

2019

INTEGRATED PEST MANAGEMENT ACT
PUBLIC AGENCY LANDSCAPE PESTICIDE
USER AUDIT



EXECUTIVE SUMMARY

Beginning in May 2019, the Ministry of Environment and Climate Change Strategy's Compliance Team conducted an audit of public agency landscape pesticide users to verify compliance under the *Integrated Pest Management Act* (IPMA or Act) and Regulation (IPMR). The main purpose of this audit was to obtain a compliance snapshot of public agencies that use pesticides, and to identify areas of non-compliance that need to be addressed. The compliance criteria assessed included requirements for pesticide storage, pesticide use, public notification, and the use of integrated pest management.

The agencies inspected in this audit included municipalities, school districts, universities, and regional districts. These agencies were all licensed in the landscape category to apply pesticides on public land such as sidewalks, sports fields, parks, and school playgrounds. Agencies that hire independent pesticide service contractors to apply pesticides on public land were not included in this report.

A total of 40 inspections were conducted in this audit, representing 58% of licensed public agencies under the landscape category. Compliance determinations were as follows:

- The overall rate of compliance was 20%.
- Agencies had relatively high (88%) compliance rates under the pesticide storage requirements and low compliance rates under the treatment notification requirements (44%), record keeping requirements (22%), and IPM requirements (30%).
- The inspections conducted led to 8 notices of compliance, 31 advisories of non-compliance, and one warning of non-compliance.

Key findings of this audit regarding pesticide use were:

- Public agencies licensed in the landscape sector used a total of 1,632 kilograms of active ingredient in 2018, which represents 4% of the total use by the entire landscape sector.
- The top five active ingredients used by agencies licensed in the landscape sector were chlorothalonil, glyphosate, acetic acid, iprodione, and mineral oil.

The majority of non-compliant agencies received an advisory, the lowest level of enforcement response. This demonstrates that most non-compliances were relatively minor in nature, and the majority of non-compliant agencies showed a desire to come quickly back into compliance. All 40 inspected agencies were also compliant with the requirements to select treatment options based on the protection of human health and the environment. Overall, these audit findings provide confidence that public agency pesticide users are a group with relatively low risk and a high willingness to comply.

The results of this audit indicate that an amendment to the Regulation to require clear documentation of all six elements of IPM would allow ministry inspectors to verify that each element is conducted for every pesticide application. Ministry staff will continue to work with agencies and the landscape industry as a whole to promote compliance, IPM, and good pesticide use practices.

CITATION AND FURTHER INFORMATION

This report should be cited as:

2019 Integrated Pest Management Act Audit of Public Agency Pesticide Users licensed in the landscape sector. Regional Operations Branch, British Columbia Ministry of Environment and Climate Change Strategy.

Further information regarding this report may be obtained by contacting:

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INTRODUCTION

BACKGROUND

The Ministry of Environment and Climate Change Strategy conducts sector-wide audits as a method to obtain a snapshot of the compliance rate within a specific sector. Audits can be conducted through a combination of on-site inspections and reviews of submitted data and reports. The primary objectives of audits are to evaluate the rate of compliance in a specific sector, determine if risks to human health or the environment are present, identify compliance promotion opportunities, and to provide recommendations to improve legislation or policy guidance.

The ministry chose to audit public agency pesticide users in 2019 for several reasons. Agencies typically apply pesticides in areas highly accessible to the public including parks, sports fields, sidewalks, recreational areas, and schools. Non-compliance or improper use of IPM in these public areas may impact human health and reduce public confidence in how pesticide use is regulated. As most public agencies have mandates to promote best practices in environmental protection and public safety, the ministry expects this group to have a relatively high rate of compliance with the Regulation. Identifying areas of non-compliance through this audit will help the ministry reduce the risks of pesticide use and provide opportunities to promote compliance.

This report covers the inspection results of agencies licensed in the landscape category under the IPMA from May to October of 2019. Unlicensed agencies that hire pesticide service operators to apply pesticides on public land and licensed public golf courses were not included in this report.

With respect to ministry policies and procedures for compliance verification and audits, it is important to understand that:

- audits represent a point in time assessment of the compliance rate of authorized parties where IPM regulatory parameters are assessed by ministry inspector, and
- many non-compliances may be administrative in nature or have minor impacts to the environment and human health. When a single problem is found during an inspection, the whole inspection is marked out of compliance, regardless of how minor the non-compliance was.

For more information on how ministry inspectors assess and respond to non-compliances, please review the [Compliance and Enforcement Policy and Procedure](#). Inspection results from previous audits and compliance reports can also be found via the [Government of B.C.'s website](#).

