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# Pest Control Products Sales Report for 2020



*Protecting the health and  
environment of Canadians*

*Protéger la santé des Canadiens  
et l'environnement*



*Également disponible en français sous le titre :  
Rapport sur les ventes de produits antiparasitaires en 2020*

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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 (1 January to 31 December) and must be submitted by 1 June 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 provides additional context in risk assessments of pesticides, in policy development, and in identifying trends in pesticide use. For example, sales data are used in the re-evaluation and special review of pesticides to help understand the presence and value of the pesticide in the Canadian marketplace, as well as to predict 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. Sales data can also be used as an additional input in market and economic trend analyses and in the development of policies and regulatory updates.

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# Introduction

This 13<sup>th</sup> Pest Control Products Sales Report provides an overview of pesticides sold in Canada for the 2020 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

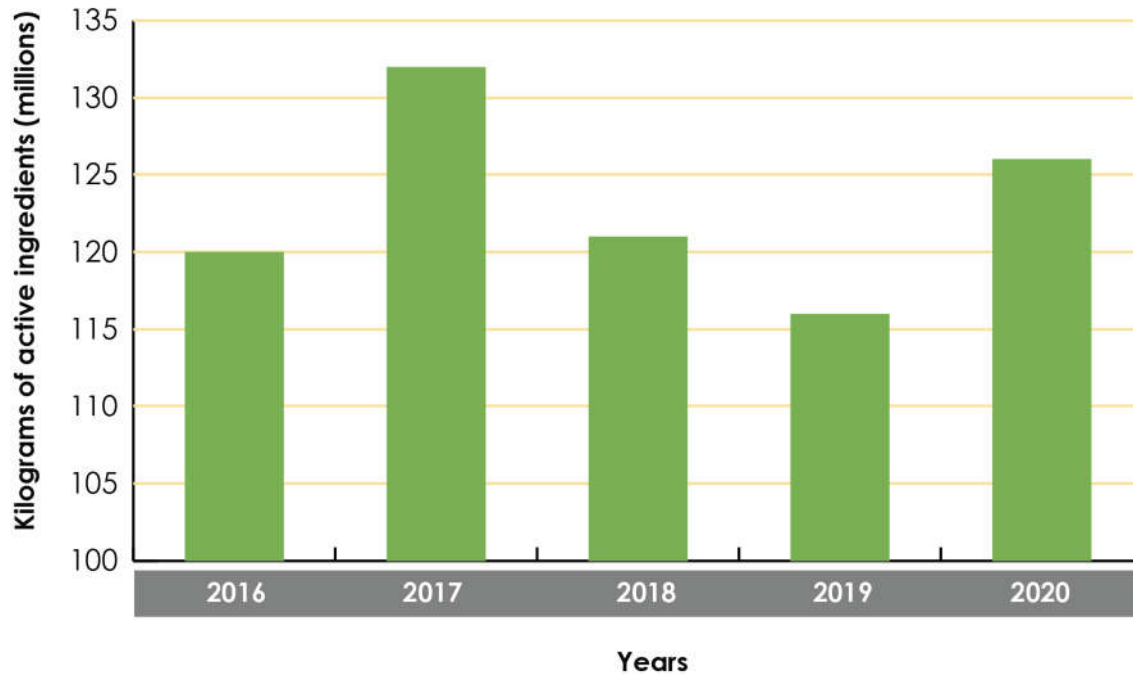
There were 7599 products registered with the PMRA for use in Canada in the 2020 calendar year. Registrants submitted sales data in different units depending on the product (for example, kilograms, litres). To standardize across varying products, the data have been converted into kilograms of active ingredient (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 2714 products reported as sold, the overall pesticide sales in Canada in 2020 were 126 439 815 kg a.i., which is an 8.4% increase from the 116 605 281 kg a.i. sold in 2019 (Figure 1). After decreases in the last two years, there was a return to quantities previously seen in 2017. Changes in overall pesticide sales are driven by changes in agricultural herbicide sales.

**Figure 1**

## Quantity of Pesticides Sold in Canada (2016-2020)



In 2020, the 50 products with the greatest sales accounted for 71% of the total kg a.i. sold in Canada (89 711 810 kg a.i.). This was an increase in the overall quantity from 2019, where the top 50 products accounted for 82 263 883 kg a.i. of total sales. The top 10 active ingredients sold, presented in decreasing order of quantity in Table 1, made up 71.9% of total sales (90 847 825 kg a.i.). A comprehensive list with the rankings for all active ingredients sold in Canada in 2020 is provided in Appendix I. Seven active ingredients have remained on the top 10 list over the past five years (since 2016): glyphosate, available chlorine, present as sodium hypochlorite, borates, creosote, 2,4-D, surfactant blend, and glufosinate ammonium.

**Table 1 Top 10 active ingredients sold in Canada in 2020**

Active ingredient	Product type
Glyphosate	Herbicide
Available chlorine, present as sodium hypochlorite	Antimicrobial
Borates	Insecticide/Fungicide/Antimicrobial
Creosote	Antimicrobial
Glufosinate ammonium	Herbicide
Surfactant blend	Other
2,4-D	Herbicide

Active ingredient	Product type
Hexahydro-1,3,5-tris(2-hydroxyethyl)-s-triazine	Antimicrobial
MCPA	Herbicide
Corn gluten meal	Herbicide

## 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 collection began, followed by Non-agricultural sector products and Domestic sector products. In 2020, 72.4% of pesticide sales in Canada were of Agricultural sector products (see Figure 2), whereas 23.2% were of Non-agricultural sector products and 4.3% were of Domestic sector products. The relative sales of products in the Agricultural sector increased between 2019 and 2020 (increasing from 66% to 72%), while the Non-agriculture sector decreased from 28% to 23%, and the Domestic sector decreased from 2019 to 2020 (decreasing from 6% to 4%) (see Figure 3 for data from 2016 to 2020).

Figure 2

## Quantity of Pesticides Sold in Canada in 2020 by Sector

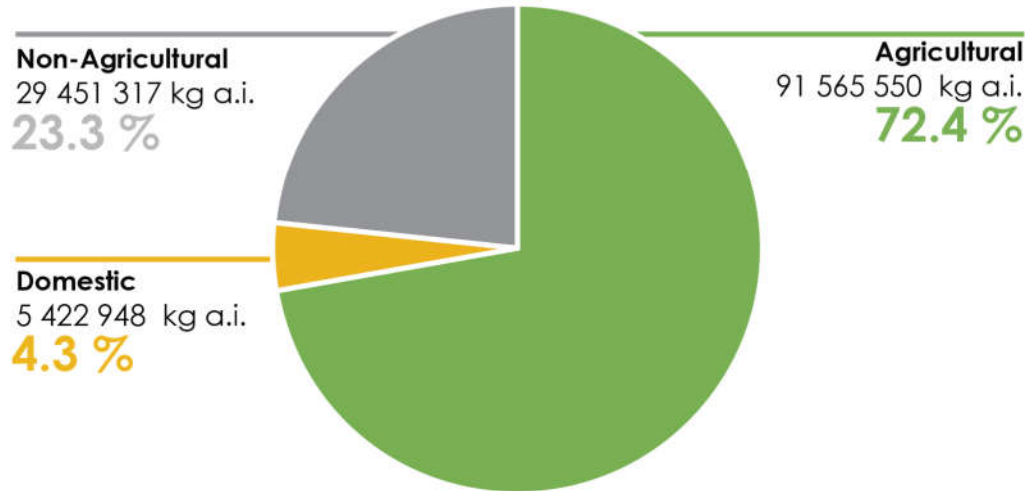
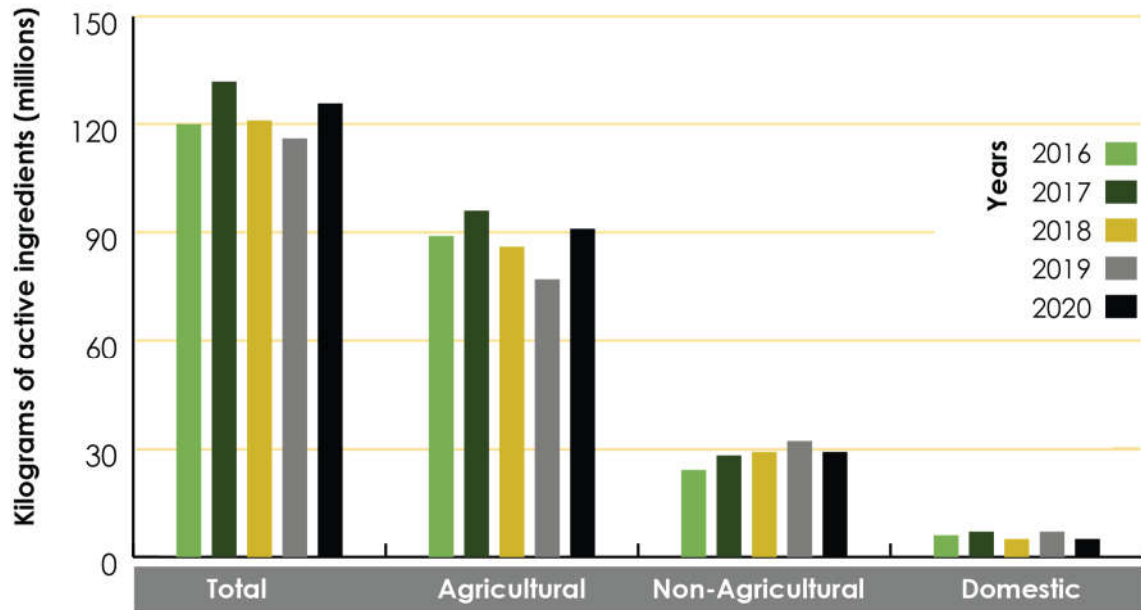


