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Pest Control Products Sales Report for 2015

Canada



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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 1 to December 31) and must be submitted by June 1 of the following year. The purpose of the sales information reporting program is to collect sales data that 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 market share of particular pesticides to help identify potential risks that may require attention.

Introduction

This eighth Pest Control Products Sales Report provides an overview of pesticides sold in Canada for the 2015 calendar year, and briefly discusses changes in pesticide sales over the last five years. Data are considered confidential business information and are combined and presented in various ways to ensure confidentiality.

Overall Canadian Pesticide Sales Data

Overview

There were 7154 products registered with the PMRA for use in Canada in the 2015 calendar year. Registrants submitted sales data in different units depending on the product (for example, kilograms, litres). To standardize across 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 that had unusual units, such as colony forming units. The majority of these products are biopesticides which are discussed separately in this document.



Of the remaining 2991 products reported as sold, the overall pesticide sales in Canada in 2015 were 101 445 964 kg a.i., which is a 0.4% increase from the 101 080 417 kg a.i. sold in 2014 (Figure 1). There is a general increasing trend in pesticide sales between 2011-2015. A larger increase was seen in 2013 which cannot be attributed to any one area of focus.

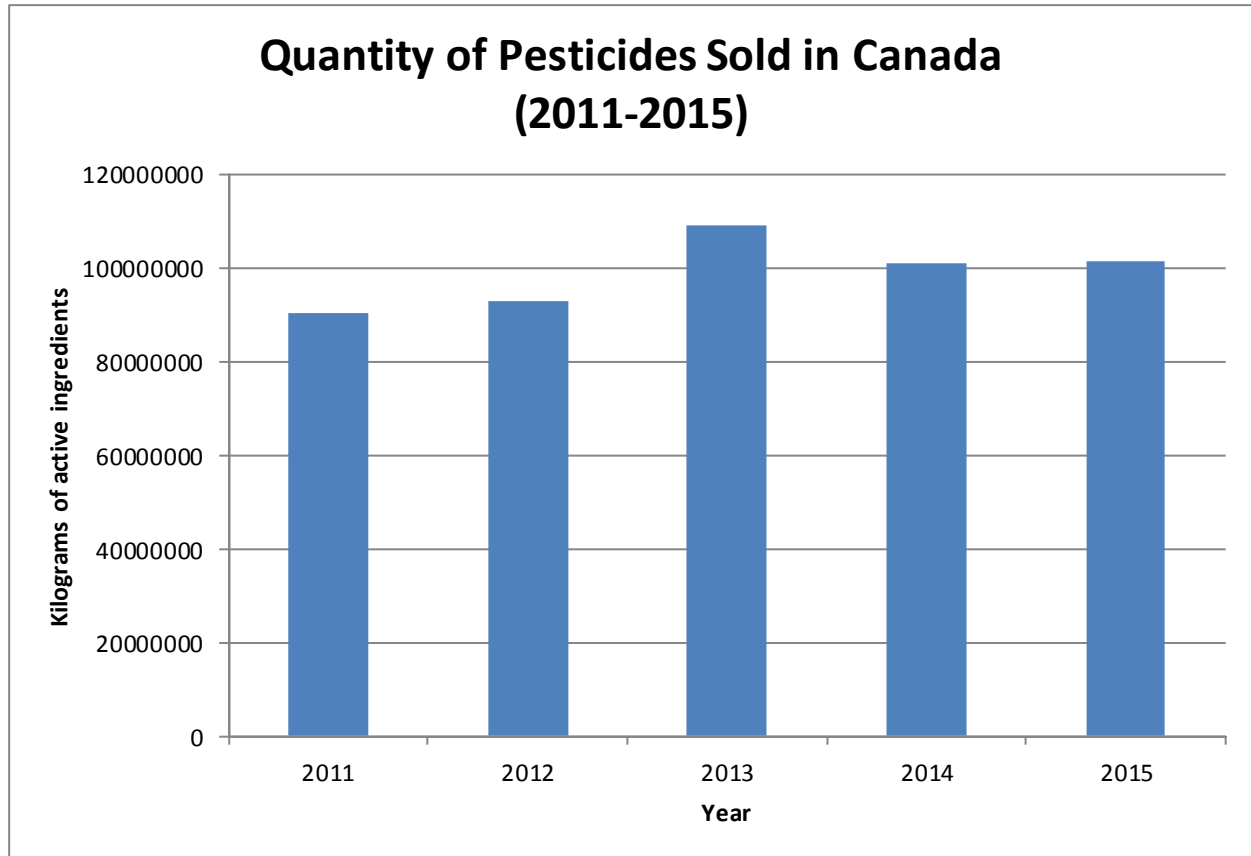


Figure 1: Quantity of pesticides sold in Canada between 2011 and 2015.

In 2015, the 50 products with the greatest sales accounted for 67.1% of the total kg a.i. sold in Canada (68 071 970 kg a.i.). This was an increase in the overall quantity and relative amount from 2014, where the top 50 products accounted for 58.3% of total sales (58 952 342 kg a.i). The top 10 active ingredients sold, presented in decreasing order in Table 1, made up 66.5% of total sales (67 418 885 kg a.i). A comprehensive list with the rankings for all active ingredients sold in Canada in 2015 is provided in Appendix I. Seven active ingredients have remained on the top 10 list over the past five years (since 2011): glyphosate, available chlorine, present as sodium hypochlorite (appears as sodium hypochlorite in previous reports), 2,4-D, MCPA, surfactant blend, glufosinate ammonium, and mineral oil.



Table 1: Top 10 Active Ingredients Sold in Canada in 2015

Active Ingredient	Product Type
Glyphosate	Herbicide
Available chlorine, present as sodium hypochlorite	Antimicrobial
Creosote	Antimicrobial
Surfactant blend	Other
Glufosinate ammonium	Herbicide
2,4-D	Herbicide
Copper as elemental	Antimicrobial/Fungicide/Herbicide
MCPA	Herbicide
Mineral oil	Insecticide/Fungicide/Other
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.

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. In 2015, 73% of pesticide sales in Canada were of Agricultural sector products (see Figure 2), whereas 23.2% were of Non-agricultural sector products and 3.7% were of Domestic sector products. The relative sales of products in the Agricultural sector decreased between 2014 and 2015 (decreasing from just over 74% to 73%), while the Non-agriculture sector increased from 21% to 23%, and the Domestic sector decreased from just under 5% in 2014 to just under 4% in 2015 (see Figure 3 for data for 2011 to 2015).

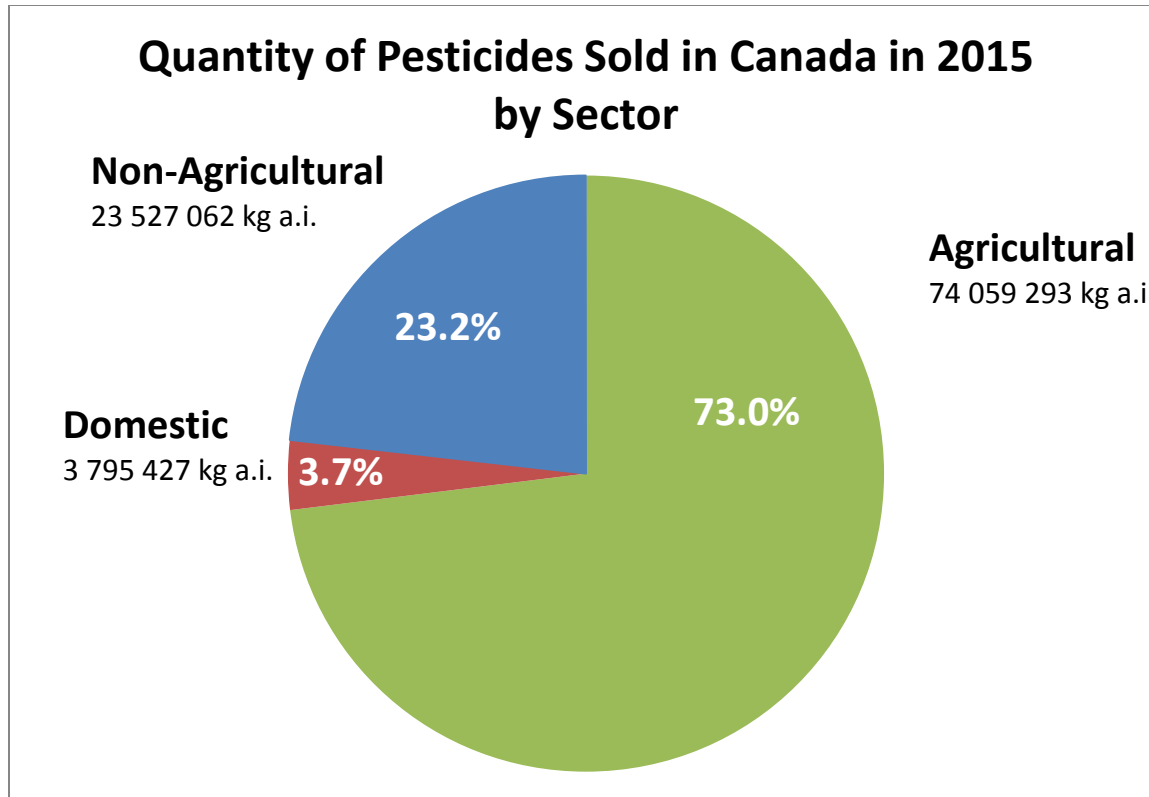


Figure 2: Quantity of pesticides sold in Canada in 2015 by sector.

