Pest Control Products Sales Report for 2013

Canada

Table of Contents

Foreword

In November 2006, the Pest Control Products Sales Information Reporting Regulations came into force, making mandatory under the *Pest Control Products Act* the reporting of sales information by registrants to Health Canada's Pest Management Regulatory Agency (PMRA). These regulations require registrants to submit annually to the PMRA the total volume of all their products registered with the PMRA and made available for sale to users (referred to as "sold" in the remainder of this report). These data are reported by calendar year (January 1st to December 31st) and must be submitted by June 1st of the following year. The purpose of the sales information reporting program is to collect sales data which are used by the PMRA to better understand potential pesticide use in Canada.

Sales data are considered in risk assessments of pesticides, in policy decisions, in identifying trends in pesticide use, and in providing guidance for risk-reduction strategies. For example, sales data are used in the re-evaluation of older pesticides to help understand the presence and value of the pesticide in the Canadian marketplace, as well as the potential impacts if changes are made to the registration status of the pesticide. Sales data are also used to inform the Pesticide Incident Reporting Program on the marketshare of particular pesticides to help identify potential risks that may require attention.

Introduction

The sixth Pest Control Products Sales Report provides an overview of pesticides sold in Canada for the 2013 calendar year, and briefly discusses changes in pesticide sales since the regulations were implemented. This report is only intended to represent the best information provided to the PMRA through the reporting program. Data are considered confidential business information and are presented in various combined ways to ensure confidentiality.

Overall Canadian Pesticide Sales Data

Overview

Registrants have reported the sales quantities for 97% of all products (6609 in total) registered in Canada in the 2013 calendar year. Data can be submitted in different units depending on the product (for example, kilograms, litres). To standardize varying products, the data have been converted into kilograms of active ingredient (kg a.i.).

All technical grade active ingredient and manufacturing concentrate product information was excluded from calculation as the quantity is reported in the end-use products. Also, products where the data could not be converted to kg a.i., due to the reported units of measure, were excluded from calculation. This includes products where units were reported incorrectly and could not be corrected, as well as products that had unusual units, such as colony forming units and devices, which were counted in units. In total, 124 out of the 2757 end use products reported as sold were excluded from the kg a.i. calculations. The majority of these products are biopesticides and are discussed separately in this document. Only three conventional products with sales were excluded from the kg a.i. calculations due to issues with units.

Of the remaining 2633 products, the overall pesticide sales in Canada in 2013 were 109 070 851 kg a.i., which is a 17% increase from the 92 917 691 kg a.i. sold in 2012 (Figure 1). This is a larger increase than reported in previous years (maximum increase of 3%).

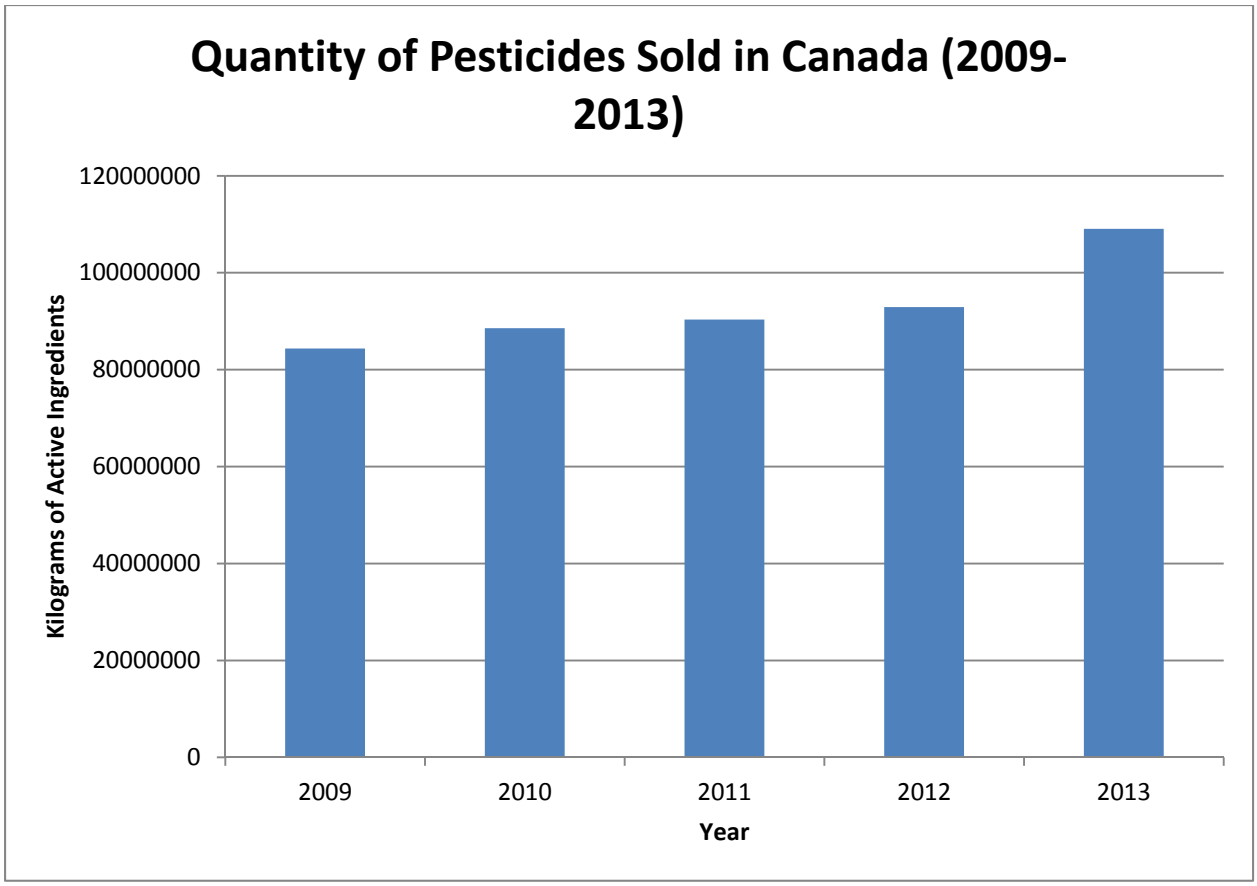

Figure 1: Quantity of pesticides sold in Canada between 2009 and 2013.

In the analysis of the overall quantity for 2013, it should be noted that the sum of the top 50 products from the total number of products for which sales reports were submitted made up 68.0% of the total kg a.i. sold in Canada in 2013 (74 154 281 kg a.i.). This was an increase in the overall quantity from 2012, where the top 50 products sold 63 293 586 kg a.i, while the relative amount was consistent (68.1% of overall). The top 10 active ingredients sold, presented in decreasing order in Table 1, made up 73 369 970 kg a.i. or 67.3% of the total. A comprehensive list with the rankings for all active ingredients sold in Canada in 2013 is provided in Appendix I. Five active ingredients have remained on the top 10 list over the past 5 years (since 2009): glyphosate, available chlorine, present as sodium hypochlorite (appears as sodium hypochlorite in previous reports), 2,4-D, MCPA, and mineral oil.

Table 1: Top 10 Active Ingredients Sold in Canada in 2013

Active Ingredient	Product Type
Glyphosate	Herbicide
Available chlorine, present as sodium hypochlorite	Antimicrobial
Creosote	Antimicrobial
2,4-D	Herbicide
MCPA	Herbicide
Glufosinate ammonium	Herbicide
Mineral Oil	Insecticide/Fungicide/Other
Surfactant Blend	Other
Available chlorine, present as trichloro-s-triazinetrione	Antimicrobial
Mancozeb	Fungicide

Sales Information by Sector

All products were grouped according to their areas of use into three sectors: Agricultural, Non-Agricultural, and Domestic. (Data from each of the sectors are discussed in more detail in the following sections.)

The groups were designed so there would be no overlap between the groupings. A product was placed into the Domestic sector if its classification was Domestic on its label. For the Non-domestic products, a product with any agricultural use on the label was grouped with the Agricultural sector, even if there were non-agricultural uses listed on the label. All remaining products were grouped as Non-agricultural. In some cases, if upon analysis, it was determined a product in the Agricultural sector had its main usage in the Non-agricultural sector, the product was moved to the Non-agricultural sector group.

Overall, 73.9% of pesticide sales in Canada were of Agricultural sector products (see Figure 2), whereas 20.2% of pesticide sales were of Non-agricultural sector products and 5.9% were of Domestic sector products. Agricultural sector products have constituted the largest amount of pesticides sold in Canada since data was collected, followed by Non-agricultural sector products and Domestic sector products. The relative sales of products in the Agricultural sector decreased slightly between 2012 and 2013 (decreasing from 78% of overall sales to 74%), while the Non-agriculture sector increased from 17% to 20% and the Domestic sector remained fairly consistent at 6% (from 5% in 2012) (see Figure 3 for data for 2009 to 2013). Absolute Agricultural sector products sales increased by 11% from 2012 to 2013. Non-Agricultural sector products sales increased by 39% from 2012 to 2013. Domestic sector products sales increased 44% from 2012 to 2013.

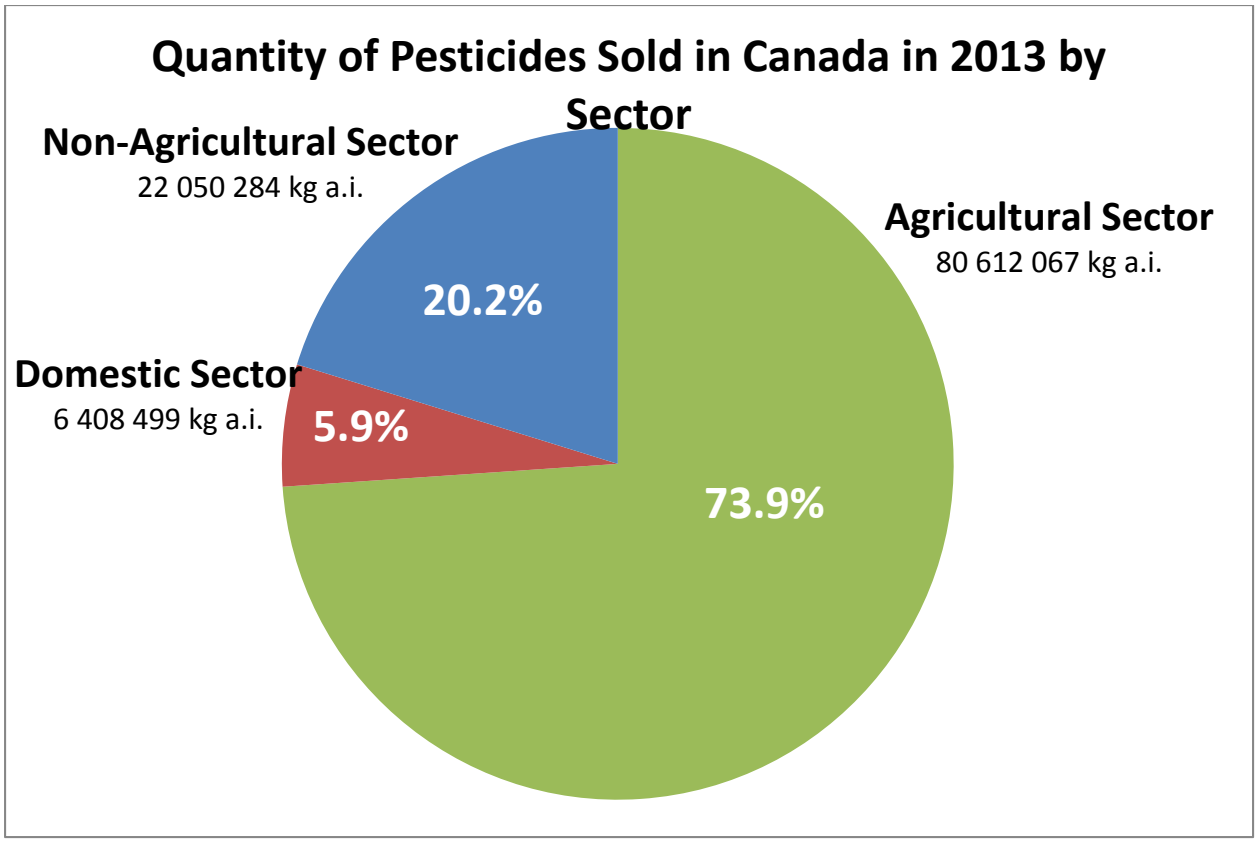

Figure 2: Quantity of pesticides sold in Canada in 2013 by sector.