DEFINITION OF TERMS USED IN THIS REPORT

Integrated Pest Management (IPM)

Integrated pest management is a science-based, stepwise process for managing pest populations that forms a cornerstone of the Act and Regulation. IPM includes the following elements: pest prevention, pest identification, monitoring, injury thresholds, treatment decisions, and evaluation. These elements ensure that pesticides are only used when necessary. Under Section 32 of the IPM Regulation, all licensed pesticide users are required to follow the principles of IPM when using pesticides.

PESTICIDES

Pesticides are defined in the Act as “a micro-organism or material that are represented, sold, used or intended to be used to prevent, destroy, repel or mitigate a pest”. The Regulation excludes some pesticides from the definition under the Act. Pesticides that still fall under the Act definition are referred to as non-excluded pesticides.

Pesticides can be broken down into categories based on the pest they are targeting. The following pesticide categories below are the most commonly used in the landscape sector:

1. Herbicides – control weeds
2. Fungicides –control fungi
3. Insecticides – control insects
4. Rodenticides – control rodents
5. Plant growth regulators – alter the growth of plants

Pesticide formulations consist of the active ingredient(s) and other ingredients. The active ingredients in a pesticide are what control the target pest. The other ingredients may aid in the stabilization, mixing, or application of the pesticide.

REGIONS

This report references regions of the province, as shown in figure 1:

- Vancouver Island
- Lower Mainland
- Southern Interior (Thompson-Nicola and Okanagan)
- Kootenay
- Cariboo
- Skeena
- Omineca
- Peace

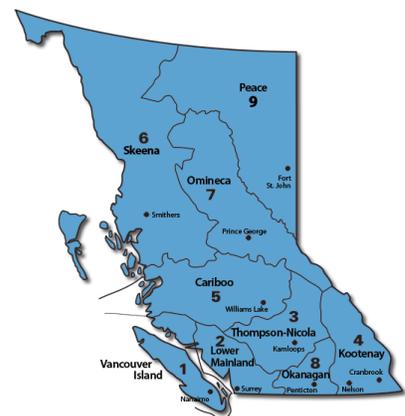


Figure 1. Regions in B.C.

METHODS

PUBLIC AGENCY INSPECTIONS

Of the 69 licensed agencies in the landscape category, 40 (58%) were inspected throughout the province by ministry inspectors in 2019. Agencies who historically used more pesticide active ingredients were prioritized for inspections. Inspectors were unable to inspect all agencies due to limited resources, travel, budgets, and time constraints. It was expected that the compliance determinations made under the IPMA and Regulation were a good representation of the overall compliance rate of agencies licensed in the landscape category. The following requirements under the Regulation were the primary criteria inspected during this audit:

- License and certificate requirements (IPMR Sections 5 & 50)
- Storage requirements (IPMR Sections 33, 65, & 66)
 - Pesticide labels
 - Storage facility
- Notification requirements (IPMR Sections 10 & 63)
 - Location and timing of posting
 - Content
- Record-keeping requirements (IPMR Section 35 & 83)
- IPM requirements (IPMR Section 68)
 - Pest prevention
 - Pest identification
 - Pest monitoring
 - Injury thresholds
 - Consideration/use of pesticide alternatives
 - Consideration of protection of human health and the environment when selecting pesticides
 - Evaluation of treatment efficacy

Each inspection included detailed questions verifying the use of IPM and pesticide use practices. The questions asked during the inspection primarily assessed and verified compliance with the IPM elements listed under section 68 of the Regulation. Responses to questions regarding additional pest management practices were also collected during the inspection, including the types of pesticides used, pests managed, areas treated, spray equipment, training received, and whether the licensee had a written pest management plan.

Upon completion of the compliance inspection and audit, agencies were issued an inspection report outlining the compliance status of each requirement assessed. Inspectors also discussed non-compliances encountered with agency staff at the time of inspection (figure 2).



Figure 2. Ministry inspector conducting an inspection of a public agency.

PESTICIDE USE EVALUATION FOR PUBLIC AGENCIES AND OTHER LANDSCAPERS

Under section 39 of the Regulation, pesticide annual use reports are required to be submitted to the Ministry by all licensed pesticide users by January 31st for the previous calendar year. For each non-excluded pesticide used, licensees report the product name, the active ingredient(s), the federal *Pest Control Products (P.C.P) Act* registration number, and the total quantity of product used in kilograms. Excluded pesticides listed in Schedule 2 of the IPM Regulation are not required to be reported and were therefore not included in this report.

