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Statistical Overview of the Canadian Honey and Bee Industry and the Economic Contribution of Honey Bee Pollination 2013-2014

Prepared by:
Horticulture and Cross Sectoral Division
Agriculture and Agri-Food Canada
January 2016



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Electronic version available at
www.agr.gc.ca/horticulture_e
ISSN: 1925-3796
AAFC No. 12447E

Paru également en français sous le titre
Aperçu statistique de l'industrie apicole canadienne et contribution économique des services de pollinisation rendus par les abeilles domestiques, 2013-2014

ISSN: 1925-380X
n° d'AAC: 12297F

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Overview

In 2014, the number of beekeepers in Canada grew to 8,777 (up 3% from 2013). The increase in beekeepers correlated with a rise in the number of colonies from 667,397 to 694,217, an increase of 4% from 2013. Although the number of colonies in Canada rose by 4% from 2013 to 2014, it is only a 0.6% increase compared to the previous high from 2012 (690,037). Ontario and British Columbia had the highest number of beekeepers in Canada with 3,262 and 2,405, respectively; however, Alberta is the province with the highest number of colonies. Alberta alone had 282,000 bee colonies in 2014, which represents 41% of Canada's total. Alberta, Saskatchewan and Manitoba combined made up 66% of Canada's total. These Prairie provinces accounted for 80% of total honey production in 2014, producing over 65 million pounds. Canada's total honey production increased from approximately 76 million to 82 million pounds in 2014, an increase of 7% from 2013. However, totals from 2014 are still lower than the five-year high of 91 million pounds achieved in 2012. Despite the up-and-down trend seen in Canadian honey production over the past five years, the value of honey produced has actually increased each year since 2010, reaching approximately \$202 million in 2014, which represents an increase of 11% over 2013 and 40% over 2010.

Nova Scotia saw a 15% increase in the number of beekeepers, the largest percentage increase of all the provinces. Prince Edward Island experienced the largest percentage decrease in the number of beekeepers (4%), followed by New Brunswick, whose decrease was 2%. Prince Edward Island also saw the largest decrease in the number of colonies in 2014, followed by Saskatchewan, falling by 15% and 5%, respectively. Although the number of beekeepers in New Brunswick decreased from 2013 to 2014, the number of colonies in the province actually rose by 26%, the largest increase in Canada.

British Columbia recorded the largest percentage increase of honey production for 2014, yielding 3.8 million pounds, which amounts to an increase of 85% from 2013. The rise in production seen in British Columbia was somewhat offset by a drop in production in other provinces. Nova Scotia, Prince Edward Island and Saskatchewan saw decreases in production of 26%, 13% and 9%, respectively. While Saskatchewan's percentage decrease was the smallest of the three provinces, its impact was the largest because of its high average yearly volume of production. Alberta continues to be the largest producer of honey in Canada, yielding approximately 34 million pounds in 2014, with a value of nearly \$79 million. Ontario saw the greatest increase in the value of honey produced, growing from approximately \$20 million to over \$30 million in 2014, an increase of 49%.

In 2014, Canada's honey industry recorded a positive trade balance of \$18.6 million, which is 46% less than the previous year's balance. This marks the second consecutive year since 2012 that Canadian exports have decreased. The downward trend is driven primarily by the decrease in exports to the United States that has been seen over the two-year period. The United States has, however, remained the largest export destination, importing over \$32 million of Canadian honey in 2014, which accounted for 63% of Canadian honey exports.

Canada increased total honey imports in 2014 to 6,338 tonnes, valued at approximately \$32 million. Brazil was able to surpass Argentina to become the largest exporter of honey to Canada in 2014, with an import value of \$6 million. Argentina and New Zealand were the second and third largest sources of Canadian imports, valued at \$5.6 million and \$4.7 million, respectively.

Managed pollination services, including those delivered by beekeepers, are a critical input for many agricultural activities, including the production of orchard fruits, many berries and vegetables and the creation of hybrid canola seed. Using established methodology, it is possible to estimate the economic contribution in additional harvest value that can be linked to honey bees as managed pollinators. Based on 2013 harvest data, the most recent estimate of the economic contribution of Canadian honey bee pollination shows that between 3 and 5 billion dollars in additional crop value is made possible through the pollination services provided by beekeepers and their honey bees.



Section A: Statistical overview of Canadian honey and bee industry

1. Production

1.1. Number of beekeepers by province

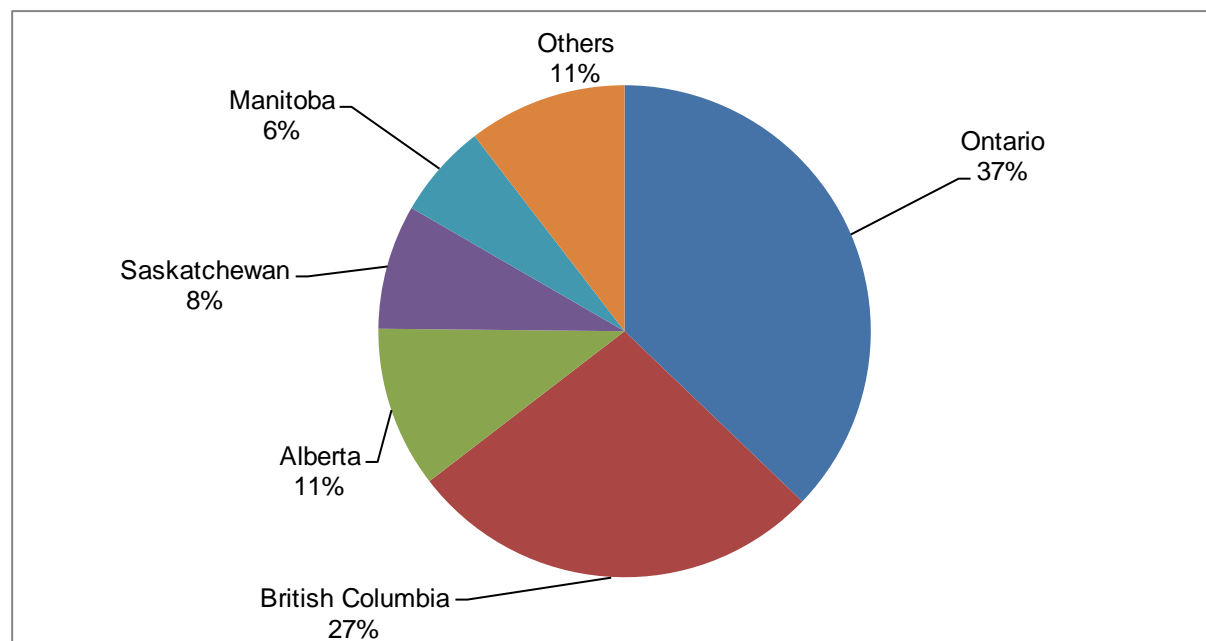
	2010	2011	2012	2013	2014
Prince Edward Island	33	43	46	47	45
Nova Scotia	215	209	230	287	330
New Brunswick	204	209	244	244	240
Quebec	262	268	305	296	300
Ontario	2,600	2,900	3,200	3,155	3,262
Manitoba	490	501	517	532	546
Saskatchewan	965	850	748	715	719
Alberta	769	798	883	890	930
British Columbia	1,865	1,935	2,139	2,323	2,405
Canada	7,403	7,713	8,312	8,489	8,777