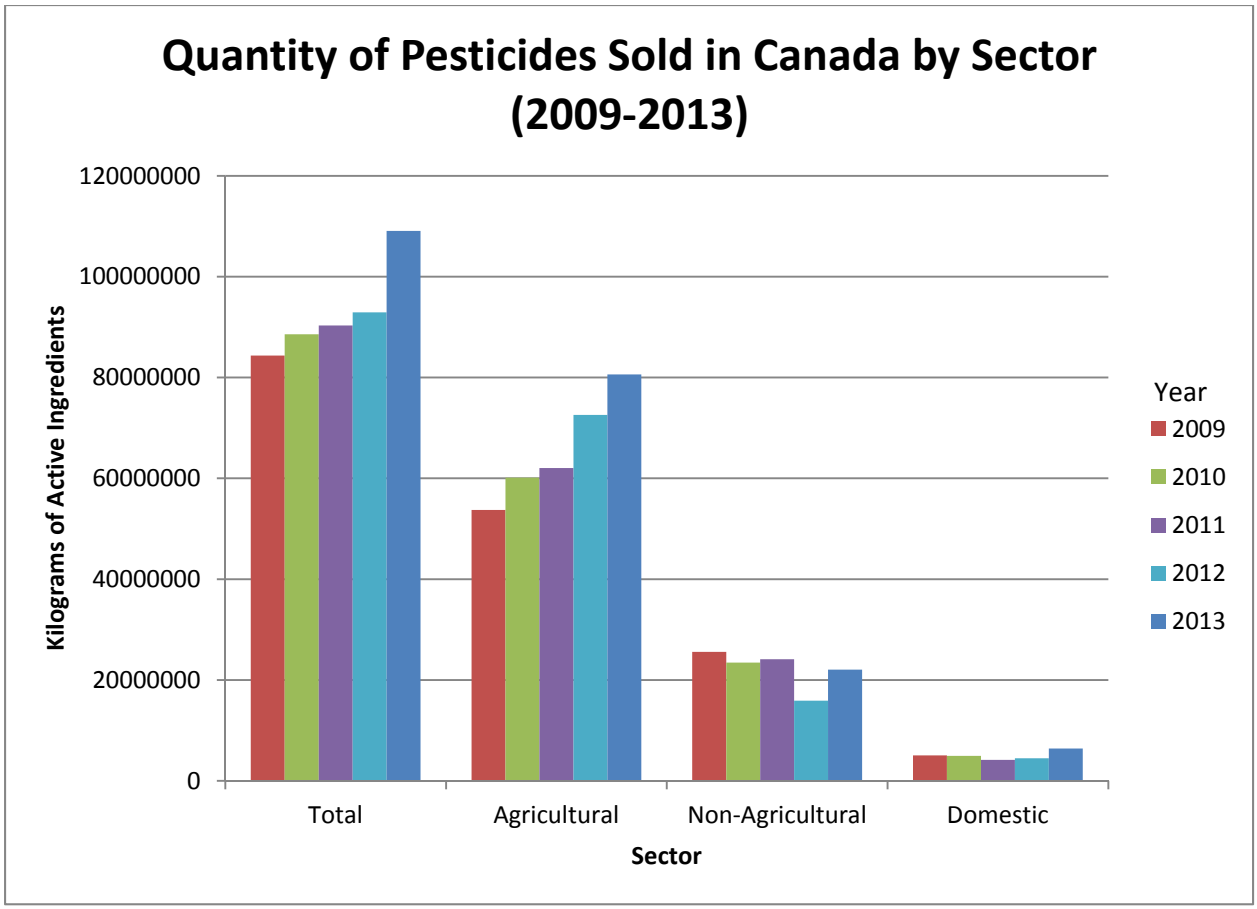

Figure 3: Quantity of pesticides sold in Canada by sector between 2009 and 2013.

Within each sector, data were further broken down into product type groupings. These include: herbicides, insecticides, fungicides, antimicrobials, vertebrate controls, and others (for the remaining products). A product may have a number of different uses on the label. As the sales reporting does not collect data on the relative amount of a product used for a specific label use, the data may not necessarily be separated into only one product type. This means that there may be overlap between the product type groupings and these numbers should not be summed to obtain total quantities sold in Canada in 2013, as an over-reporting would occur.

Agricultural Sector

Products with agricultural uses accounted for the largest amount of pesticide sales in Canada in 2013 at 73.9%. There was an 11% increase in Agricultural sector pesticide sales from 72 565 600 kg a.i. in 2012 to 80 612 067 kg a.i. in 2013. While absolute quantities increased in the Agricultural sector, when combined with increases in Non-agricultural and Domestic sector sales, there was an overall decrease in the prominence of the Agricultural sector in overall sales by about 4% (from 78% in 2012 to 74% in 2013).

Of the quantity of pesticides sold having Agricultural sector uses, herbicides accounted for 80.1% of the pesticide sales, followed by fungicides at 11.2% and insecticides at 4.6% (Figure 4). Antimicrobials (0.3%) and vertebrate control (0.02%) accounted for very small quantities of agricultural pesticides sold in 2013 and have been included in the "others" category to account for 5.4% of agricultural sales. Within the Agricultural sector, sales by product type have been consistent, with only very small changes seen in the percentage of sales in each type throughout the years reported.

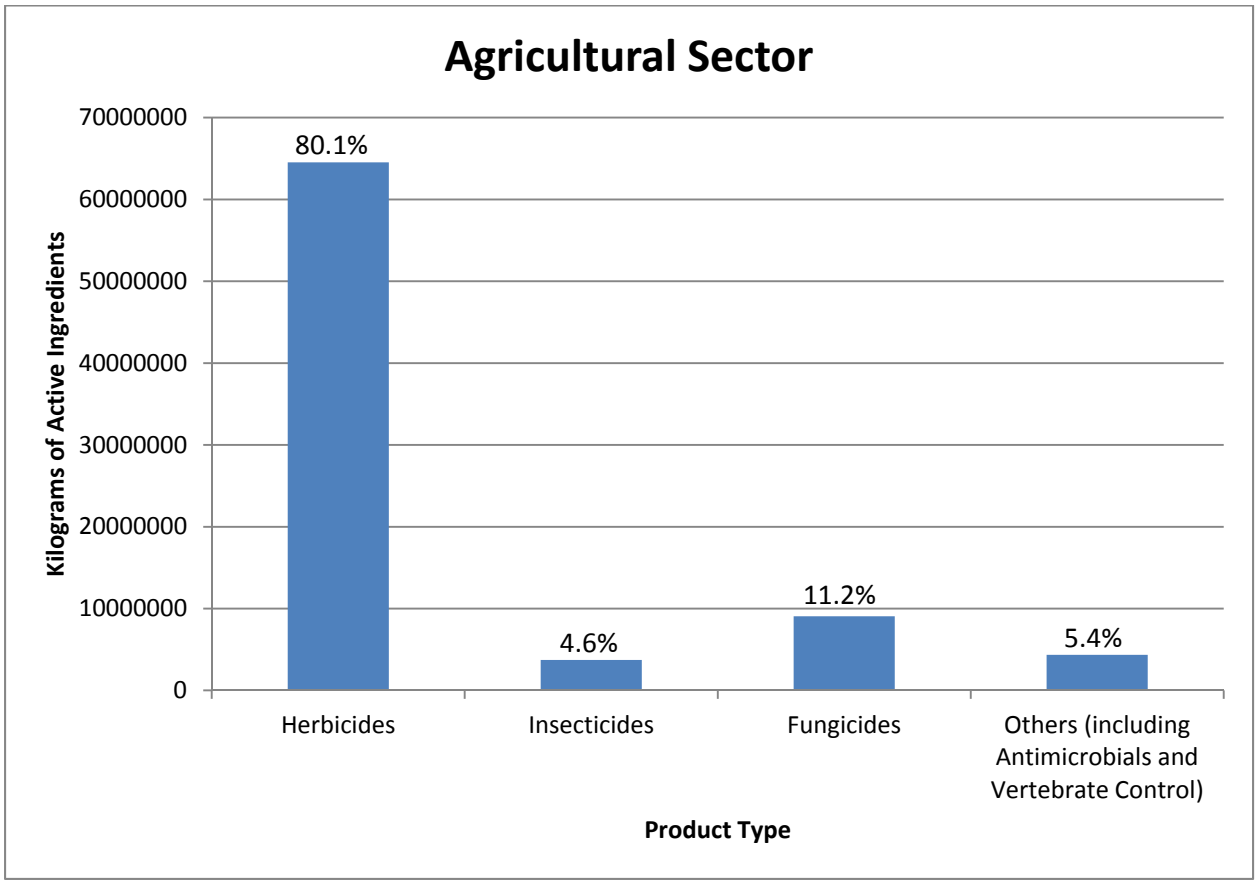

Figure 4: Kilograms of active ingredients sold in Canada in 2013 in the Agricultural sector.

The top 10 active ingredients sold with agricultural uses are shown in Table 2 in decreasing order. Eight of the top 10 agricultural active ingredients were herbicides and adjuvants that are used in conjunction with herbicides. These top 10 active ingredients accounted for 77% of the Agricultural sector pesticides sold. Of the top 10, eight have remained consistent over the last 5 years of reporting: glyphosate, 2,4-D, MCPA, mineral oil, surfactant blend, mancozeb, chlorothalonil, and bromoxynil.

Table 2: Top 10 Active Ingredients Sold in Canada in 2013 in the Agricultural Sector

Active Ingredient	Product Type
Glyphosate	Herbicide
2,4-D	Herbicide
MCPA	Herbicide
Glufosinate ammonium	Herbicide
Mineral oil	Insecticide/Fungicide/Other
Surfactant blend	Other
Mancozeb	Fungicide
Bromoxynil	Herbicide
Chlorothalonil	Fungicide
Triallate	Herbicide

Non-Agricultural Sector

Commercial products with non-agricultural uses accounted for the second-largest amount of all pesticides sold in Canada in 2013 at 20.2% (compared to 17.1% in 2012). Non-agricultural sector pesticide sales increased almost 39% from 2012 to 2013 (from 15 889 375 kg a.i. to 22 050 284 kg a.i.). After a marked drop in 2012, this rebound in Non-agriculture sales is more consistent with an overall slight decline in Non-agricultural sales since the start of the sales reporting program in 2008.

Of the total pesticides sold with Non-agricultural sector uses, antimicrobials accounted for 95.7%, followed by herbicides with 2.5%. Fungicides (1.1%), insecticides (0.8%), vertebrate control (0.5%) and other product types (0.04%) were combined due to the low quantities of pesticides sold (Figure 5). Fluctuations within the product type groupings have been evident since the start of pesticide sales reporting. However, antimicrobials consistently account for the majority of Non-agricultural sector pesticide sales (with a low of 86% to a high of 96.3%).