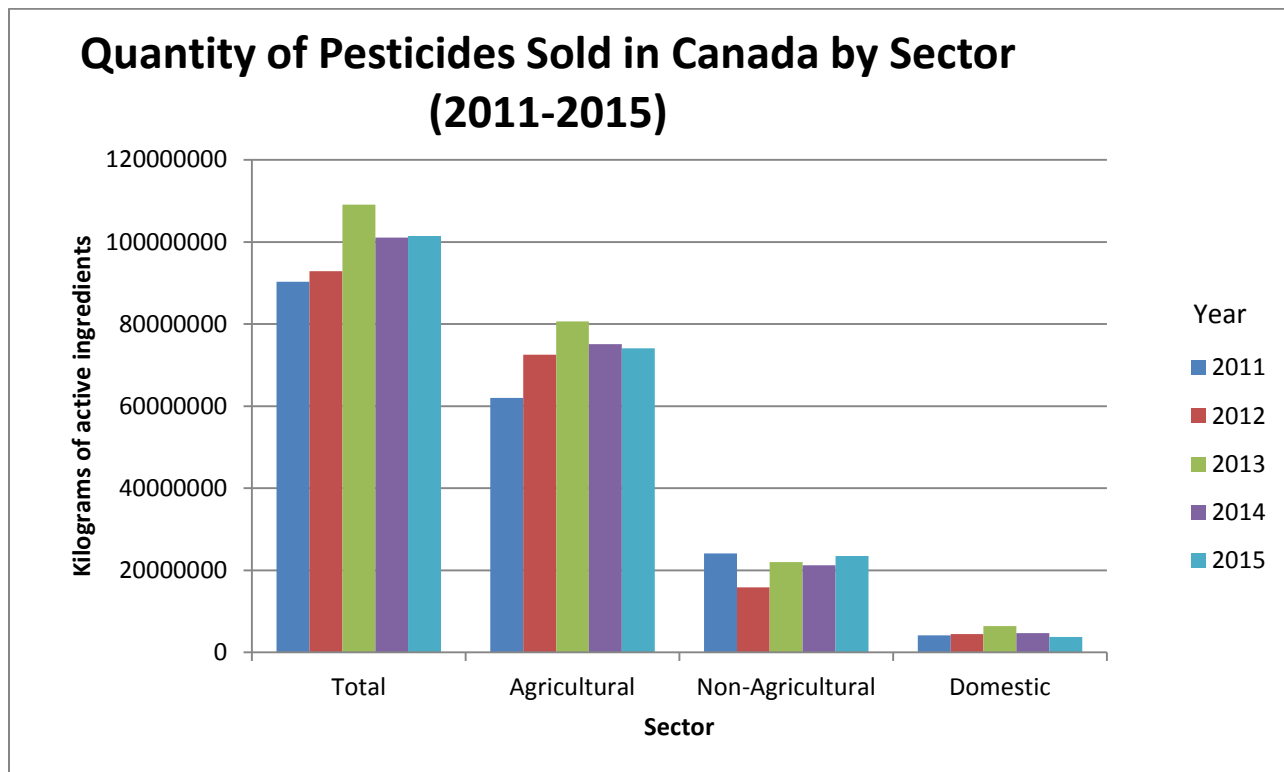


Figure 3: Quantity of pesticides sold in Canada by sector between 2011 and 2015.



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 2015, as an over-reporting would occur.

Agricultural Sector

Products with agricultural uses accounted for 73% of pesticide sales in Canada in 2015. There was a 1.4% decrease in Agricultural sector pesticide sales from 2014 (75 112 223 kg a.i) to 2015 (74 059 293 kg a.i.).

Herbicides accounted for 73.3% of agricultural sector pesticide sales, followed by fungicides (11.5%), insecticides (5.0%), antimicrobials (4.6%), and others (7.3%) (Figure 4). Vertebrate controls (0.04%) accounted for very small quantities of agricultural pesticides sold in 2015 and have been included in the “others” category. Within the Agricultural sector, sales by product type have been consistent, with only small changes seen in the percentage of sales in each type throughout the years reported.

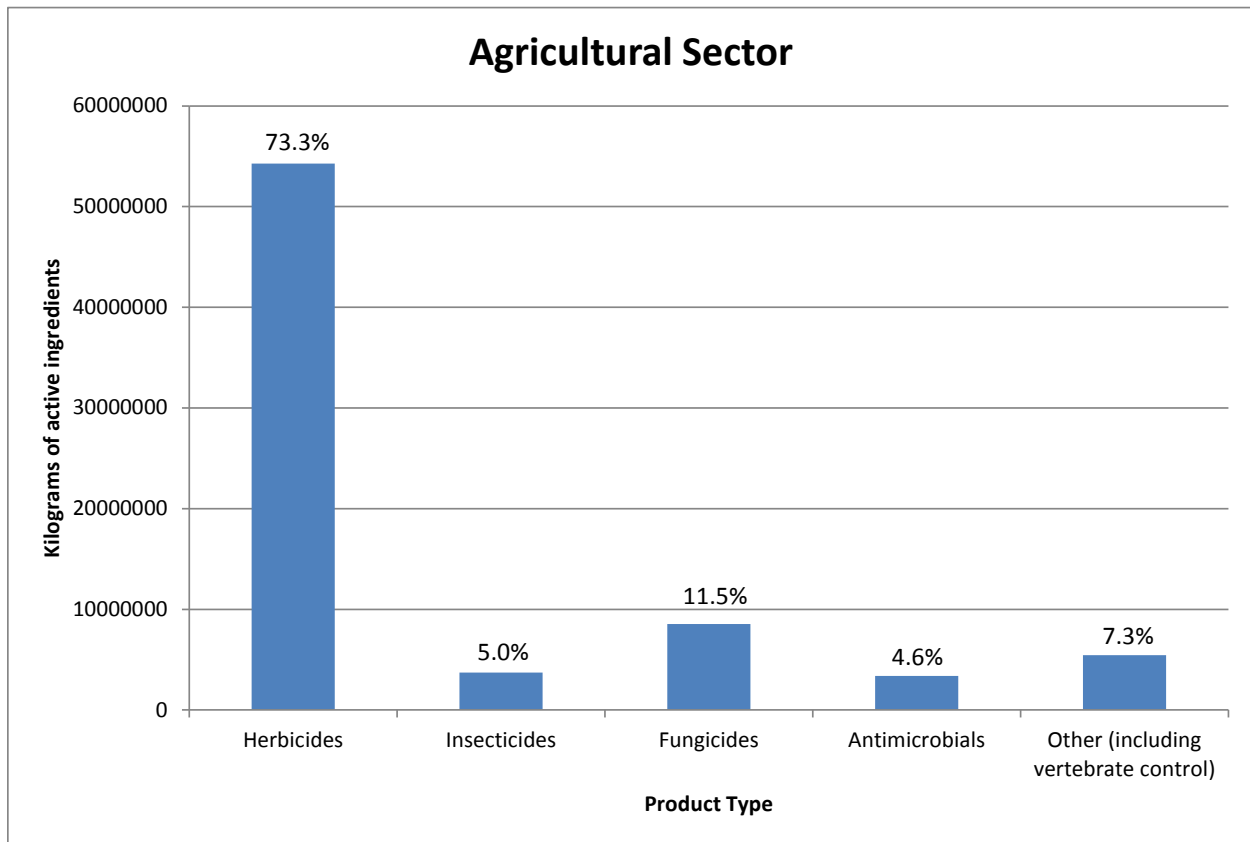


Figure 4: Kilograms of active ingredients sold in Canada in 2015 in the Agricultural sector.



The top 10 active ingredients sold with agricultural uses are shown in Table 2 in decreasing order. Seven 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 73% of the Agricultural sector pesticides sold. Seven active ingredients have remained in the top 10 over the last five years: glyphosate, 2,4-D, MCPA, glufosinate ammonium, mineral oil, surfactant blend, and mancozeb.

Table 2: Top 10 Active Ingredients Sold in Canada in 2015 in the Agricultural Sector

Active Ingredient	Product Type
Glyphosate	Herbicide
Available chlorine, present as sodium hypochlorite	Antimicrobial
Surfactant blend	Other
Glufosinate ammonium	Herbicide
2,4-D	Herbicide
MCPA	Herbicide
Mineral oil	Insecticide/Fungicide/Other
Mancozeb	Fungicide
Halosulfuron (present as methyl ester)	Herbicide
Hydrogen peroxide	Herbicide, Insecticide, Fungicide

Non-Agricultural Sector

Commercial products with non-agricultural uses accounted for 23.2% of all pesticides sold in Canada in 2015 (compared to 21.0% in 2014). Non-agricultural sector pesticide sales increased 10.7% from 2014 to 2015 (from 21 257 788 kg a.i. to 23 527 062 kg a.i.). Over the past few years, there has been some fluctuation in Non-agricultural sector sales, with a large decrease in some years (2012) and smaller increases and decreases in other years.

Antimicrobials accounted for 96.8% of non-agricultural sector sales followed by herbicides (2.0%), fungicides (0.9%), insecticides (0.6%), and vertebrate control (0.3%). These last three product types were combined in the figure due to the low quantities of pesticides sold. No quantities of “other” products were sold in 2015. 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 (ranging from 86% to 96.8%).