As the 2019 annual use data was not available at the time this report was written, 2018 annual use data was assessed and analysed for both agencies licensed in the landscape sector and the entire landscape sector. This report summarizes the 2018 annual use data to show the types and quantities of active ingredients used by agencies licensed in the landscape category, and compares the pesticide use to the entire landscape sector. In addition, the 2018 pesticide use data includes some use from other sectors as some of inspected agency pesticide users and other landscape users had additional categories on their licenses.

The 2018 annual use data was assessed and analyzed from all public agencies licensed in the landscape category throughout the province, including agencies that were not inspected. Public golf courses and non-licensed agencies that hired independent pesticide service contractors to apply pesticides on public land were not included in the total pesticide use for public agencies.

Annual use data from 2018 was also assessed and analyzed from 96% of the total landscape licensees throughout the province. Landscape licensees include lawn care companies, golf courses, public agencies, and other private landscapers that provide pesticide services.

RESULTS

NUMBER OF PUBLIC AGENCY INSPECTIONS

Inspectors completed 40 inspections of agencies licensed in the landscape category between May 3rd and October 25th, 2019.

INSPECTIONS BY REGION

Inspections of agencies licensed in the landscape category were conducted throughout the province in the following regions: Vancouver Island, Lower Mainland, Southern Interior, Kootenays, Cariboo, and Omineca (figure 3).

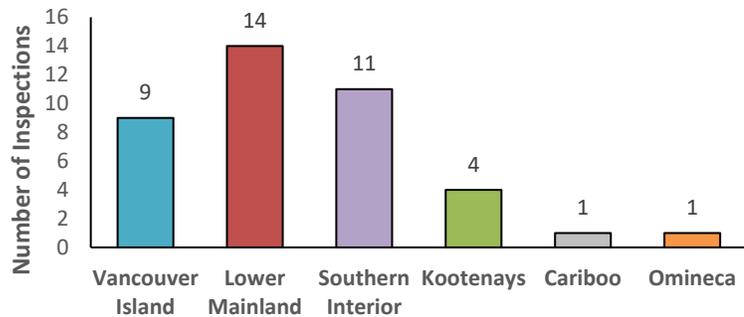


Figure 3. Number of agencies inspected by region in 2019.

COMPLIANCE OUTCOMES

OVERALL COMPLIANCE RATE AND RESULTING COMPLIANCE RESPONSE

Of the 40 agencies inspected, 8 (20%) were fully in compliance, whereas 32 (80%) were out of compliance with at least one aspect of the Regulation (figure 4a). A list of all of the inspected public agencies and the compliance determinations made under the Regulation can be found in Appendix A.

Agencies found to be in compliance were issued a notice of compliance, whereas non-compliant agencies were issued either an advisory or a warning (figure 4b), in accordance with the Ministry's Compliance and Enforcement Non-Compliance Decision Matrix.

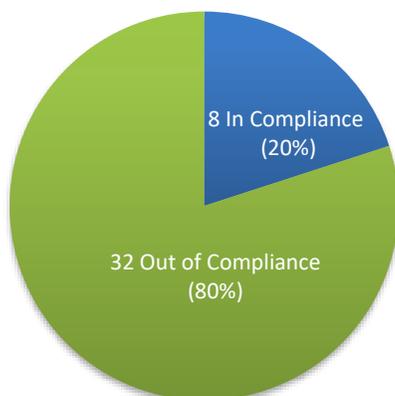


Figure 4a. Overall compliance rate of inspected agencies in 2019.

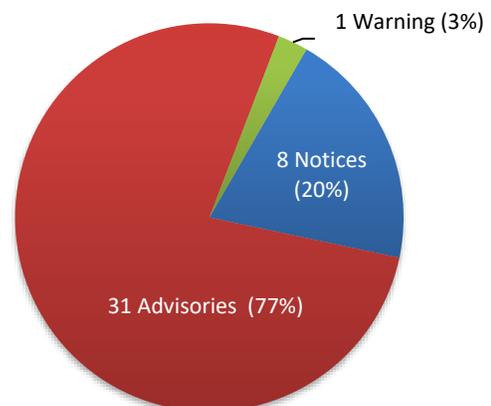


Figure 4b. Compliance response of inspected agency landscape pesticide users.

COMPLIANCE RESULTS FOR SPECIFIC REQUIREMENTS UNDER THE REGULATION

Inspectors conducted compliance inspections to assess the following requirements: pesticide storage, treatment notification, record keeping, and IPM (figure 5). All 40 agencies were assessed under the pesticide storage, record keeping, and IPM requirements. Treatment notification requirements were assessed for 36 of the agencies inspected.

