



Pest  
Management  
Regulatory  
Agency

# Pest Control Products Sales Report for 2021



*Protecting human health  
and the environment*



*Protéger la santé humaine  
et l'environnement*

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# Foreword

In November 2006, the Pest Control Products Sales Information Reporting Regulations came into force, making the reporting of sales information by registrants to Health Canada's Pest Management Regulatory Agency (PMRA) mandatory under the *Pest Control Products Act*.

These regulations require registrants to annually submit 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) to the Agency. 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 14<sup>th</sup> Pest Control Products Sales Report provides an overview of pesticides sold in Canada for the 2021 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

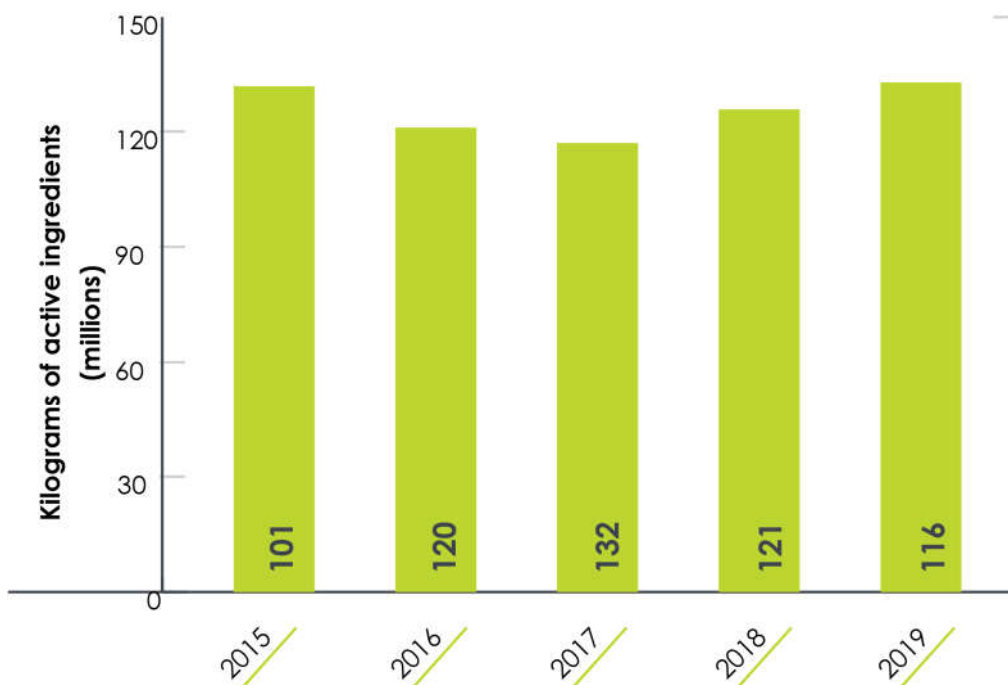
There were 7753 products registered with the PMRA for use in Canada in the 2021 calendar year. Registrants submitted sales data in different units depending on the product (for example, kilograms, litres). To standardize across varying products, the data have been converted into kilograms of active ingredient (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 2746 products reported as sold, the overall pesticide sales in Canada in 2021 were 132 885 434 kg a.i., which is an 5.1% increase from the 126 439 815 kg a.i. sold in 2020 (Figure 1). After decreases in 2018 and 2019, pesticide sales have been increasing back to levels seen in 2017. Changes in overall pesticide sales are driven by changes in agricultural herbicide sales.

**Figure 1.**

## Quantity of pesticides sold in Canada (2017–2021)



In 2021, the 50 products with the greatest sales accounted for 68% of the total kg a.i. sold in Canada (89 862 167 kg a.i.). This was a slight increase in the overall quantity from 2020, where the top 50 products accounted for 89 711 811 kg a.i. of total sales. The top 10 active ingredients sold, presented in decreasing order of quantity in Table 1, made up 62.7% of total sales (83 330 660 kg a.i.). A comprehensive list with the rankings for all active ingredients sold in Canada in 2021 is provided in Appendix I. Seven active ingredients have remained on the top 10 list over the past five years (since 2017): 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 2021**

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

## Sales information by sector

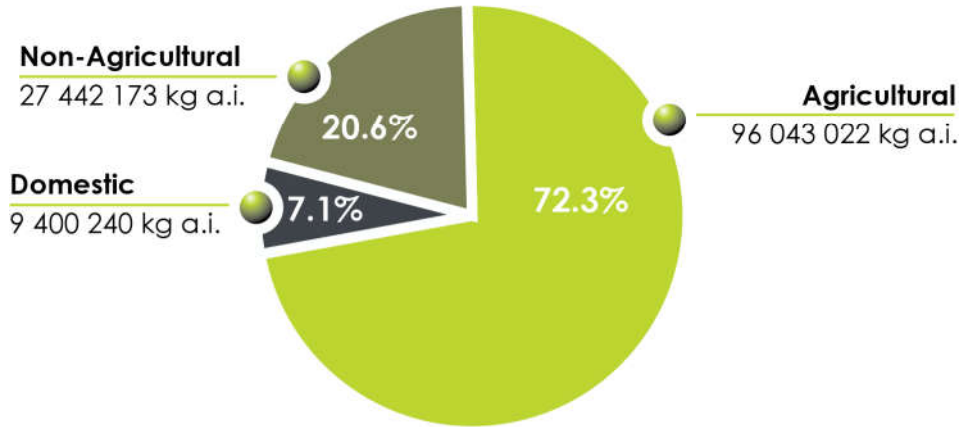
All products were grouped according to their areas of use into three sectors: Agricultural, Non-agricultural, and Domestic. (Data from each of the sectors are discussed in more detail in the following sections.)

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 2021, 72.3% of pesticide sales in Canada were of Agricultural sector products (see Figure 2), whereas 20.6% were of Non-agricultural sector products and 7.1% were of Domestic sector products. The relative sales of products in the Agricultural sector stayed the same between 2020 and 2021, while the Non-agriculture sector decreased from 23% to 21%, and the Domestic sector increased from 2020 to 2021 (increasing from 4% to 7%) (see Figure 3 for data from 2017 to 2021).