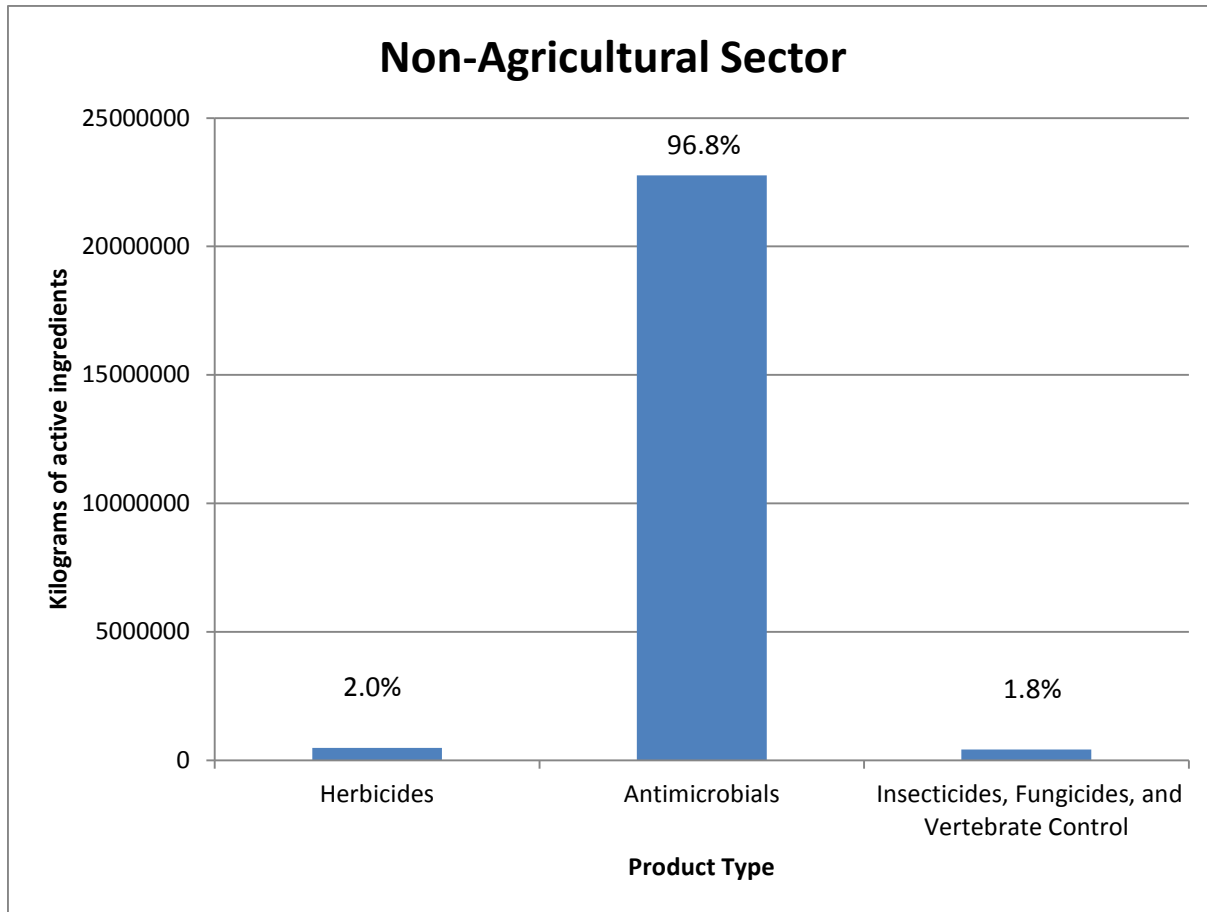


Figure 5: Kilograms of active ingredients sold in Canada in 2015 in the Non-agricultural sector.

The top 10 active ingredients sold with Non-agricultural sector uses were antimicrobials. These are presented in Table 3 in decreasing order. Two of the active ingredients also had other product types in addition to the antimicrobial type (copper and borates). Non-agricultural sector products are used predominantly in the wood preservation industry and for water treatment. The top 10 active ingredients accounted for 83% of the Non-agricultural sector pesticides sold. Six active ingredients have remained in the top 10 for Non-agricultural sector pesticides over the last five years: available chlorine, present as sodium hypochlorite (appears as sodium hypochlorite in previous reports), chromic acid, glutaraldehyde, arsenic pentoxide, copper as elemental, and sodium bromide.



Table 3: Top 10 Active Ingredients Sold in Canada in 2015 in the Non-agricultural Sector

Active Ingredient	Product Type
Available chlorine, present as sodium hypochlorite	Antimicrobial
Creosote	Antimicrobial
Copper as elemental	Antimicrobial/Herbicide/Fungicide
Chromic acid	Antimicrobial
Arsenic pentoxide	Antimicrobial
Glutaraldehyde	Antimicrobial
Pentachlorophenol	Antimicrobial
Tetrakis (hydroxymethyl) phosphonium sulfate (THPS)	Antimicrobial
Borates	Antimicrobials/Insecticides/Fungicides
Sodium bromide	Antimicrobial

Domestic Sector

The Domestic Class products accounted for 3.7% of overall pesticide sales in Canada for 2015. There was a 19% decrease from 2014 (4 699 185 kg a.i.) to 2015 (3 795 427 kg a.i.) in Domestic sector pesticide sales. This is the lowest amount sold since the start of the sales reporting program. Changes from year to year in the Domestic sector may be dependent on changes in regional regulations (e.g. restrictions at the municipal or provincial level), as well as changes in weather (e.g. hot and sunny summers may result in increased sales of swimming pool and spa products).

Antimicrobial products accounted for 73.4% of domestic pesticides sold in Canada (Figure 6) (mainly sales of swimming pool and spa products) followed by insecticides (16.9%), herbicides (6.6%), vertebrate controls (3.0%), fungicides (0.5%), and “other” products (0.07%). These last three product types were combined in Figure 6. The Domestic sector has seen fluctuation from year to year in the product-type groupings.

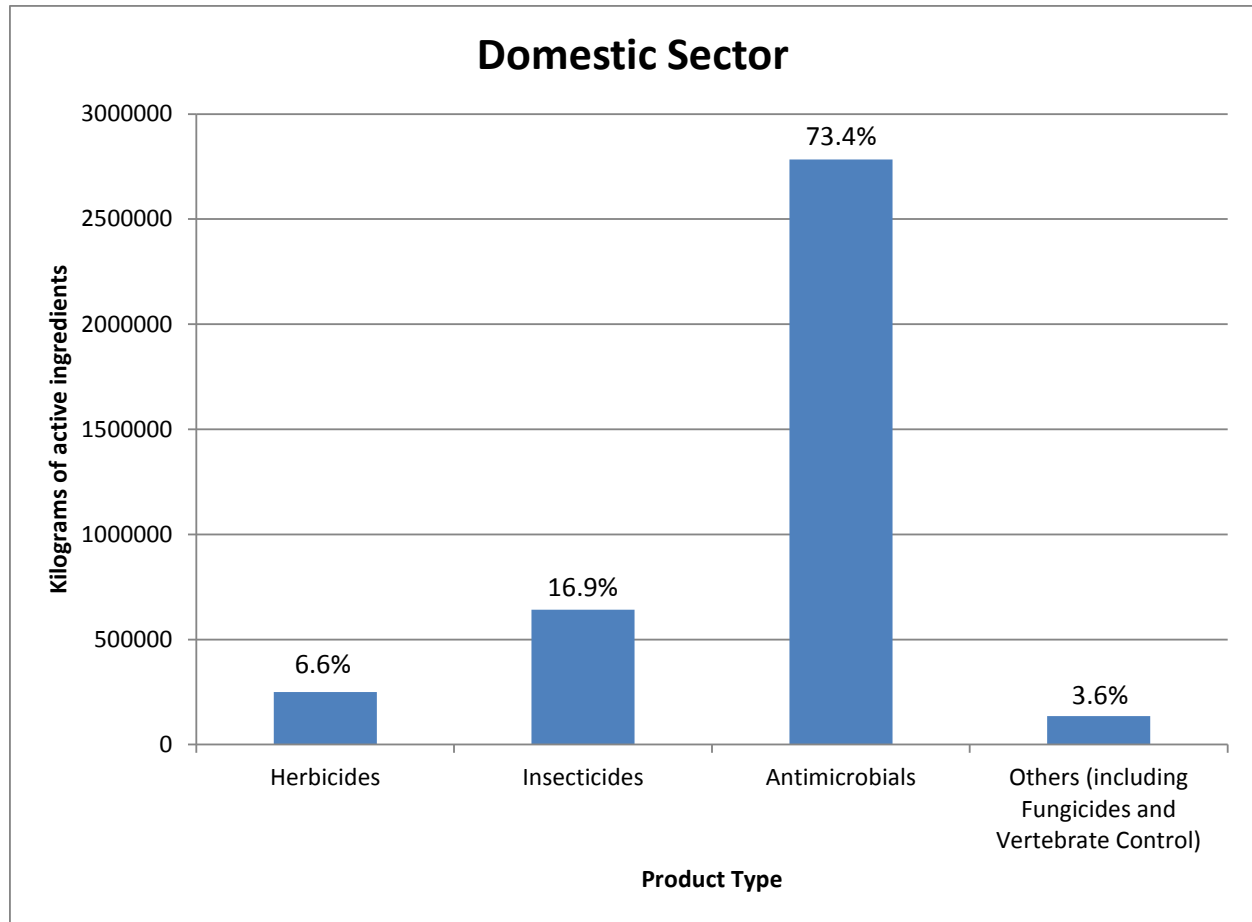


Figure 6: Kilograms of active ingredients sold in Canada in 2015 in the Domestic sector.