The pesticide storage requirements assessed included verifying compliance of the storage facility and pesticide labels. Of the agencies inspected, 88% complied with the storage requirements assessed. The most common non-compliances were issued under the storage requirements due to pesticide labels missing and improper wording on the signage posted on the pesticide storage facility.

The treatment notification requirements assessed included verifying compliance with the notification content, location, and timing of posting. Of the agencies inspected, 44% complied with the treatment notification requirements assessed. Non-compliances issued under the notification requirements were mainly due to agencies missing required information such as treatment times, or not specifically indicating the targeted pest.

The record keeping requirements assessed included verifying compliance with records of use for treatment locations and day of use. Of the agencies inspected, 22% were fully in compliance with these requirements. The most common non-compliances were due to failure to record the monitoring methods and injury thresholds, missing precautionary information, time and treatment dates not indicated, and weather conditions not properly recorded (temperature, wind speed and direction, and amount of precipitation).

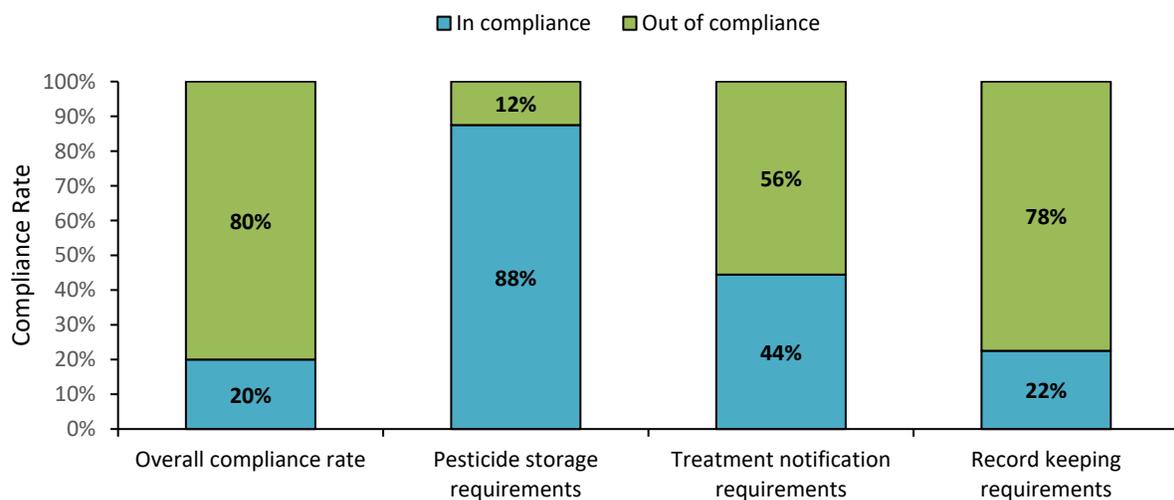


Figure 5. Compliance rate of inspected agencies under the IPMA and IPMR in 2019.

INTEGRATED PEST MANAGEMENT REQUIREMENTS

Inspectors assessed the following IPM requirements for compliance under section 68 of the Regulation: pest prevention, pest identification, monitoring, injury thresholds, treatment decisions, and evaluation (figure 6).

All 40 agencies evaluated on the pest prevention requirements of section 68 (1)(a) complied with this section. For landscaped areas, the most common pest prevention practices reported by agencies included fertilization, irrigation, mowing, aeration, and top dressing. To prevent pests in newly constructed landscaped areas, agencies most commonly reported soil preparation, good cultivar selection, establishing good maintenance schedules, good sanitation, and soil drainage as effective pest prevention practices.

Of the 40 agencies evaluated on the identification requirements of section 68 (1)(b), 95% complied with this section. The most common identification tools reported by agencies included web searches, identification manuals or books, and local experts. The IPM verification questions showed that pest and beneficial species were most commonly identified by agencies through assessing their morphological and physiological characteristics, types of damage, and areas infested. Non-compliances were issued under this section as several agencies did not indicate the targeted pests in their pesticide use records.

Of the 40 agencies evaluated on the monitoring requirements of section 68 (1)(c), 43% complied with this section. The most common pest monitoring methods reported by agencies included visual inspections and scouting. Agencies most commonly reported that monitoring occurred daily, weekly, or based on a pest's history. Detecting pest populations, assessing size and spread, and determining the best treatment method were the most common reasons for monitoring reported by agencies. Non-compliant agencies typically either did not conduct adequate monitoring of pests or did not record monitoring methods used as required.