Notes:

1. Beekeeper numbers may include pollinators that may not extract honey.
2. Newfoundland and Labrador is excluded since the province has no honey production to report.

Source: Statistics Canada (CANSIM Table 001-0007)

1.2. Number of beekeepers by province – percent share, 2014





Source: Statistics Canada (CANSIM Table 001-0007)

1.3. Number of colonies by province

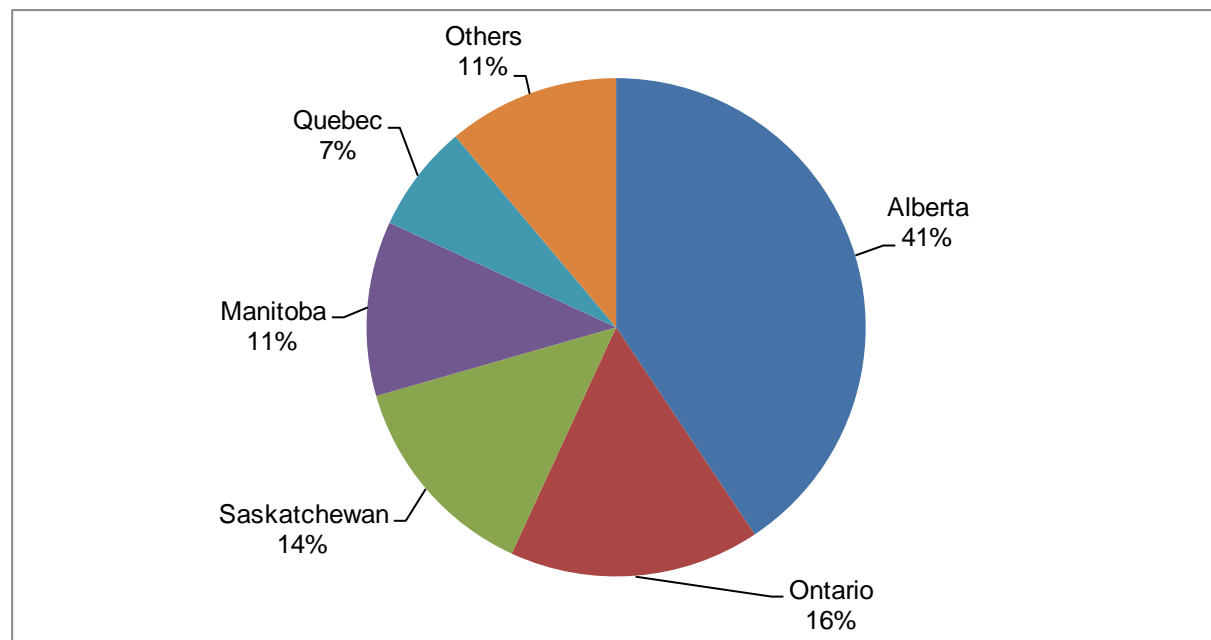
	2010	2011	2012	2013	2014
Prince Edward Island	2,605	2,954	3,719	4,432	3,777
Nova Scotia	18,500	19,300	19,000	19,500	23,000
New Brunswick	4,288	4,500	5,650	4,318	5,441
Quebec	39,812	41,407	49,708	47,203	48,500
Ontario	83,150	90,000	101,000	97,500	112,800
Manitoba	78,000	77,000	80,000	73,800	78,700
Saskatchewan	86,000	90,000	110,000	100,000	95,000
Alberta	266,000	274,600	278,400	278,100	282,000
British Columbia	41,936	38,159	42,560	42,544	44,999
Canada	620,291	637,920	690,037	667,397	694,217

Notes:

1. Colony numbers may include pollinators that may not extract honey.
2. Newfoundland and Labrador is excluded since the province has no honey production to report.

Source: Statistics Canada (CANSIM Table 001-0007)

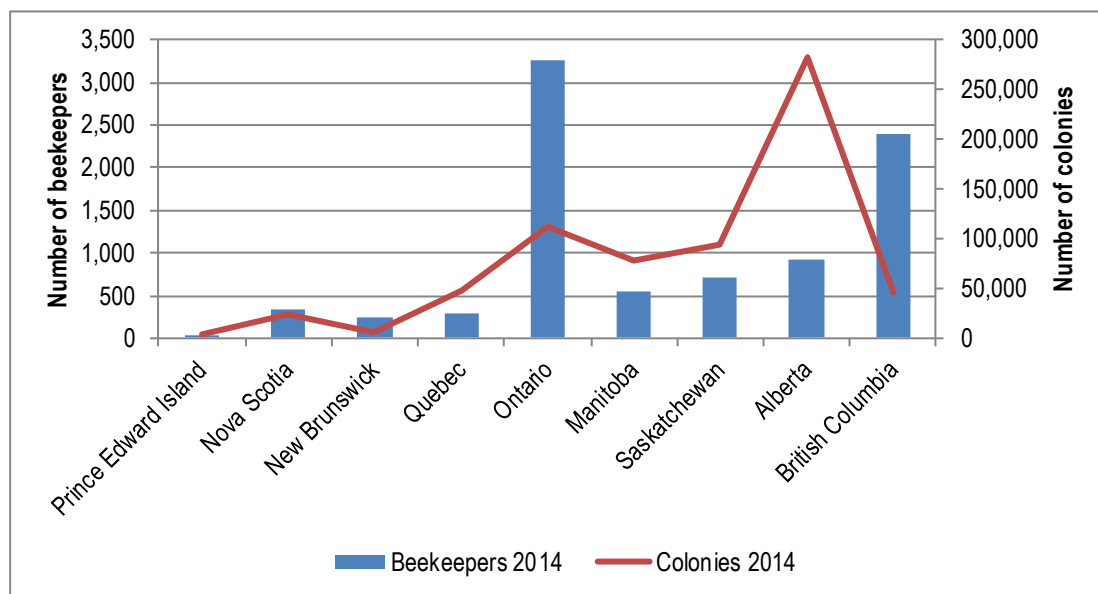
1.4. Number of colonies by province – percent share, 2014