The top 10 active ingredients sold for use in the Domestic sector are from three product type groups: antimicrobials, vertebrate control, and insecticides. They are presented in Table 4 in decreasing order. These active ingredients accounted for 81% of the Domestic sector pesticides sold. Of the top 10 products, six are used for swimming pools and spas. Six active ingredients have remained in the top 10 over the last five years: available chlorine, present as calcium hypochlorite (as calcium hypochlorite in previous reports), available chlorine, present as trichloro-s-triazinetriene (as trichloro-s-triazinetriene in previous reports), n-alkyl (40% C12, 50% C14, 10% C16) dimethyl benzyl ammonium chloride, Poly[oxyethylene(dimethyliminio)ethylene(dimethyliminio) ethylene dichloride], DEET, and available bromine 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 2015 in the Domestic Sector

Active Ingredient	Product Type
Available chlorine, present as calcium hypochlorite	Antimicrobial
Available chlorine, present as trichloro-s-triazinetriene	Antimicrobial
Available bromine, present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins	Antimicrobial
Poly[oxyethylene(dimethyliminio)ethylene]	Antimicrobial



Active Ingredient	Product Type
(dimethyliminio)ethylene dichloride]	
N-alkyl (40% C12, 50% C14, 10% C16) dimethyl benzyl ammonium chloride	Antimicrobial
DEET*	Insecticide
Available chlorine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins	Antimicrobial
Paradichlorobenzene	Insecticide
Silicon dioxide	Insecticide
Cellulose (from powdered corn cobs)	Vertebrate control

*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 2015, as an over-reporting would occur.

Herbicides

Herbicides accounted for 54.2% (54 999 360 kg a.i.) of all pesticides sold in Canada in 2015. This is a slight decrease from 2014 when herbicides accounted for 58.4% of all pesticides sold. This translates into a decrease of 7% in the quantities of herbicides sold from 2014 (59 085 239 kg a.i.) to 2015 (54 999 360 kg a.i.).

The top 10 herbicides sold in 2015, as listed in Table 5 in decreasing order, accounted for 87.3% of all herbicide sales in Canada and 47.3% of pesticide sales overall. Seven active ingredients have remained in the top 10 over the last five years: glyphosate, glufosinate ammonium, 2,4-D, MCPA, bromoxynil, S-metolachlor and R-enantiomer, and atrazine.

Table 5: Top 10 Herbicide Active Ingredients Sold in Canada in 2015

Active Ingredient
Glyphosate
Glufosinate ammonium
2,4-D
MCPA
Halosulfuron (present as methyl ester)
Bromoxynil
S-metolachlor and R-enantiomer
Metam-sodium
Bentazon (present as sodium salt)
Atrazine (plus related active triazines)



Insecticides

Insecticides accounted for 4.5% (4 522 381 kg a.i.) of all pesticides sold in Canada in 2015. Insecticide sales have remained relatively low during the years of reporting, with the highest quantities sold in 2014 (5 138 580 kg a.i.) and the lowest in 2011 (4 112 386 kg a.i.). Many of the insecticides are used in agricultural settings, though the fourth-most sold insecticide (DEET) is used only in the Domestic sector.

The top 10 insecticides sold in 2015, as listed in Table 6 in decreasing order, accounted for 81.4% of all insecticides sales in Canada and 3.6% of pesticide sales overall. Six insecticides have remained in the top 10 during all years of reporting: mineral oil, hydrogen peroxide, chlorpyrifos, DEET, sulphur, and clothianidin.

Table 6: Top 10 Insecticide Active Ingredients Sold in Canada in 2015

Active Ingredient
Mineral oil
Hydrogen peroxide
Sulphur
DEET*
Thiamethoxam
Silicon dioxide
Clothianidin
Paradichlorobenzene
Chlorpyrifos
Malathion

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

Fungicides

Fungicides accounted for 8.6% (8 768 914 kg a.i.) of all pesticides sold in Canada in 2015. Fungicide sales have remained relatively low throughout the reporting years, with a high in 2014 (9 939 107 kg a.i.) and a low in 2010 (5 784 829 kg a.i.). The vast majority of fungicides are used in the Agricultural sector (73.5%).

The top 10 fungicides sold in Canada in 2015, as listed in Table 7 in decreasing order, accounted for 74.6% of fungicide sales and 6.4% of pesticide sales overall. Six of the active ingredients have remained in the top 10 in the last five years of reporting: chlorothalonil, mancozeb, metam-sodium, prothioconazole, chloropicrin, and sulphur.



Table 7: Top 10 Fungicide Active Ingredients Sold in Canada in 2015

Active Ingredient
Mancozeb
Chlorothalonil
Metam-sodium
Chloropicrin
Prothioconazole
Sulphur
Mono- and dipotassium phosphite
Pyraclostrobin
Mono- and dibasic sodium, potassium, and ammonium phosphites
Tebuconazole

Antimicrobials

Antimicrobials accounted for 28.5% (28 932 261 kg a.i.) of all pesticides sold in Canada in 2015. 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 2015, as listed in Table 8 in decreasing order, accounted for 80.9% of all antimicrobial sales in Canada and 23.1% of pesticide sales overall. Six of the active ingredients have remained in the top 10 in the last five years of reporting: available chlorine, present as sodium hypochlorite, as calcium hypochlorite, and as trichloro-s-triazinetriene (appearing as sodium hypochlorite, calcium hypochlorite, and trichloro-s-triazinetriene, respectively, in previous reports), chromic acid, glutaraldehyde, and copper as elemental.

Table 8: Top 10 Antimicrobial Active Ingredients Sold in Canada in 2015

Active Ingredient
Available chlorine, present as sodium hypochlorite
Creosote
Copper as elemental
Chromic acid
Available chlorine, present as calcium hypochlorite
Arsenic pentoxide
Glutaraldehyde
Available chlorine, present as trichloro-s-triazinetriene
Pentachlorophenol
Tetrakis (hydroxymethyl) phosphonium sulfate (THPS)



Vertebrate Control

Vertebrate controls accounted for 0.2% (203 015 kg a.i.) of all pesticides sold in Canada in 2015. 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 98.0% of all vertebrate control sales in 2015 and 0.2% of pesticide sales overall. Seven of the active ingredients have remained in the top 10 in the last five years: carbon dioxide gas, cellulose (from powdered corn cobs), aluminum phosphide, sulphur, dried blood, fish meal mixture, and zinc phosphide.

Table 9: Top 10 Vertebrate Control Active Ingredients Sold in Canada in 2015

Active Ingredient
Cellulose (from powdered corn cobs)
Carbon dioxide gas
Aluminum phosphide
Sulphur
Dried blood
Thiram
Fish meal mixture
Zinc phosphide
Piperonyl butoxide
Rotenone

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 5.3% (5 408 478 kg a.i.) of pesticide sales in Canada in 2015. Sales in this category have fluctuated slightly over the years of reporting, but have remained fairly low, with a high in 2015 (5 408 478 kg a.i.) 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 (99.9%).

The top 10 active ingredients sold in Canada in 2015 that fall into this type are listed in Table 10 in decreasing order and accounted for 99.9% of “other” type sales and 5.3% of pesticide sales overall. Seven of the active ingredients have remained in the top 10 in the last five years of reporting: surfactant blend, mineral oil, nonylphenoxypolyethoxyethanol, paraffin based petroleum oil, octylphenoxypolyethoxyethanol, triglyceride ethoxylate, and polyoxyalkylated alkyl phosphate ester.



Table 10: Top 10 Other Active Ingredients Sold in Canada in 2015

Active Ingredient
Surfactant blend
Paraffin based petroleum oil
Mineral oil
Polyoxyalkylated alkyl phosphate ester
Triglyceride ethoxylate
Nonylphenoxypolyethoxyethanol
Methylated seed oil of soybean
Alcohols, C9-11, ethoxylated
Octylphenoxypolyethoxyethanol
Ferric sodium EDTA

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 2015, there were 168 active ingredients identified as biopesticides, which accounted for 928 registered products.

The 370 end-use biopesticide products reported as sold 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 above (for example, herbicides, insecticides, etc.).

The 313 products that could be converted to kg a.i. accounted for 5.4% of total pesticide sales (5 504 154 kg a.i.) in 2015. There was an 11% decrease in biopesticide sales from 2014 (6 194 830 kg a.i.) to 2015. The sales of biopesticides have fluctuated in the years in which data have been collected. Insecticides accounted for 56% of the biopesticide sales in 2015 (Figure 7), followed by fungicides (24.6%), herbicides (12.1%), “others” (9.3%), antimicrobials (3.7%), and vertebrate controls (3.0%).