Of the 40 agencies evaluated on the injury threshold requirements of section 68 (1)(d), 35% complied with this section. Agencies most commonly reported that their injury thresholds were based on safety, aesthetics, economics, and the location of the pest. Thirty percent of agencies inspected developed their own reference system for when an injury threshold for a specific pest had been reached. Non-compliant agencies typically either did not have specific injury thresholds established and used or did not record the use of injury thresholds on their pesticide use records.

All 40 agencies evaluated on the treatment decision requirements of section 68 (1)(e) complied with this section. Agencies reported practical alternatives to pesticide use and methods to protect human health and the environment under this section. For physical and mechanical control methods, agencies most commonly reported pulling weeds, mowing, and trimming. As for cultural methods irrigation and aeration were the most commonly reported. The use of beneficial arthropods and other biological control agents were also reported by agencies as the most common biological methods used. Public access to the treatment area, personal protective equipment used by staff, and the toxicity of the products used were the most common considerations to protect human health reported by agencies. The most common environmental protection considerations made by agencies included considering the

proximity to water bodies prior to pesticide use, non-chemical methods available, and the weather conditions.

Of the 40 agencies assessed on the evaluation requirements of section 68 (2), 98% complied with this section. Assessing the effectiveness of pesticides used on pests, the use of a monitoring program, and checking with field staff were the most common evaluation techniques reported by agencies. To continuously improve on their IPM programs, agencies most commonly reported that they would seek advise from other professionals and consider using alternative treatments. Non-compliances were issued under this section as several agencies did not appear to be evaluating their pesticide use on targeted pests.

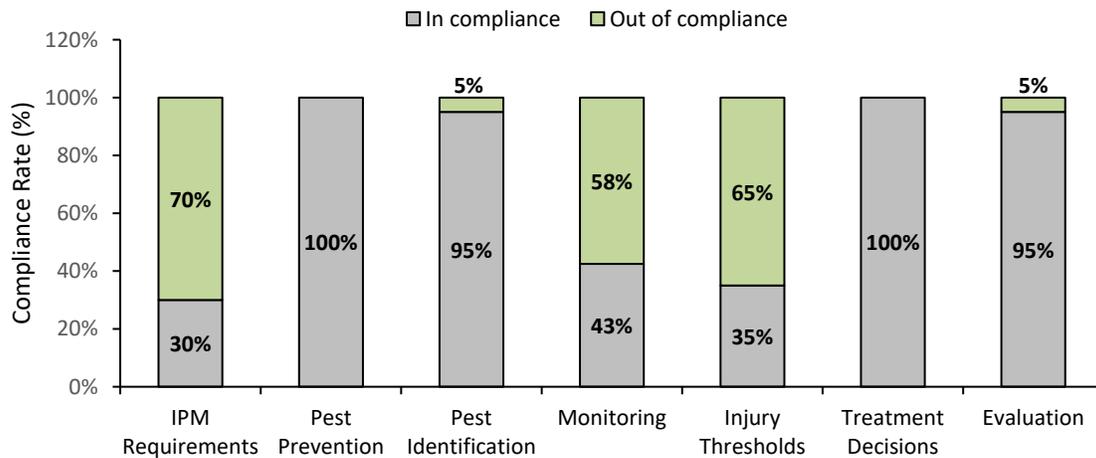


Figure 6. Compliance rate of inspected agencies in 2019 with each IPM element listed in section 68 of the IPMR.

PESTICIDE USE

PESTICIDE USE BY INSPECTED AGENCIES - THE TYPES OF PESTICIDE USED, PESTS MANAGED, LOCATION OF USE, AND APPLICATION EQUIPMENT

During each inspection, agencies were asked questions regarding the types of pesticides used, the most common types of pests managed, treatment areas, application equipment used, and their equipment calibration frequency.

Herbicides were the most common type of pesticide reported by inspected agencies. Of the 40 agencies inspected, 39 of the 40 reported herbicide use, 22 of the 40 reported using insecticides, 14 of the 40 reported using fungicides, and 3 of the 40 reported using rodenticides (figure 7).



Figure 7. Number of inspected agencies that reported use of each type of pesticide in 2019.

Inspected agencies reported that herbicides were most commonly used to manage weeds such as dandelion, grasses, and plantain. Insecticides used by agencies were most commonly reported to manage insect pests such as aphids, wasps, and caterpillars. Fungicides were most commonly reported by agencies to manage fungal diseases such as powdery mildew, fusarium, dollar spot, and black spot. Rodenticide use was only reported by a small number of agencies in the Kootenays to manage pocket gophers in landscaped areas.