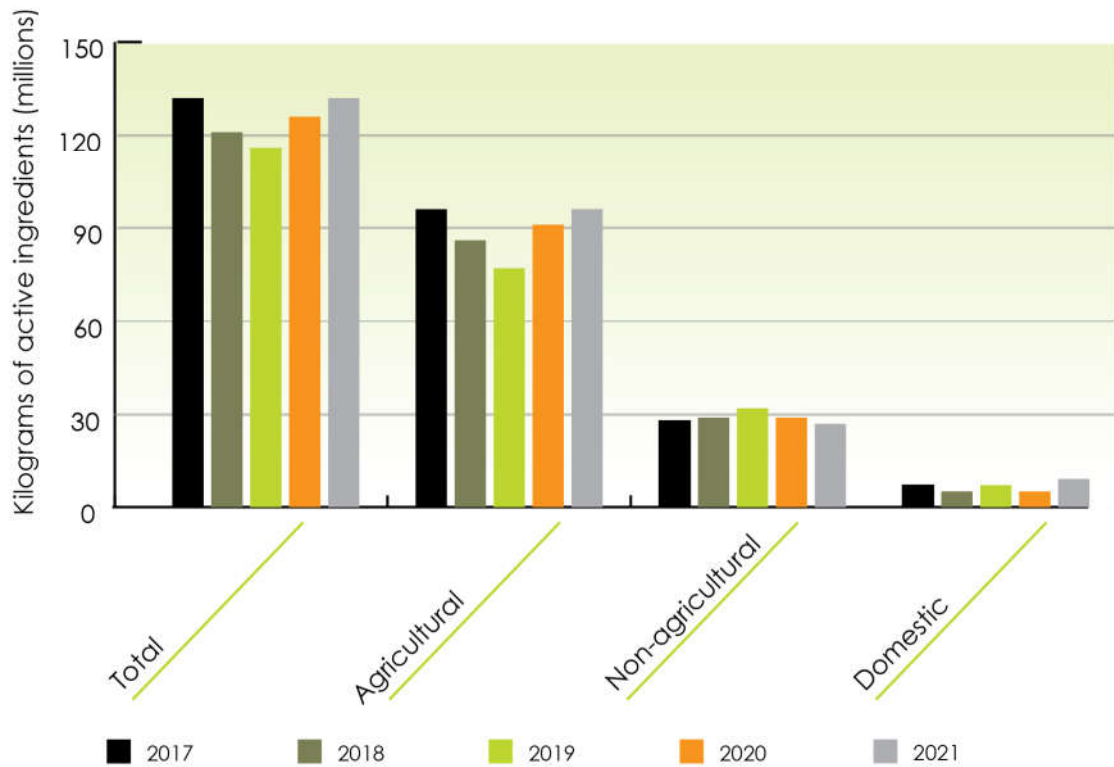
**Figure 2.**

Quantity of pesticides sold in Canada in 2021 by sector



**Figure 3.**

Quantity of pesticides sold in Canada by sector (2017-2021)





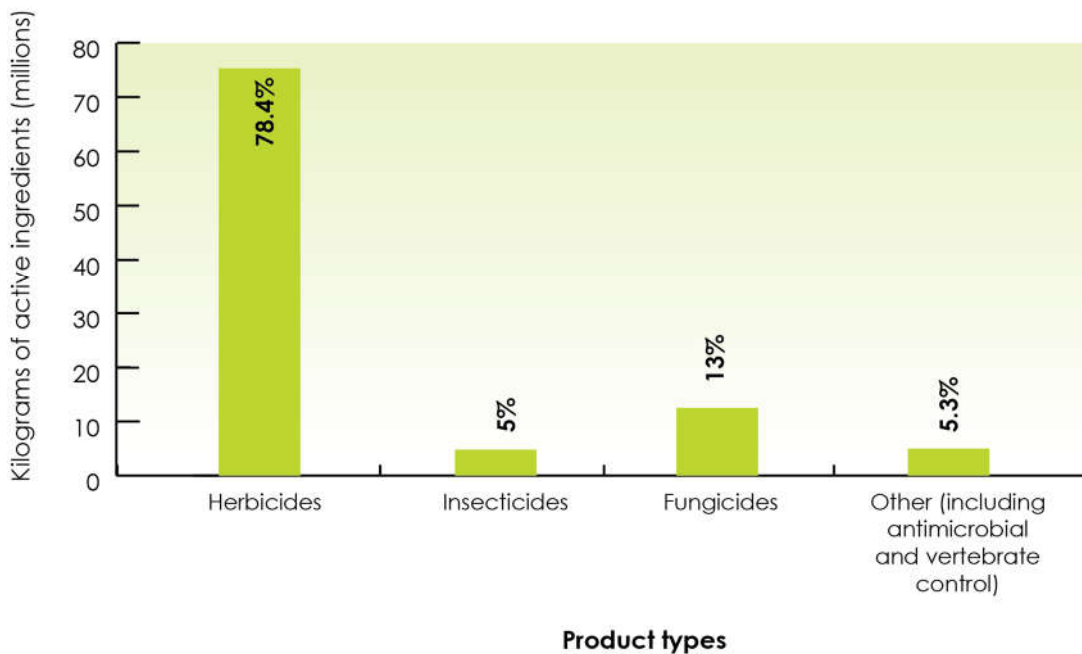
Within each sector, data were further broken down into product type groupings. These include: herbicides, insecticides, fungicides, antimicrobials, vertebrate controls, and others (for the remaining products). A product may have a number of different uses on the label. As the sales reporting does not 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 2021, as an over-reporting would occur.

## Agricultural sector

Products with agricultural uses accounted for 72.3 % of pesticide sales in Canada in 2021. There was an 4.9% increase in Agricultural sector pesticide sales from 2020 (91 565 550 kg a.i.) to 2021 (96 043 022 kg a.i.).

Herbicides accounted for 78.4% of Agricultural sector pesticide sales, followed by fungicides (13.0%), insecticides (5.0%), and others (5.1%) (Figure 4). Vertebrate controls (0.01%) and antimicrobials (0.2%) accounted for very small quantities of agricultural pesticides sold in 2021 and have been included in the “others” category. Within the Agricultural sector, sales by product type are generally consistent, with only small changes seen in the percentage of sales in each type throughout the years reported. However, in 2021, there was a large decrease in the amount of antimicrobials sold.

**Figure 4.**  
Agricultural sectors



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 73.2% of the Agricultural sector pesticides sold. Six active ingredients have remained in the top 10 over the last five years: glyphosate, 2,4-D, MCPA, glufosinate ammonium, mineral oil, and surfactant blend.

**Table 2 Top 10 active ingredients sold in Canada in 2021 in the Agricultural sector**

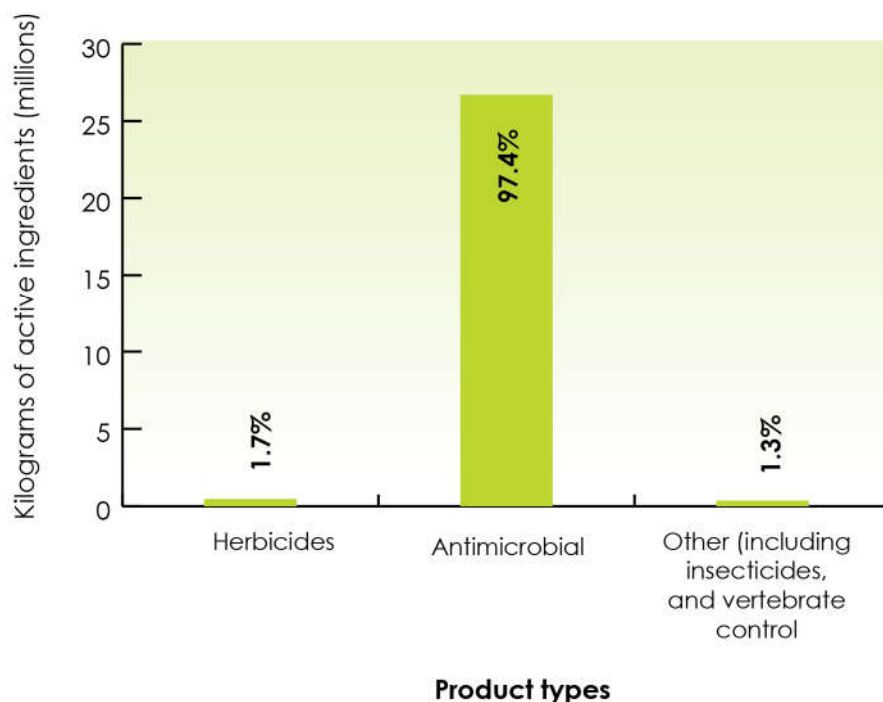
Active ingredient	Product type
Glyphosate	Herbicide
Glufosinate ammonium	Herbicide
Triallate	Herbicide
Ethalfuralin	Herbicide
Surfactant blend	Other
Chlorothalonil	Fungicide
2,4-D	Herbicide
MCPA	Herbicide
Mancozeb	Fungicide
Mineral oil	Insecticide/Fungicide/Other

## Non-agricultural sector

Commercial products with non-agricultural uses accounted for 20.6% of all pesticides sold in Canada in 2021 (the same as in 2020). Non-agricultural sector pesticide sales decreased 6.8% from 2020 to 2021 (from 29 451 317 kg a.i. to 27 442 173 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 97.4% of Non-agricultural sector sales followed by herbicides (1.7%), insecticides (0.5%), fungicides (0.4%), vertebrate control (0.3%), 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.**  
Non-agricultural sectors



The top 10 active ingredients sold with Non-agricultural sector uses were antimicrobials. These are presented in Table 3 in decreasing order of quantity. Three of the active ingredients also had other product types in addition to the antimicrobial type (copper, borates, and 2,2-dibromo-3-nitrilopropionamide). Non-agricultural sector products are used predominantly in the wood preservation industry and for water treatment. The top 10 active ingredients accounted for 87.9% of the Non-agricultural sector pesticides sold. Seven 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, alkyl-1,3-propylene diamine acetates, and copper as elemental.