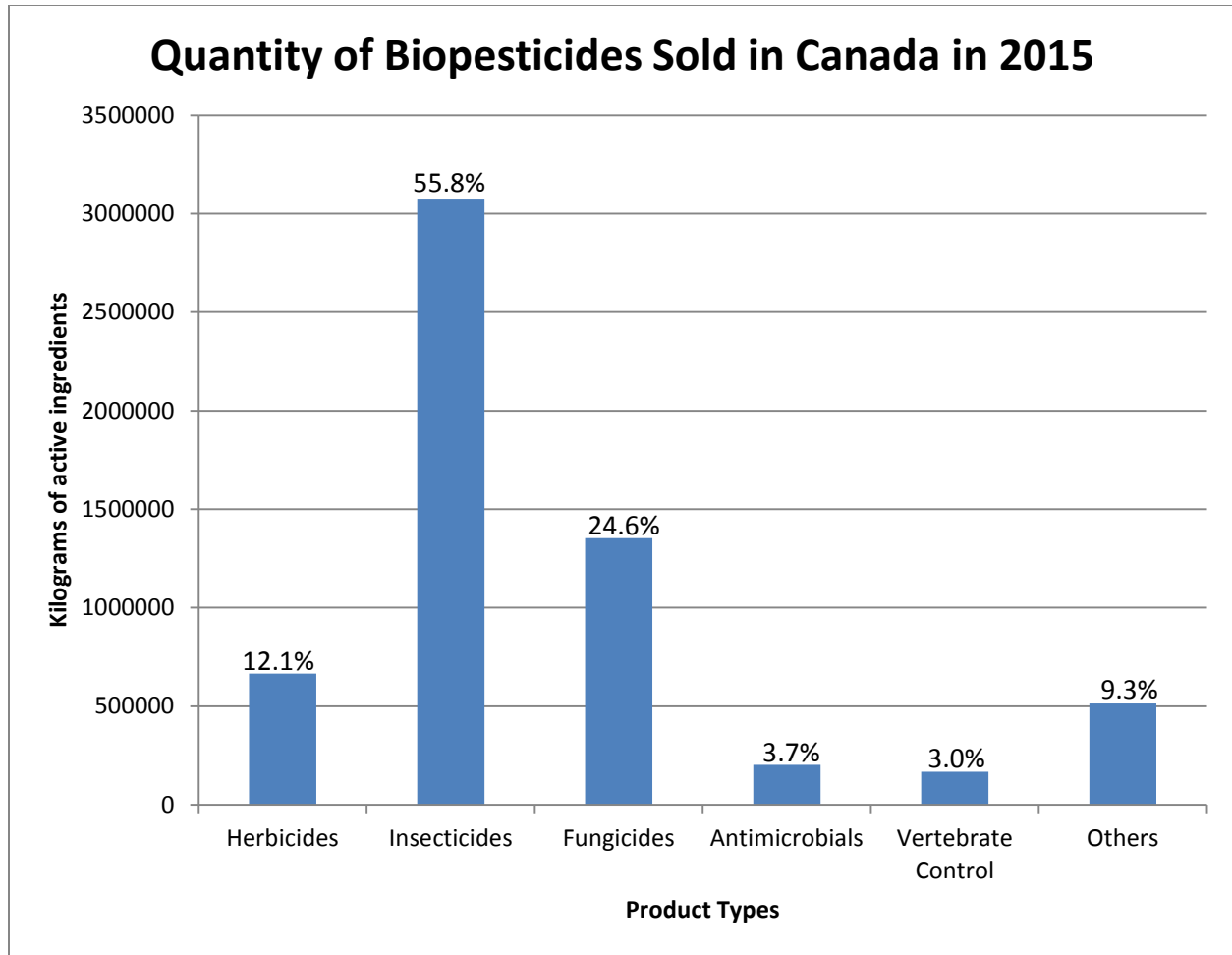


Figure 7: Kilograms of active ingredients of biopesticides sold in Canada in 2015.

The top 10 biopesticide active ingredients sold in Canada are listed in Table 11 in decreasing order. The top 10 active ingredients accounted for 60.7% of sales of biopesticides that could be converted to kg a.i. and 3.3% of pesticide sales overall. Six of the active ingredients have remained in the top 10 over the last five years: corn gluten meal, mineral oil, sulphur, N-decanol, hydrogen peroxide, and mono- and dipotassium phosphite.

Table 11: Top 10 Biopesticide Active Ingredient Sold in Canada in 2015

Active Ingredient	Product Type
Mineral oil	Fungicide, Insecticide, Other
Hydrogen peroxide	Herbicide, Insecticide, Fungicide, Antimicrobial
Sulphur	Fungicide, Insecticide, Vertebrate Control
Mono- and dipotassium phosphite	Fungicide
Mono- and dibasic sodium, potassium, and ammonium phosphites	Fungicide
Corn gluten meal	Herbicide
Ammonia (present as ammonium sulfate)	Antimicrobial
N-decanol	Herbicide



Active Ingredient	Product Type
Silicon dioxide	Insecticide
Cellulose (from powdered corn cobs)	Vertebrate control

The remaining 57 products are microbial agents that could not be converted into kg a.i. due to unconventional units of measure. The amount of products sold in 2015 of these is listed in Table 12.

Table 12: Quantity of Microbials Sold in Canada in 2015

Units of Product Sold	Total
Litres (microbials)	882 467
Kilograms (microbials)	463 051

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, 35) and are outlined in Appendix II.

In 2015, the chemical group with the largest proportion of sales was the “Phosphonic and phosphinic acids” group at 38%, followed by the “Inorganic, others” group at 17%. The third and fourth groups were the “Hydrocarbons” and “Fatty acids and surfactants” at just over 5% each. The remaining chemical groups were all under 5% and 36 out of 52 chemical groups were less than 1% of total sales. Nine chemical families remained in the top 10 from 2014 to 2015.

Table 13: Summary of Pesticide Sales by Chemical Group (All Sectors) in 2015

Chemical Grouping	Kilograms of Active Ingredients	Rank
Phosphonic acids, phosphinic acids	38569703	1
Inorganic, others	17537782	2
Hydrocarbons	5593684	3
Fatty acids & surfactants	5353958	4
Phenoxy acids	4639286	5
Benzonitriles	2207613	6
Inorganic coppers	2081297	7
Triazines, tetrazines	1960134	8
Biscarbamates	1936529	9
Oils, minerals and vegetable	1895711	10
Ammoniums, quaternary	1673471	11
Anilides/anilines	1653801	12
Sulfonylureas	1425693	13
Triazoles	1390536	14
Dinitrobenzenes	1120295	15
Dithiocarbamates	1085261	16
Urea derivatives	1011359	17



Chemical Grouping	Kilograms of Active Ingredients	Rank
Alcohols	992343	18
Carbamates	852872	19
Acylureas	828626	20
Organochlorines	XXX	21
Aldehydes	XXX	22
Phenols/chlorophenols	658097	23
Others	639020	24
Amides	564036	25
Halogenated organic acids	516925	26
Methoxyacrylates	483966	27
Cyclohexanedione oximes	XXX	28
Guanidines	406506	29
Azoles, oxazoles, thiazoles	354733	30
Aryloxyphenoxy acids	342642	31
Benzamides	283444	32
Phtalic acids	237032	33
Imidazolinones	189767	34
Benzoic acid and derivatives	171744	35
Thiophosphates	164381	36
Dithiophosphates	XXX	37
Nitrobenzenes	131032	38
Organic acids	104763	39
Pyrethroids, pyrethrins	81113	40
Morpholines & oxathiines	XXX	41
Diazines	36074	42
Pyridines	26858	43
Phosphoramidothioates	25987	44
Organohalogens	XXX	45
Phosphates	XXX	45
Inorganic zincs	XXX	46
Chromenones	2109	47
Pheromones	1969	48
Organometallics	XXX	49
Indanediones	XXX	50
Microbials	0	51

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 collecting the sales data for the 2016 calendar year. The PMRA will publish the 2016 data once the data analysis is complete.



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Appendix I Ranking of all active ingredients sold in Canada in 2015

Active name	Kilograms of active ingredients
Glyphosate	>25 000 000
Available chlorine, present as sodium hypochlorite	>5 000 000
Creosote	
Surfactant blend	>1 000 000
Glufosinate ammonium	
2,4-D	
Copper as elemental	
MCPA	
Mineral oil	
Mancozeb	
Hydrogen peroxide	
Halosulfuron (present as methyl ester)	
Bromoxynil	
S-metolachlor and R-enantiomer	
Chlorothalonil	
Chromic acid	>500 000
Metam-sodium	
Available chlorine, present as calcium hypochlorite	
Arsenic pentoxide	
Glutaraldehyde	
Available chlorine, present as trichloro-s-triazinetrione	
Bentazon (present as sodium salt)	
Atrazine (plus related active triazines)	
Pentachlorophenol	
Chloropicrin	
Ethalfluralin	
Tetrakis (hydroxymethyl) phosphonium sulfate (THPS)	
Sodium bromide	
Borates	
Available bromine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins	
Triallate	
Paraffin base petroleum oil	
Prothioconazole	
Sulphur	
Diquat	>100 000
Polyoxyalkylated alkyl phosphate ester	
Chlormequat chloride	
2,2-dibromo-3-nitrilopropionamide	