Hard surface areas were reported by inspected agencies as the most common treatment area where pests were managed. Of the 40 agencies inspected, 38 of the 40 reported treating hard surface areas, 32 of the 40 reported treating sports fields, 28 of the 40 reported treating other landscaped areas such as ornamental gardens or plant beds, and 19 of the 40 reported treating lawns (figure 8).

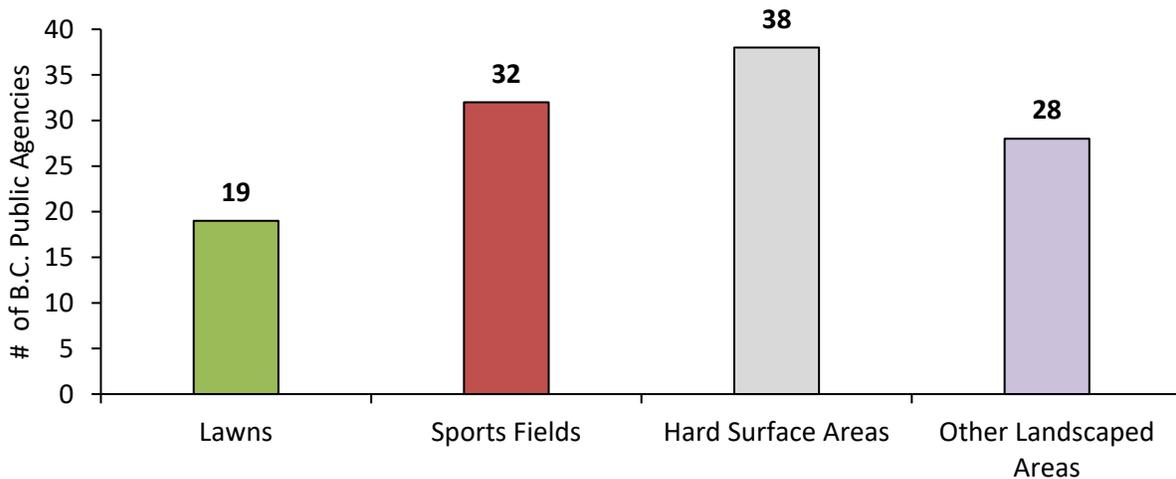


Figure 8. Number of inspected agencies that reported pesticide use on each treatment area in 2019.

The most commonly used pesticide application equipment reported by inspected agencies were backpack sprayers, handheld sprayers, boom sprayers, and truck mounted sprayers (figure 9a and 9b). The majority of the inspected agencies reported that they would either calibrate their sprayers before each use or at the beginning of the season.



Figure 9a. Backpack Sprayers used for pesticide applications.



Figure 9b. Truck mounted pressurized sprayer used for pesticide applications.

SUMMARY OF THE TOTAL PESTICIDE USE IN 2018 FOR ALL PUBLIC AGENCIES LICENSED IN THE LANDSCAPE CATEGORY

In 2018, there were 69 agencies licensed in the landscape category that were each required to submit an annual use report by January 31st, 2019. The 2018 annual use data, which included all 69 licensed agencies in the landscape sector, was analyzed in this section for the purposes of this report, as the 2019 annual use data was not yet available. Most agencies licensed in 2018 under the landscape category were in the Lower Mainland, Vancouver Island, and the Southern Interior (figure 10).

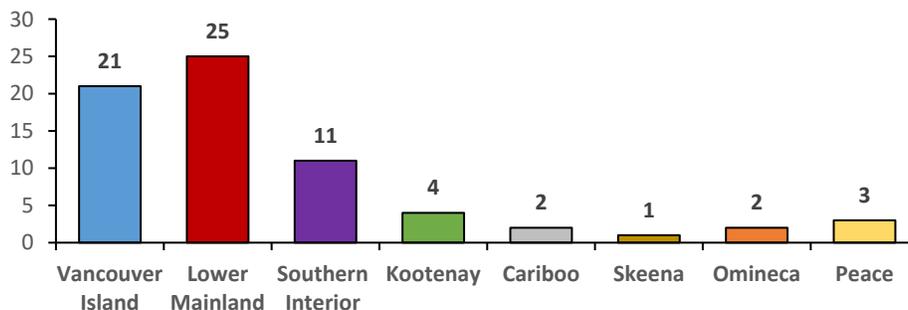


Figure 10. Number of public agencies in each region licensed in the landscape sector in 2018.

A total of 91 commercial pesticide products were used by agencies licensed in the landscape category in 2018. These commercial pesticides contained a total of 60 active ingredients (Appendix B). The top active ingredients used by licensed public agencies in 2018 were chlorothalonil, glyphosate, and acetic acid (table 1).