**Table 3 Top 10 active ingredients sold in Canada in 2021 in the Non-agricultural sector**

Active ingredient	Product type
Creosote	Antimicrobial
Available chlorine, present as sodium hypochlorite	Antimicrobial
Borates	Antimicrobial/Insecticide/Fungicide
Copper as elemental	Antimicrobial/Herbicide/Fungicide
Pentachlorophenol	Antimicrobial
Glutaraldehyde	Antimicrobial
Alkyl-1,3-propylene diamine acetates	Antimicrobial

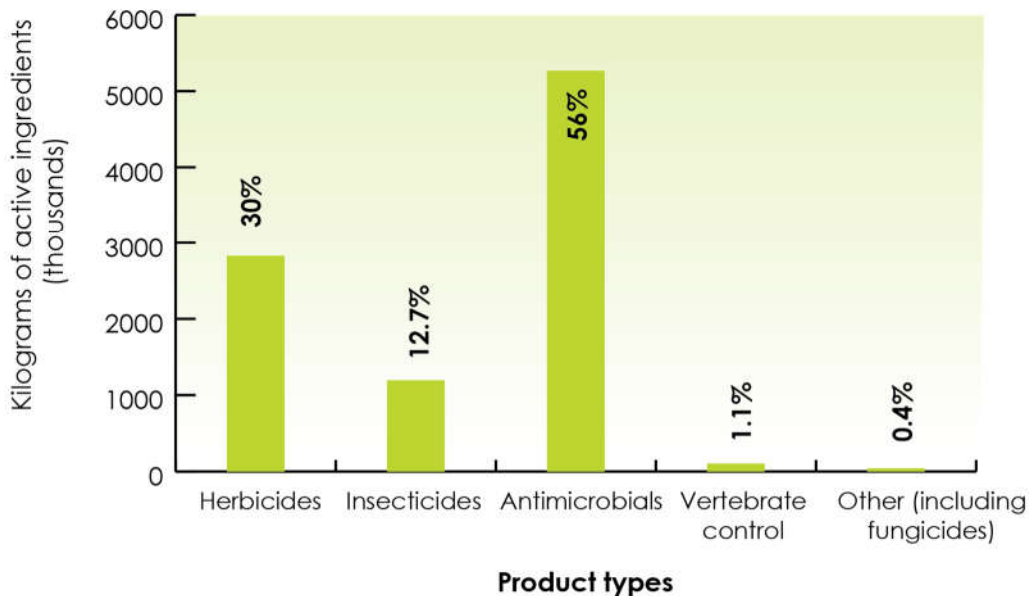
Active ingredient	Product type
2,2-dibromo-3-nitrilopropionamide	Antimicrobial/Fungicide
Chromic acid	Antimicrobial
Arsenic acid	Antimicrobial

## Domestic sector

The Domestic Class products accounted for 7.1% of overall pesticide sales in Canada for 2021. There was a 73.3% increase from 2020 (5 422 948 kg a.i.) to 2021 (9 004 240 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 56.0% of domestic pesticides sold in Canada (Figure 6) (mainly sales of swimming pool and spa products) followed by herbicides (30.1%), insecticides (12.7%), vertebrate controls (1.1%), fungicides (0.4%), and “other” products (0.03%). 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.**  
Domestic sectors



The top 10 active ingredients sold for use in the Domestic sector are from three product type groups: antimicrobials, herbicides, and insecticides. They are presented in Table 4 in decreasing order of quantity. These active ingredients accounted for 90.4% of the Domestic sector pesticides sold. Of the top 10 products, five are used for swimming pools and spas. Six 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, 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 2021 in the Domestic sector**

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

\*Since DEET is an insect repellent, it has been grouped with the insecticides. Sales information by product type.

## 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 59.1% (78 572 467 kg a.i.) of all pesticides sold in Canada in 2021. This is similar to sales in 2020 when herbicides accounted for 59.2% of all pesticides sold. This translates into an increase of 4.9% in the quantities of herbicides sold from 2020 (74 885 409 kg a.i.) to 2021 (78 572 467 kg a.i.).

The top 10 herbicides sold in 2021, as listed in Table 5 in decreasing order of quantity, accounted for 86.0% of all herbicide sales in Canada and 50.8% 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 2021**

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

## Insecticides

Insecticides accounted for 4.6% (6 144 217 kg a.i.) of all pesticides sold in Canada in 2021. Insecticide sales have remained relatively low during the years of reporting, with the highest quantities sold in 2021 (6 144 217 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 seventh-most sold insecticide (DEET) is used only in the Domestic sector.

The top 10 insecticides sold in 2021, as listed in Table 6 in decreasing order of quantity, accounted for 78.7% of all insecticides sales in Canada and 3.6% of pesticide sales overall. Five insecticides have remained in the top 10 during the last five years of reporting: mineral oil, hydrogen peroxide, silicon dioxide, DEET, and sulphur.

**Table 6 Top 10 insecticide active ingredients sold in Canada in 2021**

Active Ingredient
Mineral oil
Phosmet
Hydrogen peroxide
Paradichlorobenzene
Sulphur
Chlorpyrifos
DEET*
Silicon dioxide
Pyridaben
Cyantraniliprole

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

## Fungicides

Fungicides accounted for 9.5% (12 621 314 kg a.i.) of all pesticides sold in Canada in 2021. 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 (98.8%).

The top 10 fungicides sold in Canada in 2021, as listed in Table 7 in decreasing order of quantity, accounted for 76.9% of fungicide sales and 7.3% of pesticide sales overall. Eight of the active ingredients have remained in the top 10 in the last five years of reporting: chlorothalonil, mancozeb, metam-sodium, prothioconazole, chloropicrin, mono- and dibasic sodium, potassium, and ammonium phosphites, tebuconazole and sulphur.

**Table 7 Top 10 fungicide active ingredients sold in Canada in 2021**

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

## Antimicrobials

Antimicrobials accounted for 24.2% (32 204 924 kg a.i.) of all pesticides sold in Canada in 2021. 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 2021, as listed in Table 8 in decreasing order of quantity, accounted for 83.4% of all antimicrobial sales in Canada and 20.2% 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-triazinetrione, creosote, borates, glutaraldehyde, and copper as elemental.