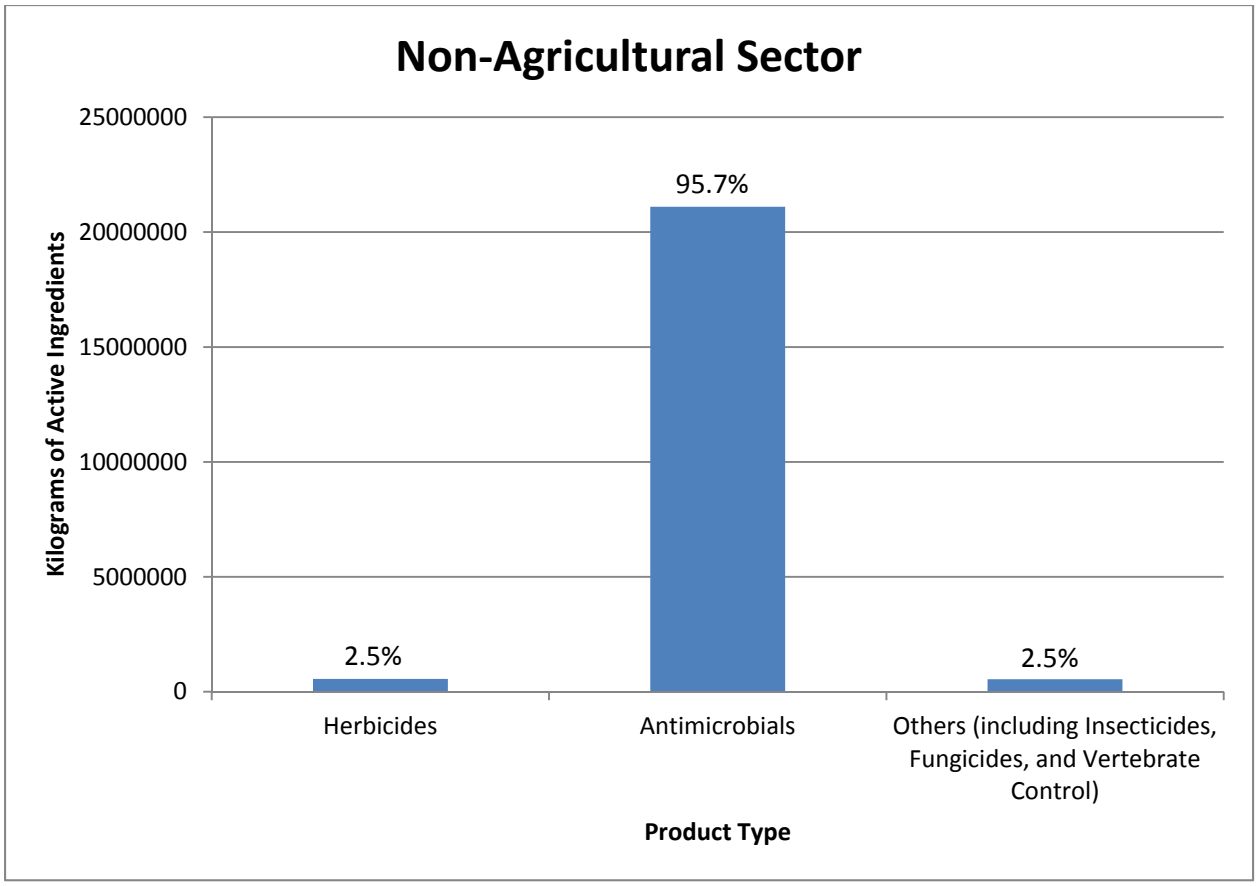

Figure 5: Kilograms of active ingredients sold in Canada in 2013 in the Non-agricultural sector.

The top 10 active ingredients sold with Non-agricultural sector uses were antimicrobials. These are presented in Table 3 in decreasing order. Some of the active ingredients also have product types in addition to the antimicrobial type. Non-agricultural sector products would be used predominantly in the wood preservation industry and for water treatment. The top 10 active ingredients accounted for 76% of the Non-agricultural sector pesticides sold. Six active ingredients have remained on the top 10 list for Non-agricultural sector pesticides over the last 5 years: available chlorine, present as sodium hypochlorite (appears as sodium hypochlorite in previous reports), chromic acid, glutaraldehyde, arsenic pentoxide, copper as elemental, and cupric oxide.

Table 3: Top 10 Active Ingredients Sold in Canada in 2013 in the Non-agricultural Sector

Active Ingredient	Product Type
Available chlorine, present as sodium hypochlorite	Antimicrobial
Creosote	Antimicrobial
Glutaraldehyde	Antimicrobial
Chromic acid	Antimicrobial
Arsenic pentoxide	Antimicrobial
Copper as elemental	Antimicrobial /Herbicide/Fungicide
Pentachlorophenol	Antimicrobial
Cupric oxide	Antimicrobial
Sodium bromide	Antimicrobial
Ammonium bromide	Antimicrobial

Domestic Sector

The Domestic Class products accounted for 5.9% of overall pesticide sales in Canada for 2013. There was a 44% increase from 2012 (4 462 716 kg a.i.) to 2013 (6 408 499 kg a.i.) in Domestic sector pesticide sales. This increased total is within amounts that have been seen in previous years of reporting.

Antimicrobial products accounted for 79.7% of domestic pesticides sold in Canada (Figure 6) mainly due to the sales of swimming pool and spa products. Insecticides accounted for 11.4% of the Domestic sector sales. Herbicides accounted for 7.4% of the Domestic sector sales. Fungicides (0.5%), vertebrate controls (1.3%), and “other “products (0.05%) accounted for a small portion of sales and were combined. The Domestic sector has seen fluctuation from year to year in the product type groupings, especially in the herbicide, insecticide, and antimicrobial groupings.

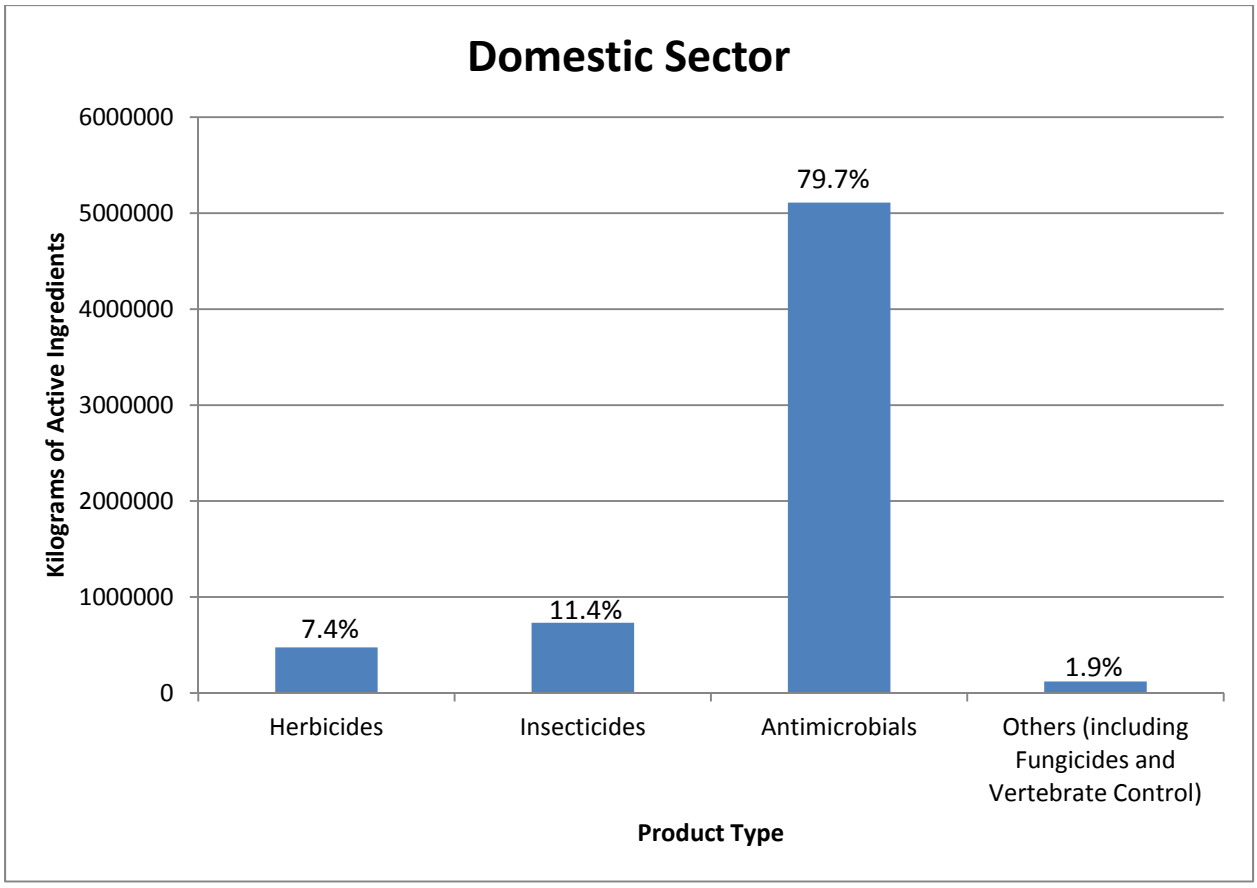

Figure 6: Kilograms of active ingredients sold in Canada in 2013 in the Domestic sector

The top 10 active ingredients sold for use in the Domestic sector are from two product type groups: antimicrobials and insecticides. They are presented in Table 4 in decreasing order. Of the top 10 products, seven are used for swimming pools and spas and accounted for 87% of the amount sold of the top 10 Domestic sector list. The top 10 active ingredients accounted for 88.1% of the Domestic sector pesticides sold. Eight actives remained in the top 10 over the last 5 years: available chlorine, present as calcium hypochlorite (as calcium hypochlorite in previous reports), available chlorine, present as trichloro-s-triazinetrione (as trichloro-s-triazinetrione in previous reports), n-alkyl (40% C12, 50% C14, 10% C16) dimethyl benzyl ammonium chloride, Poly[oxyethylene(dimethyliminio)ethylene(dimethyliminio) ethylene dichloride], naphthalene, DEET, available bromine and chlorine, present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins (as halobrom in previous reports).

Table 4: Top 10 Active Ingredients Sold in Canada in 2013 in the Domestic Sector

Active Ingredient	Product Type
Available chlorine, present as trichloro-s-triazinetrione	Antimicrobial
Available bromine, present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins	Antimicrobial
Available chlorine, present as calcium hypochlorite	Antimicrobial
Available chlorine, present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins	Antimicrobial

Active Ingredient	Product Type
N-alkyl (40% C12, 50% C14, 10% C16) dimethyl benzyl ammonium chloride	Antimicrobial
Soap	Herbicide/Insecticide
Poly[oxyethylene(dimethyliminio)ethylene (dimethyliminio)ethylene dichloride]	Antimicrobial
Naphthalene	Insecticide
Available chlorine present as 1-bromo-3-chloro-5,5-dimethylhydantoin, 1,3-dichloro-5,5-dimethylhydantoin, 1,3-dichloro-5-ethyl-5-methylhydantoin and related hydantoins	Antimicrobial
DEET*	Insecticide

*Since DEET is an insect repellent, it has been grouped with the insecticides.

Sales Information by Product Type

In the following sections, all pesticides are discussed according to their product type (including herbicides, insecticides, fungicides, antimicrobials, vertebrate controls, and other product types). As previously discussed, a product may have a number of different uses on the label. As the sales reporting does not collect data on the relative amount of a product used for a specific label use, the data may not necessarily be separated into only one product type. This means that there may be overlap between the product type groupings and these numbers should not be summed to obtain total quantities sold in Canada in 2013, as an over-reporting would occur.

Herbicides

Herbicides accounted for 60.1% (65 569 883 kg a.i.) of all pesticides sold in Canada in 2013. This is a decrease in proportional representation from 2012 when herbicides accounted for 64% of all pesticides sold, but is similar to proportions seen in years prior to 2012. There was an overall increase of 11% in the quantities of herbicides sold in 2012 (59 087 185 kg a.i.) to 2013 (65 569 883 kg a.i.).