Active name	Kilograms of active ingredients
Fluroxypyr (present as 1-methylheptyl ester)	
Mono- and dipotassium phosphite	
Triglyceride ethoxylate	
Poly[oxyethylene(dimethyliminio)ethylene(dimethyliminio)ethylene dichloride]	
Pyraclostrobin	
Trifluralin	
Mono- and dibasic sodium, potassium, and ammonium phosphites	
N-alkyl (40% C12, 50% C14, 10% C16) dimethyl benzyl ammonium chloride	
Tebuconazole	
Hexahydro-1,3,5-tris(2-hydroxyethyl)-s-triazine	
N-alkyl (67% C12, 25% C14, 7% C16, 1% C18) dimethyl benzyl ammonium chloride	
Propiconazole	
Metribuzin	
Metiram	
Alkyl-1,3-propylene diamine acetates	
Available chlorine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins	
DEET	
Corn gluten meal	
Captan	
Acrolein	
Sethoxydim	
Ammonia (present as ammonium sulfate)	
Ammonium bromide	
Thifensulfuron-methyl	
Dimethenamid-P	
Dicamba (present as acid, amine salt, ester, or sodium salt)	
Clethodim	
Thiamethoxam	
N-decanol	
Silicon dioxide	
Clothianidin	
Pendimethalin	
Iprodione	
Sodium chlorite	
Nonylphenoxypolyethoxyethanol	
Clodinafop-propargyl	
Boscalid	



Active name	Kilograms of active ingredients
Bronopol	
Paradichlorobenzene	
Methylated seed oil of soybean	
Fluxapyroxad	
Linuron	
Saflufenacil	
Mecoprop	
Chlorpyrifos	
Tribenuron-methyl	
Available chlorine, present as sodium dichloro-s-triazinetrione	
Cellulose (from powdered corn cobs)	
Sodium chloride	>50 000
Chlorpropham	
Fenoxaprop-P-ethyl	
Soap	
Metconazole	
Sulfentrazone	
Alcohols, C9-11, ethoxylated	
Quizalofop-P-ethyl	
Pinoxaden	
Tralkoxydim	
2,4-DB	
Dazomet	
Malathion	
Azoxystrobin	
Imazamox	
Carbathiin	
Iron	
Propamocarb hydrochloride	
Carbaryl	
Imazethapyr	
Mesotrione	
Mineral spirits	
Acetic acid	
Picoxystrobin	
Thiram	
Imidacloprid	
Potassium dimethyldithiocarbamate	
Fomesafen	
Fosetyl-Al	



Active name	Kilograms of active ingredients
Octylphenoxypolyethoxyethanol	
Diazinon	
Clopyralid	
Pyrasulfotole	
Carbon dioxide gas	
Difenoconazole	
1-(3-chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride	
Dimethoate	
Didecyldimethylammonium present as carbonate and bicarbonate salts	
Available chlorine present as 1,3-dichloro-5,5-dimethylhydantoin and 1,3- dichloro-5-ethyl-5-methylhydantoin	
Iodocarb	
1,2-benzisothiazolin-3-one, bit	
Pyrimethanil	
Metalaxyl-m and s-isomer	
Sulfuryl fluoride	
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	
Fluazinam	
Didecyl dimethyl ammonium chloride	
Permethrin	
Lime sulphur	
Phosmet	
Amitrole	
Maleic hydrazide	
Kaolin	
Imazamethabenz-methyl	
Metam-potassium	
Triclopyr, present as butoxyethyl ester	
Penthiopyrad	
N-alkyl (5% C12, 60% C14, 30% C16, 5% C18) dimethyl benzyl ammonium chloride	
5-chloro-2-methyl-4-isothiazolin-3-one	
2-n-octyl-4-isothiazolin-3-one	
EPTC	
Aluminum phosphide	
Acephate	
Flumioxazin	
Paraquat	



Active name	Kilograms of active ingredients
Isoxaflutole	
Lambda-cyhalothrin	
Thiophanate-methyl	
4-chloro-3-methylphenol (sodium salt)	
Sedaxane	
N-alkyl (68% C12, 32% C14) dimethyl ethylbenzyl ammonium chloride	
Formic acid	
Oxydiethylene bis(alkyl dimethyl ammonium chloride)	
Cyantraniliprole	
Pyroxasulfone	
Picloram	
Folpet	
Carfentrazone-ethyl	
Ethephon	
Nabam	
Sodium dimethyldithiocarbamate	
Sodium omadine	
Fluopyram	
Fluazifop-P-butyl	
Naled	
Dichlorprop	
Fludioxonil	
Ferbam	
Piperonyl butoxide	
Ferrous sulfate	
Napropamide	
Diuron	
Garlic juice	
Thiabendazole	
Triticonazole	
Flucarbazone (present as flucarbazone-sodium)	
Aminopyralid	
Terbacil	
Carbendazim	
Imazapyr	
2-phenylphenol	
Florasulam	
N-coco-alkyltrimethylene diamines present as monobenzoate salt	
2-methyl-4-isothiazolin-3-one	
Dichlobenil	



Active name	Kilograms of active ingredients
Flumetsulam	
Chlorantraniliprole	
Formaldehyde	
Potassium bicarbonate	
Deltamethrin	
Prometryne plus related active triazines	
Simazine plus related active triazines	
Fenamidone	
Trifloxystrobin	
1,2-dibromo-2,4-dicyanobutane	
Peracetic acid	
Quinclorac	
Thiencarbazone-methyl	
Diflufenzopyr	
MCPB	
2-(thiocyanomethylthio)benzothiazole	
Oxirane derivatives (50% minimum)	
1,3-bis(hydroxymethyl)-5,5-dimethylhydantoin	
Propyzamide	
Diodofon	
Dichlorvos	
Barium metaborate monohydrate	
4,5-dichloro-2-n-octyl-3(2H)isothiazolone	
Alcohol anhydrous	
Acifluorfen-sodium	
Daminozide	
Potassium peroxymonosulfate (present as potassium peroxymonosulfate sulfate)	
Spirotetramat	
Chlorimuron-ethyl	
Chlorthal-dimethyl	
Dried blood	
Bifenthrin	
Zinc as elemental	
Clomazone	
Acetamiprid	
Silica gel (amorphous)	
Ethaboxam	
Icaridin	
Fenhexamid	
D-phenothrin	
Ferric sodium EDTA	



Active name	Kilograms of active ingredients
3-decen-2-one	
Cymoxanil	
Cyfluthrin	
Tetrachlorvinphos	
Flonicamid	
Myclobutanil	
Methomyl	
Methylene bis(thiocyanate)	
Fish meal mixture	
Zinc phosphide	
Penflufen	
Dimethomorph	
Pyrethrins	
Bromacil (present in free form, as dimethylamine salt, or as lithium salt)	
Metsulfuron-methyl	
Halauxifen-methyl	
Ametoctradin	
2,2'-(1-methyltrimethylenedioxy)bis-(4-methyl-1,3,2-dioxaborinane)	
Rimsulfuron	
Streptomycin	
Rotenone	
Trinexapac-ethyl	
Tembotrione	
Sodium chlorate	
Octylbicyclo heptene dicarboximide	
D-cis,trans-allethrin	
Oriental mustard seed meal	
Metrafenone	
Thiacloprid	
Spinetoram	
Ethofumesate	
Pyroxsulam	
(S)-methoprene	
Tetramethrin	
Garlic powder	
Dodecylguanidine hydrochloride	
Oxyfluorfen	
Spinosad	
Zoxamide	
Indaziflam	



Active name	Kilograms of active ingredients
Topramezone	
P-menthane-3,8-diol	
Nicosulfuron	
1- or 3-monomethylol-5,5-dimethylhydantoin	
Liquid corn gluten	
Tefluthrin	
Quinoxifen	
Isofetamid	
Ipconazole	
Desmedipham	
Phenmedipham	
Prohexadione calcium	
Bifenazate	
Fluopicolide	
Kresoxim-methyl	
2,2-oxybis(4,4,6-trimethyl-1,3,2-dioxaborinane)	
P-menthane-3,8-diol and related oil of lemon eucalyptus compounds	
Cyazofamid	
Spiromesifen	
Cypermethrin	
Magnesium phosphide	
Amitraz	
Famoxadone	
Acequinocyl	
Cyflumetofen	
Metaldehyde	
Sodium 2-phenylphenate	
Butoxypolypropylene glycol	
Pyridaben	
Methoxyfenozide	
Dried eggs	
1,4-dimethylnaphthalene	
Bis(trichloromethyl)sulfone	
Tebufenozide	
D-trans-allethrin	
Novaluron	
Cloransulam-methyl	
BLAD polypeptide	
Oxalic acid	
Diphenylamine	



Active name	Kilograms of active ingredients
Naphthalene	
Azadirachtin	
Propoxur	
Triforine	
Ferric phosphate	
Oil of black pepper	
Cyprodinil	
Spirodiclofen	
Aminocyclopyrachlor	
Fenbuconazole	
Formetanate hydrochloride	
Azamethiphos	
<i>Brassica hirtawhite</i> mustard seed powder	
10,10'-oxybis(phenoxarsine)	
Sulfoxaflor	
Citronella oil	
Oxamyl	
Oxadiazon	
Meat meal mixture	
From nanogen: chlorocresol (or: parachlorocresol)	
Lactic acid	
Clove oil	
Etridiazole	
Wintergreen oil	
Capsaicin	
Tea tree oil	
Methyl nonyl ketone	
Sodium alpha-olefin sulfonate	
Sodium fluoride	
Chlorsulfuron	
6-benzylaminopurine (or: 6-benzyladenine)	
Fenbutatin oxide	
Foramsulfuron	
Kasugamycin (present as hydrochloride hydrate)	
Phosphine	
Citronella terpene	
Ethametsulfuron-methyl	
Citric acid	
Chlorfenapyr	
Natamycin	
Garlic oil	