Source: Statistics Canada (CANSIM Table 001-0007)



1.5. Number of beekeepers and number of colonies by province



Source: Statistics Canada (CANSIM Table 001-0007)



1.6. Total honey production by province – thousands of pounds

	2010	2011	2012	2013	2014
Prince Edward Island	201	271	184	176	154
Nova Scotia	528	248	400	495	366
New Brunswick	257	208	199	207	236
Quebec	4,030	2,867	4,395	3,286	3,747
Ontario	8,814	9,023	9,439	6,363	8,192
Manitoba	12,870	15,400	13,200	12,472	14,087
Saskatchewan	18,404	15,930	23,125	18,200	16,530
Alberta	34,580	34,050	38,000	33,200	34,404
British Columbia	1,988	1,826	1,817	2,069	3,840
Canada	81,672	79,824	90,759	76,468	81,556

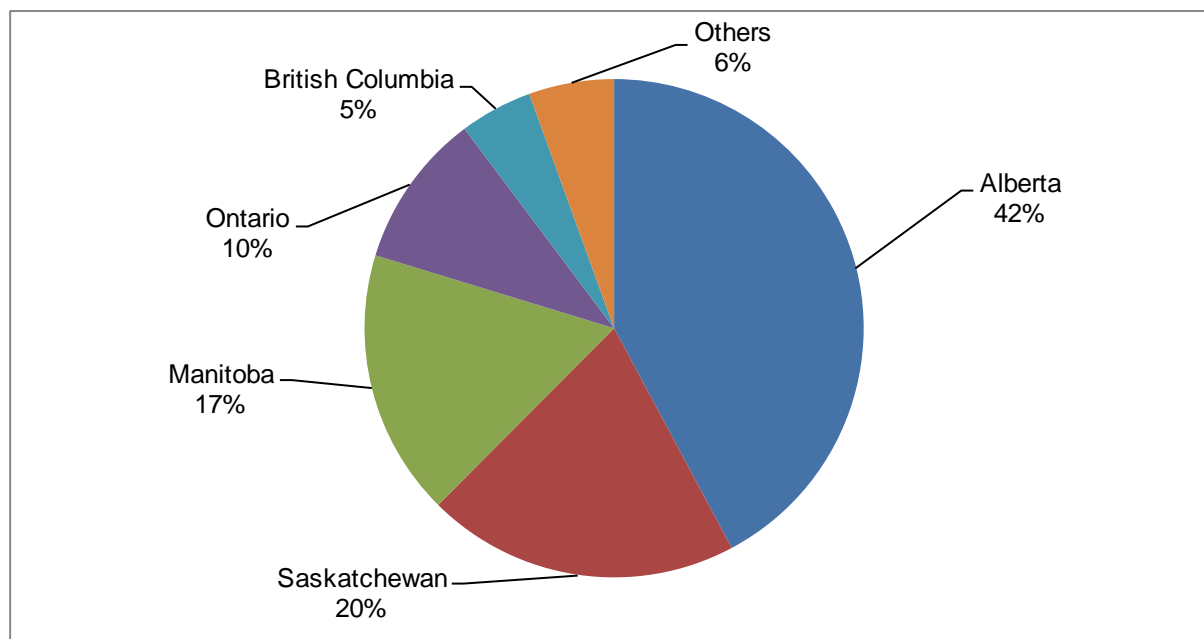
Notes:

1. Production excludes inventory.

2. Newfoundland and Labrador is excluded since the province has no honey production to report.

Source: Statistics Canada (CANSIM Table 001-0007)

1.7. Total honey production by province – percent share, 2014



Source: Statistics Canada (CANSIM Table 001-0007)



1.8. Production value of honey by province – thousands of Canadian dollars

	2010	2011	2012	2013	2014
Prince Edward Island	603	813	551	453	415
Nova Scotia	1,584	745	1,260	1,559	1,545
New Brunswick	963	781	503	517	630
Quebec	9,516	10,234	12,291	12,279	12,500
Ontario	20,379	22,537	23,815	20,362	30,310
Manitoba	19,562	24,948	23,100	25,318	30,288
Saskatchewan	28,526	24,692	38,156	37,310	34,713
Alberta	56,230	59,168	68,340	72,905	78,602
British Columbia	6,834	6,774	8,190	10,580	12,617
Canada	144,197	150,691	176,206	181,283	201,620

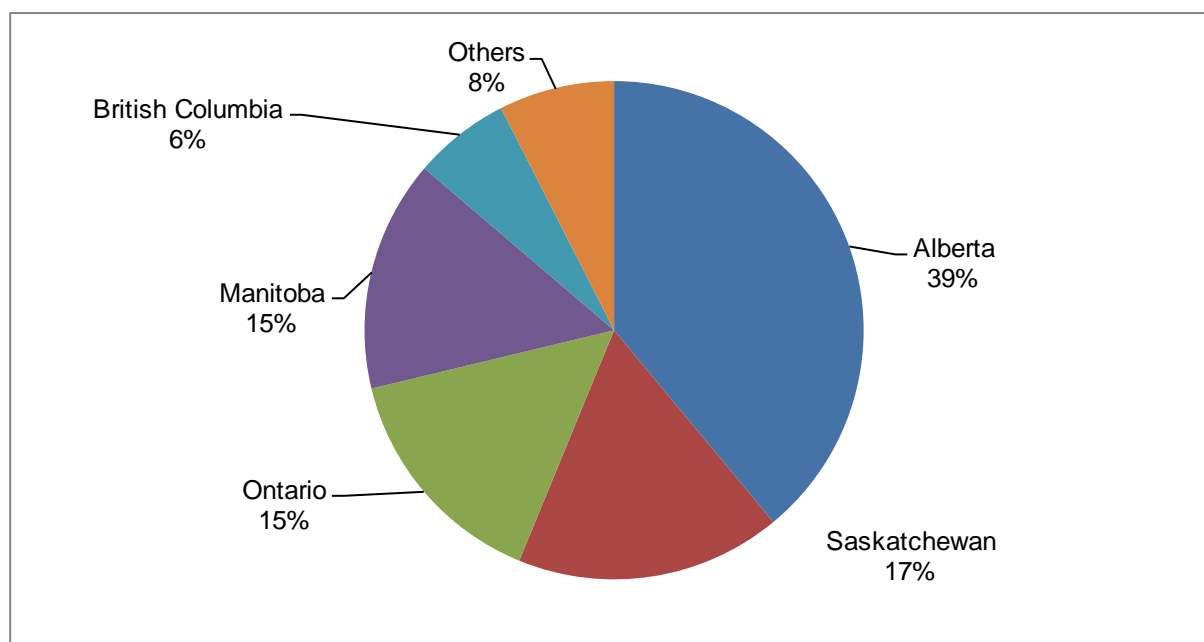
Notes:

1. Value excludes inventory sales except for in Quebec.

2. Newfoundland and Labrador is excluded since the province has no honey production to report.

Source: Statistics Canada (CANSIM Table 001-0007)

1.9. Production value of honey by province – percent share, 2014



Source: Statistics Canada (CANSIM Table 001-0007)



2. Trade

2.1. Trade balance

2.1.1. Canada's honey trade balance – thousands of Canadian dollars

	2010	2011	2012	2013	2014
Exports	57,834	39,012	73,794	60,856	50,856
Imports	14,493	13,324	14,923	26,029	32,215
Trade Balance (Exports - Imports)	43,342	25,688	58,871	34,826	18,641

Source: Statistics Canada. (CATSnet, February 2015)



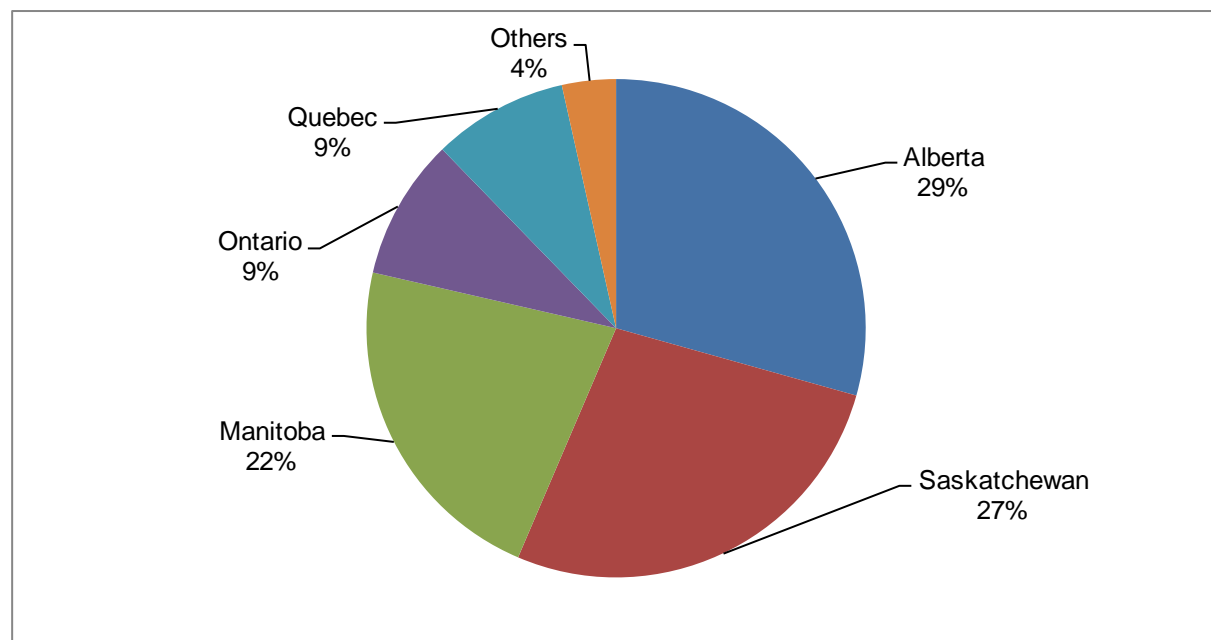
2.2. Exports

2.2.1. Canada's honey exports by province – value (thousands of Canadian dollars)

	2010	2011	2012	2013	2014
Prince Edward Island	25	284	58	19	0
Nova Scotia	358	71	2	2	3
New Brunswick	66	0	0	0	0
Quebec	8,028	7,149	19,265	11,650	4,458
Ontario	2,322	2,400	2,696	3,944	4,653
Manitoba	18,782	14,435	23,097	15,571	11,274
Saskatchewan	11,322	4,449	17,294	16,056	13,764
Alberta	15,740	9,389	10,995	12,832	14,929
British Columbia	1,191	835	386	783	1,774
Canada	57,834	39,012	73,794	60,856	50,856

Note:
 1. Exports may include honey not produced in that province.
 Source: Statistics Canada. (CATSnet, February 2015)

2.2.2. Canada's honey exports by province – percent share, 2014



Source: Statistics Canada. (CATSnet, February 2015)