**Table 8 Top 10 antimicrobial active ingredients sold in Canada in 2021**

Active ingredient
Creosote
Available chlorine, present as sodium hypochlorite
Borates
Ethanol
Copper as elemental
Available chlorine, present as trichloro-s-triazinetriene
Pentachlorophenol
Available chlorine, present as calcium hypochlorite
Glutaraldehyde
Alkyl-1,3-propylene diamine acetates

## Vertebrate control

Vertebrate controls accounted for 0.15% (195 571 kg a.i.) of all pesticides sold in Canada in 2021. 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 96.7% of all vertebrate control sales in 2021 and 0.14% 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 2021**

Active ingredient
Cellulose (from powdered corn cobs)
Carbon dioxide gas
Aluminum phosphide
Sulphur
Stearic acid
Dried blood
Fish meal mixture
Zinc phosphide
Oil of black pepper
Capsaicin

## Others

Products fall into the "Others" type when they include uses that are not classified in any of the groups above and include adjuvants, nematicides, and molluscicides. These "other" products accounted for 3.7% (4 953 398 kg a.i.) of pesticide sales in Canada in 2021. 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 2021 that fall into this type are listed in Table 10 in decreasing order of quantity and accounted for 99.5% of “other” type sales and 3.7% 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 2021**

Active ingredient
Surfactant blend
Nonylphenoxypolyethoxyethanol
Methylated seed oil of soybean
Mineral oil
Triglyceride ethoxylate
Polyoxyalkylated alkyl phosphate ester
Paraffin based petroleum oil
Solvent (petroleum hydrocarbons)
Alcohols, C9-11, ethoxylated
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.

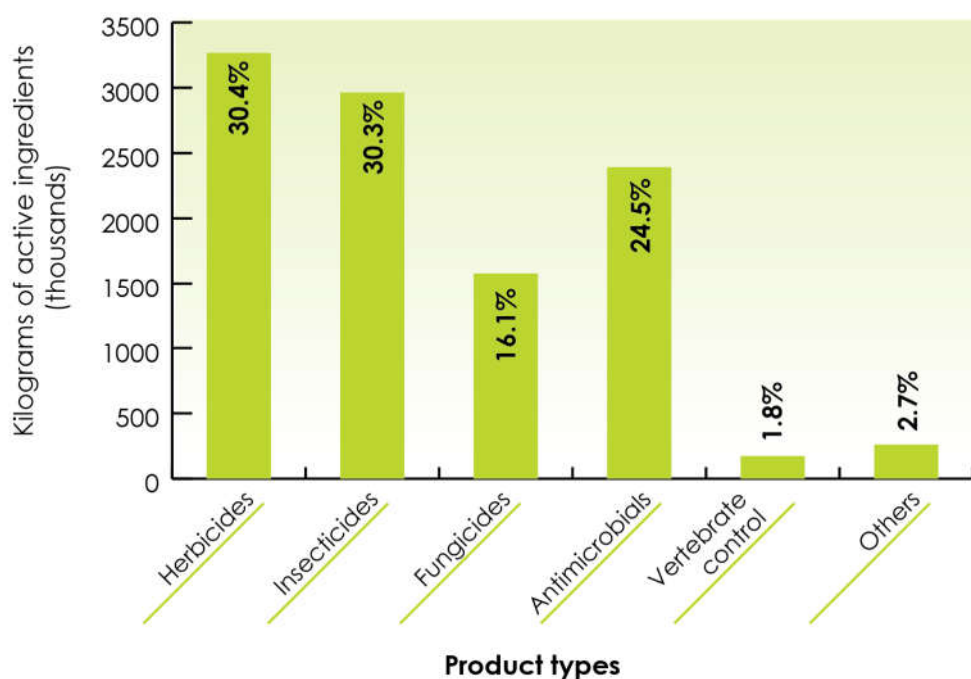
In 2021, there were 198 active ingredients identified as biopesticides, which accounted for 1081 registered products.

The 376 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 314 products that could be converted to kg a.i. accounted for 7.3% of total pesticide sales (9 770 135 k.g. a.i.) in 2021. There was a 53.7% increase in biopesticide sales from 2020 (6 355 173 kg a.i.) to 2021. The sales of biopesticides have fluctuated over the years in which data have been collected. Herbicides accounted for 33.4% of the biopesticide sales in 2021 (Figure 7), followed by insecticides (30.3%), antimicrobials (24.5%), fungicides (16.1%), “others” (2.7%), and vertebrate controls (1.8%).

**Figure 7.**

## Quantity of Biopesticides Sold in Canada in 2021



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 91.5% of sales of biopesticides that could be converted to kg a.i. and 6.7% 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 2021**

Active ingredient	Product type
Corn gluten meal	Herbicide
Ethanol	Herbicide/Fungicide/Antimicrobial
Mineral oil	Fungicide/Insecticide/Other
Hydrogen peroxide	Herbicide/Insecticide/Fungicide/Antimicrobial
Sulphur	Fungicide/Insecticide/Vertebrate Control
Mono- and dibasic sodium, potassium, and ammonium phosphites	Fungicide
Ammonia	Antimicrobial
N-decanol	Herbicide
Silicon dioxide	Insecticide
Mono- and dipotassium phosphite	Fungicide

The remaining 62 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 2021 of these is listed in Table 12.

**Table 12 Quantity of microbials sold in Canada in 2021**

Units of product sold	Total
Litres (microbials)	2 262 466
Kilograms (microbials)	1 546 269

## 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 2021, the chemical group with the largest proportion of sales was the “Phosphonic and phosphinic acids” group at 36%, followed by the “Inorganics” group at 12%. The third group was the “Hydrocarbons” at 7%. The remaining chemical groups were all under 5% and 38 out of 54 chemical groups were less than 1% of total sales. Eight chemical families remained in the top 10 from 2020 to 2021.

**Table 13 Summary of pesticide sales by chemical group (all sectors) in 2021**

Chemical grouping	Kilograms of active ingredients	Rank
Phosphonic acids, phosphinic acids	47 323 718	1
Inorganic	16 388 761	2
Hydrocarbons	9 446 797	3
Phenoxy acids	6 530 854	4
Thiocarbamates	XXX	5
Fatty acids & surfactants	5 257 761	6
Dinitrobenzenes	4 911 957	7
Benzonitriles	4 461 387	8
Others	3 033 166	9
Acylureas	2 903 335	10
Alcohols	2 589 361	11
Biscarbamates	2 197 446	12
Oils, minerals and vegetable	2 133 440	13
Anilides	2 034 506	14

Chemical grouping	Kilograms of active ingredients	Rank
Ammoniums, quaternary	2 000 487	15
Triazoles	1 680 011	16
Organochlorines	XXX	17
Dithiocarbamates	1 026 713	18
Azoles, oxazoles, thiazoles	1 006 541	19
Dithiophosphates	XXX	20
Sulfonylureas	936 714	21
Phenols/chlorophenols	882 047	22
Triazines, tetrazines	708 900	23
Aldehydes	655 310	24
Aryloxyphenoxy acids	616 142	25
Imidazolinones	597 196	26
Chlorotriazines	XXX	27
Benzamides	575 025	28
Cyclohexanedione oximes	570 684	29
Amides	568 307	30
Benzoic acid and derivatives	565 057	31
Methoxyacrylates	487 805	32
Diazines	306 181	33
Organic acids	286 373	34
Halogenated organic acids	280 552	35
Thiophosphates	272 498	36
Carbamates	257 293	37
Phtalic acids	229 789	38
Urea derivatives	214 198	39
Guanidines	185 553	40
Pyrethroids, pyrethrins	162 336	41
Nitrobenzenes	153 137	42
Morpholines & oxathiines	74 827	43
Pyridines	31 776	44
Phosphates	XXX	45
Organohalogens	18 595	46
Phosphoramidothioates	XXX	47

Chemical grouping	Kilograms of active ingredients	Rank
Oximes-carbamates	XXX	48
Anilines	XXX	49
Pheromones	2 475	50
Organometallics	XXX	51
Chromenones	43	52
Indanediones	XXX	53
Microbials	0	54

XXX Indicates confidential business information. The chemical group did not contain a minimum of three 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 2021