Active name	Kilograms of active ingredients
Abamectin	
Fish oil mixture	
Polybutene	
Hydramethylnon	
Castor oil	
Putrescent whole egg solids	
Fluoxastrobin	
Related capsaicinoids	
Naphthylacetic acid	
Clofentezine	
Verbenone	
Octenol	
(Z)-9-dodecenyl acetate + (Z)-11-tetradecenyl acetate	
Dioctyl dimethyl ammonium chloride	
Pyriproxyfen	
Gibberellic acid	
3-methyl-2-cyclohexen-1-one	
Codlure	
3-(trimethoxysilyl)-propyldimethyloctadecyl ammonium chloride	
Di-n-propyl isocinchomeronate	
S-kinoprene	
Coumaphos	
Tetraconazole	
N-dialkyl (5% C12, 60% C14, 30% C16, 5% C18) methyl benzyl ammonium chloride	
Warfarin	
Eucalyptus oil	
Oil of geranium	
Lemon oil	
Pine needle oil	
Muscalure	
Z-8-dodecenyl acetate	
Piperine	
Paclobutrazol	
Diisobutylphenoxyethoxyethyl dimethyl benzyl ammonium chloride	
Bromadiolone	
Artificial grape extract	
Metofluthrin	
Diflubenzuron	
Mandipropamid	



Active name	Kilograms of active ingredients
1-alkyl(C6-C18)-1,3-propanediamine	
1-dodecanol	
Bispyribac-sodium	
(E,Z)-11-tetradecenal	
Camphor oil	
Tau-fluvalinate	
Disodium cyanodithioimidocarbonate	
Denatonium benzoate	
(Z,Z)-3,13-octadecadienyl acetate	
Chlorophacinone	
Diphacinone (present in free form or as sodium salt)	
Octyl decyl dimethyl ammonium chloride	
4-aminopyridine	
Triflusulfuron-methyl	
1-MCP	
Brodifacoum	
(E,Z)-3,13-octadecadienyl acetate	
1-tetradecanol	
Difethialone	
Bromethalin	
E-8-dodecenyl acetate	
Pymetrozine	
Uniconazole-P	
Prosulfuron	
Strychnine	
Z-8-dodecenol	
Aviglycine hydrochloride	
Sodium monofluoroacetate	
(E,Z)-2,13-octadecadien-1-yl acetate	
4-CPA	
Ancymidol	
Acibenzolar-s-methyl	
(Z,Z)-3,13-octadecadien-1-ol	
(E,Z)-2,13-octadecadien-1-ol	
Sodium cyanide	
3-chloro-P-toluidine hydrochloride	
<i>Bacillus thuringiensis</i>	
Octadec-9-enoic acid, methyl ester	
Cyphenothrin	
<i>Chondrostereum purpureum</i> (strain: North American; pathovar: PFC2139)	
Cornmint oil	



Active name	Kilograms of active ingredients
Oxycarboxin	
<i>Coniothyrium minitans</i> strain CON/M/91-08	
Etoxazole	
<i>Phoma macrostoma</i>	
N-alkyl (25% C12, 60% C14, 15% C16) dimethyl benzyl ammonium chloride	
Niclosamide	
N-alkyl (5% C5-18, 61% C12, 23% C14, 11% C16) dimethyl benzyl ammonium chloride	
Extract of <i>Reynoutria sachalinensis</i>	
<i>Bacillus firmus</i> I-1582	
Aromatics	
Thymol	
Fenpropimorph	
Quintozene	
<i>Streptomyces griseoviridis</i> strain K61	
2-(hydroxymethyl)-2-nitro-1,3-propanediol	
Endothal or Endothall	
Soybean oil	
N-octanol	
Benzovindiflupyr	
Decyl isononyl dimethyl ammonium chloride	
Siloxylated polyether	
Bicyclopyrone	
Dodine	
N-alkyl (40% C12, 50% C14, 10% C16) dimethyl benzyl ammonium saccharinate	
<i>Cydia pomonella</i> granulosis virus	
N-alkyl (3% C12, 95% C14, 2% C16) dimethyl benzyl ammonium chloride (or: myristyl dimethyl benzyl ammonium chloride dihydrate)	
R-(-)-1-octen-3-ol	
<i>Sclerotinia minor</i> IMI 3144141	
Bensulide	
Cloquintocet-mexyl	
Flutriafol	
Flupyradifurone	
Sodium lauryl sulfate	
<i>Aureobasidium pullulans</i>	
<i>Trichoderma asperellum</i> , strain T34	
Momfluorothrin	
<i>Lactococcus lactis</i> ssp.c <i>Cremoris</i> strain M11/CSL	



Active name	Kilograms of active ingredients
Octadec-9-enoic acid, ethyl ester	
Primisulfuron-methyl	
Pyrazon	
Diallyl disulfide and related sulfides	
German cockroach extract	
Fungus: <i>Gliocladium catenulatum</i>	
Cyprosulfamide	
Flufenacet	
Saponins of <i>Chenopodium quinoa</i>	
(E,E)-8,10-dodecadien-1-ol + 1-dodecanol + 1-tetradecanol	
Iodosulfuron-methyl-sodium	
<i>Typhyla phacorrhiza</i> (strain 94671)	
Dichloran	
(Z)-8-dodecenyl acetate + (E)-8-dodecenyl acetate + (Z)-8-dodecen-1-ol	
1-(alkyl-amino)-3-aminopropane hydrochloride (component of AMPHO 443-31)	
Triethylene glycol	
Isopropyl alcohol	
Tepraloxydim	
<i>Streptomyces acidiscabies</i> strain RL-110T cells and spent fermentation media	
<i>Trichoderma harzianum</i>	
<i>Lactobacillus rhamnosus</i> (strain LPT-21)	
<i>Bacillus amyloliquefaciens</i> , strain D747	
Spiroxamine	
<i>Bacillus sphaericus</i>	
<i>Lactococcus lactis</i> ssp. <i>lactis</i>	
<i>Pseudomonas fluorescens</i>	
1-(alkyl-amino)-3-carboxymethylaminopropane (component of AMPHO443-31)	
Dinocap (plus related active compounds)	
Tributyl tetradecyl phosphonium chloride	
Benzyl benzoate	
2-bromo-4'-hydroxyacetophenone	
<i>Bacillus subtilis</i>	
Oxalic acid dihydrate	
Dithiopyr	
Available chlorine, present as lithium hypochlorite	
Hexazinone	
<i>Trichoderma virens</i> strain G-41	



Active name	Kilograms of active ingredients
Nucleopolyhedrovirus for Douglas-fir tussock moth	
<i>Agrobacterium radiobacter</i>	
<i>Clavibacter michiganensis</i> (spp <i>michiganensis</i>) bacteriophage	
1,4-bis(bromoacetoxy)-2-butene	
Nuclear polyhedrosis virus of red-headed pine sawfly	
Triclopyr triethylamine salt	
Mesosulfuron-methyl	
Isoxaben	
<i>Pantoea agglomerans</i>	
Pyraflufen-ethyl	
Ziram	
<i>Lactobacillus casei</i> strain LPT-111	
Picolinafen	
Methyl bromide	
<i>Beauveria bassiana</i>	
Baculovirus: nucleopolyhedrovirus <i>Autographa californica</i> (AcMNPV)	
Imiprothrin	
Prallethrin	
<i>Streptomyces lydicus</i> strain WYEC108	
5,5-dimethylhydantoin	
<i>Nosema locustae</i> canning, (spore of)	
Naphthaleneacetamide	
Sulfometuron methyl	
4-nitro-3-(trifluoromethyl) phenol sodium salt	
(E)-11-tetradecenyl acetate	
Oxathiapiprolin	
Phorate	
(Z)-11-tetradecen-1-ol	
Thyme oil	
Methyl salicylate	
<i>Phlebiopsis gigantea</i>	
Petroleum hydrocarbon blend	
<i>Metarhizium anisopliae</i> (strain F52)	
<i>Paecilomyces fumosoroseus</i> strain FEe 9901	
(Z)-11-tetradecenyl acetate	
Cyromazine	
Paraformaldehyde	
(Z)-9-tetradecen-1-yl acetate	
<i>Neodiprion abietis</i> nucleopolyhedrovirus	
Pheromone pine shoot borer	



Active name	Kilograms of active ingredients
<i>Pasteuria nishizawae</i> PN1	
<i>Pseudomonas syringae</i> - strain ESC-10	
Ethylene oxide	
Nucleopolyhedrovirus for gypsy moth larvae	
Etofenprox	
Thidiazuron	
Propetamphos	
<i>Verticillium albo-atrum</i> , isolate WCS850	
(E)-4-tridecenyl acetate + (Z)-4-tridecenyl acetate	
Propylene glycol	
D-limonene	
(Z)-11-tetradecenal	



Appendix II Chemical Groups and Active Ingredients-2015

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 Aviglycine hydrochloride Bronopol Butoxypolypropylene glycol Alcohol anhydrous Ethylene oxide N-decanol N-octanol Tetrakis (hydroxymethyl) phosphonium sulphate (THPS) Isopropyl alcohol P-menthane-3,8-diol and related oil of lemon eucalyptus compounds 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 Isofetamid Mandipropamid Naphthaleneacetamide Napropamide Related capsaicinoids Saflufenacil