Figure 3

## Quantity of pesticides sold in Canada by sector (2016-2020)



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



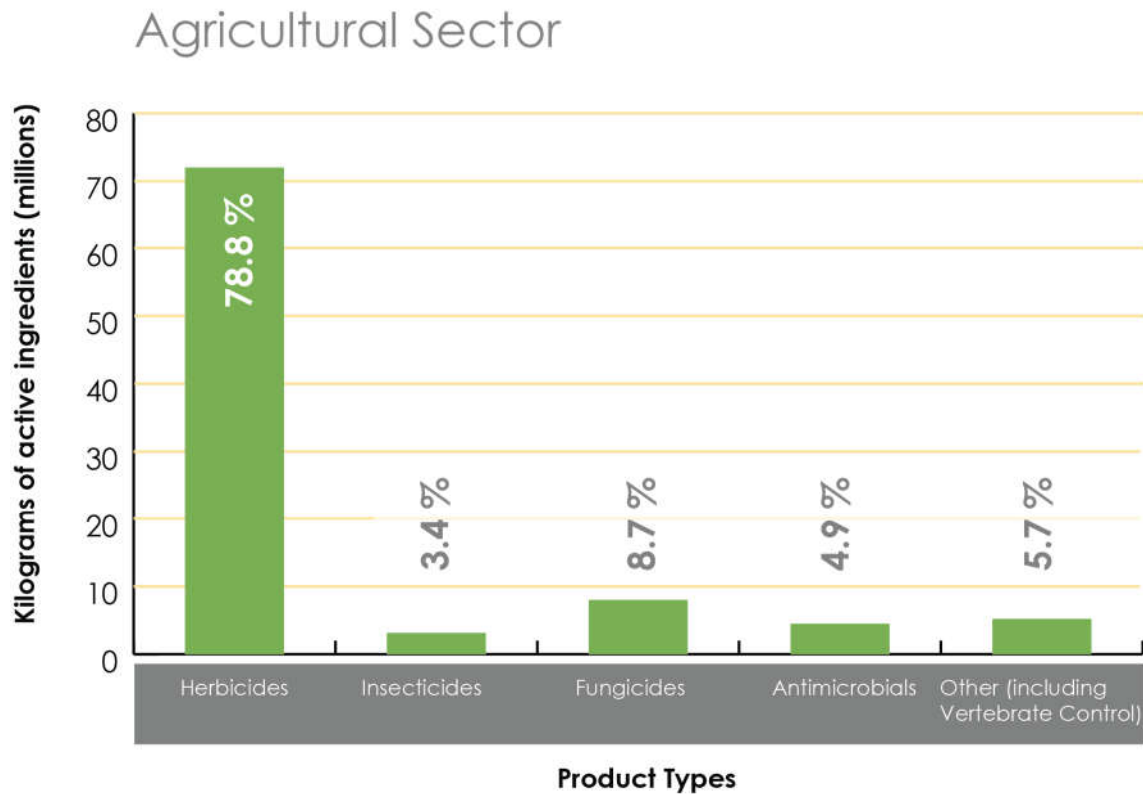
reporting does not collect data on the relative amount of a product used for a specific label use, the data may not necessarily be separated into only one product type. This means that there may be overlap between the product type groupings and these numbers should not be summed to obtain total quantities sold in Canada in 2020, as an over-reporting would occur.

## Agricultural sector

Products with agricultural uses accounted for 72.4 % of pesticide sales in Canada in 2020. There was an 18% increase in Agricultural sector pesticide sales from 2019 (77 546 092 kg a.i.) to 2020 (91 565 550 kg a.i.).

Herbicides accounted for 78.8% of Agricultural sector pesticide sales, followed by fungicides (8.7%), insecticides (3.4%), antimicrobials (4.5%), and others (5.2%) (Figure 4). Vertebrate controls (0.03%) accounted for very small quantities of agricultural pesticides sold in 2020 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**



The top 10 active ingredients sold with agricultural uses are shown in Table 2 in decreasing order of quantity. 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 79.8% of the Agricultural sector pesticides sold. Seven active ingredients have remained in the top 10 over the last five years: glyphosate, available chlorine, present as sodium hypochlorite, 2,4-D, MCPA, glufosinate ammonium, mineral oil, and surfactant blend.

**Table 2 Top 10 active ingredients sold in Canada in 2020 in the Agricultural sector**

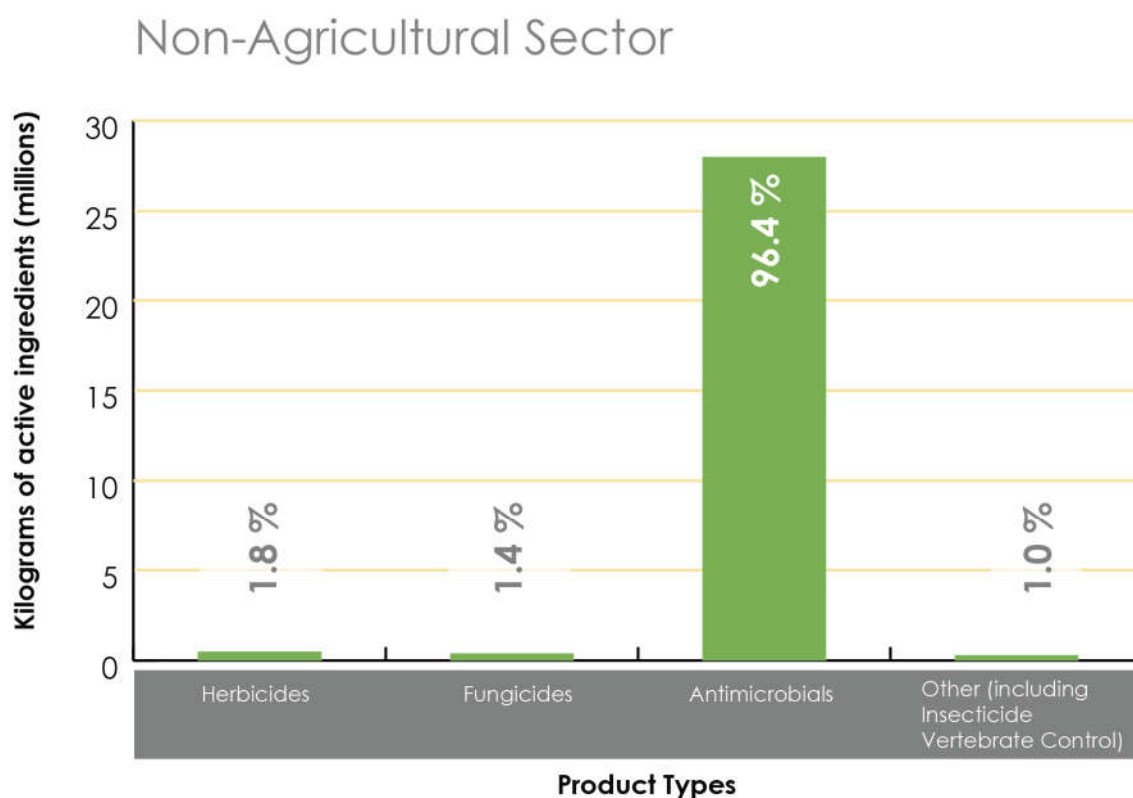
Active ingredient	Product type
Glyphosate	Herbicide
Available chlorine, present as sodium hypochlorite	Antimicrobial
Glufosinate ammonium	Herbicide
Surfactant blend	Other
2,4-D	Herbicide
MCPA	Herbicide
Mancozeb	Fungicide
Bromoxynil	Herbicide
Mineral oil	Insecticide/Fungicide/Other
S-metolachlor and R-enantiomer	Herbicide

## Non-agricultural sector

Commercial products with non-agricultural uses accounted for 23.3% of all pesticides sold in Canada in 2020 (compared to 27.7% in 2019). Non-agricultural sector pesticide sales decreased 8.8% from 2019 to 2020 (from 32 310 381 kg a.i. to 29 451 317 kg a.i.). Small fluctuations (increases and decreases) with Non-Agriculture sector sales are seen from year to year with the exception of 2012 when a large decrease was seen.

Antimicrobials accounted for 96.4% of Non-agricultural sector sales followed by herbicides (1.8%), fungicides (1.4%), insecticides (0.6%), vertebrate control (0.2%), and others (0.1%) (Figure 5). These last four product types were combined in the figure due to the low quantities of pesticides sold. 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 97.7%).

**Figure 5**



The top 10 active ingredients sold with Non-agricultural sector uses were antimicrobials. These are presented in Table 3 in decreasing order of quantity. 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 87.1% 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, creosote, chromic acid, glutaraldehyde, borates, and copper as elemental.