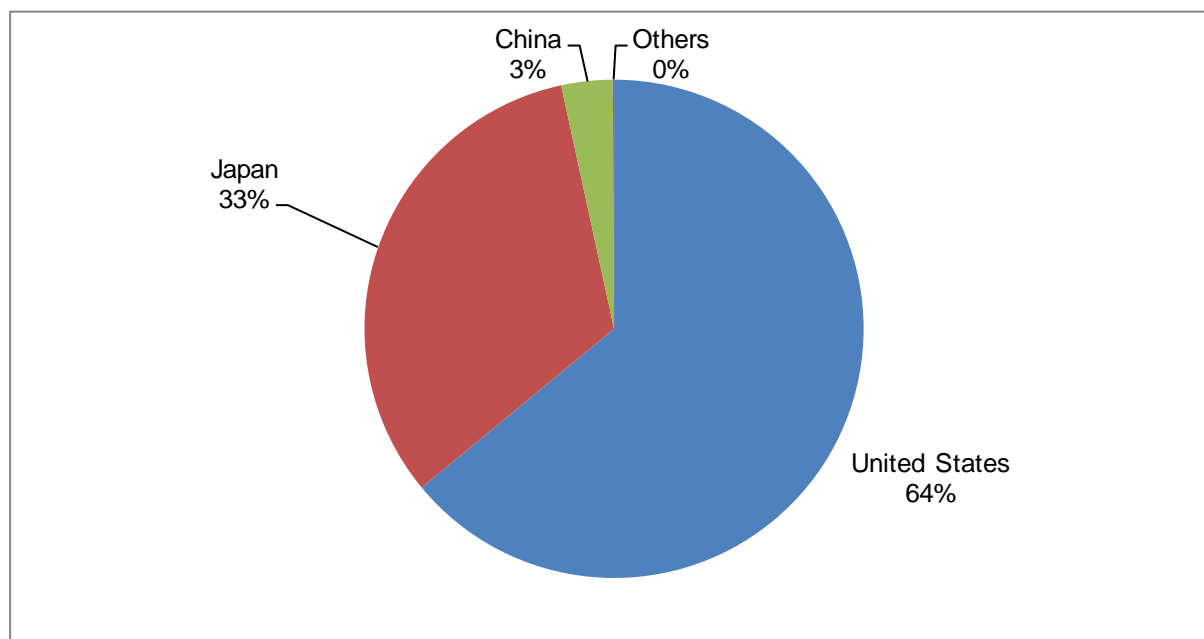


2.2.3. Canada's top 10 honey export destinations – volume (kilograms)

	2010	2011	2012	2013	2014
United States	11,178,117	7,233,626	15,922,716	9,535,289	5,927,483
Japan	2,440,219	1,690,307	1,896,912	2,363,414	3,142,736
China	215,649	191,261	203,363	196,223	249,684
Hong Kong	23,274	45,694	47,360	22,320	85,442
Bahamas	3,324	0	0	0	16,003
Greece	0	4,418	20,761	25,939	13,343
Barbados	21,687	12,470	12,084	3,510	6,030
Singapore	3,322	2,901	3,029	965	4,927
Lebanon	6,408	0	2,531	1,665	2,055
Australia	57,508	38,594	20,650	0	1,818
Others	1,195,829	335,089	210,062	116,826	6,870
Total	15,145,337	9,554,360	18,339,468	12,266,151	9,456,391

Source: Statistics Canada. (CATSnet, February 2015)

2.2.4. Canada's top honey export destinations by country – percent share, 2014



Source: Statistics Canada. (CATSnet, February 2015)



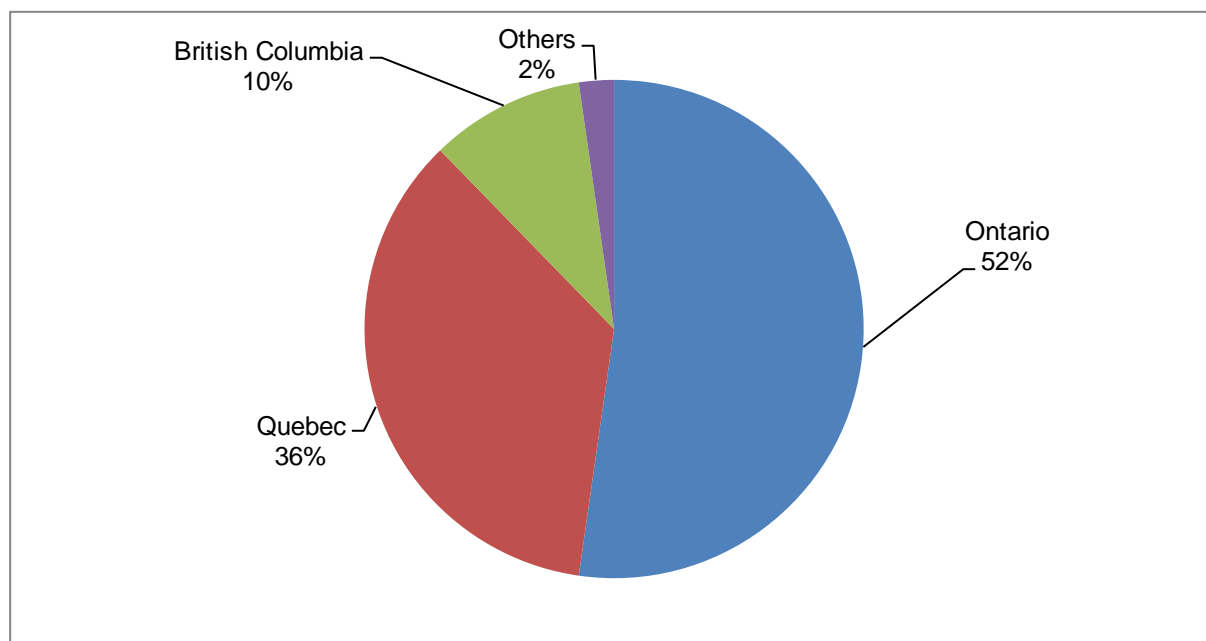
2.3. Imports

2.3.1. Canada's honey imports by province – value (thousands of Canadian dollars)

	2010	2011	2012	2013	2014
Nova Scotia	1.4	0.7	0.8	3.1	2.8
New Brunswick	0.5	0.6	0.4	0.0	0.0
Quebec	2,646.8	3,878.4	4,750.2	6,736.9	11,426.8
Ontario	9,397.2	7,391.4	8,145.0	16,897.8	16,835.7
Manitoba	159.5	145.6	38.1	292.1	603.3
Saskatchewan	0.0	12.8	13.2	13.1	0.0
Alberta	11.8	18.9	79.6	10.0	123.8
British Columbia	2,275.6	1,876.0	1,895.2	2,076.4	3,222.3
Canada	14,492.8	13,324.4	14,922.5	26,029.5	32,214.7

Source: Statistics Canada. (CATSnet, February 2015)

2.3.2. Canada's honey imports by province – percent share, 2014



Source: Statistics Canada. (CATSnet, February 2015)