Table 1. Top 10 pesticide active ingredients used by all licensed public agencies in 2018.

Pesticide Active Ingredient	Pesticide Type	Quantity of Active Ingredient Used (Kgs)
Chlorothalonil	Fungicide	538
Glyphosate	Herbicide	487
Acetic Acid	Herbicide	127
Iprodione	Fungicide	83
Mineral Oil	Insecticide	59
Fosetyl-al	Fungicide	56
Dichlobenil	Herbicide	44
Mono- And Dipotassium Phosphite	Fungicide	42
2,4-d	Herbicide	39
Propiconazole	Fungicide	34

Public agencies licensed in the landscape category used a total of 1,632 kilograms of pesticide active ingredient in 2018. The largest quantity of active ingredient was applied in Lower Mainland, followed by the Southern Interior, Vancouver Island, and the Kootenays. Of the 69 agencies licensed in the landscape category, nine licensees reported that no pesticides had been used in 2018.

A total of six categories of pesticides were used by public agencies in 2018. Herbicides represented 53% of the total quantity of pesticide active ingredients used, followed by fungicides which represented 32% of the use, insecticides at 11%, plant growth regulators at 3%, and both acaricides and algaecides each at 0.5% (figure 11).

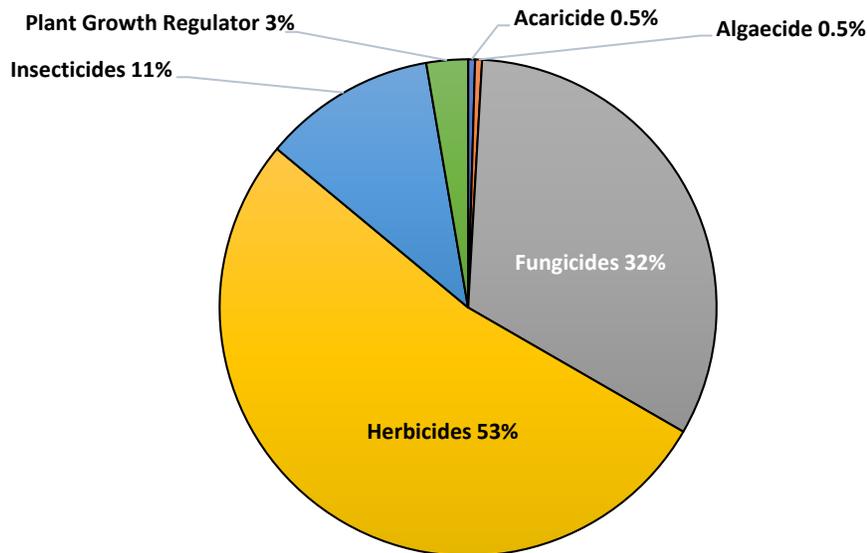


Figure 11. Total percentage of each type of pesticide used by agencies in 2018.

SUMMARY OF THE TOTAL PESTICIDE USE IN 2018 FOR ALL LICENSEES IN LANDSCAPE SECTOR

In 2018, there was a total of 376 landscape licensees that were each required to submit an annual use report by January 31st, 2019. Landscape licensees included lawn care companies, golf courses, public agencies, and other private landscapers that provide pesticide services. Approximately 96% of the annual reports of pesticide use from the landscape sector were received and analyzed for this report.

A total of 242 commercial pesticide products were reported used by all landscape licensees in 2018. These commercial pesticides reported contained a total of 126 active ingredients (Appendix C). The top active ingredients used by the entire landscape sector in 2018 were chlorothalonil, mineral oil, and glyphosate.

A total of 45,573 kilograms of pesticide active ingredient were used by all landscape licensees in 2018. Of the 376 landscape licensees, 24 reported that no pesticides had been used in 2018.

INTEGRATED PEST MANAGEMENT TRAINING AND EDUCATION

AGENCY IPM TRAINING AND EDUCATION PROGRAMS

Inspected public agencies were asked additional questions that go beyond regulatory requirements; for example, if they provide written pest management plan, in class training, or field training for their pesticide applicators. A written pest management plan was provided by 55% of agencies inspected. Of the agencies inspected, 45% indicated that they provided in class training for their staff that went beyond ministry requirements. Agencies reported that the most common field training topics reviewed for new pest management staff included public safety, spray techniques, calibration of equipment, pest identification, and pest monitoring.