**Table 3 Top 10 active ingredients sold in Canada in 2020 in the Non-agricultural sector**

Active ingredient	Product type
Available chlorine, present as sodium hypochlorite	Antimicrobial
Borates	Antimicrobial/Insecticide/Fungicide
Creosote	Antimicrobial
Hexahydro-1,3,5-tris(2-hydroxyethyl)-s-triazine	Antimicrobial
Copper as elemental	Antimicrobial/Herbicide/Fungicide
Glutaraldehyde	Antimicrobial
Pentachlorophenol	Antimicrobial

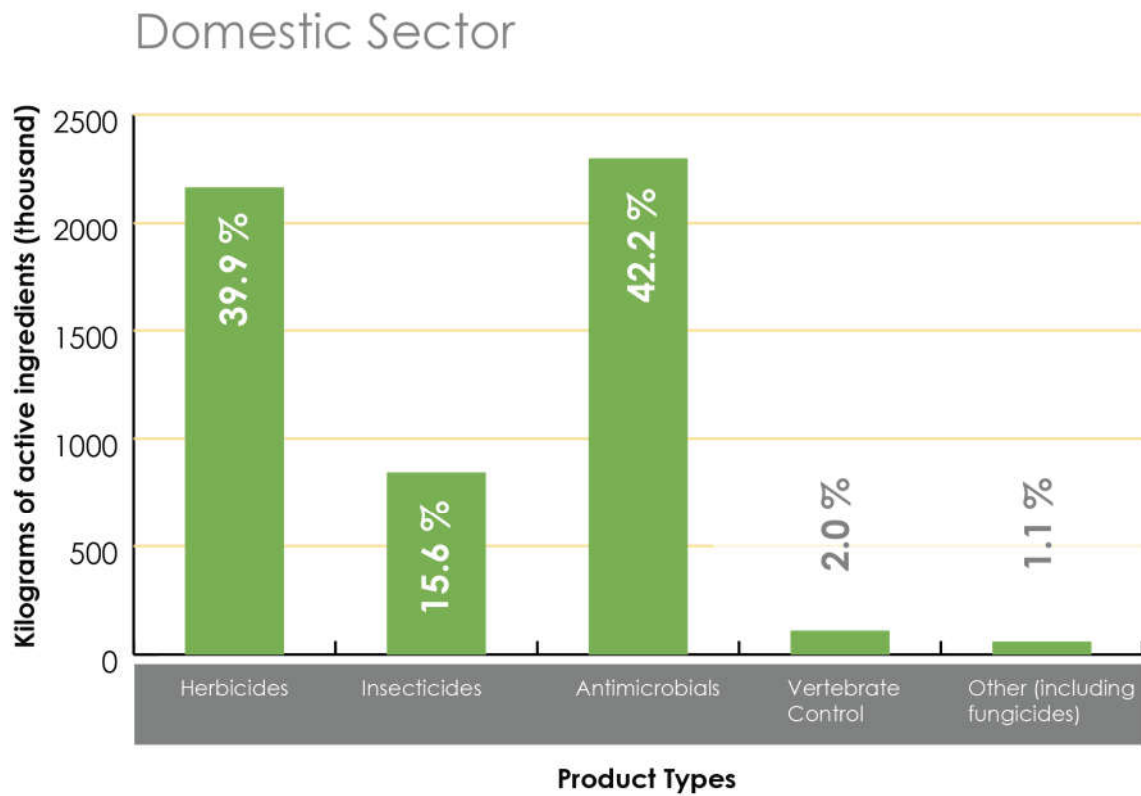
Active ingredient	Product type
Chromic acid	Antimicrobial
Alkyl-1,3-propylene diamine acetates	Antimicrobial
Arsenic acid	Antimicrobial

## Domestic sector

The Domestic Class products accounted for 4.3% of overall pesticide sales in Canada for 2020. There was a 19.6% decrease from 2019 (6 748 808kg a.i.) to 2020 (5 422 948 kg a.i.) in Domestic sector pesticide sales. Changes from year to year in the Domestic sector may be dependent on changes in regional regulations (for example, restrictions at the municipal or provincial level), as well as changes in weather (for example, hot and sunny summers may result in increased sales of swimming pool and spa products) and changes in the marketing strategies of specific products.

Antimicrobial products accounted for 42.4% of domestic pesticides sold in Canada (Figure 6) (mainly sales of swimming pool and spa products) followed by herbicides (39.9%), insecticides (15.6%), vertebrate controls (2%), fungicides (1%), and "other" products (0.04%). These last two product types were combined in Figure 6. The Domestic sector has seen fluctuation from year to year in the product-type groupings.

Figure 6



The top 10 active ingredients sold for use in the Domestic sector are from four product type groups: antimicrobials, herbicides, vertebrate control, and insecticides. They are presented in Table 4 in decreasing order of quantity. These active ingredients accounted for 90.5% of the Domestic sector pesticides sold. Of the top 10 products, five are used for swimming pools and spas. Seven active ingredients have remained in the top 10 over the last five years: corn gluten meal, available chlorine, present as trichloro-s-triazinetrione, alkyl (40% C12, 50% C14, 10% C16) dimethylbenzylammonium chloride, poly[oxyethylene(dimethyliminio)ethylene(dimethyliminio)ethylene dichloride], DEET, available chlorine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins, and available bromine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins.

**Table 4 Top 10 active ingredients sold in Canada in 2020 in the Domestic sector**

Active ingredient	Product type
Corn gluten meal	Herbicide
Available chlorine, present as trichloro-s-triazinetrione	Antimicrobial
Available bromine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins	Antimicrobial
Poly[oxyethylene(dimethyliminio)ethylene (dimethyliminio)ethylene dichloride]	Antimicrobial
Alkyl (40% C12, 50% C14, 10% C16) dimethylbenzylammonium chloride	Antimicrobial
Silicon dioxide	Insecticide
DEET*	Insecticide
Paradichlorobenzene	Insecticides
Available chlorine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins	Antimicrobial
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 2020, as an over-reporting would occur.

## Herbicides

Herbicides accounted for 59.2% (74 885 409 kg a.i.) of all pesticides sold in Canada in 2020. This is an increase from 2019 when herbicides accounted for 53.2% of all pesticides sold. This translates into an increase of 20.8% in the quantities of herbicides sold from 2019 (61 985 371 kg a.i.) to 2020 (74 885 409 kg a.i.).

The top 10 herbicides sold in 2020, as listed in Table 5 in decreasing order of quantity, accounted for 90.2% of all herbicide sales in Canada and 59.2% of all pesticide sales. Seven active ingredients have remained in the top 10 over the last five years: glyphosate, glufosinate ammonium, 2,4-D, MCPA, corn gluten meal, bromoxynil, and S-metolachlor and R-enantiomer.

**Table 5 Top 10 herbicide active ingredients sold in Canada in 2020**

Active Ingredient
Glyphosate
Glufosinate ammonium
2,4-D

Active Ingredient
MCPA
Corn gluten meal
Bromoxynil
S-metolachlor and R-enantiomer
Diquat
Bentazon
Fluroxypyr-meptyl

## Insecticides

Insecticides accounted for 3.3% (4 170 917 kg a.i.) of all pesticides sold in Canada in 2020. Insecticide sales have remained relatively low during the years of reporting, with the highest quantities sold in 2016 (5 744 585 kg a.i.) and the lowest in 2018 (3 836 995 kg a.i.). Many of the insecticides are used in agricultural settings, though the fifth-most sold insecticide (DEET) is used only in the Domestic sector.

The top 10 insecticides sold in 2020, as listed in Table 6 in decreasing order of quantity, accounted for 76.1% of all insecticides sales in Canada and 3.3% of pesticide sales overall. Six insecticides have remained in the top 10 during the last five years of reporting: mineral oil, hydrogen peroxide, silicon dioxide, DEET, thiamethoxam, and sulphur.

**Table 6 Top 10 insecticide active ingredients sold in Canada in 2020**

Active Ingredient
Mineral oil
Hydrogen peroxide
Sulphur
Silicon dioxide
DEET*
Chlorantraniliprole
Paradichlorobenzene
Chlorpyrifos
Borates
Thiamethoxam

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

## Fungicides

Fungicides accounted for 6.7% (8 418 177 kg a.i.) of all pesticides sold in Canada in 2020. Fungicide sales have remained relatively low throughout the reporting years, with a high in 2018 (13 724 886 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 (94.5%).

The top 10 fungicides sold in Canada in 2020, as listed in Table 7 in decreasing order of quantity, accounted for 76.5% of fungicide sales and 5.1% 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 2020**

Active ingredient
Mancozeb
Metam-sodium
Prothioconazole
Chloropicrin
Propiconazole
Sulphur
Chlorothalonil
Tebuconazole
Mono- and dibasic sodium, potassium, and ammonium phosphites
Mineral Oil

## Antimicrobials

Antimicrobials accounted for 27.8% (35 143 552 kg a.i.) of all pesticides sold in Canada in 2020. 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 2020, as listed in Table 8 in decreasing order of quantity, accounted for 87.2% of all antimicrobial sales in Canada and 24.2% 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 and as trichloro-s-triazinetriene, creosote, borates, glutaraldehyde, and copper as elemental.



**Table 8 Top 10 antimicrobial active ingredients sold in Canada in 2020**

Active ingredient
Available chlorine, present as sodium hypochlorite
Borates
Creosote
Hexahydro-1,3,5-tris(2-hydroxyethyl)-s-triazine
Copper as elemental
Available chlorine, present as trichloro-s-triazinetrione
Glutaraldehyde
Pentachlorophenol
Chromic Acid
Alkyl-1,3-propylene diamine acetates

## Vertebrate control

Vertebrate controls accounted for 0.17% (209 474 kg a.i.) of all pesticides sold in Canada in 2020. Since sales data collection began 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 of quantity, accounted for 96.6% of all vertebrate control sales in 2020 and 0.16% 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 2020**

Active ingredient
Cellulose (from powdered corn cobs)
Carbon dioxide gas
Aluminum phosphide
4-nitro-3-(trifluoromethyl)phenol or sodium salt
Sulphur
Stearic acid
Dried blood
Fish meal mixture
Zinc phosphide
Strychnine

## Others

Products fall into the “Others” type when they include uses that are not classified in any of the groups above and include adjuvants, nematocides, and molluscicides. These “other” products accounted for 4.1% (5 234 411 kg a.i.) of pesticide sales in Canada in 2020. Sales in this category have fluctuated slightly over the years of reporting, but have remained fairly low, with a high in 2016 (7 852 564 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 (99.2%).

The top 10 active ingredients sold in Canada in 2020 that fall into this type are listed in Table 10 in decreasing order of quantity and accounted for 99% of “other” type sales and 4.1% of pesticide sales overall. Eight 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, triglyceride ethoxylate, 5,5-dimethylhydantoin, methylated seed oil of soybean, and alcohols, C9-11, ethoxylated.