The top 10 herbicides sold in 2013, as listed in Table 5 in decreasing order, accounted for 90.1% of all herbicide sales in Canada and 54.1% of pesticide sales overall. Six of the top 10 active ingredients have remained in the top 10 over the last five years: glyphosate, 2,4-D, MCPA, bromoxynil, S-metolachlor and R-enantiomer, and atrazine.

Table 5: Top 10 Herbicide Active Ingredients Sold in Canada in 2013

Active Ingredient
Glyphosate
2,4-D
MCPA
Glufosinate ammonium
Bromoxynil
Corn gluten meal
Triallate
S-metolachlor and R-enantiomer

Active Ingredient
Atrazine (plus related active triazines)
Metam-sodium

Insecticides

Insecticides accounted for 4.3% (4 643 243 kg a.i.) of all pesticides sold in Canada in 2013. Insecticide sales have remained relatively low during the years of reporting, with the highest quantities sold in 2012 (4 742 608 kg a.i.) and the lowest in 2010 (3 796 725 kg a.i.). Many of the insecticides are used in agricultural settings, though the fifth- and sixth-most sold insecticides (naphthalene and DEET) are used only in the Domestic sector.

The top 10 insecticides sold in 2013, as listed in Table 6 in decreasing order, accounted for 79% of all insecticides sales in Canada and 3.3% of pesticide sales overall. Seven of the top 10 insecticides have remained on the top 10 list during all years of reporting: mineral oil, chlorpyrifos, naphthalene, DEET, sulphur, thiamethoxam, and clothianidine.

Table 6: Top 10 Insecticide Active Ingredients Sold in Canada in 2013

Active Ingredient
Mineral oil
Chlorpyrifos
Hydrogen peroxide
Sulphur
Naphthalene
DEET*
Silicon dioxide
Thiamethoxam
Clothianidin
Carbaryl

*Since DEET is an insect repellent, it has been grouped with the insecticides.

Fungicides

Fungicides accounted for 8.5% (9 324 913 kg a.i.) of all pesticides sold in Canada in 2013. Fungicide sales have remained relatively low throughout the reporting years, with a high in 2013 and a low in 2010 (5 784 829 kg a.i.). The vast majority of fungicides are used in the Agricultural sector (97%).

The top 10 fungicides sold in Canada in 2013, as listed in Table 7 in decreasing order, accounted for 72.9% of fungicide sales and 6.2% of pesticide sales overall. Five of the top 10 active ingredients have remained consistent in the last 5 years of reporting: chlorothalonil, mancozeb, metam-sodium, chloropicrin, and sulphur.

Table 7: Top 10 Fungicide Active Ingredients Sold in Canada in 2013

Active Ingredient
Mancozeb
Chlorothalonil
Metam-sodium
Chloropicrin
Propiconazole
Prothioconazole
Sulphur
Pyraclostrobin
Tebuconazole
Metiram

Antimicrobials

Antimicrobials accounted for 24.2% (26 430 767 kg a.i.) of all pesticides sold in Canada in 2013. This was a 44% increase from 2012 (18 341 475 kg a.i). This is a return closer to amounts sold in previous years, after a drop in 2012. While most of the antimicrobial active ingredients are used in the Non-agricultural sector, there are a number where the majority of the active ingredient is sold in the Domestic sector. This is true of some of the active ingredients containing available chlorine and available bromine. The high volumes are due to large quantities used in swimming pools and spas, which are mostly for Domestic use.

The top 10 antimicrobial active ingredients sold in 2013, as listed in Table 8 in decreasing order, accounted for 80% of all antimicrobial sales in Canada and 19.4% of pesticide sales overall. Six of the top 10 active ingredients have remained consistent in the last 5 years of reporting: available chlorine, present as sodium hypochlorite (appears as sodium hypochlorite in previous reports), available bromine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins (appears as halobrom in previous reports), chromic acid, glutaraldehyde, arsenic pentoxide, and copper as elemental.

Table 8: Top 10 Antimicrobial Active Ingredients Sold in Canada in 2013

Active Ingredient
Available chlorine, present as sodium hypochlorite
Creosote
Available chlorine, present as trichloro-s-triazinetrione
Glutaraldehyde
Available bromine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins
Available chlorine, present as calcium hypochlorite
Chromic acid
Copper as elemental
Arsenic pentoxide
Pentachlorophenol

Vertebrate Control

Vertebrate controls accounted for 0.2% (212 785 kg a.i.) of all pesticides sold in Canada in 2013. Since sales data have been collected in Canada, products for vertebrate control have always accounted for a very small and consistent amount of overall pesticide sales.

The top 10 vertebrate controls, as listed in Table 9 in decreasing order, accounted for 97.7% of all vertebrate control sales in 2013 and 0.2% of pesticide sales overall. Four of the top 10 active ingredients have remained consistent in the last 5 years: carbon dioxide gas, cellulose (from powdered corn cobbs), dried blood, and zinc phosphide.

Table 9: Top 10 Vertebrate Control Active Ingredients Sold in Canada in 2013

Active Ingredient
Carbon dioxide gas
Cellulose (from powdered corn cobbs)
4-nitro-3-(trifluoromethyl)phenol sodium salt
Aluminum phosphide
Dried blood
Castor oil
Sulphur
Thiram
Fish meal mixture
Zinc phosphide

Others

Products fall into the “Others” type when they include uses that are not classified in any of the groups above and include adjuvants, nematicides, and molluscicides . These “other” products accounted for 3.8% (4 122 259 kg a.i) of pesticide sales in Canada in 2013. Sales in this category have fluctuated slightly over the years of reporting, but have remained fairly low, with a high in 2013 and a low in 2008 (2 033 691 kg a.i.). The majority of the label uses of these other active ingredients are in the Agricultural sector (99.7%).

The top 10 active ingredients sold in Canada in 2013 that fall into this type are listed in Table 10 in decreasing order and accounted for 99.3% of “other” type sales and 3.8% of pesticide sales overall. Six of the top 10 active ingredients have remained consistent in the last 5 years of reporting: surfactant blend, mineral oil, nonylphenoxypolyethoxyethanol, paraffin based petroleum oil, octylphenoxypolyethoxyethanol, and polyoxyalkylated alkyl phosphate ester.

Table 10: Top 10 Other Active Ingredients Sold in Canada in 2013

Active Ingredient
Surfactant blend
Polyoxyalkylated alkyl phosphate ester
Paraffin based petroleum oil
Mineral oil
Triglyceride ethoxylate
Alcohols, C9-11, ethoxylated
Nonylphenoxypolyethoxyethanol
Octadec-9-enoic acid, ethyl ester
Octadec-9-enoic acid, methyl ester
Octylphenoxypolyethoxyethanol

Biopesticides

Biopesticides include microbial pesticides (contain a bacterium, fungus, virus, protozoan, or alga as the active ingredient), pheromones and other semiochemical pesticides, and other non-conventional (formerly biochemical) pesticides.

In 2013, there were 157 active ingredients identified as biopesticides, which accounted for 817 registered products.

A total of 54 products out of the 340 end-use products reported as sold could not be converted into kg a.i. due to the use of unconventional units, such as colony forming units and international units or errors in reporting of the products. Biopesticide sales have been broken into two groups: 1) those products which could be converted into kg a.i., and 2) microbial products that could not be converted into kg a.i. It is important to note that biopesticide sales are represented in this subsection in addition to being included in each individual product type section (e.g., herbicides, insecticides, etc.).

The 286 products that could be converted to kg a.i. accounted for 5 786 693 kg a.i. sold in 2013 which represents 5.3 % of pesticide sales overall. There was a slight decrease in biopesticide sales from 2012 (5 919 276 kg a.i.) to 2013. The sales of biopesticides have fluctuated in the years that data have been collected. Insecticides accounted for 45.9% of the biopesticide sales in 2013 (Figure 7). Herbicides accounted for the next largest portion of biopesticide sales in 2013 at 35.0%, followed by fungicides with 16.7% of sales, and vertebrate control with 3.1%. Antimicrobials accounted for 0.6% of the biopesticides sold in 2013 and were added to the “others” product type (7.0%).

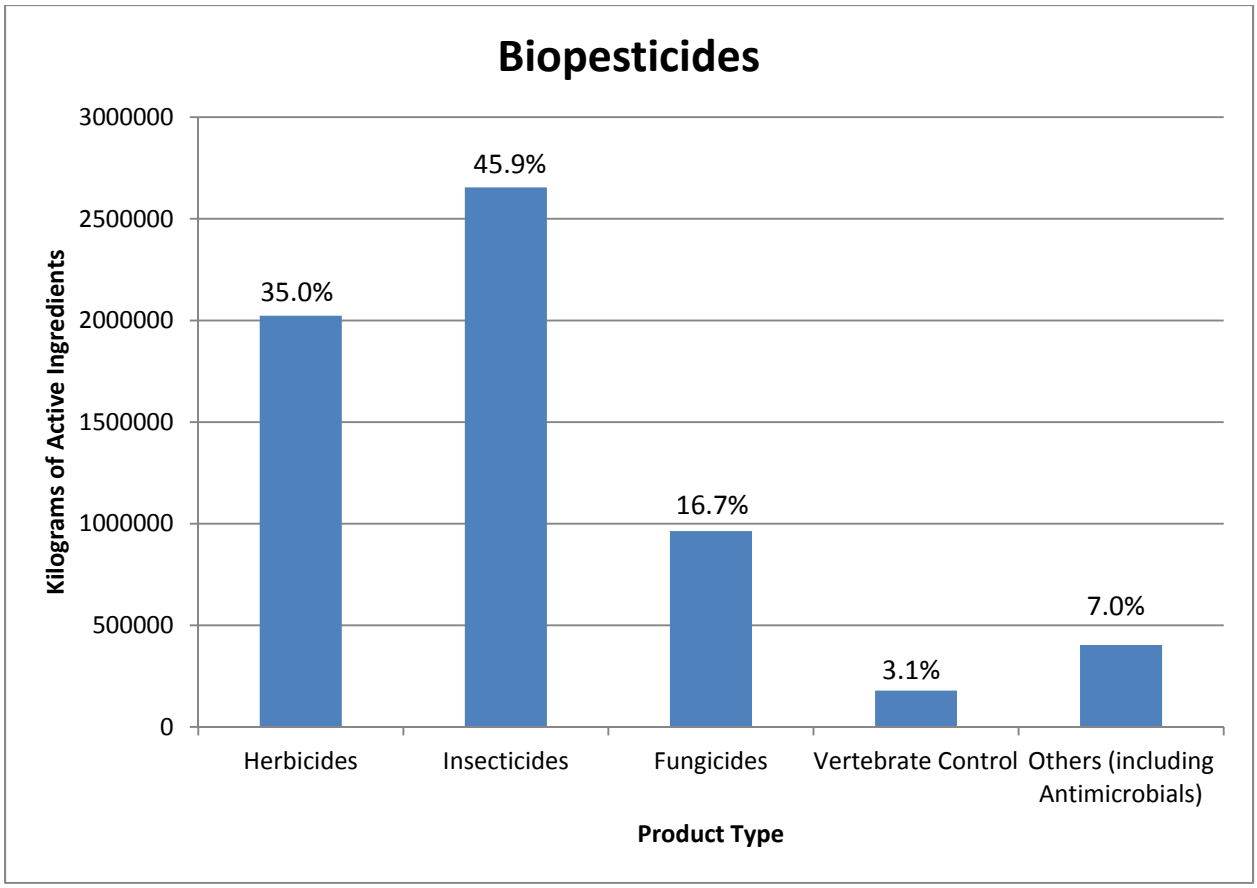

Figure 7: Kilograms of active ingredients of biopesticides sold in Canada in 2013.

