.</p> <p>(ii) Overwintering reports are excluded from this table. Counts are the number of unique bee yards.</p> <p>(iii) The # of colonies is the estimated number of colonies reported as affected. In most cases the number of colonies in each yard and the number of affected colonies were available. However, for some yards, this information was not available and was estimated as follows. If the number of colonies present in the yard was reported but the numbers of colonies affected were not reported, it was assumed that all the colonies in the yard were affected. Where no information was available about the number of colonies in a yard, an average of 20 colonies affected per yard was used as an estimate. Affected colonies were only counted once.</p>								

Table 7: Number of bee yards and colonies reported with incidents across Canada (2012 – 2015), associated with spray events.

Province	2012		2013		2014		2015 (i)	
	# of bee yards	# of colonies (ii)	# of bee yards	# of colonies (ii)	# of bee yards	# of colonies (ii)	# of bee yards	# of colonies (ii)
NS	2	140	---	---	2	2	---	---
QC	9	615	3	416	7	1198	---	---
ON	1	4	---	---	9	115	---	---
MB	1	20	---	---	---	---	---	---
AB	2	58	---	---	---	---	---	---
SK	16	1135	---	---	---	---	---	---
Total	31	1972	3	416	18	1292	---	---
<p>--- means that no reports were received</p> <p>(i) Data through July 14, 2015. The reporting of mortality events could occur throughout the summer and fall as in previous years, therefore numbers for 2015 may increase.</p> <p>(ii) The # of colonies is the estimated number of colonies reported as affected. In most cases the number of colonies in each yard and the number of affected colonies were available. However, for some yards, this information was not available and was estimated as follows. If the number of colonies present in the yard was reported but the numbers of colonies affected were not reported, it was assumed that all the colonies in the yard were affected. Where no information was available about the number of colonies in a yard, an average of 20 colonies affected per yard was used as an estimate.</p>								

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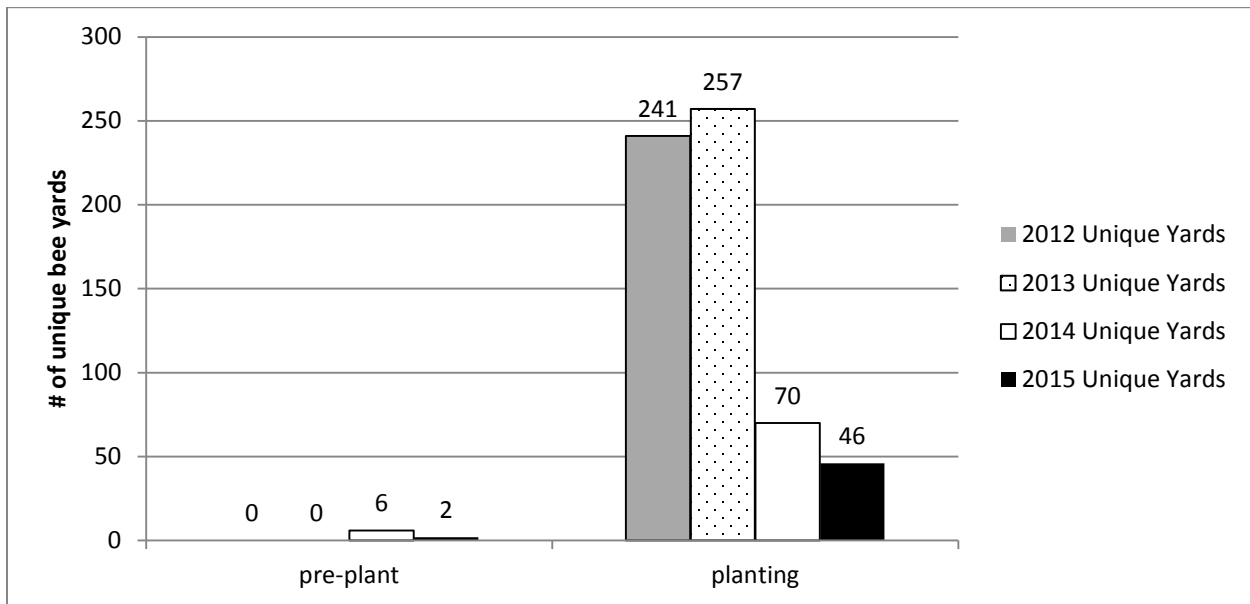


Figure 1: Comparison of the unique number of Ontario yards reported at planting over the last four years - as of July 14, 2015 (during planting period there was ~70% decrease in the number of reported yards affected in 2014 compared to 2013, and in 2015 the reduction was ~80% compared to 2013)

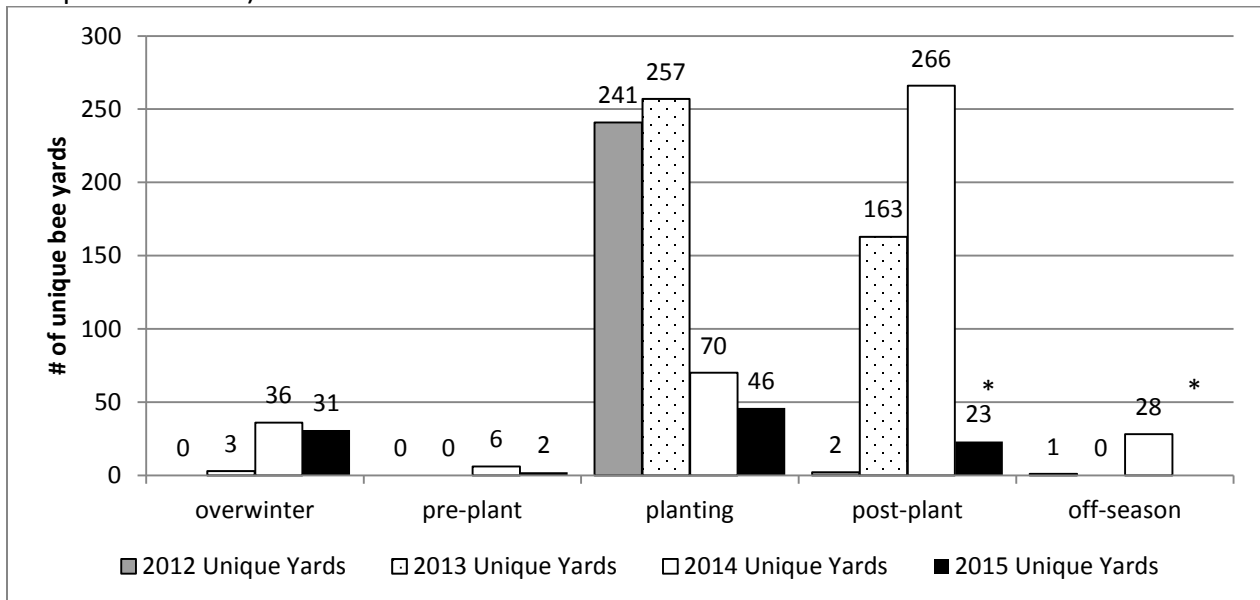


Figure 2: Number of unique bee yards in Ontario reported during the different seasons (planting season was considered as the following months: 2012: April and May; 2013 and 2014: May and June; 2015: May to June 15)

*Data through July 14, 2015 is included. Post-plant season for 2012 – 2013 extended until September
Off-season = these reports were very late in the season and many of the hives had been or were in the process of being winterized