**Table 10 Top 10 other active ingredients sold in Canada in 2020**

Active Ingredient
Surfactant blend
Nonylphenoxypolyethoxyethanol
Triglyceride ethoxylate
Mineral oil
Methylated seed oil of soybean
Paraffin based petroleum oil
Alcohols, C9-11, ethoxylated
Polyoxyalkylated alkyl phosphate ester
Octadec-9-enoic acid
5,5-dimethylhydantoin

## Biopesticides

Biopesticides include microbial pesticides (which 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 2020, there were 192 active ingredients identified as biopesticides, which accounted for 1060 registered products.

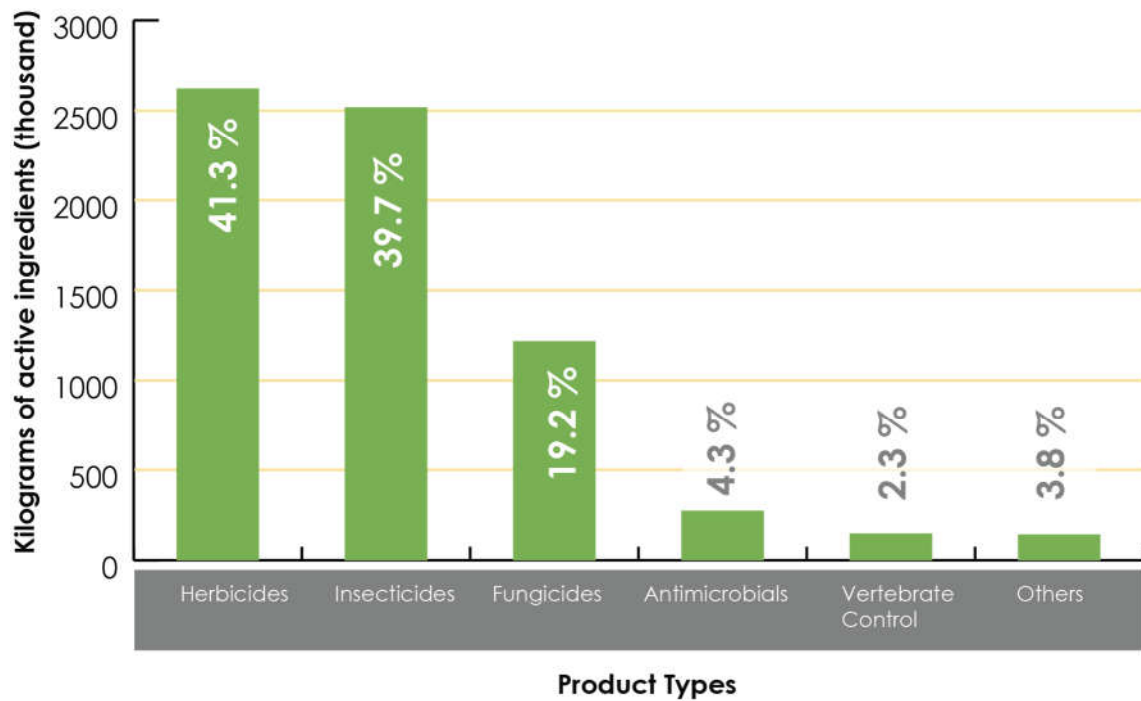
The 387 end-use biopesticide products reported as sold have been broken into two groups: 1) those products which could be converted into kg a.i. and 2) microbial products that could not be converted into kg a.i. It is important to note that biopesticide sales are represented in this

subsection in addition to being included in each individual product type section above (for example, herbicides, insecticides).

The 300 products that could be converted to kg a.i. accounted for 5.4% of total pesticide sales (6 355 173kg a.i.) in 2020. There was a 4.8% decrease in biopesticide sales from 2019 (6 672 161 kg a.i.) to 2020. The sales of biopesticides have fluctuated over the years in which data have been collected. Herbicides accounted for 41.3% of the biopesticide sales in 2020 (Figure 7), followed by insecticides (39.7%), fungicides (19.2%), antimicrobials (4.3%), “others” (3.8%), and vertebrate controls (2.3%).

**Figure 7**

### Quantity of Biopesticides Sold in Canada in 2020



The top 10 biopesticide active ingredients sold in Canada are listed in Table 11 in decreasing order of quantity. The top 10 active ingredients accounted for 90.7% of sales of biopesticides that could be converted to kg a.i. and 4.9% 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 ammonia.

**Table 11 Top 10 biopesticide active ingredient sold in Canada in 2020**

Active ingredient	Product type
Corn gluten meal	Herbicide
Mineral oil	Fungicide/Insecticide/Other

Active ingredient	Product type
Hydrogen peroxide	Herbicide/Insecticide/Fungicide/Antimicrobial
Sulphur	Fungicide/Insecticide/Vertebrate Control
Mono- and dibasic sodium, potassium, and ammonium phosphites	Fungicide
Silicon dioxide	Insecticide
Ammonia	Antimicrobial
N-decanol	Herbicide
Mono- and dipotassium phosphite	Fungicide
Soap	Herbicide/Insecticide/Fungicide

The remaining 66 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 2020 of these is listed in Table 12.

**Table 12 Quantity of microbials sold in Canada in 2020**

Units of product sold	Total
Litres (microbials)	1 544 842
Kilograms (microbials)	780 818

## 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 are aligned with the Quebec Ministry of Sustainable Development, Environment and Climate Change listings (Quebec, 2016) and are outlined in Appendix II.

In 2020, the chemical group with the largest proportion of sales was the "Phosphonic and phosphinic acids" group at 43%, followed by the "Inorganics" group at 19%. The third group was the "Phenoxy acids" at 5%. The remaining chemical groups were all under 5% and 40 out of 54 chemical groups were less than 1% of total sales. Eight chemical families remained in the top 10 from 2019 to 2020.

**Table 13 Summary of pesticide sales by chemical group (all sectors) in 2020**

Chemical grouping	Kilograms of active ingredients	Rank
Phosphonic acids, phosphinic acids	54 150 983	1
Inorganic	24 499 527	2
Phenoxy acids	6 681 559	3
Fatty acids & surfactants	5 287 416	4

Chemical grouping	Kilograms of active ingredients	Rank
Hydrocarbons	4 163 829	5
Triazines, tetrazines	3 182 440	6
Acylureas	2 787 691	7
Others	2 444 760	8
Ammoniums, quaternary	2 109 722	9
Biscarbamates	1 967 858	10
Triazoles	1 955 170	11
Oils, minerals and vegetable	1 841 282	12
Benzonitriles	1 817 070	13
Anilides	1 783 800	14
Dinitrobenzenes	1 092 290	15
Dithiocarbamates	1 005 372	16
Azoles, oxazoles, thiazoles	866 868	17
Organochlorines	XXX	18
Aldehydes	788 366	19
Thiocarbamates	XXX	20
Phenols/chlorophenols	651 359	21
Alcohols	643 773	22
Chlorotriazines	XXX	23
Benzamides	499 560	24
Methoxyacrylates	466 071	25
Cyclohexanedione oximes	444 101	26
Amides	425 274	27
Benzoic acid and derivatives	412 528	28
Aryloxyphenoxy acids	310 663	29
Guanidines	230 042	30
Carbamates	211 962	31
Urea derivatives	200 525	32
Imidazolinones	182 910	33
Pyrethroids, pyrethrins	157 447	34
Dithiophosphates	XXX	35
Organic acids	141 884	36
Halogenated organic acids	138 306	37

Chemical grouping	Kilograms of active ingredients	Rank
Nitrobenzenes	133 541	38
Thiophosphates	133 375	39
Phtalic acids	128 304	40
Morpholines and oxathiines	XXX	41
Sulfonylureas	72 693	42
Diazines	33 154	43
Pyridines	25 595	44
Phosphates	15 910	45
Organohalogens	8 414	46
Phosphoramidothioates	XXX	47
Oximes-carbamates	XXX	48
Anilines	XXX	49
Organometallics	1 031	50
Pheromones	XXX	51
Chromenones	144	52
Indanediones	XXX	53
Microbials	0	54

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

## References

Quebec. Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques. *Bilan des ventes de pesticides au Québec 2016*. Retrieved from ministry website: <http://www.mddelcc.gouv.qc.ca/pesticides/bilan/> April 2018.

## Appendix I Ranking of all active ingredients sold in Canada in 2020

Active name	Kilograms of active ingredients
Glyphosate	>50 000 000
Available chlorine, present as sodium hypochlorite	>10 000 000
Borates	>1 000 000
Creosote	
Glufosinate-ammonium	
Surfactant blend	
2,4-D	
Hexahydro-1,3,5-tris(2-hydroxyethyl)-s-triazine	
MCPA	
Corn gluten meal	
Mancozeb	
Copper as elemental	
Bromoxynil	
Mineral oil	
S-metolachlor and R-enantiomer	
Diquat	
Available chlorine, present as trichloro-s-triazinetrione	
Bentazon	>500 000
Metam-sodium	
Fluroxypyr-meptyl	
Glutaraldehyde	
Prothioconazole	
Ethalfuralin	
Chloropicrin	
Triallate	
Pentachlorophenol	
Propiconazole	
Chromic acid	
Hydrogen peroxide	
Atrazine (plus related active triazines)	
Nonylphenoxypolyethoxyethanol	
Alkyl-1,3-propylene diamine acetates	
Available bromine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins	>100 000
Sulphur	
Triglyceride ethoxylate	
Arsenic acid	