The top 10 biopesticide active ingredients sold in Canada are listed in Table 11 in decreasing order. The top 10 active ingredients accounted for 92.9% of sales of biopesticides that could be converted to kg a.i. and 4.9% of pesticide sales overall. Six of the top 10 active ingredients remained consistent in the last five years of reporting: corn gluten meal, mineral oil, sulphur, N-decanol, silicon dioxide, and mono- and dipotassium phosphite.

Table 11: Top 10 Biopesticide Active Ingredient Sold in Canada in 2013

Active Ingredient	Product Type
Mineral oil	Fungicide, Insecticide, Other
Corn gluten meal	Herbicide
Sulphur	Fungicide, Insecticide, Vertebrate Control
Soap	Herbicide, Insecticide, Fungicide
N-decanol	Herbicide
Hydrogen peroxide	Herbicide, Insecticide, Fungicide, Antimicrobial
Mono- and dipotassium phosphite	Fungicide
Silicon dioxide	Insecticide
Mono- and dibasic sodium, potassium, and ammonium phosphites	Fungicide
Carbon dioxide gas	Insecticide, Vertebrate Control

The remaining 54 products could not be converted into kg a.i. due to unconventional units of measure. Many of these products are of interest as they are dispensers for pheromones and microbial agents. The amount of products sold in 2013 of these is listed in Table 12.

Table 12: Quantity of Pheromone Dispensers and Microbials Sold in Canada in 2013

Units of Product Sold	Total
Dispensers (pheromones)	18 649
Litres (microbials)	978 001
Kilograms (microbials)	419 481

Sales Information by Chemical Group

Active ingredients have been grouped into chemical groups to present an alternate way of viewing Canadian pesticide sales information (Table 13). The chemical groups were aligned with the Quebec Ministry of Sustainable Development, Environment and Parks' listings (Dion 2007) and are outlined in Appendix II.

In 2013, the chemical group with the largest proportion of sales was the "Phosphonic and phosphinic acids" group at 43%, followed by the "Inorganic, others" group at 12%. The next group was the "Phenoxy acids" at 6%. The "Hydrocarbons" increased in relevance to 5% of sales in 2013. The remaining chemical groups were all under 4% and 35 out of 52 chemical groups were under 1% of total sales. Eight chemical families remained in the top 10 from 2012 to 2013.

Table 13: Summary of Pesticide Sales by Chemical Group (All Sectors) in 2013

Chemical Grouping	Kilograms of Active Ingredients	Ranking
Phosphonic acids, phosphinic acids	47 147 366	1
Inorganic, others	12 695 156	2
Phenoxy acids	6 694 177	3
Hydrocarbons	5 626 561	4
Fatty acids & surfactants	4 282 330	5
Triazines, tetrazines	3 083 094	6
Benzonitriles	2 524 203	7
Urea derivatives	2 251 799	8
Oils, minerals and vegetable	2 132 423	9
Biscarbamates	2 049 292	10
Triazoles	1 798 910	11
Others	1 611 091	12
Inorganic coppers	1 528 063	13
Carbamates	1 439 449	14
Anilides/anilines	1 314 603	15
Ammoniums, quaternary	1 262 306	16
Aldehydes	1 204 430	17
Dithiocarbamates	984 105	18
Dinitrobenzenes	901 913	19
Alcohols	883 833	20
Organochlorines	741 830	21

Chemical Grouping	Kilograms of Active Ingredients	Ranking
Halogenated organic acids	699 179	22
Acylureas	690 869	23
Methoxyacrylates	690 812	24
Phenols/chlorophenols	662 553	25
Thiophosphates	595 200	26
Azoles, oxazoles, thiazoles	459 755	27
Guanidines	420 788	28
Cyclohexanedione oximes	338 423	29
Aryloxyphenoxyl acids	328 341	30
Dithiophosphates	XXX	31
Phtalic acids	260 028	32
Amides	259987	33
Benzoic acid and derivatives	257 489	34
Benzamides	225685.8899	35
Imidazolinones	141522.358	36
Organic acids	105264.5158	37
Nitrobenzenes	95079.6926	38
Sulfonylureas	84311.41639	39
Pyridines	73420.7819	40
Pyrethroids, pyrethrins	67519.96483	41
Morpholines & oxathiines	XXX	42
Organohalogens	31616.829	43
Diazines	29024.96688	44
Phosphoramidothioates	XXX	45
Phosphates	XXX	46
Inorganic zincs	5550.942764	47
Pheromones	1305.128203	48
Organometallics	XXX	49
Chromenones	224.7555099	50
Indanediones	XXX	51
Microbials	0	52

XXX indicates confidential business information. The chemical group did not contain a minimum of 4 registrants in the calculation of the total.

Future Years

The PMRA is working on analyzing the sales data for the 2014 calendar. The PMRA will publish the 2014 data once the analysis is complete.

References

Dion, S. 2007. Guide de classement des ingrédients actifs par groupes chimiques. Ministère du développement durable, de l'environnement et des parcs. Québec. 35 pp.

http://www.mddefp.gouv.qc.ca/pesticides/bilan/bilan2009.pdf

Appendix I: Ranking of all active ingredients sold in Canada in 2013

Active name	Kilograms of active ingredients
Glyphosate	>25 000 000
Available chlorine, present as sodium hypochlorite	>5 000 000
Creosote	
2,4-D	>1 000 000
MCPA	
Glufosinate ammonium	
Mineral oil	
Surfactant blend	
Available chlorine, present as trichloro-s-triazinetrione	
Mancozeb	
Bromoxynil	
Chlorothalonil	
Glutaraldehyde	
Corn gluten meal	
Available bromine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins	
Triallate	
Copper as elemental	
Available chlorine, present as calcium hypochlorite	
Chromic acid	
S-metolachlor and R-enantiomer	>500 000
Arsenic pentoxide	
Metam-sodium	
Atrazine (plus related active triazines)	
Chloropicrin	
Polyoxyalkylated alkyl phosphate ester	
Pentachlorophenol	
Available chlorine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins	
Chlorpyrifos	
Fluroxypyr (present as 1-methylheptyl ester)	
Propiconazole	
Bentazon (present as sodium salt)	>100 000
Ethalfluralin	
Sulphur	
Prothioconazole	
Cupric oxide	
Paraffin base petroleum oil	
N-alkyl (40% C12, 50% C14, 10% C16) dimethyl benzyl ammonium chloride	
Tebuconazole	
Pyraclostrobin	
N-decanol	
Sodium bromide	
Triglyceride ethoxylate	
Hydrogen peroxide	
Soap	

Active name	Kilograms of active ingredients
Diquat	
Ammonium bromide	
Poly[oxyethylene(dimethyliminio)ethylene(dimethyliminio)ethylene dichloride]	
Hexahydro-1,3,5-tris(2-hydroxyethyl)-s-triazine	
Borates	
Metiram	
Alcohols, C9-11, ethoxylated	
Dicamba (present as acid, amine salt, ester, or sodium salt)	
Trifluralin	
Captan	
Mono- and dipotassium phosphite	
Available chlorine present as 1-bromo-3-chloro-5,5-dimethylhydantoin, 1,3-dichloro-5,5-dimethylhydantoin, 1,3-dichloro-5-ethyl-5-methylhydantoin and related hydantoins	
Naphthalene	
Clethodim	
Acrolein	
DEET	
2,2-dibromo-3-nitrilopropionamide	
Metconazole	
Sodium chlorite	
1-alkyl (C8-C18)-1,3-propanediamine acetate	
Pendimethalin	
Dimethenamid-P	
Tetrakishydroxymethyl phosphonium sulphate	
Metribuzin	
Azoxystrobin	
Linuron	
Silicon dioxide	
Fenoxaprop-P-ethyl	
Picoxystrobin	
Clopyralid	
Pinoxaden	
Mecoprop	
Boscalid	
Nonylphenoxypolyethoxyethanol	
1-(3-chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride	
Thiamethoxam	
Mono- and dibasic sodium, potassium, and ammonium phosphites	
Iprodione	
Clodinafop-propargyl	
Cyprodinil	>50 000
Clothianidin	
Carbaryl	
2,4-DB	
Bronopol	
Carbon dioxide gas	
Didecyldimethylammonium present as carbonate and bicarbonate salts	

Active name	Kilograms of active ingredients
Tralkoxydim	
Malathion	
Available chlorine, present as sodium dichloro-s-triazinetrione	
Didecyl dimethyl ammonium chloride	
EPTC	
Metam-potassium	
Sodium chloride	
1,2-benzisothiazolin-3-one	
Chlorpropham	
Phosmet	
Quizalofop-P-ethyl	
Acetic acid	
Dimethoate	
Pyrasulfotole	
Fludioxonil	
Potassium dimethyldithiocarbamate	
Thiram	
Amitrole	
Hexazinone	
Diuron	
N-alkyl (67% C12, 25% C14, 7% C16, 1% C18) dimethyl benzyl ammonium chloride	
Imidacloprid	
Cellulose (from powdered corn cobs)	
Sodium omadine	
Penthiopyrad	
Carbathiin	
Fluxapyroxad	
Diazinon	
Propamocarb hydrochloride	
Mesotrione	
Phorate	
Saflufenacil	
Difenoconazole	<50 000
Imazamox	
Dazomet	
Triclopyr-butotyl	
Imazethapyr	
Imazamethabenz-methyl	
Fosetyl-Al	
Lime sulphur	
N-alkyl (5% C12, 60% C14, 30% C16, 5% C18) dimethyl benzyl ammonium chloride	
Iron (present as FeHEDTA)	
Mineral spirits	
Dichlorprop	
Metalaxyl	
Fluazinam	

Active name	Kilograms of active ingredients
Tribenuron-methyl	
Pyrimethanil	
Florasulam	
Fomesafen	
3-iodo-2-propynyl n-butylcarbamate	
Sulfuryl fluoride	
N-alkyl (68% C12, 32% C14) dimethyl ethylbenzyl ammonium chloride	
Simazine plus related active triazines	
Sulfentrazone	
Paraquat	
Tepraloxydim	
Lambda-cyhalothrin	
Maleic hydrazide	
Aminopyralid	
Ammonia (present as ammonium sulfate)	
Thiophanate-methyl	
Available chlorine present as 1,3-dichloro-5,5-dimethylhydantoin and 1,3-dichloro-5-ethyl-5-methylhydantoin	
Octadec-9-enoic acid, ethyl ester	
Octadec-9-enoic acid, methyl ester	
Pyroxsulam	
Isoxaflutole	
Paradichlorobenzene	
Nabam	
Sodium dimethyldithiocarbamate	
Octylphenoxypolyethoxyethanol	
Thifensulfuron-methyl	
Picloram	
5-chloro-2-methyl-4-isothiazolin-3-one	
Permethrin	
4-chloro-3-methylphenol (sodium salt)	
Piperonyl butoxide	
Dichlobenil	
Kaolin	
Acephate	
Aluminum phosphide	
Ethephon	
Thiabendazole	
Trifloxystrobin	
Difenzoquat metilsulfate	
Diphenylamine	
Folpet	
4-nitro-3-(trifluoromethyl) phenol sodium salt	
Oxydiethylene bis(alkyl dimethyl ammonium chloride)	
Formic acid	
N-coco-alkyltrimethylene diamines present as monobenzoate salt	
Chlorantraniliprole	