Chemical Group	Active Ingredient Name
Ammoniums, Quaternary	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 (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 Benzovindiflupyr Boscalid 3-chloro-P-toluidine hydrochloride Dimethenamid-P Diphenylamine Fenhexamid Flufenacet Flumioxazin Fluxapyroxad Artificial grape extract Metalaxyl-m and s-isomer Metalaxyl Picolinafen Penflufen Penthiopyrad Sedaxane



Chemical Group	Active Ingredient Name
Aryloxyphenoxy Acids	Clodinafop-propargyl Fenoxaprop-P-ethyl Fluazifop-P-butyl Quizalofop-P-ethyl
Azoles, Oxazoles, Thiazoles	Chlorfenapyr 1,2-benzisothiazolin-3-one Carbendazim Clomazone Ethaboxam Etoxazole 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 2-n-octyl-4-isothiazolin-3-one Oxathiapiprolin Pyraflufen-ethyl 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 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 Iodocarb Methomyl Oxadiazon Oxamyl Propamocarb hydrochloride Icaridin Triallate
Chromenones	Brodifacoum Bromadiolone Difethialone Rotenone Warfarin
Cyclohexanedione Oximes	Clethodim Sethoxydim Tepraloxydim Tralkoxydim
Diazines	Aminocyclopyrachlor 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 Alkyl-1,3-propylene diamine acetates 1-alkyl(C6-C18)-1,3-propanediamine Alkanolamine salts of fatty acids Ammonium salt of fatty acid 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] Sodium lauryl sulfate Soap (non-specific) Potassium salts of fatty acids Soap (herbicidal) Triethanolamine salts of fatty acids Tributyl tetradecyl phosphonium chloride Triglyceride ethoxylate 10 POE 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 Cyflumetofen Clopyralid Fluroxypyr (present as 1-methylheptyl ester) Halauxifen-methyl 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 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 copper octanoate) 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 micro 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	Aluminum phosphide Ammonium bromide Arsenic pentoxide Ammonia (present as ammonium sulfate) Barium metaborate monohydrate Borax pentahydrate Borax Boracic acid (boric acid) Disodium octaborate tetrahydrate Borax or sodium borate Available chlorine, present as calcium hypochlorite Chromic acid Borax or disodium tetraborate decahydrate 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 gel (amorphous) Silicon dioxide (present as 100% diatomaceous earth) - salt water fossils Sulphur Lime sulphur or calcium polysulphide Zinc borate
Methoxyacrylates	Azoxystrobin Fluoxastrobin Kresoxim-methyl Pyraclostrobin Picoxystrobin Trifloxystrobin



Chemical Group	Active Ingredient Name
Microbials	<p><i>Agrobacterium radiobacter</i> <i>Aureobasidium pullulans</i> DSM 14940 <i>Aureobasidium pullulans</i> DSM 14941 <i>Aureobasidium pullulans</i> DSM 14940 and DSM 14941 Baculovirus: nucleopolyhedrovirus <i>Autographa californica</i> (AcMNPV) <i>Beauveria bassiana</i> strain ANT 03 <i>Bacillus firmus</i> I-1582 <i>Beauveria bassiana</i> strain GHA <i>Beauveria bassiana</i> strain HF23 <i>Bacillus amyloliquefaciens</i>, strain D747 <i>Pseudomonas fluorescens</i> A506 <i>Pseudomonas syringae</i> - strain ESC-10 <i>Pseudomonas fluorescens</i> CL145A <i>Bacillus subtilis</i> QST 713 <i>Bacillus subtilis</i> (strain GB03) <i>Bacillus subtilis</i> MB1600 <i>Bacillus subtilis</i> var. <i>amyloliquefaciens</i> strain FZB24 <i>Bacillus thuringiensis</i> Berliner spp. <i>kurstaki</i> <i>Bacillus thuringiensis</i> serotype H-14 <i>Bacillus sphaericus</i> <i>Bacillus thuringiensis</i> sp. <i>tenebrionis</i> <i>Bacillus thuringiensis</i> ssp. <i>aizawai</i> <i>Coniothyrium minitans</i> strain CON/M/91-08 <i>Cydia pomonella</i> granulovirus (strain M) <i>Cydia pomonella</i> granulosis virus (strain CMGV4) <i>Chondrostereum purpureum</i> (strain: North American; pathovar: PFC2139) Fungus: <i>Gliocladium catenulatum</i> <i>Sclerotinia minor</i> IMI 3144141 <i>Trichoderma harzianum</i> strain KRL-AG2 <i>Lactobacillus casei</i> strain LPT-111 <i>Lactobacillus rhamnosus</i> strain LPT-21 <i>Lactococcus lactis</i> ssp. <i>lactis</i> strain LL64/CSL <i>Lactococcus lactis</i> ssp. <i>cremoris</i> strain M11/CSL <i>Lactococcus lactis</i> ssp. <i>lactis</i> strain LL102/CSL <i>Metarhizium anisopliae</i> (strain F52) <i>Phoma macrostoma</i> <i>Neodiprion abietis</i> nucleopolyhedrovirus <i>Nosema locustae</i> canning (spore of) Nucleopolyhedrovirus for gypsy moth larvae Nuclear polyhedrosis virus of red-headed pine sawfly Nucleopolyhedrovirus for Douglas-fir tussock moth <i>Pantoea agglomerans</i> C9-1 <i>Pantoea agglomerans</i> strain E325 (NRRL B-21856) <i>Phlebiopsis gigantea</i> <i>Paecilomyces fumosoroseus</i> strain FE 9901 <i>Pasteuria nishizawae</i> Pn1 <i>Streptomyces acidiscabies</i> strain RL-110T cells and spent fermentation media <i>Streptomyces griseoviridis</i> strain K61</p>



Chemical Group	Active Ingredient Name
	<i>Streptomyces lydicus</i> strain WYEC 108 <i>Trichoderma asperellum</i> , strain T34 <i>Trichoderma virens</i> strain G-41 <i>Trichoderma harzianum</i> Rifai strain T-22 <i>Clavibacter michiganensis</i> (spp <i>michiganensis</i>) bacteriophage <i>Typhyla phacorhiza</i> (strain 94671) <i>Verticillium albo-atrum</i> isolate WCS850
Morpholines & Oxathiines	Dimethomorph Fenpropimorph Oxycarboxin Carbathiin Spiroxamine
Nitrobenzenes	Acifluorfen-sodium Dichloran Fomesafen Tembotrione Mesotrione Oxyfluorfen Quintozene
Oils, Minerals And Vegetable	Oil of black pepper Citronella oil Clove oil Castor oil Oil of geranium Garlic oil D-limonene Lemon oil Mineral oil- paraffin base (adjuvants) Mineral oil Methylated seed oil of soybean Verbenone Pine needle oil Thymol Soybean oil Thyme 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 dihydrate Oxalic acid



Chemical Group	Active Ingredient Name
	Peracetic acid Prohexadione calcium Natamycin Spinosad Spiromesifen Spinetoram Sodium monofluoroacetate Trinexapac-ethyl Ferric sodium EDTA
Organochlorines	Chloropicrin Paradichlorobenzene
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 <i>Brassica hirta</i> white mustard seed powder BLAD polypeptide Bis(trichloromethyl)sulfone Cellulose (from powdered corn cobs) 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 Putrescent whole egg solids Dried eggs Endothall or endothal Ethofumesate Eucalyptus oil Fish meal mixture Fish oil mixture Garlic powder Garlic juice Oxirane derivatives (50% minimum) Liquid corn gluten Methylene bis(thiocyanate) 1-MCP



Chemical Group	Active Ingredient Name
	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 <i>Reynoutria sachalinensis</i> Sodium alpha-olefin sulfonate Saponins of <i>Chenopodium quinoa</i>
Phenols/Chlorophenols	2-bromo-4'-hydroxyacetophenone 2-phenylphenol 2-phenylphenol (present as sodium salt) Pentachlorophenol plus related active chlorophenols From nanogen: chlorocresol (or: parachlorocresol) 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) 2,4-D present as choline salt 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, present as butoxyethyl ester



Chemical Group	Active Ingredient Name
Pheromones	E-8-dodecenyl 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 Pheromone pine shoot borer (E,Z)-3,13-octadecadienyl acetate (Z,Z)-3,13-octadecanienyl acetate R-(-)-1-octen-3-ol (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-dodecenol Z-8-dodecenyl 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 Octylbicyclo heptene 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 Momfluorothrin Tefluthrin
Pyridines	4-aminopyridine Bicyclopyrone Dithiopyr Flupyradifurone Di-n-propyl isocinchomeronate Acetamiprid Sodium omadine Pyriproxyfen Quinoxifen Sulfoxaflor Thiacloprid Flonicamid
Sulfonylureas	Chlorimuron-ethyl Chlorsulfuron Rimsulfuron Ethametsulfuron-methyl Flucarbazone (present as flucarbazone sodium) Foramsulfuron Halosulfuron (present as methyl ester) Iodosulfuron-methyl-sodium Mesosulfuron-methyl Metsulfuron-methyl Tribenuron-methyl Thifensulfuron-methyl Nicosulfuron Primisulfuron-methyl Prosulfuron Sulfometuron methyl Triflusulfuron-methyl



Chemical Group	Active Ingredient Name
Thiophosphates	Azamethiphos Coumaphos Diazinon Chlorpyrifos
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 Available chlorine, present as trichloro-s-triazinetrione
Triazoles	Amitrole Ametoctradin Carfentrazone-ethyl Cloransulam-methyl Difenoconazole Fenbuconazole Flutriafol 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 Thidiazuron



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 (for example, 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.