Active name	Kilograms of active ingredients
2,2-dibromo-3-nitropropionamide	
Dicamba	
Chlorothalonil	
Tebuconazole	
Alkyl (40% C12, 50% C14, 10% C16)dimethylbenzylammonium chloride	
Poly[oxyethylene(dimethyliminio)ethylene(dimethyliminio)ethylene dichloride]	
Chlormequat chloride	
Mono- and dibasic sodium, potassium, and ammonium phosphites	
Silicon dioxide	
Ammonia	
Trifluralin	
Metribuzin	
Clethodim	
Sodium bromide	
Methylated seed oil of soybean	
DEET	
N-decanol	
Available chlorine, present as calcium hypochlorite	
Paraffin based petroleum oil	
Available chlorine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins	
Trifloxystrobin	
Sodium chlorate	
Ammonium bromide	
Pinoxaden	
Boscalid	
Dimethenamid-P	
Alcohols, C9-11, ethoxylated	
Chlorantraniliprole	
Paradichlorobenzene	
Tetrakis (hydroxymethyl) phosphonium sulfate (THPS)	
Pydiflumetofen	
Sulfentrazone	
Chlorpyrifos	
Polyoxyalkylated alkyl phosphate ester	
Clodinafop-propargyl	
Mecoprop	
Thiamethoxam	
Mono- and dipotassium phosphite	
Bronopol	
Tralkoxydim	
Pyraclostrobin	



Active name	Kilograms of active ingredients
Linuron	
Azoxystrobin	
Clopyralid	
Saflufenacil	
Captan	
Acrolein	
Imazamox	
Metconazole	
Permethrin	>50 000
Soap	
Cyantraniliprole	
Pendimethalin	
Sodium chloride	
Fenoxaprop-P-ethyl	
Mesotrione	
Cellulose (from powdered corn cobs)	
Sethoxydim	
Quizalofop-P-ethyl	
Carbathiin	
3-iodo-2-propynyl butyl carbamate	
Pyroxasulfone	
Dazomet	
Oxirane derivatives (50% minimum)	
Iron	
Imazethapyr	
Ferrous sulfate monohydrate	
Pyrasulfotole	
Available chlorine, present as sodium dichloro-s-triazinetrione	
Difenoconazole	
Malathion	
Available chlorine present as 1,3-dichloro-5,5-dimethylhydantoin and 1,3-dichloro-5-ethyl-5-methylhydantoin	
Picoxystrobin	
Flumioxazin	
Metalaxyl	
Thiram	
Chlorpropham	
EPTC	
2,4-DB	
Hexazinone	
Fluxapyroxad	
Octadec-9-enoic acid	

Active name	Kilograms of active ingredients
Didecyldimethylammonium chloride	
Sodium chlorite	
Fluazinam	
1,2-benzisothiazolin-3-one	
Pyrimethanil	
Didecyldimethylammonium present as carbonate and bicarbonate salts	
Lime sulphur	
Potassium dimethyldithiocarbamate	
5,5-dimethylhydantoin	
Dimethoate	
Carbaryl	
Carbon dioxide gas	
Fomesafen	
Fosetyl-Al	
Octhilinone	
Aluminum phosphide	
Solvent (petroleum hydrocarbons)	
Triclopyr-butotyl	
Kaolin	
Carfentrazone-ethyl	
Metam-potassium	
Acetic acid	
Clothianidin	
5-chloro-2-methyl-4-isothiazolin-3-one	
Phorate	
Imidacloprid	
Maleic hydrazide	
Lambda-cyhalothrin	
Sedaxane	
Flucarbazone (present as flucarbazone-sodium)	
Phosmet	
4-nitro-3-(trifluoromethyl)phenol or sodium salt	
Fluopyram	
N-alkyl (60% C14, 30% C16, 5% C12, 5% C18)dimethyl benzyl ammonium chloride	
Carbendazim	
Florasulam	
Icaridin	
N-alkyl(68% C12, 32% C14)dimethyl ethylbenzyl ammonium chloride	
Piperonyl butoxide	
Formic acid	
Pyroxsulam	

Active name	Kilograms of active ingredients
Fludioxonil	
Potassium bicarbonate	
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	
Thiabendazole	
Garlic juice	
Oxydiethylene bis(alkyl dimethyl ammonium chloride)	
Ethephon	
Folpet	
Quinclorac	
2-methyl-4-isothiazolin-3-one	
Tribenuron-methyl	
Sulfuryl fluoride	
Canola oil	
Picloram	
Thifensulfuron-methyl	
Napropamide	
Zinc	
Formaldehyde	
4,5-dichloro-2-n-octyl-3(2H)isothiazolone	
3-decen-2-one	
Dichlobenil	
Dichlorprop	
Triticonazole	>5000
Halauxifen-methyl	
Octylphenoxypolyethoxyethanol	
Deltamethrin	
1,3-bis(hydroxymethyl)-5,5-dimethylhydantoin	
2-phenylphenol	
Aminopyralid	
Fluazifop-P-butyl	
Pyraflufen-ethyl	
Naled	
Potassium peroxymonosulfate (present as potassium peroxymonosulfate sulfate)	
Prometryne plus related active triazines	
Bicyclopyrone	
4-chloro-3-methylphenol (sodium salt)	
Propamocarb hydrochloride	
Fenamidone	
N-alkyl(67% C12, 25% C14, 7% C16, 1% C18)dimethylbenzylammonium chloride	
2,2'-(1-methyltrimethylenedioxy)bis-(4-methyl-1,3,2-dioxaborinane)	

Active name	Kilograms of active ingredients
Acephate	
Silica gel (amorphous)	
Clomazone	
Propyzamide	
Pyrethrins	
Dichlorvos	
Thiencarbazone-methyl	
Penflufen	
Daminozide	
Sulfoxaflor	
Methylene bis(thiocyanate)	
Diflufenzopyr	
Acetamiprid	
Oxyfluorfen	
Methyl bromide	
Flumetsulam	>1000
MCPB (present as sodium salt)	
Dimethomorph	
Simazine plus related active triazines	
2-(thiocyanomethylthio)benzothiazole	
Stearic acid and related fatty acids	
Aminocyclopyrachlor	
Chlorthal-dimethyl	
2-(hydroxymethyl)-2-nitro-1,3-propanediol	
2,6-diisopropyl-naphthalene	
Siloxylated polyether	
Novaluron	
Dried blood	
Thiophanate-methyl	
Rimsulfuron	
D-cis,trans-allethrin	
Topramezone	
Spirotetramat	
1,4-dimethylnaphthalene	
Spinosad	
Imazapyr	
Ametoctradin	
Fish meal mixture	
Penthiopyrad	
Fenhexamid	
Flupyradifurone	

Active name	Kilograms of active ingredients
Cypermethrin	
Peracetic acid	
D-phenothrin	
Metsulfuron-methyl	
3-(trimethoxysilyl)propyldimethyloctadecyl ammonium chloride	
Mefentrifluconazole	
Mandipropamid	
N-octyl bicycloheptene dicarboximide	
2,2-oxybis(4,4,6-trimethyl-1,3,2-dioxaborinane)	
Benzovindiflupyr	
Metalddehyde	
Indaziflam	
Nabam	
Sodium dimethyldithiocarbamate	
Ethofumesate	
Oxamyl	
Terbacil	
Trinexapac-ethyl	
Tolpyralate	
Zinc phosphide	
Methomyl	
Hydroxymethyl-5,5-dimethylhydantoin	
Garlic powder	
Streptomycin present as sulphate	
Halosulfuron (present as methyl ester)	
Chlorimuron-ethyl	
Thiacloprid	
Oil of lemon eucalyptus, hydrated, cyclized	
Flonicamid	
Methoxyfenozide	
Tetramethrin	
Metrafenone	
Tetrachlorvinphos	
Cyazofamid	
Fluoxastrobin	
Acifluorfen-sodium	
Ethylene oxide	
Naphthalene	
Caprylic acid	
1-octanol	
Tefluthrin	

Active name	Kilograms of active ingredients
Isoxatflutole	
Cyprodinil	
Acequinocyl	
Extract of <i>Reynoutria sachalinensis</i>	
Oxathiapiprolin	
Propoxycarbazone-sodium	
Ipconazole	
Strychnine	
Tembotrione	
P-menthane-3,8-diol	
Capric acid	
Dried eggs	
Dodecylguanidine hydrochloride	>500
Bifenazate	
<i>Brassica hirta</i> white mustard seed powder	
Prohexadione-calcium	
Pelargonic acid	
Butoxypolypropylene glycol	
Isofetamid	
Oil of black pepper	
Fluopicolide	
4-chloroindole-3-acetic acid	
Spiromesifen	
Fenbutatin oxide	
Amitraz	
Sodium alpha-olefin sulfonate	
Phenmedipham	
Desmedipham	
Diazinon	
Tetraniliprole	
Tea tree oil	
Magnesium phosphide	
Polyoxin D zinc salt, Polyoxorim-zinc	<500
Capsaicin	
Bromacil (present in free form, as dimethylamine salt, or as lithium salt)	
Pyridaben	
Cyflumetofen	
Nicosulfuron	
Kresoxim-methyl	
Foramsulfuron	
Azadirachtin	

Active name	Kilograms of active ingredients
Mandestrobin	
Diphenylamine	
Abamectin	
Thymol	
Meat meal mixture	
Spiroxamine	
Cymoxanil	
Related capsaicinoids	
Wintergreen oil	
Sodium 2-phenylphenate	
Diodofon	
Zoxamide	
Codlure	
10,10'-oxybis(phenoxarsine)	
Cyclaniliprole	
Etridiazole	
Natamycin	
Lactic acid	
Beta-cyfluthrin	
1-alkyl(c6-c18)-1,3-propanediamine	
Kasugamycin hydrochloride hydrate	
Cyfluthrin	
Chlorfenapyr	
Methyl nonyl ketone	
Chlorsulfuron	
Garlic oil	
Phosphine	
Cloransulam-methyl	
Afidopyropen	
Fish oil mixture	
S-methoprene	
Citric acid	
Ethametsulfuron-methyl	
Castor oil	
Fluensulfone	
From nanogen: chlorocresol (or: parachlorocresol)	
Metofluthrin	
Polybutene	
3-methyl-2-cyclohexen-1-one	
Pyriofenone	
Verbenone	