Active name	Kilograms of active ingredients
Fluazifop-P-butyl	
Octhilinone	
Flucarbazone (present as flucarbazone-sodium)	
Diodofon	
Siloxylated polyether	
Bromacil (present in free form, as dimethylamine salt, or as lithium salt)	
Napropamide	
Terbacil	
Methylene bis(thiocyanate)	
Formaldehyde	
Sedaxane	
2-(thiocyanomethylthio)benzothiazole	
5,5-dimethylhydantoin	
Sethoxydim	
Methyl bromide	
Oxirane derivatives (50% minimum)	
2-phenylphenol	
Prometryne plus related active triazines	
Diflufenzopyr	
Oriental mustard seed meal	
Triticonazole	
Thiencarbazone-methyl	
Propyzamide	
1,2-dibromo-2,4-dicyanobutane	
Naled	
1,3-bis(hydroxymethyl)-5,5-dimethylhydantoin	
Mandipropamid	
2-methyl-4-isothiazolin-3-one	
Ferbam	
Sodium fluoride	
Dichlorvos	
Fenamidone	
Fluopyram	
Deltamethrin	
Carfentrazone-ethyl	
Flumetsulam	
Metsulfuron-methyl	
Potassium bicarbonate	
Barium metaborate monohydrate	
Dried blood	
Chlormequat chloride	
Dodecylguanidine hydrochloride	
Castor oil	
MCPB	
Tembotrione	
Zinc	
Fenhexamid	
Oxamyl	

Active name	Kilograms of active ingredients
Cypermethrin	
Cymoxanil	
Peracetic acid	
Spirotetramat	
N-octyl bicycloheptene dicarboximide	
Chlorimuron-ethyl	
Silica aerogel	
2,2'-(1-methyltrimethylenedioxy)bis-(4-methyl-1,3,2-dioxaborinane)	
Rimsulfuron	
Dimethomorph	
Myclobutanil	
Pyrethrins	
Ethofumesate	
Acifluorfen (present as sodium salt)	
Ferric sodium EDTA	
Methylated seed oil of soybean	
Penflufen	
Liquid corn gluten	
Methomyl	
Imazapyr	
Clomazone	
Thiacloprid	
Cyfluthrin	
Ametoctradin	
Nicosulfuron	
Chlorthal-dimethyl	
Acetamiprid	
Daminozide	
Flonicamid	
Formetanate hydrochloride	
Pyroxasulfone	
Extract of *Reynoutria sachalinensis*	
Metrafenone	
Fish meal mixture	
Oxyfluorfen	
1- or 3-monomethylol-5,5-dimethylhydantoin	
Tetrachlorvinphos	
Magnesium phosphide	
Tetramethrin	
Propoxur	
Dithiopyr	
Pyrazon	
Methoxyfenozide	
Zoxamide	
Zinc phosphide	
D-cis, trans allethrin	
2,2-oxybis(4,4,6-trimethyl-1,3,2-dioxaborinane)	
Cyazofamid	

Active name	Kilograms of active ingredients
Trinexapac-etyl	
P-menthane-3,8-diol	
Sodium 2-phenylphenate	
Spinosad	
Spinetoram	
Ipconazole	
Putrescent whole egg solids	
Bifenazate	
D-trans allethrin	
Tefluthrin	
Pyridaben	
Prohexadione-calcium	
Triforine	
Novaluron	
Butoxypolypropylene glycol	
Spiromesifen	
Kresoxim-methyl	
Quinoxyfen	
Streptomycin present as sulphate	
Disodium cyanodithioimidocarbonate	
Metaldehyde	
Flumioxazin	
Oil of black pepper	
Topramezone	
D-phenothrin	
10,10'-oxybis(phenoxarsine)	
Phenmedipham	
Desmedipham	
Oxalic acid	
Spirodiclofen	
Ferric phosphate	
Garlic powder	
Quinclorac	
Cyantraniliprole	
Dried eggs	
(s)-methoprene	
Famoxadone	
Acequinocyl	
4,5-dichloro-2-n-octyl-3(2H)isothiazolone	
Cloransulam-methyl	
Tebufenozide	
Citronella oil	
Azadirachtin	
Azamethiphos	
Dodemorph-acetate	
1,4-bis(bromoacetoxy)-2-butene	
Polybutene	
Fenbutatin oxide	

Active name	Kilograms of active ingredients
Methyl nonyl ketone	
Bis(trichloromethyl)sulfone	
Dodine	
Foramsulfuron	
Amitraz	
Oxadiazon	
Fenbuconazole	
Strychnine	
Etridiazole	
Ethametsulfuron-methyl	
3-methyl-4-chlorophenol (or: p-chloro-m-cresol)	
1,4-dimethylnaphthalene	
Sulfoxaflor	
Indaziflam	
Endosulfan	
Meat meal mixture	
Capsaicin	
3-(trimethoxysilyl)-propyldimethyloctadecyl ammonium chloride	
Codlelure	
Citronella terpene	
Rotenone	
Wintergreen oil	
Kasugamycin (present as hydrochloride hydrate)	
6-benzylaminopurine (or: 6-benzyladenine)	
(Z)-11-tetradecenyl acetate	
3-decen-2-one	
Chlorsulfuron	
1-alkyl(C6-C18)-1,3-propanediamine	
Phosphine	
(Z)-9-dodecenyl acetate + (Z)-11-tetradecenyl acetate	
Dioctyl dimethyl ammonium chloride	
Verbenone	
Abamectin	
Octyl decyl dimethyl ammonium chloride	
Lactic acid	
Tetraconazole	
Hydramethylnon	
Fish oil mixture	
Fluopicolide	
Octenol	
Tau-fluvalinate	
Brassica hirta white mustard seed powder	
Di-n-propyl isocinchomeronate	
Diisobutylphenoxyethoxyethyl dimethyl benzyl ammonium chloride	
Pyriproxyfen	
Naphthylacetic acid	
Clofentezine	

Active name	Kilograms of active ingredients
Citric acid	
Resmethrin	
Sodium alpha-olefin sulfonate	
Bispyribac-sodium (KIH-2023)	
Metofluthrin	
N-dialkyl (5% C12, 60% C14, 30% C16, 5% C18) methyl benzyl ammonium chloride	
S-kinoprene	
1-dodecanol	
Carbendazim	
Muscalure	
Gibberellins	
Piperine	
Garlic oil	
Methyl anthranilate	
Naphthaleneacetamide	
(Z)-9-tetradecen-1-yl acetate	
(Z)-8-dodecen-1-yl acetate	
Icaridin	
Bromadiolone	
Saponins of *Chenopodium quinoa*	
Coumaphos	
Warfarin	
(Z, Z)-3,13 octadecadienyl acetate	
Paclobutrazol	
1-tetradecanol	
Related capsaicinoids	
(Z)-11-tetradecen-1-ol	
Garlic	
Triflusulfuron-methyl	
(E,Z)-11-tetradecenal	
Chlorophacinone	
(Z)-11-tetradecenal	
4-aminopyridine	
Denatonium benzoate	
Brodifacoum	
Diphacinone (present in free form or as sodium salt)	
Natamycin	
1-methylcyclopropene	
(E,Z)-3,13-octadecadienyl acetate	
Difethialone	
Pymetrozine	
Pine needle oil	
Lemon oil	
Eucalyptus oil	
Oil of geranium	
(E)-8-dodecen-1-yl acetate	
Bromethalin	

Active name	Kilograms of active ingredients
Cyromazine	
Uniconazole-P	
Camphor oil	
Prosulfuron	
Aminoethoxyvinylglycine	
(E,Z)-2,13-octadecadien-1-yl acetate	
(Z)-8-dodecen-1-ol	
Ancymidol	
(Z,Z)-3,13-octadecadien-1-ol	
4-CPA	
(E,Z)-2,13-octadecadien-1-ol	
Sodium monofluoroacetate	
Acibenzolar-s-methyl	
Sodium cyanide	
Propetamphos	
Nucleopolyhedrovirus for Douglas-fir tussock moth	
Lactococcus lactis ssp. *lactis*	
(Z)-8-dodecenyl acetate + (E)-8-dodecenyl acetate + (Z)-8-dodecen-1-ol	
Phoma macrostoma	
Propylene glycol	
Verticillium albo-atrum, isolate WCS850	
Primisulfuron-methyl	
Neodiprion abietis nucleopolyhedrovirus	
(Z)-4-tridecenyl acetate	
Paecilomyces fumosoroseus strain FE 9901	
Petroleum hydrocarbon blend	
Paraformaldehyde	
D-limonene	
Soybean oil	
Sodium lauryl sulfate	
Clavibacter michiganensis (spp *michiganensis*) bacteriophage	
Pantoea agglomerans	
Tributyl tetradecyl phosphonium chloride	
(E,E)-8,10-dodecadien-1-ol + 1-dodecanol + 1-tetradecanol	
Picolinafen	
Fosamine ammonium	
Sodium chlorate	
2-(hydroxymethyl)-2-nitro-1,3-propanediol	
Triclopyr triethylamine salt	
Methyl salicylate	
Typhyla phacorrhiza (strain 94671)	
N-alkyl (3% C12, 95% C14, 2% C16) dimethyl benzyl ammonium chloride (or: myristyl dimethyl benzyl ammonium chloride dihydrate)	
Potassium peroxymonosulfate (present as potassium peroxymonosulfate sulfate)	
Nucleopolyhedrovirus for gypsy moth larvae	
(E)-11-tetradecenyl acetate	
Mesosulfuron-methyl	
Nuclear polyhedrosis virus of red-headed pine sawfly	

Active name	Kilograms of active ingredients
Triethylene glycol	
N-alkyl (25% C12, 60% C14, 15% C16) dimethyl benzyl ammonium chloride	
Oxycarboxin	
N-alkyl (50% C12, 30% C14, 17% C16, 3% C18) dimethyl ethylbenzyl ammonium chloride	
Ophiostoma piliferum fungus	
Prallethrin	
Nosema locustae canning, (spore of)	
Available chlorine, present as lithium hypochlorite	
Sulfometuron methyl	
N-alkyl (5% C5-18, 61% C12, 23% C14, 11% C16) dimethyl benzyl ammonium chloride	
Irgarol 1051	
Ziram	
Streptomyces griseoviridis strain K61	
Streptomyces lydicus strain WYEC108	
N-alkyl (40% C12, 50% C14, 10% C16) dimethyl benzyl ammonium saccharinate	
Decyl isononyl dimethyl ammonium chloride	
Quintozene	
Trichoderma virens strain G-41	
Thymol	
(E)-4-tridecenyl acetate + (Z)-4-tridecenyl acetate	
Trichoderma asperellum, strain T34	
Tea tree oil	
Metarhizium anisopliae (strain F52)	
Pseudomonas fluorescens CL145A	
Garlic juice	
1-(alkyl-amino)-3-carboxymethylaminopropane (component of Ampho 443-31)	
Fenpropimorph	
Iodosulfuron-methyl-sodium	
Aureobasidium pullulans	
Cloquintocet-mexyl	
Ferrous sulfate	
Ethyl alcohol	
N-octanol	
Fungus: *Gliocladium catenulatum*	
Beauveria bassiana	
Bacillus subtilis	
Bacillus thuringiensis	
Chlorfenapyr	
Agrobacterium radiobacter	
Coniothyrium minitans strain CON/M/91-08	
Benzyl benzoate	
(E)-4-tridecenyl acetate	
Flufenacet	
1-(alkyl-amino)-3-aminopropane hydrochloride (component of Ampho 443-31)	
Bacillus sphaericus	
3-methyl-2-cyclohexen-1-one	

Active name	Kilograms of active ingredients
Bacillus firmus I-1582	
Diflubenzuron	
Cyphenothrin	
German cockroach extract	
Isoxaben	
Etofenprox	
Pseudomonas syringae - strain ESC-10	
Ethylene	
Bifenthrin	
Cydia pomonella granulosis virus	
Bensulide	
Flusilazole	
Chondrostereum purpureum (strain: North American; pathovar: PFC2139)	
Diallyl disulfide and related sulfides	
Ethylene oxide	
Cornmint oil	
Anhydrous ammonia	
Aromatics	
Imiprothrin	
Isopropyl alcohol	
Dimethoxane	
Iron (present as ferric phosphate)	
Sclerotinia minor IMI 3144141	
Dichloran	
Endothal or endothall	
Cyprosulfamide	
Trichoderma harzianum strain KRL-AG2	
Fluoxastrobin	
Niclosamide	
Dinocap (plus related active compounds)	
2-bromo-4'-hydroxyacetophenone	