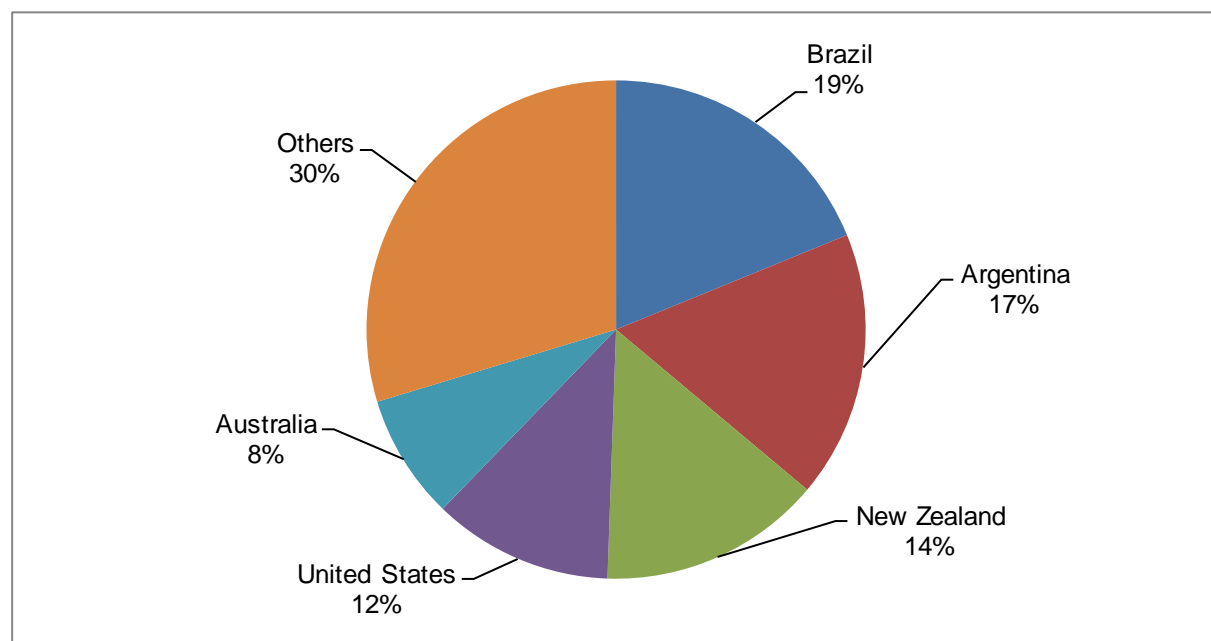


2.3.3. Canada's top 10 sources of honey imports – value (thousands of Canadian dollars)

	2010	2011	2012	2013	2014
Brazil	2,234	2,534	1,672	3,811	6,059
Argentina	2,586	1,138	3,834	8,696	5,574
New Zealand	1,825	2,157	2,799	3,763	4,652
United States	1,885	1,633	1,447	3,065	3,759
Australia	3,428	2,132	2,600	2,789	2,610
Ukraine	0	0	0	0	1,442
China	82	61	198	71	1,216
India	709	633	387	582	1,072
Greece	651	749	788	1,388	878
Turkey	6	4	3	29	815
Others	1,087	2,285	1,194	1,836	4,139
Total	14,493	13,324	14,923	26,029	32,215

Source: Statistics Canada. (CATSnet, February 2015)

2.3.4. Canada's top sources of honey imports by country – percent share, 2014



Source: Statistics Canada. (CATSnet, February 2015)



2.3.5. Canada's sources of honey bee imports – value (thousands of Canadian dollars)

	2010	2011	2012	2013	2014
New Zealand	834	2,746	2,110	3,398	3,794
Australia	56	333	414	1,494	1,579
Total	890	3,079	2,524	4,892	5,388

Notes:

1. Package bees are sold in a variety of sizes typically one pound, two pound and three pound packages. No detail on the individual numbers of different package sizes is available.

2. Does not include queen bees.

Source: Statistics Canada. (CATSnet, March 2015)

2.3.6. Canada's sources of queen bee imports – value (thousands of Canadian dollars)

	2010	2011	2012	2013	2014
United States	2,584	3,021	3,399	4,265	5,364
Chile	189	156	50	168	149
Australia	503	150	264	259	109
New Zealand	143	159	149	91	104
Denmark	12	4	4	0	14
Total	3,432	3,490	3,867	4,782	5,740

Source: Statistics Canada. (CATSnet, March 2015)



3. Consumption

3.1. Honey available for consumption in Canada – kilograms per person

	2010	2011	2012	2013	2014
Honey	0.80	0.91	0.82	0.85	1.02

Note:

1. Does not adjust for losses, such as waste and/or spoilage in stores, households, private institutions or restaurants or losses during preparation.

Source: Statistics Canada (CANSIM Table 002-0011)



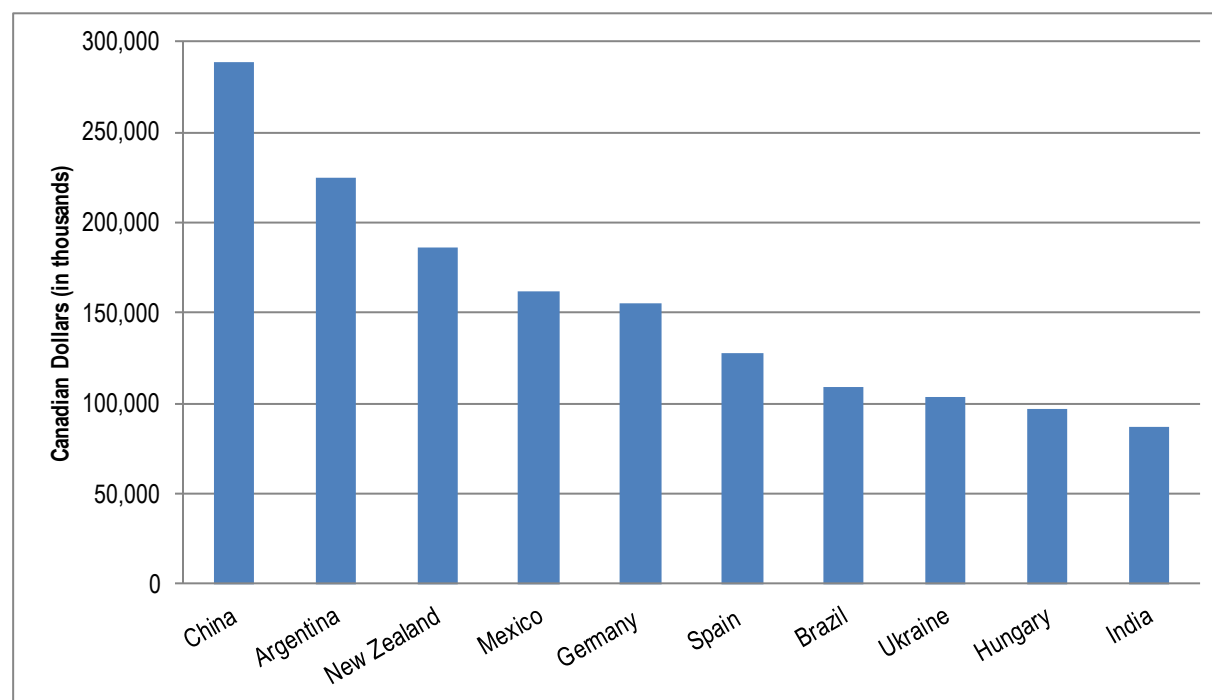
4. World data

4.1. Top 10 exporters of honey worldwide – value (thousands of Canadian dollars)

	2010	2011	2012	2013	2014
China	187,674	200,050	214,606	254,731	288,077
Argentina	178,429	220,338	215,145	217,234	224,372
New Zealand	73,109	86,612	103,762	144,161	185,541
Mexico	87,589	88,262	101,854	115,853	161,328
Germany	114,765	113,806	121,172	134,724	154,721
Spain	84,354	78,997	80,894	96,821	127,396
Brazil	56,634	69,786	52,390	55,811	108,581
Ukraine	20,490	27,613	31,013	54,742	103,481
Hungary	62,813	59,962	63,423	88,395	97,147
India	57,977	65,639	60,997	79,734	86,516
Others	489,900	494,963	563,186	683,581	729,341
Total	1,413,734	1,506,026	1,608,443	1,925,786	2,266,500