Active name	Kilograms of active ingredients
Glyphosate	<50 000 000
Creosote	>5 000 000
Available chlorine, present as sodium hypochlorite	
Borates	>1 000 000
Glufosinate ammonium	
Triallate	
Ethalfuralin	
Surfactan blend	
Chlorothalonil	
2,4-D	
Corn gluten meal	
MCPA	
Mancozeb	
Ethanol	
Copper (as elemental)	
Mineral oil	
S-metolachlor and R-enantiomer	
EPTC	
Available chlorine, present as trichloro-s-triazinetrione	
Bromoxynil	
Trifluralin	
Diquat	
Metam-sodium	>500 000
Pentachlorophenol	
Prosulfuron	
Phosmet	
Fluroxypyr-meptyl	
Chloropicrin	
Bentazone	
Available chlorine, present as calcium hypochlorite	
Prothioconazole	
Hydrogen peroxide	
Glutaraldehyde	
Atrazine (plus related active triazines)	
Paradichlorobenzene	
Alkyl-1,3-propanediamine acetate	
2,2-dibromo-3-nitrilopropionamide	
Dicamba	
Available bromine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins	
Chromic acid	
Sulphur	>100 000

Active name	Kilograms of active ingredients
Chlormequat chloride	
Poly[oxyethylene(dimethyliminio)ethylene(dimethyliminio)ethylene dichloride]	
Fenamidone	
Mono- and dibasic sodium, potassium, and ammonium phosphites	
Clethodim	
Arsenic acid	
Propiconazole	
Quizalofop-p-ethyl	
Tebuconazole	
Nonylphenoxypolyethoxyethanol	
Alkyl (40% C12, 50% C14, 10% C16) dimethylbenzylammonium chloride	
Hexahydro-1,3,5-tris(2-hydroxyethyl)-s-triazine	
Ammonia	
Metribuzin	
Pydiflumetofen	
Chlorpyrifos	
Methylated seed oil of soybean	
N-decanol	
Sodium chlorate	
DEET	
Sodium bromide	
Triglyceride ethoxylate	
Silicon dioxide	
Polyoxyalkylated alkyl phosphate ester	
Pyridaben	
Mono- and dipotassium phosphite	
Available chlorine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins	
Captan	
Soap	
Boscalid	
Pinoxaden	
Ammonium bromide	
Paraffin base petroleum oil	
Dimethenamid-p	
Trifloxystrobin	
Clodinafop-propargyl	
Cyantraniliprole	
Pendimethalin	
Azoxystrobin	
Pyraclostrobin	
Mecoprop	
Linuron	
Clopyralid	
Spirodiclofen	
Bronopol	

Active name	Kilograms of active ingredients
Chlorpropham	>50 000
Solvent (petroleum hydrocarbons)	
Permethrin	
Tralkoxydim	
Fluopyram	
Tetrakis(hydroxymethyl)phosphonium sulfate (THPS)	
Mesotrione	
Pyroxasulfone	
Malathion	
Metconazole	
Imazamox	
Maleic hydrazide	
Acetic acid	
Flumioxazin	
Available chlorine, present as sodium dichloro-s-triazinetriene	
Iron	
Sethoxydim	
Sodium chloride	
Cellulose (from powdered corn cobs)	
Saflufenacil	
Sulfentrazone	
Carbon dioxide gas	
Dazomet	
Fenoxaprop-P-ethyl	
Difenoconazole	
Imazethapyr	
Carbathiin	
Pyrasulfotole	
Trinexapac-ethyl	
Picoxystrobin	
Oxirane derivatives (50% minimum)	
Thiamethoxam	
Chlorantraniliprole	
Metalaxyl	
3-iodo-2-propynyl butyl carbamate	
Imidacloprid	
2,4-DB	
Lime sulphur	
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	>10 000
1,2-benzisothiazolin-3-one	
Carbaryl	
Fluxapyroxad	
Fosetyl-al	
Acrolein	



Active name	Kilograms of active ingredients
Didecyldimethylammonium chloride	
Metam-potassium	
Hexazinone	
Pyrimethanil	
Sodium chlorite	
Carfentrazone-ethyl	
Fomesafen	
Alcohols, c9-11, ethoxylated	
Triclopyr-butotyl	
Phorate	
Octhilinone	
5,5-dimethylhydantoin	
Kaolin	
Dimethoate	
Formic acid	
Available chlorine present as 1,3-dichloro-5,5-dimethylhydantoin and 1,3- dichloro-5-ethyl-5-methylhydantoin	
Potassium dimethyldithiocarbamate	
Garlic juice	
Potassium bicarbonate	
Quinclorac	
Lambda-cyhalothrin	
Sedaxane	
Folpet	
Didecyldimethylammonium present as carbonate and bicarbonate salts	
5-chloro-2-methyl-4-isothiazolin-3-one	
Florasulam	
Pyroxulam	
Fludioxonil	
Icaridin	
Zoxamide	
Clothianidin	
Thiram	
Thiophanate-methyl	
Aluminum phosphide	
Flucarbazone (present as flucarbazone-sodium)	
Thiabendazole	
Carbendazim	
N-alkyl (60% c14, 30% c16, 5% c12, 5% c18)dimethyl benzyl ammonium chloride	
Naled	
Acifluorfen-sodium	
Tetraconazole	
Tribenuron-methyl	
Piperonyl butoxide	
Dichlorprop	
N-alkyl (68% c12, 32% c14)dimethyl ethylbenzyl ammonium chloride	

Active name	Kilograms of active ingredients	
Picloram		
Thifensulfuron-methyl		
2-methyl-4-isothiazolin-3-one		
Tributyl tetradecyl phosphonium chloride		
Halauxifen-methyl		
Isoxaflutole		
Imazapyr		
Triticonazole		
Canola oil		
Oxydiethylene bis(alkyl dimethyl ammonium chloride)		
4,5-dichloro-2-n-octyl-3(2h)isothiazolone		
Mandipropamid		
Ethephon		
Dichlobenil		
Peracetic acid		
Deltamethrin		
Octylphenoxyethoxyethanol		
Chlorthal-dimethyl		
Fluazifop-p-butyl		
2-phenylphenol		
Bicyclopyrone		
Clomazone		
Aminopyralid		>5000
Methyl bromide		
Diflufenzopyr		
Zinc		
Potassium peroxymonosulfate (present as potassium peroxymonosulfate sulfate)		
Fluoxastrobin		
Propamocarb hydrochloride		
Siloxyated polyether		
MCPB		
Prometryne plus related active triazines		
Napropamide		
Simazine plus related active triazines		
Flupyradifurone		
Stearic acid and related fatty acids		
Penthiopyrad		
Silica gel (amorphous)		
4-chloro-3-methylphenol (sodium salt)		
Mefentrifluconazole		
Pyraflufen-ethyl		
Tebufenozide		
Dimethomorph		
Tembotrione		
Trichloro-s-triazinetrione		
Propyzamide		

Active name	Kilograms of active ingredients
2,6-diisopropyl-naphthalene	
Thiencarbazone-methyl	
1,3-bis(hydroxymethyl)-5,5-dimethylhydantoin	
Terbacil	
Cypermethrin	
Broflanilide	
Acetamiprid	
Penflufen	
D-cis,trans-allethrin	
Garlic powder	
Flumetsulam	
Pyrethrins	>1000
Acephate	
Aminocyclopyrachlor	
Ferrous sulfate monohydrate	
1,4-dimethylnaphthalene	
Ametoctradin	
Benzovindiflupyr	
Metsulfuron-methyl	
Spirotetramat	
Topramezone	
Oxathiapiprolin	
Rimsulfuron	
Fenhexamid	
2-(thiocyanomethylthio)benzothiazole	
Sulfoxaflor	
Dried blood	
N-alkyl (40% C12, 50% C14, 10% C16)dimethylbenzylammonium saccharinate	
Spinosad	
D-phenothrin	
Fish meal mixture	
Ipconazole	
Daminozide	
Zinc phosphide	
Spinetoram	
Ethaboxam	
Streptomycin present as sulphate	
Chlorimuron-ethyl	
Indaziflam	
Ethofumesate	
Thiacloprid	
Tetramethrin	
2,2'-(1-methyltrimethylenedioxy)bis-(4-methyl-1,3,2-dioxaborinane)	
Novaluron	
Methylene bis(thiocyanate)	
Metrafenone	