Active name	Kilograms of active ingredients
1-methylcyclopropene	
Rotenone	
Octenol	
Naphthylacetic acid	
Z-8-dodecen-1-yl acetate or Z-8-dodecenyl acetate	
6-benzylaminopurine (or: 6-benzyladenine)	
Denatonium benzoate	
Piperine	
Clove oil	
Di-n-propyl isocinchomeronate	
Flazasulfuron	
HOP beta acids, present as potassium salts	
Fenpyroximate	
Buprofezin	
Pine needle oil	
Lemon oil	
Eucalyptus oil	
Geranium oil	
1-dodecanol	
(Z)-9-dodecenyl acetate + (Z)-11-tetradecenyl acetate	
S-kinoprene	
Pyriproxyfen	
Triflurosulfuron-methyl	
Artificial grape extract	
Paclobutrazol	
Diisobutylphenoxyethoxyethyl dimethylbenzylammonium chloride	
Dinotefuran	
D-limonene	
Hydramethylnon	
Bromadiolone	
Camphor oil	
Propoxur	
Nicarbazin	
Famoxadone	
Muscalure	
Ethaboxam	
N-dialkyl(5% C12, 60% C14, 30% C16, 5% C18)methylbenzylammonium chloride	
Garlic	
1-tetradecanol	
Bispyribac-sodium	
Coumaphos	



Active name	Kilograms of active ingredients
Warfarin	
Chlorophacinone	
(Z,Z)-3,13-octadecadien-1-yl acetate	
Diphacinone (present in free form or as sodium salt)	
Difethialone	
E-8-dodecen-1-yl acetate or E-8-dodecenyl acetate	
(E,Z)-3,13-octadecadien-1-yl acetate	
Brodifacoum	
Etoxazole	
Spinetoram	
Gibberellic acid	
(9Z,12E)-9,12-tetradecadien-1-yl acetate	
Bromethalin	
Myclobutanil	
Saponins of <i>Chenopodium quinoa</i>	
Z-8-dodecen-1-ol or Z-8-dodecenol	
Aviglycine hydrochloride	
Uniconazole-P	
(Z)-11-tetradecenyl acetate	
Fenbuconazole	
Prosulfuron	
(Z)-9-tetradecen-1-yl acetate	
Ancymidol	
(Z)-11-tetradecen-1-ol	
(Z)-11-tetradecenal	
Sodium monofluoroacetate	
Flumethrin	
4-CPA	
Sodium cyanide	
Tioxazafen	
Oriental mustard seed meal	
Nucleopolyhedrovirus for Douglas-fir tussock moth	
Propylene glycol	
N-alkyl(40% C12, 50% C14, 10% C16)dimethylbenzylammonium saccharinate	
Spirodiclofen	
<i>Lactococcus lactis</i>	
Noviflumuron	
(E)-11-tetradecenyl acetate	
Oxalic acid	
Paecilomyces fumosoroseus strain FE 9901	
Isoxaben	

Active name	Kilograms of active ingredients
<i>Streptomyces acidiscabies</i> strain RL-110T cells and spent fermentation media	
<i>Streptomyces griseoviridis</i> strain K61	
<i>Lecanicillium muscarium</i> strain VE6	
<i>Streptomyces lydicus</i> strain WYEC108	
Triclopyr triethylamine salt	
Triethylene glycol	
Sodium lauryl sulfate	
Prohydrojasmon	
Metiram	
Tetraconazole	
<i>Lactobacillus rhamnosus</i> (strain LPT-21)	
Diocetyltrimethylammonium chloride	
Sulfuric acid	
<i>Verticillium albo-atrum</i> , isolate WCS850	
(E,Z)-11-tetradecenal	
<i>Nosema locustae</i> canning, (spore of)	
Mineral spirits	
3-(trihydroxysilyl)-propyldimethyloctadecyl ammonium chloride	
Soybean oil	
<i>Trichoderma asperellum</i> , strain T34	
<i>Neodiprion abietis</i> nucleopolyhedrovirus	
1R-trans prallethrin	
Pyrazon	
<i>Trichoderma virens</i> strain G-41	
N-alkyl(25% C12, 60% C14, 15% C16)dimethylbenzylammonium chloride	
Thidiazuron	
Liquid corn gluten	
Momfluorothrin	
Triforine	
<i>Pantoea agglomerans</i>	
Mefenpyr	
3-ketopetromyzonol-24-sulfate, ammonium salt	
Paraquat	
Pepino mosaic virus, strain CH2, isolate 1906	
Sodium fluoride	
Paraformaldehyde	
<i>Phlebiopsis gigantea</i>	
Octyldecyldimethylammonium chloride	
Sulfometuron methyl	
Sodium omadine	
Pethoxamid	

Active name	Kilograms of active ingredients
Mild pepino mosaic virus	
Tebufenozide	
Picolinafen	
(Z,Z)-3,13-octadecadien-1-ol	
Quintozene	
<i>Metarhizium anisopliae</i> (strain F52)	
<i>Lactobacillus casei</i> strain LPT-111	
R-(-)-1-octen-3-ol	
<i>Phoma macrostoma</i>	
Oxadiazon	
Mesosulfuron-methyl	
Iprodione	
Nucleopolyhedrovirus for gypsy moth larvae	
Petroleum hydrocarbon blend	
Methyl salicylate	
<i>Clavibacter michiganensis</i> (spp <i>michiganensis</i> ) bacteriophage	
Ziram	
Nuclear polyhedrosis virus of red-headed pine sawfly	
<i>Pasteuria nishizawae</i> PN1	
(Z)-8-dodecenyl acetate + (E)-8-dodecenyl acetate + (Z)-8-dodecen-1-ol	
(E,E)-8,10-dodecadien-1-ol + 1-dodecanol + 1-tetradecanol	
Tepraloxydim	
Tributyl tetradecyl phosphonium chloride	
(E)-4-tridecenyl acetate + (Z)-4-tridecenyl acetate	
L-menthol	
Available chlorine, present as lithium hypochlorite	
<i>Trichoderma harzianum</i>	
Diflubenzuron	
4-aminopyridine	
1,4-bis(bromoacetoxy)-2-butene	
1-(alkyl-amino)-3-aminopropane hydrochloride (component of AMPHO 443-31)	
Niclosamide	
<i>Bacillus mycoides</i> isolate J	
Alkyl(C12-C16)dimethylamine oxide	
<i>Bacillus amyloliquefaciens</i>	
Inpyrfluxam	
<i>Bacillus firmus</i> strain I-1582	
<i>Coniothyrium minitans</i> strain CON/M/91-08	
Dodine	
Bensulide	
German cockroach extract	

Active name	Kilograms of active ingredients
1,2-dibromo-2,4-dicyanobutane	
1-(alkyl-amino)-3-carboxymethylaminopropane (component of AMPHO 443-31)	
<i>Helicoverpa armigera</i> nucleopolyhedrovirus BV-0003	
Putrescent whole egg solids	
Iodosulfuron-methyl-sodium	
Broflanilide	
<i>Aureobasidium pullulans</i>	
Endothall	
Commint oil	
(E,Z)-2,13-octadecadien-1-yl acetate	
BLAD polypeptide	
<i>Cydia pomonella</i> granulovirus	
Etofenprox	
Cloquintocet-mexyl	
<i>Bacillus sphaericus</i>	
<i>Bacillus subtilis</i>	
<i>Pseudomonas fluorescens</i>	
Citronella oil	
Imiprothrin	
Isopropyl alcohol	
(E,Z)-9-dodecenyl acetate	
(E,Z)-2,13-octadecadien-1-ol	
Racemic camphor	
Formetanate hydrochloride	
Dithiopyr	
Bifenthrin	
Imazamethabenz-methyl	
Available chlorine present as trichloro-s-triazinetrione and sodium dichloro-s-triazinetrione	
1-(3-chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride	
Ferrous sulfate heptahydrate	
Fenpropimorph	
3-chloro-p-toluidine hydrochloride	
Fenprothrin	
Cyprosulfamide	
<i>Pseudomonas syringae</i> - strain ESC-10	
Benzyl benzoate	
Azamethiphos	
<i>Beauveria bassiana</i>	
Clofentezine	
Fungus: <i>Gliocladium catenulatum</i>	
N-coco-alkyltrimethylene diamines present as monobenzoate salt	

Active name	Kilograms of active ingredients
<i>Agrobacterium radiobacter</i>	
Flutriafol	
<i>Bacillus licheniformis</i> strain FMCH001	
Citronella terpene	
Amitrole	
Cyphenothrin	
Flufenacet	
Acibenzolar-s-methyl	
Tau-fluvalinate	
<i>Chondrostereum purpureum</i> (strain: North American; pathovar: PFC2139)	
(ACMNPV) cabbage looper	
Bixafen	
Diuron	
Cyromazine	
<i>Bacillus thuringiensis</i>	
Alcohol anhydrous	
Pymetrozine	

## Appendix II Chemical groups and active ingredients – 2020

Chemical group	Active ingredient name
Acylureas	<p>Bromacil (present in free form as dimethylamine salt or as lithium salt)</p> <p>Available chlorine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins</p> <p>Available bromine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins</p> <p>Bentazon (present as sodium salt)</p> <p>Bentazone</p> <p>Cymoxanil</p> <p>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</p> <p>Available chlorine present as 1,3-dichloro-5,5-dimethylhydantoin and 1,3-dichloro-5-ethyl-5-methylhydantoin</p> <p>Diflubenzuron</p> <p>Iprodione</p> <p>Noviflumuron</p> <p>Novaluron</p> <p>Saflufenacil</p> <p>Terbacil</p> <p>Available chlorine, present as trichloro-s-triazinetriene</p> <p>Hexazinone</p>
Alcohols	<p>Alcohols, C9-11, ethoxylated</p> <p>Bronopol</p> <p>Butoxypolypropylene glycol</p> <p>Alcohol anhydrous</p> <p>Ethylene oxide</p> <p>N-decanol</p> <p>1-octanol</p> <p>Tetrakis (hydroxymethyl) phosphonium sulphate (THPS)</p> <p>Isopropyl alcohol</p> <p>Octenol</p> <p>Oil of lemon eucalyptus, hydrated, cyclized</p> <p>P-menthane-3,8-diol</p> <p>Propylene glycol</p> <p>Siloxyated polyether</p>