Appendix II: Chemical Groups and Active Ingredients-2013

Chemical Group	Active Ingredient Name
Acylureas	Bromacil (present in free form as dimethylamine salt or as lithium salt) Bentazon (present as sodium salt) Cymoxanil Diflubenzuron Iprodione Novaluron Terbacil Hexazinone
Alcohols	Alcohols, C9-11, ethoxylated Aminoethoxyvinylglycine Bronopol Butoxypolypropylene glycol Ethyl alcohol Ethylene oxide N-decanol N-octanol Tetrakishydroxymethyl phosphonium sulphate Isopropyl alcohol P-menthane-3,8-diol Propylene glycol Siloxylated polyether Triethylene glycol 2-(hydroxymethyl)-2-nitro-1,3-propanediol
Aldehydes	Formaldehyde Glutaraldehyde Metaldehyde Paraformaldehyde
Amides	2,2-dibromo-3-nitrilopropionamide Capsaicin Piperine Daminozide Mandipropamid Naphthaleneacetamide Napropamide Related capsaiciniods Saflufenacil

Chemical Group	Active Ingredient Name
Ammoniums, Quaternary	Difenzoquat metilsulfate Chlormequat chloride 1-(3-chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride Denatonium benzoate Diquat Paraquat N-alkyl (25% C12, 60% C14, 15% C16) dimethyl benzyl ammonium chloride N-alkyl (40% C12, 50% C14, 10% C16) dimethyl benzyl ammonium chloride N-alkyl (50% C12, 30% C14, 17% C16, 3% C18) dimethyl ethylbenzyl ammonium chloride N-alkyl (68% C12, 32% C14) dimethyl ethylbenzyl ammonium chloride Didecyl dimethyl ammonium chloride N-alkyl (5% C12, 60% C14, 30% C16, 5% C18) dimethyl benzyl ammonium chloride N-alkyl (67% C12, 25% C14, 7% C16, 1% C18) dimethyl benzyl ammonium chloride Diisobutylphenoxyethoxyethyl dimethyl benzyl ammonium chloride N-alkyl (5% C5-C18, 61% C12, 23% C14, 11% C16) dimethyl benzyl ammonium chloride N-alkyl (40% C12, 50% C14, 10% C16) dimethyl benzyl ammonium saccharinate Didecyldimethylammonium present as carbonate and bicarbonate salts Decyl isononyl dimethyl ammonium chloride Dioctyl dimethyl ammonium chloride Octyl decyl dimethyl ammonium chloride N-dialkyl (5% C12, 60% C14, 30% C16, 5% C18) methyl benzyl ammonium chloride Oxydiethylene bis(alkyl dimethyl ammonium chloride) N-alkyl (3% C12, 95% C14, 2% C16) dimethyl benzyl ammonium chloride (or: myristyl dimethyl benzyl ammonium chloride dihydrate) 3-(trimethoxysilyl)-propyldimethyloctadecyl ammonium chloride
Anilides/Anilines	S-Metolachlor and R-Enantiomer Amitraz Niclosamide Boscalid Dimethenamid-P Diphenylamine Fenhexamid Flufenacet Flumioxazin Fluxapyroxad Methyl anthranilate Metalaxyl-m and s-isomer Metalaxyl Picolinafen Penflufen Penthiopyrad

Chemical Group	Active Ingredient Name
	Sedaxane
Aryloxyphenoxyl Acids	Clodinafop-propargyl Fenoxaprop-P-ethyl Fluazifop-P-butyl Quizalofop P-ethyl
Azoles, Oxazoles, Thiazoles	Chlorfenapyr 1,2-benzisothiazolin-3-one Carbendazim Clomazone Fludioxonil 2-methyl-4-isothiazolin-3-one 5-chloro-2-methyl-4-isothiazolin-3-one 4,5-dichloro-2-n-octyl-3(2H)isothiazolone Isoxaflutole Topramezone Octhilinone Pinoxaden Pyrasulfotole Pyroxasulfone Spirotetramat Strychnine 2-(thiocyanomethylthio)benzothiazole Etridiazole Thiabendazole
Benzamides	Cyantraniliprole Cyprosulfamide DEET Fluopicolide Fluopyram Isoxaben Chlorantraniliprole Propyzamide Methoxyfenozide Tebufenozide Zoxamide
Benzoic Acid And Derivatives	Acibenzolar-s-methyl Benzyl benzoate Bispyribac-sodium (KIH-2023) Dicamba (present as acid, amine salt, ester or sodium salt) Methyl salicylate Quinclorac
Benzonitriles	Bromoxynil Dichlobenil Chlorothalonil

Chemical Group	Active Ingredient Name
Biscarbamates	Desmedipham Ferbam Mancozeb Metiram Nabam Phenmedipham Thiram Thiophanate-methyl
Carbamates	Propoxur Bifenazate Carbaryl Chlorpropham EPTC Famoxadone Formetanate hydrochloride 3-iodo-2-propynyl n-butylcarbamate Methomyl Oxadiazon Oxamyl Propamocarb hydrochloride Icaridin Triallate
Chromenones	Brodifacoum Bromadiolone Difethialone Rotenone Warfarin
Cyclohexanedione Oximes	Clethodim Sethoxydim Tepraloxydim Tralkoxydim
Diazines	Ancymidol 6-benzylaminopurine (or: 6-benzyladenine) Maleic hydrazide Pyridaben Pyrazon Triforine
Dinitrobenzenes	Bromethalin Dinocap (plus related active compounds) Ethalfluralin Fluazinam Pendimethalin Trifluralin

Chemical Group	Active Ingredient Name
Dithiocarbamates	Dazomet Disodium cyanodithioimidocarbonate Potassium dimethyldithiocarbamate Metam-potassium Metam-sodium Sodium dimethyldithiocarbamate Ziram
Dithiophosphates	Bensulide Dimethoate Malathion Phorate Phosmet
Fatty Acids & Surfactants	N-coco-alkyltrimethylene diamines present as monobenzoate salt 1-alkyl (C8-C18)-1,3-propanediamine acetate 1-alkyl C6-C18 1,3-propanediamine Alkanolamine salts of fatty acids Ammonium salt of fatty acid Ammonium salts of higher fatty acids Fatty acids Nonylphenoxypolyethoxyethanol Octadec-9-enoic acid, methyl ester Octadec-9-enoic acid, ethyl ester Octylphenoxypolyethoxyethanol Paraffin based petroleum oil Polyoxyalkylated alkyl phosphate ester Poly[oxyethylene(dimethyliminio)ethylene(dimethyliminio)ethylene dichloride] Potassium salts of fatty acids Soap (non-specific) Herbicidal soap Sodium lauryl sulfate Triethanolamine salts of fatty acids Tributyl tetradecyl phosphonium chloride Triglyceride ethoxylate 10 POE Triglyceride ethoxylate Surfactant blend Surfactant mixture
Guanidines	Hydramethylnon Clothianidin Cyprodinil Dodine Dodecylguanidine hydrochloride Imidacloprid Kasugamycin (present as hydrochloride hydrate) Pyrimethanil Streptomycin Thiamethoxam

Chemical Group	Active Ingredient Name
Halogenated Organic Acids	Aminopyralid 1,4-bis(bromoacetoxy)-2-butene Clopyralid Fluroxypyr (present as 1-methylheptyl ester) Picloram (present as potassium salts) Picloram (present as acid) Picloram (present as amine salts) Spirodiclofen Triclopyr triethylamine salt
Hydrocarbons	Citronella terpene Creosote 1,4-dimethylnaphthalene Ethylene Mineral spirits Naphthalene Petroleum hydrocarbon blend Polybutene
Imidazolinones	Imazapyr Imazamethabenz-methyl Fenamidone Imazethapyr Imazamox
Indanediones	Chlorophacinone Diphacinone (present in free form or as sodium salt)
Inorganic Coppers	Copper, present as basic copper sulphate Copper (present as cuprous thiocyanate) Copper (present as cupric oxide) Metallic copper Copper (present as copper naphthenate) Cupric oxide Copper (present as cuprous oxide) Copper, present as copper 8-quinolinolate Copper (present as mixed copper ethanolamine complexes or as bis(2-aminoethanolate)) Copper (present as copper sulfate pentahydrate) Copper, present as basic copper carbonate Copper (present as picro cupric ammonium formate and tannate complex) Copper (present as copper oxychloride) Copper (present as copper hydroxide)
Inorganic Zincs	Zinc as elemental (present as zinc naphthenate) Zinc (present as zinc oxide) Zinc phosphide

Chemical Group	Active Ingredient Name
Inorganic, Others	Anhydrous ammonia Aluminum phosphide Ammonium bromide Arsenic pentoxide Ammonia (present as ammonium sulfate) Barium metaborate monohydrate Borax Boracic acid (boric acid) Disodium octaborate tetrahydrate Borax or sodium borate Available chlorine, present as calcium hypochlorite Liquid carbon dioxide Chromic acid Fosetyl-Al Ferrous sulfate Ferric phosphate Hydrogen peroxide Iron (present as ferric phosphate) Iron (present as FeHEDTA) Kaolin Potassium peroxymonosulfate present as potassium peroxymonosulfate Sulfate Available chlorine, present as lithium hypochlorite Mono- and dipotassium phosphite Magnesium phosphide Sodium chloride Phosphine Potassium bicarbonate Sodium bromide Sodium chlorite Sodium chlorate Sodium cyanide Sodium fluoride Sulfuryl fluoride Available chlorine, present as sodium hypochlorite Silicon dioxide (present as 100% diatomaceous earth) - fresh water fossils Silica aerogel Silicon dioxide (present as 100% diatomaceous earth) - salt water fossils Sulphur Lime sulphur Zinc borate
Methoxyacrylates	Azoxystrobin Fluoxastrobin Kresoxim-methyl Pyraclostrobin Picoxystrobin Trifloxystrobin
Microbials	*Aureobasidium pullulans* DSM 14940 *Aureobasidium pullulans* DSM 14941

Chemical Group	Active Ingredient Name
	Aureobasidium pullulans DSM 14940 and DSM 14941 *Agrobacterium radiobacter* *Bacillus firmus* I-1582 *Beauveria bassiana* strain GHA *Beauveria bassiana* strain HF23 *Pseudomonas fluorenscens* A506 *Pseudomonas syringae* - strain ESC-10 *Pseudomonas fluorescens* CL145A *Bacillus subtilis* QST 713 *Bacillus subtilis* MB1600 *Bacillus thuringiensis Berliner* spp. *kurstaki* *Bacillus thuringiensis* serotype H-14 *Bacillus sphaericus* *Bacillus thuringiensis* sp. *tenebrionis* *Coniothyrium minitans* strain CON/M/91-08 *Cydia pomonella* granulovirus (strain M) *Cydia pomonella* granulosis virus (strain CMGV4) *Chondrostereum purpureum* (strain: North American; pathovar: PFC2139) Fungus: *Gliocladium catenulatum* *Sclerotina minor* IMI 3144141 *Trichoderma harzianum* strain KRL-AG2 *Lactococcus lactis* ssp. *lactis* strain LL64/CSL *Lactococcus lactis* ssp. *lactis* strain LL102/CSL *Metarhizium anisopliae* (strain F52) *Phoma macrostoma* *Neodiprion abietis* nucleopolyhedrovirus *Nosema locustae* canning (spore of) Nucleopolyhedrovirus for gypsy moth larvae Nuclear polyhedrosis virus of red-headed pine sawfly Nucleopolyhedrovirus for Douglas-fir tussock moth *Ophiostoma piliferum* fungus *Pantoea agglomerans* C9-1 *Pantoea agglomerans* strain E325 (NRRL B-21856) *Paecilomyces fumosoroseus* strain FE 9901 *Streptomyces griseoviridis* strain K61 *Streptomyces lydicus* strain WYEC 108 *Trichoderma asperellum*, strain T34 *Trichoderma virens* strain G-41 *Clavibacter michiganensis* (spp *michiganensis*) bacteriophage *Typhyla phacorrhiza* (strain 94671) *Verticillium albo-atrum* isolate WCS850
Morpholines & Oxathiines	Dimethomorph Dodemorph-acetate Fenpropimorph Oxycarboxin Carbathiin