Active name	Kilograms of active ingredients
Oil of black pepper	
Dodine	
3-(trimethoxysilyl)-propyldimethyloctadecyl ammonium chloride	
Flonicamid	
Oxamyl	
Tetraniliprole	
Oriental mustard seed meal	
S-methoprene	
Myclobutanil	
Dichlorvos	
Ethylene oxide	
N-octyl bicycloheptene dicarboximide	
Cyazofamid	
Ethanol extract of Reynoutria sachalinensis	
Halosulfuron (present as methyl ester)	
Cyromazine	
Tetrachlorvinphos	
Bifenazate	
Cyprodinil	
Diphenylamine	
Hydroxymethyl-5,5-dimethylhydantoin	
Methomyl	
Fenpropathrin	
1-octanol	
N-alkyl(67% c12, 25% c14, 7% c16, 1% c18)dimethylbenzylammonium chloride	
Acequinocyl	
Spiromesifen	
Methoxyfenozide	
Fluopicolide	
Amitraz	
Oxyfluorfen	
Propoxycarbazone-sodium	
Dodecylguanidine hydrochloride	
Capsaicin	
Butoxypolypropylene glycol	
Dried eggs	>500
<i>Brassica hirta</i> white mustard seed powder	
Isofetamid	
Phenmedipham	
Desmedipham	
2,2-oxybis(4,4,6-trimethyl-1,3,2-dioxaborinane)	
Prohexadione-calcium	
Bromacil (present in free form, as dimethylamine salt, or as lithium salt)	
Related capsaicinoids	
Diuron	

Active name	Kilograms of active ingredients
Lactic acid	
P-menthane-3,8-diol	
Formaldehyde	
Potassium chloride	
Strychnine	
Polyoxin D zinc salt, Polyoxorim-zinc	
Diodofon	
Sodium alpha-olefin sulfonate	
Oil of lemon eucalyptus, hydrated, cyclized	
Cyflumetofen	
4-chloroindole-3-acetic acid	
Abamectin	
Foramsulfuron	
Magnesium phosphide	
Tea tree oil	<500
Tefluthrin	
Afidopyropen	
Azadirachtin	
Etridiazole	
Fenbutatin oxide	
Meat meal mixture	
Chlorfenapyr	
Citric acid	
Pelargonic acid	
Beta-cyfluthrin	
Diazinon	
Cyclaniliprole	
Cyfluthrin	
Wintergreen oil	
Phosphine	
Iprodione	
Nicosulfuron	
Codlure	
Tolpyralate	
Kasugamycin hydrochloride hydrate	
Methyl nonyl ketone	
Spiroxamine	
Nabam	
Sodium dimethyldithiocarbamate	
Metofluthrin	
10,10'-oxybis(phenoxarsine)	
Buprofezin	
Mandestrobin	
Diflubenzuron	
1-methylcyclopropene	
Fenbuconazole	
6-benzylaminopurine (or: 6-benzyladenine)	

Active name	Kilograms of active ingredients
Natamycin	
Sodium 2-phenylphenate	
Picarbutrazox	
Fish oil mixture	
Piperine	
Castor oil	
Pyriofenone	
Polybutene	
Octenol	
Flzasulfuron	
Fenpyroximate	
Famoxadone	
Cymoxanil	
Cloransulam-methyl	
Ethametsulfuron-methyl	
3-methyl-2-cyclohexen-1-one	
Chlorsulfuron	
Di-n-propyl isocinchomeronate	
Z-8-dodecen-1-yl acetate or z-8-dodecenyl acetate	
(Z)-9-dodecenyl acetate + (z)-11-tetradecenyl acetate	
Verbenone	
HOP beta acids, present as potassium salts	
Denatonium benzoate	
Eucalyptus oil	
S-kinoprene	
Pine needle oil	
Lemon oil	
Geranium oil	
Pyriproxyfen	
Dinotefuran	
1-dodecanol	
Inpyrfluxam	
Hydramethylnon	
Triflusulfuron-methyl	
Naphthylacetic acid	
Pacllobutrazol	
Gibberelic acid	
Thymol	
Fluensulfone	
Prohydrojasmon	
Bromadiolone	
D-limonene	
Bispyribac-sodium	
Camphor oil	
Muscalure	
Nicarbazin	

Active name	Kilograms of active ingredients
N-dialkyl(5% c12, 60% c14, 30% c16, 5% c18)methylbenzylammonium chloride	
Garlic	
Octadec-9-enoic acid	
(Z,Z)-3,13-octadecadien-1-yl acetate	
Diphacinone (present in free form or as sodium salt)	
1-tetradecanol	
(E,Z)-11-tetradecenal	
Etoazole	
E-8-dodecen-1-yl acetate or e-8-dodecenyl acetate	
Metaldehyde	
Warfarin	
Chlorophacinone	
Saponins of chenopodium quinoa	
(E,Z)-3,13-octadecadien-1-yl acetate	
Difethialone	
Brodifacoum	
Bromethalin	
(9z,12e)-9,12-tetradecadien-1-yl acetate	
4-aminopyridine	
L-menthol	
Racemic camphor	
Z-8-dodecen-1-ol or z-8-dodecenol	
Uniconazole-p	
Aviglycine hydrochloride	
(E,Z)-2,13-octadecadien-1-yl acetate	
Diisobutylphenoxyethoxyethyl dimethylbenzylammonium chloride	
Rotenone	
(Z,Z)-3,13-octadecadien-1-ol	
Ancymidol	
(E,Z)-2,13-octadecadien-1-ol	
Sodium monofluoroacetate	
Flumethrin	
Octyldecyldimethylammonium chloride	
Dioctyldimethylammonium chloride	
Pepino mosaic virus, strain ch2, isolate 1906	
Oxalic acid	
Phlebiopsis gigantea	
Sodium omadine	
Nosema locustae canning, (spore of)	
3-ketopetromyzonol-24-sulfate, ammonium salt	
Trichoderma asperellum, strain t34	
Neodiprion abietis nucleopolyhedrovirus	
Pantoea agglomerans	
Streptomyces acidiscabies strain rl-110t cells and spent fermentation media	
Phoma macrostoma	

Active name	Kilograms of active ingredients
(E)-4-tridecenyl acetate + (z)-4-tridecenyl acetate	
Pethoxamid	
Naphthalene	
Rosemary oil	
Sodium fluoride	
N-alkyl (25% c12, 60% c14, 15% c16)dimethylbenzylammonium chloride	
Propylene glycol	
Lactobacillus casei strain lpt-111	
Sulfometuron methyl	
Triethylene glycol	
Sulfuryl fluoride	
Metarhizium brunneum strain F52	
Kresoxim-methyl	
Sulfuric acid	
Pymetrozine	
Metiram	
Mild pepino mosaic virus	
(E,E)-8,10-dodecadien-1-ol + 1-dodecanol + 1-tetradecanol	
Artificial grape extract	
Lymantria dispar nucleopolyhedrovirus	
(Z)-11-tetradecen-1-ol	
Chloridazon	
Trichoderma virens strain g-41	
Ziram	
Thidiazuron	
Lactobacillus rhamnosus (strain lpt-21)	
Nuclear polyhedrosis virus of red-headed pine sawfly	
Paraquat	
Isoxaben	
Petroleum hydrocarbon blend	
Mefenpyr	
Triforine	
Mesosulfuron-methyl	
Sodium lauryl sulfate	
4-nitro-3-(trifluoromethyl)phenol or sodium salt	
1r-trans prallethrin	
2-(hydroxymethyl)-2-nitro-1,3-propanediol	
R-(-)-1-octen-3-ol	
Trifludimoxazin	
From nanogen: chlorocresol (or: parachlorocresol)	
Peppermint oil	
Paecilomyces fumosoroseus strain FE 9901	
Available chlorine, present as lithium hypochlorite	
Verticillium albo-atrum, isolate WCS850	
Oxadiazon	
Sodium cyanide	