Chemical group	Active ingredient name
	Saponins of <i>Chenopodium quinoa</i> Triethylene glycol 2-(hydroxymethyl)-2-nitro-1,3-propanediol
Aldehydes	Formaldehyde Glutaraldehyde Metaldehyde Paraformaldehyde
Amides	Bixafen 2,2-dibromo-3-nitrilopropionamide Capsaicin Piperine Daminozide Isofetamid Mandipropamid Napropamide Related capsaicinoids
Ammoniums, Quaternary	Chlormequat chloride 1-(3-chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride Alkyl(C12-C16)dimethylamine oxide Denatonium benzoate Diquat Paraquat N-alkyl (25% C12, 60% C14, 15% C16) dimethylbenzylammonium chloride Alkyl (40% C12, 50% C14, 10% C16) dimethylbenzylammonium chloride N-alkyl (68% C12, 32% C14) dimethyl ethylbenzyl ammonium chloride Didecyldimethylammonium chloride N-alkyl (60% C14, 30% C16, 5% C12, 5% C18) dimethyl benzyl ammonium chloride N-alkyl (67% C12, 25% C14, 7% C16, 1% C18) dimethylbenzylammonium chloride Diisobutylphenoxyethoxyethyl dimethylbenzylammonium chloride N-alkyl (40% C12, 50% C14, 10% C16) dimethylbenzylammonium saccharinate Didecyldimethylammonium present as carbonate and bicarbonate salts Dioctyldimethylammonium chloride Octyldecyldimethylammonium chloride N-dialkyl (5% C12, 60% C14, 30% C16, 5% C18) methylbenzylammonium chloride Oxydiethylene bis(alkyl dimethyl ammonium chloride) 3-(trimethoxysilyl)-propyldimethyloctadecyl ammonium chloride 3-(trihydroxysilyl)-propyldimethyloctadecyl ammonium chloride

Chemical group	Active ingredient name
Anilides	S-Metolachlor and R-Enantiomer Niclosamide Benzovindiflupyr Boscalid 3-chloro-P-toluidine hydrochloride Dimethenamid-P Fenhexamid Flufenacet Flumioxazin Fluxapyroxad Inpyrfluxam Metalaxyl-m and s-isomer Metalaxyl Picolinafen Penflufen Penthiopyrad Pethoxamid Sedaxane Tetraniliprole
Anilines	Amitraz Diphenylamine
Aryloxyphenoxy Acids	Clodinafop-propargyl Fenoxaprop-P-ethyl Fluazifop-P-butyl Quizalofop-P-ethyl
Azoles, Oxazoles, Thiazoles	Chlorfenapyr 1,2-benzisothiazolin-3-one 4-chloroindole-3-acetic acid 4-chloroindole-3-acetic acid, present as potassium salt Carbendazim Clomazone Fluensulfone Ethaboxam Etoxazole Fenpyroximate Fludioxonil Pydiflumetofen Metconazole Oxirane derivatives (50% minimum) 2-methyl-4-isothiazolin-3-one



Chemical group	Active ingredient name
	5-chloro-2-methyl-4-isothiazolin-3-one 4,5-dichloro-2-n-octyl-3(2H)isothiazolone Tioxazafen Isoxaflutole Mefenpyr Topramezone Oethilinone Oxathiapiprolin Pinoxaden Pyrasulfotole Pyroxasulfone Spirotetramat Strychnine 2-(thiocyanomethylthio)benzothiazole Tolpyralate Etridiazole Thiabendazole
Benzamides	Broflanilide Cyantraniliprole Cyclaniliprole Cyprosulfamide DEET Fluopicolide Fluopyram Isoxaben Chlorantraniliprole Propyzamide Methoxyfenozide Tebufenozide Zoxamide
Benzoic Acid And Derivatives	Acibenzolar-s-methyl Benzyl benzoate Bispyribac-sodium Dicamba-olamine Dicamba (present as BAPMA salt) Dicamba (present as acid, amine salt, ester or sodium salt) Artificial grape extract Methyl salicylate Quinclorac

Chemical group	Active ingredient name
Benzonitriles	Bromoxynil Dichlobenil Chlorothalonil
Biscarbamates	Desmedipham Mancozeb Metiram Nabam Phenmedipham Thiram Thiophanate-methyl
Carbamates	Ammonia (present as ammonium carbamate) Propoxur Bifenazate Carbaryl Chlorpropham Famoxadone Formetanate hydrochloride 3-iodo-2-propynyl butyl carbamate Oxadiazon Propamocarb hydrochloride Icaridin Polyoxin D zinc salt, Polyoxorim-zinc
Chlorotriazines	Atrazine (plus related active triazines) Pymetrozine Simazine plus related active triazines
Chromenones	Brodifacoum Bromadiolone Difethialone Rotenone Warfarin
Cyclohexanedione Oximes	Clethodim Sethoxydim Tepaloxym Tralkoxydim
Diazines	Aminocyclopyrachlor Aminocyclopyrachlor-potassium Ancymidol 6-benzylaminopurine (or: 6-benzyladenine) Buprofezin Maleic hydrazide

Chemical group	Active ingredient name
	Pyridaben Pyrazon Triforine
Dinitrobenzenes	Bromethalin Ethalfluralin Fluazinam Pendimethalin Trifluralin
Dithiocarbamates	Dazomet 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 acids Capric acid Fatty acids Pelargonic acid Nonylphenoxypolyethoxyethanol Caprylic acid Octadec-9-enoic acid, methyl ester Octadec-9-enoic acid, ethyl ester Octylphenoxypolyethoxyethanol Polyoxyalkylated alkyl phosphate ester Poly[oxyethylene(dimethyliminio)ethylene(dimethyliminio)ethylene dichloride] Sodium lauryl sulfate Soap (non-specific) Potassium salts of fatty acids Soap (herbicidal) Stearic acid and related fatty acids Triethanolamine salts of fatty acids

Chemical group	Active ingredient name
	Tributyl tetradecyl phosphonium chloride Triglyceride ethoxylate 10 POE Surfactant blend Surfactant mixture
Guanidines	Hydramethylnon Clothianidin Cyprodinil Dinotefuran Dodine Dodecylguanidine hydrochloride Imidacloprid Pyrimethanil Streptomycin present as sulphate Thiamethoxam
Halogenated Organic Acids	Aminopyralid 1,4-bis(bromoacetoxy)-2-butene Cyflumetofen Clopypalid Halauxifen-methyl Picloram (present as potassium salts) Picloram (present as acid) Picloram (present as amine salts) Spirodiclofen
Hydrocarbons	Citronella terpene Creosote 1,4-dimethylnaphthalene 2,6-diisopropylnaphthalene 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, Others	Aluminum phosphide Ammonium bromide

Chemical group	Active ingredient name
	Arsenic acid
	Ammonia (present as ammonium sulfate)
	Borax pentahydrate
	Borax
	Boracic acid (boric acid)
	Disodium octaborate tetrahydrate
	Available chlorine, present as calcium hypochlorite
	Copper (present as cupric ammonium formate and tannate complex)
	Chromic acid
	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 picro cupric ammonium formate and tannate complex)
	Copper (present as copper oxychloride)
	Copper (present as copper hydroxide)
	Borax or disodium tetraborate decahydrate
	Fosetyl-Al
	Ferrous sulfate monohydrate
	Ferrous sulfate heptahydrate
	Ferric phosphate
	Hydrogen peroxide
	Iron (present as ferric phosphate)
	Kaolin
	Potassium peroxymonosulfate (present as potassium peroxymonosulfate) sulfate
	Available chlorine, present as lithium hypochlorite
	Mono- and dipotassium phosphite
	Magnesium phosphide
	Mono- and dibasic sodium, potassium, and ammonium phosphites
	Sodium chloride
	Phosphine
	Potassium bicarbonate

Chemical group	Active ingredient name
	<p>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  Sulfuric acid  Zinc borate  Zinc as elemental (present as zinc naphthenate)  Zinc (present as zinc oxide)  Zinc phosphide</p>
Methoxyacrylates	<p>Azoxystrobin  Fluoxastrobin  Kresoxim-methyl  Mandestrobin  Pyraclostrobin  Picoxystrobin  Trifloxystrobin</p>
Microbials	<p><i>Aureobasidium pullulans</i> DSM 14940  <i>Aureobasidium pullulans</i> DSM 14941  <i>Aureobasidium pullulans</i> DSM 14940 and DSM 14941  <i>Agrobacterium radiobacter</i>  (ACMNPV) cabbage looper  <i>Bacillus amyloliquefaciens</i> strain F727  <i>Bacillus amyloliquefaciens</i>, strain PTA-4838  <i>Beauveria bassiana</i> strain ANT 03  <i>Beauveria bassiana</i> strain PPRI 5339  <i>Bacillus subtilis</i> strain FMCH002  <i>Bacillus firmus</i> I-1582  <i>Beauveria bassiana</i> strain GHA  <i>Beauveria bassiana</i> strain HF23  <i>Bacillus licheniformis</i> strain FMCH0001  <i>Bacillus amyloliquefaciens</i>, strain D747  <i>Bacillus mycoides</i> isolate J  <i>Pseudomonas fluorescens</i> A506</p>