Source: Global Trade Atlas (June 2015)

4.2. Top 10 honey-exporting countries, 2014



Source: Global Trade Atlas (June 2015)

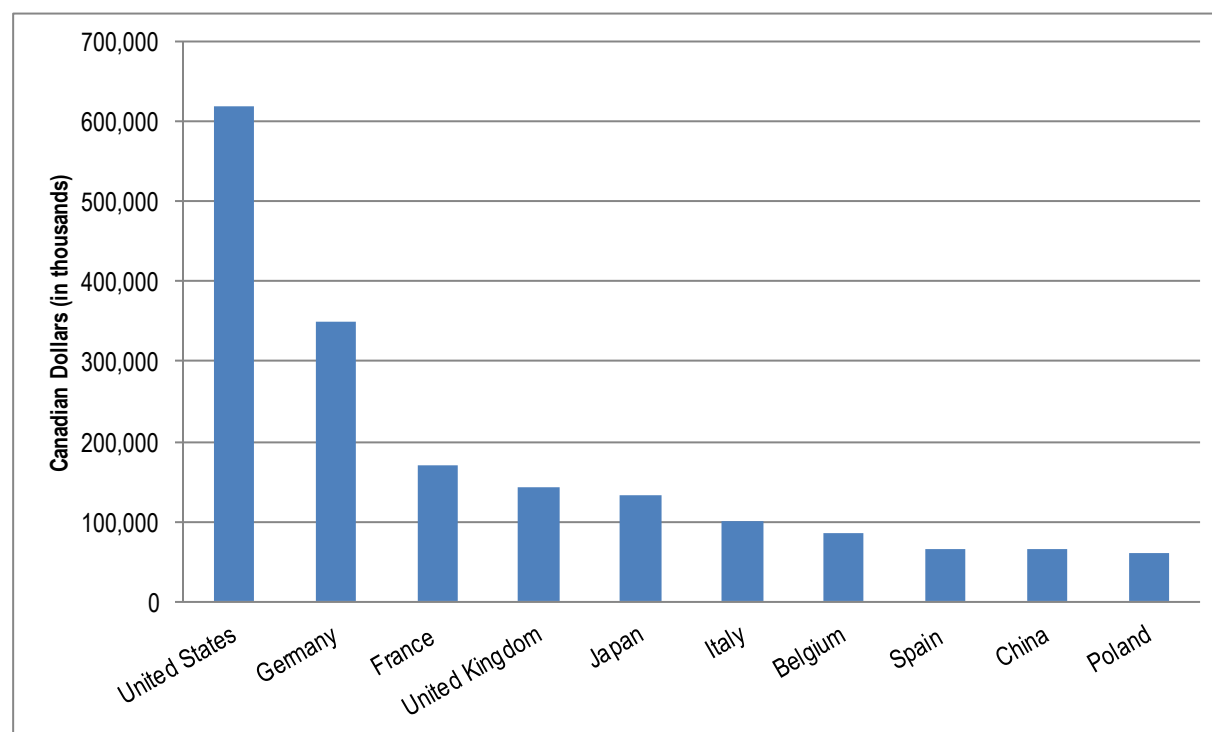


4.3. Top 10 importers of honey worldwide – value (thousands of Canadian dollars)

	2010	2011	2012	2013	2014
United States	301,557	381,018	416,364	495,401	618,087
Germany	303,219	269,935	281,381	335,464	348,629
France	99,895	109,704	94,252	117,867	169,786
United Kingdom	108,284	124,946	113,772	130,120	142,669
Japan	104,055	116,535	105,207	119,594	132,669
Italy	55,142	57,333	55,943	77,868	100,075
Belgium	52,469	56,078	55,760	65,367	85,329
Spain	39,098	45,463	48,339	55,388	66,078
China	9,938	12,759	26,217	44,269	64,761
Poland	32,004	38,153	34,940	49,790	59,613
Others	331,317	340,203	360,756	424,917	518,677
Total	1,436,978	1,552,127	1,592,930	1,916,046	2,306,373

Source: Global Trade Atlas (June 2015)

4.4. Top 10 honey-importing countries, 2014



Source: Global Trade Atlas (June 2015)



Section B: Honey bee pollination

5. Economic value of honey bee pollination of Canadian agriculture

5.1. Background

Honey bee pollination is a critical input for many agricultural commodities. An established methodology can be applied to estimate the value of the direct economic contribution to agriculture generated by honey bee pollination.

Honey bees placed near target crops by commercial and hobbyist beekeepers are the most common form of managed pollination, though alfalfa leafcutter bees, bumblebees and some other insect species are used in specific agricultural circumstances. This analysis attempts to exclude the contribution of natural and controlled pollinators other than honey bees. Pollination services for blueberry, cranberry, orchard fruit and canola seed production generate the bulk of the demand for honey bee pollination.

This analysis relies on Canadian farm gate value or farm cash receipts for key commodities for which data is available for the year 2013. The estimation uses established coefficients for each crop to determine the proportion of the crop harvest reliant on insect pollination and the proportion of insect pollination that is delivered by honey bees.

5.2. Value of bee pollination by crop

The contribution of honey bee pollination to agricultural production can be estimated using an established formula:

$$V \times D \times P$$

where

V = Annual value of crop

D = Dependency of the crop on insect pollinators

P = Proportion of effective insect pollinators of the crop that are honey bees

The estimates used for D and P are those used by Morse and Calderone (2000).