Active name	Kilograms of active ingredients
Lecanicillium muscarium strain VE6	
Methyl salicylate	
Trichoderma harzianum	
Pasteuria nishizawae PN1	
Nucleopolyhedrovirus for Douglas-fir tussock moth	
(Z)-11-tetradecenal	
Clavibacter michiganensis (spp michiganensis) bacteriophage	
(Z)-9-tetradecen-1-yl acetate	
Tepraloxym	
Lemongrass oil	
Picolinafen	
Soybean oil	
Noviflumuron	
Caprylic acid	
Quintozene	
Liquid corn gluten	
Triclopyr triethylamine salt	
Tioxazafen	
(Z)-11-tetradecenyl acetate	
(E)-11-tetradecenol acetate; trans-11-tetradecenyl acetate	
Lactococcus lactis	
Paraformaldehyde	
Streptomyces griseoviridis strain K61	
Streptomyces lydicus strain WYEC108	
Ferrous sulfate heptahydrate	
Capric acid	
Niclosamide	
Bixafen	
Formetanate hydrochloride	
1-alkyl(c6-c18)-1,3-propanediamine	
Blad polypeptide	
Bacillus licheniformis strain fmch001	
Pseudomonas syringae - strain esc-10	
Agrobacterium radiobacter	
Calcium disodium edta hydrate	
Cedarwood oil	
Citronella oil	
Coniothyrium minitans strain con/m/91-08	
Putrescent whole egg solids	
Bacillus amyloliquefaciens	
Endothall	
Beauveria bassiana	
Coumaphos	
Etofenprox	
Ethylene	
Fluazaindolizine	
Bacillus mycoides isolate j	

Active name	Kilograms of active ingredients
German cockroach extract	
4-cpa	
Acibenzolar-s-methyl	
Bacillus velezensis strain RTI301	
Helicoverpa armigera nucleopolyhedrovirus bv-0003	
Clove oil	
(E,Z)-9-dodecenyl acetate	
Imiprothrin	
1-(alkyl-amino)-3-aminopropane hydrochloride (component of ampho 443-31)	
Cydia pomonella granulosis virus	
Pseudomonas fluorescens	
Aureobasidium pullulans	
N-coco-alkyltrimethylene diamines present as monobenzoate salt	
Chondrostereum purpureum (strain: north american; pathovar: pfc2139)	
(Acmpv) cabbage looper	
Imazamethabenz-methyl	
Bifenthrin	
Cornmint oil	
Fenpropimorph	
Cyprosulfamide	
Pyridate	
Bacillus subtilis	
Dithiopyr	
Cyphenothrin	
1-(3-chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride	
1-(alkyl-amino)-3-carboxymethylaminopropane (component of ampho 443-31)	
Bacillus thuringiensis	
1,2-dibromo-2,4-dicyanobutane	
Bacillus sphaericus	
Alkyl(c12-16)dimethylamine oxide	
Cloquintocet-mexyl	
Bensulide	
3-(trihydroxysilyl)-propyldimethyloctadecyl ammonium chloride	
Garlic oil	
Bacillus firmus strain i-1582	
Isopropyl alcohol	
3-decen-2-one	
Indole-3-butyric acid	
Propoxur	
Iodosulfuron-methyl-sodium	
1,4-bis(bromoacetoxy)-2-butene	
Tau-fluvalinate	
Azamethiphos	
Benzyl benzoate	

Active name	Kilograms of active ingredients
Clofentezine	
Flufenacet	
Flutriafol	
Available chlorine present as trichloro-s-triazinetrione and sodium dichloro-s-triazinetrione	
Fungus: gliocladium catenulatum	
3-chloro-p-toluidine hydrochloride	

## 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>Trifludimoxazin</p> <p>Available chlorine, present as trichloro-s-triazinetrione</p> <p>Trichloro-s-triazinetrione</p> <p>Hexazinone</p>
Alcohols	<p>Alcohols, C9-11, ethoxylated</p> <p>Bronopol</p> <p>Butoxypolypropylene glycol</p> <p>Ethanol</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>Siloxylated polyether</p> <p>Saponins of Chenopodium quinoa</p> <p>Triethylene glycol</p> <p>2-(hydroxymethyl)-2-nitro-1,3-propanediol</p>

Chemical group	Active ingredient name
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
Anilides	S-Metolachlor and R-enantiomer Niclosamide Benzovindiflupyr Boscalid 3-chloro-P-toluidine hydrochloride Dimethenamid-P Fenhexamid

Chemical group	Active ingredient name
	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) Indole-3-butyric acid, present as potassium salt Indole-3-butyric acid 2-methyl-4-isothiazolin-3-one 5-chloro-2-methyl-4-isothiazolin-3-one 4,5-dichloro-2-n-octyl-3(2H)isothiazolone Tioxazafen Isoxaflutole Mefenpyr Topramezone Octhilinone Oxathiapiprolin Pinoxaden

Chemical group	Active ingredient name
	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
Benzonitriles	Bromoxynil Dichlobenil Chlorothalonil
Biscarbamates	Desmedipham Mancozeb Metiram Nabam Phenmedipham Thiram Thiophanate-methyl
Carbamates	Ammonia (present as ammonium carbamate) Propoxur Bifenazate

Chemical group	Active ingredient name
	Carbaryl Chlorpropham Famoxadone Formetanate hydrochloride 3-iodo-2-propynyl butyl carbamate Oxadiazon Picarbutrazox 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 Tepraloxydim Tralkoxydim
Diazines	Aminocyclopyrachlor Aminocyclopyrachlor-potassium Ancymidol 6-benzylaminopurine (or: 6-benzyladenine) Buprofezin Pyridate Maleic hydrazide Pyridaben Chloridazon Triforine
Dinitrobenzenes	Bromethalin Ethalfluralin Fluazinam Pendimethalin Trifluralin
Dithiocarbamates	Dazomet Potassium dimethyldithiocarbamate Metam-potassium Metam-sodium Sodium dimethyldithiocarbamate Ziram



Chemical group	Active ingredient name
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 Tributyl tetradecyl phosphonium chloride Triglyceride ethoxylate 10 POE Surfactant blend Surfactant mixture
Guanidines	Hydramethylnon Clothianidin Cyprodinil Dinotefuran Dodine Dodecylguanidine hydrochloride Imidacloprid Pirimethanil Streptomycin present as sulphate Thiamethoxam

Chemical group	Active ingredient name
Halogenated Organic Acids	Aminopyralid 1,4-bis(bromoacetoxy)-2-butene Cyflumetofen Clopyralid Halauxifen-methyl Picloram (present as potassium salts) Picloram (present as acid) Picloram (present as amine salts) Spirodiclofen
Hydrocarbons	Creosote 1,4-dimethylnaphthalene 2,6-diisopropylnaphthalene Ethylene 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 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))

Chemical group	Active ingredient name
	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 chloride
	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
	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