Chemical group	Active ingredient name
	<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> (strain BU 1814)
	<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> subsp. <i>galleriae</i> strain SDS-502
	<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>Trichoderma harzianum</i> strain KRL-AG2
	<i>Helicoverpa armigera</i> nucleopolyhedrovirus BV-0003
	<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>Lecanicillium muscarium</i> strain VE6
	<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
	Pepino mosaic virus, strain CH2, isolate 1906
	<i>Pasteuria nishizawae</i> PN1
	<i>Streptomyces acidiscabies</i> strain RL-110T cells and spent fermentation media
	<i>Streptomyces griseoviridis</i> strain K61

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 Mild pepino mosaic virus isolate VC1 <i>Verticillium albo-atrum</i> isolate WCS850 Mild pepino mosaic virus isolate VX1
Morpholines, Oxathiines	Dimethomorph Fenpropimorph Carbathiin Spiroxamine
Nitrobenzenes	Acifluorfen-sodium Fomesafen Mesotrione Oxyfluorfen Quintozene
Oils, Minerals, Vegetable	Racemic camphor Oil of black pepper Citronella oil Clove oil Canola oil Camphor oil Cornmint oil Castor oil Eucalyptus oil Fish oil mixture Geranium Oil Garlic oil D-limonene Lemon oil L-menthol Mineral oil - paraffin base (adjuvants) Mineral oil Methylated seed oil of soybean Paraffin based petroleum oil Verbenone Pine needle oil Thymol Soybean oil



Chemical group	Active ingredient name
	Tea tree oil Wintergreen oil
Organic Acids	Abamectin Acetic acid Acequinocyl Aviglycine hydrochloride Azadirachtin Citric acid Formic acid Gibberellic acid Gibberellins A4A7 HOP beta acids, present as potassium salts Iron (present as FeHEDTA) Kasugamycin hydrochloride hydrate Lactic acid Naphthylacetic acid Oxalic acid dihydrate Oxalic acid Peracetic acid Prohexadione calcium Prohydrojasmon Natamycin Spinosad Spiromesifen Spinetoram Sodium monofluoroacetate Trinexapac-ethyl Ferric sodium EDTA
Organochlorines	Chloropicrin Paradichlorobenzene
Organohalogens	1,2-dibromo-2,4-dicyanobutane Diodofon Tembotrione Methyl bromide Metrafenone Pyriofenone
Organometallics	Fenbutatin oxide 10,10'-oxybis(phenoxarsine)

Chemical group	Active ingredient name
Others	<p>Acrolein</p> <p>1-(alkyl-amino)-3-aminopropane hydrochloride (component of AMPHO 443-31)</p> <p>1-(alkyl-amino)-3-carboxymethylaminopropane (component of AMPHO 443-31)</p> <p>Solvent (petroleum hydrocarbons)</p> <p>2,2-oxybis(4,4,6-trimethyl-1,3,2-dioxaborinane)</p> <p>BLAD polypeptide</p> <p>Dried blood</p> <p><i>Brassica hirta</i> white mustard seed powder</p> <p>Cellulose (from powdered corn cobs)</p> <p>Corn gluten meal</p> <p>Carbon dioxide gas</p> <p>3-methyl-2-cyclohexen-1-one</p> <p>3-decen-2-one</p> <p>Putrescent whole egg solids</p> <p>Dried eggs</p> <p>Endothall</p> <p>Ethofumesate</p> <p>Fish meal mixture</p> <p>Garlic powder</p> <p>Garlic juice</p> <p>Garlic</p> <p>Liquid corn gluten</p> <p>Methylene bis(thiocyanate)</p> <p>1-Methylcyclopropene</p> <p>2,2'-(1-methyltrimethylenedioxy)bis-(4-methyl-1,3,2-dioxaborinane)</p> <p>Methyl nonyl ketone</p> <p>Oriental mustard seed meal</p> <p>Meat meal mixture</p> <p>Piperonyl butoxide</p> <p>Extract of <i>Reynoutria sachalinensis</i></p> <p>Sodium alpha-olefin sulfonate</p>
Oximes-carbamates	<p>Methomyl</p> <p>Oxamyl</p>
Phenols/Chlorophenols	<p>2-phenylphenol</p> <p>2-phenylphenol (present as sodium salt)</p> <p>Pentachlorophenol plus related active chlorophenols</p> <p>From nanogen: chlorocresol (or: parachlorocresol)</p> <p>4-chloro-3-methylphenol (sodium salt)</p> <p>Sodium 2-phenylphenate</p>

Chemical group	Active ingredient name
	4-nitro-3-(trifluoromethyl)phenol or sodium salt
Phenoxy Acids	<p>4-CPA</p> <p>Cloquintocet-mexyl</p> <p>2,4-DB</p> <p>Dichlorprop-P (present as dimethylamine salt)</p> <p>Dichlorprop-P</p> <p>Dichlorprop P-isomer (present as 2-ethylhexyl ester)</p> <p>2,4-D (present as acid)</p> <p>2,4-D (present as amine salts : dimethylamine salt, diethanolamine salt, or other amine salts)</p> <p>2,4-D (present as low volatile esters)</p> <p>2,4-D present as choline salt</p> <p>Fluroxypyr-meptyl</p> <p>MCPA (present as acid)</p> <p>MCPA (present as amine salts: diethanolamine, dimethylamine or mixed amines)</p> <p>MCPA (present as esters)</p> <p>MCPA (present as potassium salt or sodium salt)</p> <p>MCPB (present as sodium salt)</p> <p>MCPB (present as isomer specific)</p> <p>Mecoprop P-isomer (present as acid)</p> <p>Mecoprop-P (present as dimethylamine salt)</p> <p>Mecoprop-P (present as potassium salt)</p> <p>Mecoprop-P (present as amine salt)</p> <p>Pyraflufen-ethyl</p> <p>Triclopyr-butotyl</p> <p>Triclopyr triethylamine salt</p>

Chemical group	Active ingredient name
Pheromones	<p>E-8-dodecen-1-yl acetate or E8-dodecenyl acetate  (E,Z)-2,13-octadecadien-1-yl acetate  (E,Z)-9-dodecenyl acetate  (E,Z)-2,13-octadecadien-1-ol  German cockroach extract  S-kinoprene  3-ketopetromyazonol-24-sulfate, ammonium salt  S-methoprene  (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)-11-tetradecenol  (E,Z)-3,13-octadecadien-1-yl acetate  (Z,Z)-3,13-octadecadien-1-yl acetate  R-(-)-1-octen-3-ol  (E)-11-tetradecenyl acetate  Muscalure  (Z)-11-tetradecenol  (Z)-11-tetradecen-1-ol  (Z)-9-tetradecen-1-yl acetate  1-tetradecanol  1-dodecanol  Codlelure  Z-8-dodecen-1-ol or Z-8-dodecenol  Z-8-dodecen-1-yl acetate or Z-8-dodecenyl acetate  (Z)-11-tetradecenyl acetate  (Z,Z)-3,13-octadecadien-1-ol  (9Z,12E)-9,12-tetradecadien-1-yl acetate  (E)-4-tridecenyl acetate + (Z)-4-tridecenyl acetate</p>
Phosphates	<p>Dichlorvos plus related compounds  Tetrachlorvinphos  Naled</p>
Phosphonic Acids, Phosphinic Acids	<p>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</p>

Chemical group	Active ingredient name
Phosphoramidothioates	Acephate
Phthalic Acids	Captan Chlorthal-dimethyl Folpet N-octyl bicycloheptene dicarboximide
Pyrethroids, Pyrethrins	D-cis, trans allethrin Bifenthrin Beta-cyfluthrin Cyfluthrin Lambda-cyhalothrin Cypermethrin Cyphenothrin Deltamethrin Imiprothrin Etofenprox Fenpropathrin Flumethrin Tau-fluvalinate Tetramethrin Metofluthrin Permethrin D-phenothrin 1R-trans prallethrin Pyrethrins Momfluorothrin Tefluthrin
Pyridines	Afidopyropen 4-aminopyridine Bicyclopyrone Dithiopyr Flupyradifurone Di-n-propyl isocinchomeronate Acetamiprid Sodium omadine Pyriproxyfen Sulfoxaflor Thiacloprid Flonicamid
Sulfonylureas	Chlorimuron-ethyl Chlorsulfuron

Chemical group	Active ingredient name
	Rimsulfuron Ethametsulfuron-methyl Flucarbazone (present as flucarbazone-sodium) Foramsulfuron Flazasulfuron Halosulfuron (present as methyl ester) Iodosulfuron-methyl-sodium Mesosulfuron-methyl Metsulfuron-methyl Tribenuron-methyl Thifensulfuron-methyl Nicosulfuron Propoxycarbazine-sodium Prosulfuron Thiencarbazine-methyl Sulfometuron methyl Triflurosulfuron-methyl
Thiocarbamates	EPTC Triallate
Thiophosphates	Azamethiphos Coumaphos Diazinon Chlorpyrifos
Triazines, Tetrazines	Metribuzin Clofentezine Available chlorine present as trichloro-s-triazinetrione and sodium dichloro-s-triazinetrione Cyromazine Hexahydro-1,3,5-tris(2-hydroxyethyl)-s-triazine Indaziflam Prometryne plus related active triazines Available chlorine, present as sodium dichloro-s-triazinetrione

Chemical group	Active ingredient name
Triazoles	Amitrole Ametoctradin Cloransulam-methyl Difenoconazole Fenbuconazole Flutriafol Flumetsulam Florasulam Ipconazole Pyroxsulam Mefentrifluconazole Myclobutanil Paclobutrazol Propiconazole Prothioconazole Sulfentrazone Tebuconazole Triticonazole Tetraconazole Uniconazole-P
Urea Derivatives	Carfentrazone-ethyl Cyazofamid Diflufenzopyr Diflufenzopyr (present as sodium salt) 5,5-dimethylhydantoin 1,3-bis(hydroxymethyl)-5,5-dimethylhydantoin Diuron Linuron Hydroxymethyl-5,5-dimethylhydantoin Nicarbazin 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.



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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.

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