5.3. Estimated contribution of Canadian honey bee pollination to value of key crops in 2013 – thousands of Canadian dollars

Crop	D ₁ (1 =100%)	P ₂ (1 =100%)	D x P ₃ (1 =100%)	V ₄ (CAN\$ '000)	Value of Honey Bee Pollination D x P x V
Tree fruits	-	-	-	306,883	251,098
Apples	1	0.9	0.9	197,391	177,652
Apricots	0.7	0.8	0.56	781	437
Sour cherries	0.9	0.9	0.81	10,328	8,366
Sweet cherries	0.9	0.9	0.81	44,033	35,667
Nectarines	0.6	0.8	0.48	5,344	2,565
Peaches	0.6	0.8	0.48	33,986	16,313
Pears	0.7	0.9	0.63	7,959	5,014
Plums	0.8	0.9	0.72	7,061	5,084
Berries	-	-	-	529,984	273,822
Grapes	0.1	0.1	0.01	154,491	1,545
Blueberries	1	0.9	0.9	187,146	168,431
Raspberries	0.8	0.9	0.72	24,514	17,650
Strawberries	0.2	0.1	0.02	69,606	1,392
Cranberries	1	0.9	0.9	94,227	84,804
Cucurbits	-	-	-	86,020	37,608
Cucumbers	0.9	0.9	0.81	25,742	20,851
Melons	0.8	0.9	0.72	17,988	12,951
Pumpkins	0.9	0.1	0.09	18,023	1,622
Squash/Zucchini	0.9	0.1	0.09	24,267	2,184
Oilseeds	-	-	-	9,945,801	1,486,213
Canola	0.2	0.9	0.18	7,325,446	1,318,580
Sunflower	1	0.9	0.9	30,322	27,290
Mustard Seed	0.2	0.8	0.16	98,564	15,770
Soybeans	0.1	0.5	0.05	2,491,469	124,573
Forage seed	-	-	-	-	-
Alfalfa Seed	1	0.1	0.1	25,000	2,500
Total	-	-	-	-	2,051,243

Notes:

1. D = Dependency of the crop on insect pollinators.
2. P = Proportion of effective insect pollinators of the crop that are honey bees.
3. D x P = Combined coefficient.
4. V = 2013 value of crop.

Sources:

The estimates used for D and P are those used by Morse and Calderone (2000)

The estimates for crop value: Statistics Canada



5.4. Impact of bee pollination on crop production

Fruits and Vegetables

Insect pollination is critical to the economic performance of key crops in the horticulture (fruit and vegetable) sector. In Table 5.3, the established methodology is used to estimate the contributions of honey bee pollination to the Canadian harvest of major insect-pollinated crops. Apple production in Canada in 2013 generated a total harvest value of \$197 million (farm gate value) of which honey bees were responsible for 81% or \$177 million. For berries, in the rapidly growing blueberry sector honey bees are responsible for \$168 million out of \$187 million (81%) in high-bush and low-bush blueberries combined. In total, the 2013 economic contribution of honey bee pollination to production of fruits and vegetables is estimated at \$562 million.

Canola

Special consideration of the contribution of honey bees to the production of canola is merited. Most canola planted in Canada today is hybrid seed. The production of hybrid canola seed grown to be subsequently planted by farmers the following season requires precisely timed and thorough insect pollination to bring together the separate genetic lines of the male and female parent plant strains. Since hybrid canola seed is produced primarily with managed pollinators, a portion of the value of this crop can be included as part of the direct agricultural contribution of honey bees through pollination.

Most of the hybrid canola seed produced in Canada is subsequently planted in Canada. While commodity canola is primarily wind-pollinated, research indicates that honey bees foraging on canola can add to harvest quantity and quality. Researchers offer a wide range of estimates for the increase in production linked to honey bee foraging depending on plant variety and a number of local conditions, including the abundance of natural pollinators. The highest estimates suggest a gain approaching 20% in additional harvest value, while more modest gains from 2% to 15% have also been reported. Most of the 455,700 hives in the Prairie provinces forage on commodity canola for several weeks in the peak of summer.

Honey bees are estimated to be responsible for about half of the pollination that makes the production of hybrid canola seed possible (with alfalfa leafcutter bees primarily responsible for the other half). One approach to estimating the magnitude of this contribution is to take this share (50%) of the total farm gate value of canola into account as a key economic contribution of honey bees to the total value produced by Canadian agriculture. Total farm cash receipts for producers of canola were \$7.3 billion in 2013. If honey bees are credited with making 50% of the production of canola seed possible (for a contributed value \$3.66 billion), in order to avoid double counting, the additional estimated contribution from honey bee pollination to commodity canola from Table 5.3 must be removed from the total contribution. The additional agricultural value of all other crop pollination, less canola, is \$733 million, generating a total estimate for the contribution of honey bees of \$4.39 billion.

An alternative model for estimating the contribution of honey bees to canola crops could be based on the additional contribution to harvest volume through the development and adoption of hybrid canola seed technology over the past twenty years - made possible through the use of managed insect pollination. Hybrid canola seed has increased harvest volumes by a (conservatively) estimated 30%, all other things being equal, compared with non-hybrid canola. If honey bees make half of the 30% increase in canola harvest value possible as they provide about half of the managed pollination to make the seed, for 2013 that contribution (half of 30%, or 15% of total harvest) would be valued at \$1.1 billion. The total contribution to agriculture of honey bees from adopting this approach is \$3.15 billion: \$2.05 billion (for contribution to increased harvest 'in field' from Table 5.3) and \$1.1 billion in value contribution by making possible the adoption of more productive hybrid canola seed technology.



5.5. Estimated economic contribution of honey bee pollination to crop production

The 2013 total annual economic contribution of honey bee pollination through direct additional harvest value is estimated at \$2.05 billion (Table 5.3). Value beyond this is created by the contribution of honey bees to the production of hybrid canola seed—which, depending on the approach chosen, was valued at between \$1.1 billion and \$3.66 billion per year in 2013. The contribution to canola production combined with other agricultural production which benefits from honey bee pollination suggests the economic harvest value contributed by honey bees ranges from \$3.15 to \$4.39 billion per year.

While a more rigorous and detailed scientific assessment of each commodity in production could produce higher or lower estimates, this analysis shows that the value to agriculture of honey bee pollination is substantially greater than the value of honey and other hive products produced (about \$200 million per year). This estimate does not capture the growing contribution of alfalfa leafcutter bees to canola and blueberry production, nor the valuable contribution of natural pollinators.



6. Key Resources

- Global Trade Atlas
- Statistics Canada. (CANSIM TABLE 001-0007)
- Statistics Canada. (CANSIM TABLE 002-0001)
- Statistics Canada. CATSNET

Import and export data is based on the following Harmonized System Codes (H.S. Codes):

Honey for import: 0409000010 0409000021 0409000022 0409000023 0409000024
0409000025 0409000026 0409000029 0409000090

Honey for export: 04090000

Honey Bees for import: 0106410011 0106410012 0106410020 0106900011 0106900012
0106900020