Chemical group	Active ingredient name
Methoxyacrylates	<p>Azoxystrobin            Fluoxastrobin            Kresoxim-methyl            Mandestrobin            Pyraclostrobin            Picoxystrobin            Trifloxystrobin</p>
Microbials	<p>Aureobasidium pullulans DSM 14940            Aureobasidium pullulans DSM 14941            Aureobasidium pullulans DSM 14940 and DSM 14941            Agrobacterium radiobacter            (ACMNPV) cabbage looper            Bacillus amyloliquefaciens strain F727            Bacillus amyloliquefaciens, strain PTA-4838            Beauveria bassiana strain ANT 03            Beauveria bassiana strain PPRI 5339            Bacillus subtilis strain FMCH002            Bacillus firmus I-1582            Beauveria bassiana strain GHA            Beauveria bassiana strain HF23            Bacillus licheniformis strain FMCH0001            Bacillus amyloliquefaciens, strain D747            Bacillus mycoides isolate J            Pseudomonas fluorescens A506            Pseudomonas syringae - strain ESC-10            Pseudomonas fluorescens CL145A            Bacillus amyloliquefaciens strain FZB42            Bacillus subtilis QST 713            Bacillus subtilis (strain GB03)            Bacillus subtilis (strain BU 1814)            Bacillus subtilis MB1600            Bacillus subtilis strain RTI477            Bacillus subtilis var. amyloliquefaciens strain FZB24            Bacillus thuringiensis Berliner spp. kurstaki            Bacillus thuringiensis serotype H-14            Bacillus sphaericus            Bacillus thuringiensis subsp. galleriae strain SDS-502            Bacillus thuringiensis sp. tenebrionis            Bacillus thuringiensis ssp. aizawai            Bacillus velezensis strain RTI301            Coniothyrium minitans strain CON/M/91-08            Cydia pomonella granulovirus (strain M)            Cydia pomonella granulosis virus (strain CMGV4)            Chondrostereum purpureum (strain: North American; pathovar: PFC2139)</p>

Chemical group	Active ingredient name
	<p> <i>Cydia pomonella</i> granulovirus isolate V-22  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 brunneum</i> strain F52  <i>Phoma macrostoma</i>  <i>Neodiprion abietis</i> nucleopolyhedrovirus  <i>Nosema locustae</i> Canning (spore of)  <i>Lymantria dispar</i> nucleopolyhedrovirus  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  <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 </p>
Morpholines, Oxathiines	<p> Dimethomorph  Fenpropimorph  Carbathiin  Spiroxamine </p>
Nitrobenzenes	<p> Acifluorfen-sodium  Fomesafen  Mesotrione  Oxyfluorfen  Quintozene </p>

Chemical group	Active ingredient name
Oils, Minerals, Vegetable	Racemic camphor Oil of black pepper Cedarwood oil 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 Lemongrass oil Paraffin based petroleum oil Peppermint oil Verbenone Pine needle oil Thymol Rosemary Oil Soybean oil Tea tree oil Wintergreen oil
Organic Acids	Abamectin Acetic acid Acequinocyl Aviglycine hydrochloride Azadirachtin Citric acid Calcium disodium EDTA hydrate Formic acid Gibberellic acid Gibberellins A4A7 HOP beta acids, present as potassium salts Iron (present as FeHEDTA) Kasugamycin hydrochloride hydrate Lactic acid Naphthylacetic acid

Chemical group	Active ingredient name
	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)
Others	Acrolein 1-(alkyl-amino)-3-aminopropane hydrochloride (component of AMPHO 443-31) 1-(alkyl-amino)-3-carboxymethylaminopropane (component of AMPHO 443-31) Solvent (petroleum hydrocarbons) 2,2-oxybis(4,4,6-trimethyl-1,3,2-dioxaborinane) BLAD polypeptide Dried blood <i>Brassica hirta</i> white mustard seed powder Cellulose (from powdered corn cobs) Corn gluten meal Carbon dioxide gas 3-methyl-2-cyclohexen-1-one 3-decen-2-one Putrescent whole egg solids Dried eggs Endothall Ethofumesate Fish meal mixture Garlic powder Garlic juice Garlic

Chemical group	Active ingredient name
	Liquid corn gluten Methylene bis(thiocyanate) 1-Methylcyclopropene 2,2'-(1-methyltrimethylenedioxy)bis-(4-methyl-1,3,2-dioxaborinane) Methyl nonyl ketone Oriental mustard seed meal Meat meal mixture Piperonyl butoxide Ethanol extract of Reynoutria sachalinensis Sodium alpha-olefin sulfonate
Oximes-carbamates	Methomyl Oxamyl
Phenols/Chlorophenols	2-phenylphenol 2-phenylphenol (present as sodium salt) Pentachlorophenol From nanogen: chlorocresol (or: parachlorocresol) 4-chloro-3-methylphenol (sodium salt) Sodium 2-phenylphenate 4-nitro-3-(trifluoromethyl)phenol or sodium salt
Phenoxy Acids	4-CPA Cloquintocet-mexyl 2,4-DB 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 Fluroxypyr-meptyl 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) Pyraflufen-ethyl Triclopyr-butotyl Triclopyr triethylamine salt



Chemical group	Active ingredient name
Pheromones	<p>E-8-dodecen-1-yl acetate or E-8-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-ketopetromyzonol-24-sulfate, ammonium salt  S-methoprene  (E,E)-8,10-dodecadien-1-ol + 1-dodecanol + 1-tetradecanol  (Z)-9-dodecenyl acetate + (Z)-11-tetradecenyl acetate  (E,Z)-11-tetradecenal  (E,Z)-3,13-octadecadien-1-yl acetate  (Z,Z)-3,13-octadecadien-1-yl acetate  R-(-)-1-octen-3-ol  (E)-11-tetradecenol acetate; trans-11-tetradecenyl acetate  Muscalure  (Z)-11-tetradecenal  (Z)-11-tetradecen-1-ol  (Z)-9-tetradecen-1-yl acetate  1-tetradecanol  1-dodecanol  Codlure  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  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>
Phosphoramidothioates	<p>Acephate</p>
Phthalic Acids	<p>Captan  Chlorthal-dimethyl  Folpet  N-octyl bicycloheptene dicarboximide</p>

Chemical group	Active ingredient name
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 Tefluthrin
Pyridines	Afidopyropen 4-aminopyridine Bicyclopyrone Dithiopyr Flupyradifurone Fluzaindolizine Di-n-propyl isocinchomeronate Acetamiprid Sodium omadine Pyriproxyfen Sulfoxaflor Thiacloprid Fonicamid
Sulfonylureas	Chlorimuron-ethyl Chlorsulfuron Rimsulfuron Ethametsulfuron-methyl Flucarbazone (present as flucarbazone-sodium) Foramsulfuron Flazasulfuron Halosulfuron (present as methyl ester) Iodosulfuron-methyl-sodium Mesosulfuron-methyl Metsulfuron-methyl

Chemical group	Active ingredient name
	Tribenuron-methyl Thifensulfuron-methyl Nicosulfuron Propoxycarbazone-sodium Prosulfuron Thiencarbazone-methyl Sulfometuron methyl Triflurosulfuron-methyl
Thiocarbamates	EPTC Triallate
Thiophosphates	Azamethiphos Coumaphos Diazinon Chlorpyrifos
Triazines, Tetrazines	Metribuzin Clofentezine Available chlorine present as trichloro-s-triazinetriene and sodium dichloro-s-triazinetriene Cyromazine Hexahydro-1,3,5-tris(2-hydroxyethyl)-s-triazine Indaziflam Prometryne plus related active triazines Available chlorine, present as sodium dichloro-s-triazinetriene
Triazoles	Ametoctradin Cloransulam-methyl Difenoconazole Fenbuconazole Flutriafol Flumetsulam Florasulam Ipconazole Pyroxsulam Mefentrifluconazole Myclobutanil Paclobutrazol Propiconazole Prothioconazole Sulfentrazone Tebuconazole Triticonazole Tetraconazole Uniconazole-P

Chemical group	Active ingredient name
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.
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.