Chemical Group	Active Ingredient Name
Nitrobenzenes	Acifluorfen (present as sodium salt) Dichloran Fomesafen Tembotrione Mesotrione Oxyfluorfen Quintozene
Oils, Minerals And Vegetable	Oil of black pepper Citronella oil Castor oil Oil of geranium Garlic oil D-limonene Lemon oil Mineral oil- paraffin base (adjuvants) Mineral oil (insecticidal) Methylated seed oil of soybean Verbenone Pine needle oil Thymol Soybean oil Tea tree oil Wintergreen oil
Organic Acids	Abamectin Acetic acid Acequinocyl Azadirachtin Citric acid Formic acid Gibberellic acid Gibberellins A4A7 Lactic acid Naphthylacetic acid Oxalic acid Peracetic acid Prohexadione calcium Natamycin Spinosad Spiromesifen Spinetoram Sodium monofluoroacetate Trinexapac-ethyl Ferric sodium EDTA
Organochlorines	Chloropicrin Endosulfan Paradichlorobenzene

Chemical Group	Active Ingredient Name
Organohalogens	1,2-dibromo-2,4-dicyanobutane Diodofon Methyl bromide Metrafenone
Organometallics	Fenbutatin oxide 10,10'-oxybis(phenoxarsine)
Others	Acrolein 1-(alkyl-amino)-3-aminopropane hydrochloride (component of Ampho 443-31) 1-(alkyl-amino)-3-carboxymethylaminopropane (component of Ampho 443-31) Aromatics 2,2-oxybis(4,4,6-trimethyl-1,3,2-dioxaborinane) Dried blood *Brassica hirta* white mustard seed powder Bis(trichloromethyl)sulfone Cellulose (from powdered corn cobbs) Corn gluten meal Carbon dioxide gas Camphor oil 3-decen-2-one Cornmint oil 3-methyl-2-cyclohexen-1-one Diallyl disulfide and related sulfides Dimethoxane Putrescent whole egg solids Dried eggs Endothall or endothal Ethofumesate Eucalyptus oil Fish meal mixture Fish oil mixture Garlic powder Garlic juice Garlic Oxirane derivatives (50% minimum) Liquid corn gluten Methylene bis(thiocyanate) 1-methylcyclopropene 2,2'-(1-methyltrimethylenedioxy)bis-(4-methyl-1,3,2-dioxaborinane) Methyl nonyl ketone Oriental mustard seed meal Meat meal mixture Piperonyl butoxide Extract of *Reynoutria sachalinensis* Sodium alpha-olefin sulfonate Saponins Of *Chenopodium quinoa*

Chemical Group	Active Ingredient Name
Phenols/Chlorophenols	2-bromo-4'-hydroxyacetophenone 2-phenylphenol 2-phenylphenol (present as sodium salt) Pentachlorophenol plus related active chlorophenols 3-methyl-4-chlorophenol (or: p-chloro-m-cresol) 4-chloro-3-methylphenol (sodium salt) Sodium 2-phenylphenate 4-nitro-3-(trifluoromethyl)phenol sodium salt
Phenoxy Acids	4-CPA Cloquintocet-mexyl 2,4-DB Dichlorprop (present as butoxyethyl ester, as isooctyl ester, or as ethylhexyl ester) Dichlorprop-P (present as dimethylamine salt) Dichlorprop-P Dichlorprop P-isomer (present as 2-ethylhexyl ester) 2,4-D (present as acid) 2,4-D (present as amine salts : dimethylamine salt, diethanolamine salt, or other amine salts) 2,4-D (present as low volatile esters) MCPA (present as acid) MCPA (present as amine salts: diethanolamine, dimethylamine or mixed amines) MCPA (present as esters) MCPA (present as potassium salt or sodium salt) MCPB (present as sodium salt) MCPB (present as isomer specific) Mecoprop P-isomer (present as acid) Mecoprop-P (present as dimethylamine salt) Mecoprop-P (present as potassium salt) Mecoprop-P (present as amine salt) Triclopyr-butotyl

Chemical Group	Active Ingredient Name
Pheromones	(E)-4-tridecenyl acetate (E)-8-dodecen-1-yl acetate (E)-4-tridecenyl-acetate (E,Z)-2,13-octadecadien-1-yl acetate (E,Z)-2,13-octadecadien-1-ol German cockroach extract S-kinoprene (S)-methoprene Octenol (Z)-8-dodecenyl acetate + (E)-8-dodecenyl acetate + (Z)-8-dodecen-1-ol (E,E)-8,10-dodecadien-1-ol + 1-dodecanol + 1-tetradecanol (Z)-9-dodecenyl acetate + (Z)-11-tetradecenyl acetate (E,Z)-3,13-octadecadienyl acetate (Z,Z)-3,13-octadecanienyl acetate (E)-11-tetradecenyl acetate Muscalure (Z)-11-tetradecenal (Z)-11-tetradecen-1-ol (Z)-9-tetradecen-1-yl acetate 1-tetradecanol 1-dodecanol Codlelure (Z)-8-dodecen-1-ol (Z)-8-dodecen-1-yl acetate (Z)-4-tridecenyl acetate (Z)-11-tetradecenyl acetate (Z,Z)-3,13-octadecadien-1-ol (E,Z)-11-tetradecenal (E)-4-tridecenyl acetate + (Z)-4-tridecenyl acetate
Phosphates	Dichlorvos plus related compounds Tetrachlorvinphos Naled
Phosphonic Acids, Phosphinic Acids	Ethephon Glufosinate ammonium Glyphosate present as isopropylamine or ethanolamine salt Glyphosate present as mono-ammonium or diammonium salt Glyphosate present as isopropylamine and potassium salt Glyphosate present as potassium salt Glyphosate Glyphosate present as dimethylamine salt Fosamine ammonium Mono- and dibasic sodium, potassium, and ammonium phosphites
Phosphoramidothioates	Acephate Propetamphos
Phtalic Acids	Captan Chlorthal-dimethyl Folpet N-octyl bicycloheptene dicarboximide

Chemical Group	Active Ingredient Name
Pyrethroids, Pyrethrins	D-cis, trans allethrin D-trans allethrin Bifenthrin Cyfluthrin Lambda-cyhalothrin Cypermethrin Cyphenothrin Deltamethrin Imiprothrin Etofenprox Tau-fluvalinate Tetramethrin Metofluthrin Prallethrin Permethrin D-phenothrin Pyrethrins Resmethrin Tefluthrin
Pyridines	4-aminopyridine Dithiopyr Di-n-propyl isocinchomeronate Acetamiprid Sodium omadine Pyriproxyfen Quinoxyfen Sulfoxaflor Thiacloprid Flonicamid
Sulfonylureas	Chlorimuron-ethyl Chlorsulfuron Rimsulfuron Ethametsulfuron-methyl Flucarbazone (present as flucarbazone sodium) Foramsulfuron Iodosulfuron-methyl-sodium Mesosulfuron-methyl Metsulfuron-methyl Tribenuron-methyl Thifensulfuron-methyl Nicosulfuron Primisulfuron-methyl Prosulfuron Sulfometuron methyl Triflusulfuron-methyl
Thiophosphates	Azamethiphos Coumaphos Diazinon Chlorpyrifos

Chemical Group	Active Ingredient Name
Triazines, Tetrazines	Atrazine (plus related active triazines) Metribuzin Clofentezine Cyromazine Hexahydro-1,3,5-tris(2-hydroxyethyl)-s-triazine Indaziflam Prometryne plus related active triazines Pymetrozine Thiencarbazone-methyl Available chlorine, present as sodium dichloro-s-triazinetrione Simazine plus related active triazines Irgarol 1051 Available chlorine, present as trichloro-s-triazinetrione
Triazoles	Amitrole Ametoctradin Flusilazole Carfentrazone-ethyl Cloransulam-methyl Difenoconazole Fenbuconazole Flumetsulam Florasulam Metconazole Ipconazole Pyroxsulam Myclobutanil Paclobutrazol Propiconazole Prothioconazole Sulfentrazone Tebuconazole Triticonazole Tetraconazole Uniconazole-P

Chemical Group	Active Ingredient Name
Urea Derivatives	Available chlorine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins Available bromine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins Cyazofamid Available chlorine present as 1-bromo-3-chloro-5,5-dimethylhydantoin, 1,3-dichloro-5,5-dimethylhydantoin, 1,3-dichloro-5-ethyl-5-methylhydantoin and related hydantoins Available chlorine present as 1,3-dichloro-5,5-dimethylhydantoin and 1,3-dichloro-5-ethyl-5-methylhydantoin Diflufenzopyr Diflufenzopyr (present as sodium salt) 5,5-dimethylhydantoin 1,3-bis(hydroxymethyl)-5,5-dimethylhydantoin Diuron Linuron 1- or 3-monomethylol-5,5-dimethylhydantoin

Appendix III Glossary

Active ingredient:	That ingredient of a pesticide that actually controls the targeted pest.
Adjuvant:	Any substance that is added to a spray tank (separate from the pesticide formulation) that will improve the performance of the pesticide.
Agricultural sector:	Commercial pesticides applied to farms involved in the production of raw agricultural commodities, such as food, fibre, and tobacco; excluding non-crop and post harvest applications.
Antimicrobial:	A pest control product that intends to control microorganisms and fouling organisms on/in inanimate objects, industrial processes and systems, surfaces, water and air.
Biopesticide:	Microbial pesticides (contain a bacterium, fungus, virus, protozoan, or alga as the active ingredient), pheromones and other semiochemical pesticides, and other non-conventional (formerly biochemical) pesticides.
Colony forming unit:	A measure of viable bacterial or fungal numbers.
Commercial product:	A product that is used in commercial activities, such as farming and other industrial processes.
Device:	An instrument or apparatus that generates or applies a pest control product.
Domestic product:	A product that is used in or around the house by the public.
End-use product:	A product containing active ingredient(s) and usually formulant(s) that is labelled with instructions for direct pest control use or application.
Fungicide:	Pesticides used to kill or inhibit fungi or fungal spores.
Herbicide:	Pesticides used to kill or inhibit weeds.
Insecticide:	Pesticides used to kill or inhibit insects.
Insect repellent:	Pesticides used to repel insects.
Manufacturing concentrate:	A product containing a registered technical grade of active ingredient(s) and formulant(s) intended for further reformulating and/or repackaging into end-use products.
Non-agricultural sector:	Commercial pesticides that are not applied to farms involved in the production of raw agricultural commodities.
Pest control product or Pesticide:	Any product, device, organism, substance or thing that is manufactured, represented, sold or used as a means for directly or indirectly controlling, preventing, destroying, mitigating, attracting or repelling any pest.
Product type:	Pesticide products can be grouped by their main target pest, into herbicide, insecticide, fungicide, antimicrobial, vertebrate control and “other”.
Registrant:	A company that holds the registration of a pesticide with the PMRA.
Technical grade active ingredient:	Contains the active ingredient and normally contains impurities that are by-products of the manufacturing process.
Vertebrate control:	A product used to control vertebrates.
Water treatment:	Products to control microorganisms in swimming pools and industrial process waters (e.g. paper mill whitewater, wastewater systems, cooling water).
Wood preservative:	Antimicrobials applied to wood to control wood-destroying organisms and increase the service life of the wood.