PROFESSIONAL/INDUSTRY ASSOCIATIONS

Inspected agencies were asked if any individuals working for them belong to any professional or industry associations. The most common associations that inspected agencies reported being a part of included the following: The Western Canada Turf Grass Association (WCTA), the British Columbia Recreation and Parks Association (BCRPA), the Integrated & Environmental Plant Management Association of Western Canada (IEPMA), and the International Society of Arboriculture (ISA). Ministry inspectors attend some of these industry events to promote compliance for authorization holders (figure 12). While membership in industry associations is not a requirement of authorization holders, the ministry encourages membership as updates on pesticide legislation, registrations, and pest management practices are often provided.

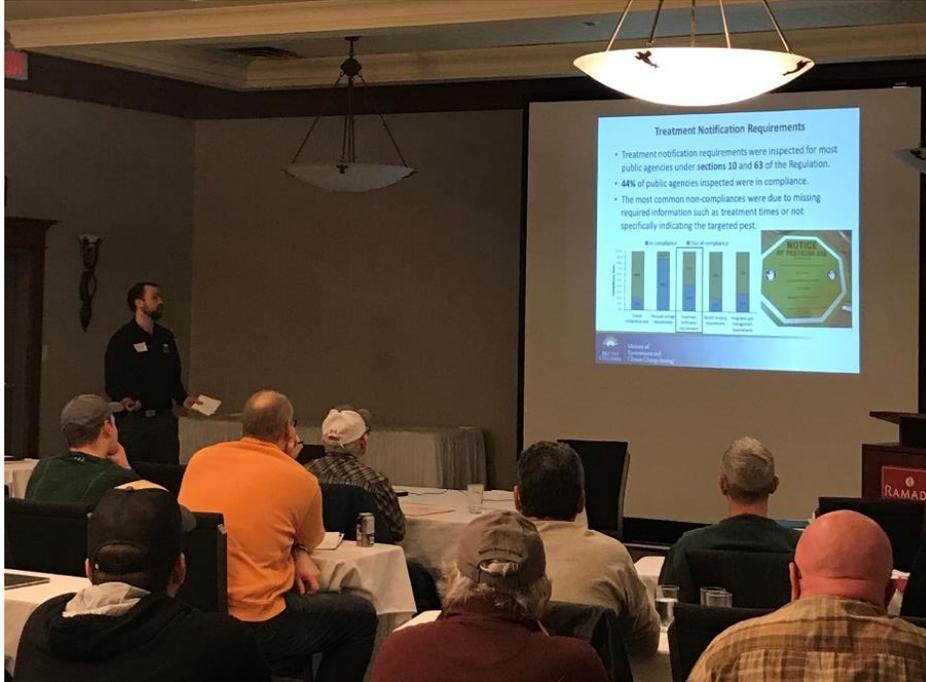


Figure 12. Ministry inspector presenting the public agency pesticide users audit findings to landscapers at the 2020 IEPMA conference in Kelowna, B.C.

DISCUSSION

COMPLIANCE RESULTS

The overall compliance rate for public agencies was relatively low, with only 20% of inspected agencies being fully in compliance with the IPMA and Regulation. This result was not unexpected, given that a single non-compliance, regardless of how minor, results in an “out of compliance” determination. Therefore, an analysis of the compliance rate for each of the regulatory requirements inspected was used to determine specific areas of non-compliance and identify areas that require improvement.

Inspected agencies received high compliance rates under the pesticide storage requirements and under four of the IPM elements including pest prevention, pest identification, treatment decisions, and evaluation. High compliance rates in these areas show that agencies are well informed of the storage and IPM requirements under the Regulation. Inspectors provide new storage facility signs if non-compliant signage is found, which improves compliance rates with storage requirements (figure 13). Inspectors that found unmarked pesticides informed licensees to either replace the label or take products with unknown contents to proper disposal facilities.



Figure 13. School District adding new pesticide storage facility signage in compliance with the Regulation.

Low compliance rates were found for inspected agencies under notification, record keeping, and several of the IPM requirements (figure 14).

Inspectors found that many agencies were using very outdated pesticide use record forms and notification templates. This indicates that public agencies require additional regulatory promotion to ensure they are aware of the current ministry templates and other materials available online.

Finally, over half of the inspected public agencies failed to conduct adequate pest monitoring or record their monitoring methods and injury thresholds for targeted pests in their pesticide use records. The use of appropriate monitoring and thresholds prior to any pesticide application is key to ensuring that the use of the pesticide is necessary and justified.



Figure 14. Pesticide treatment notification out of compliance with the Regulation.

PESTICIDE USE

In this report, the total amount of pesticide active ingredients used in 2018 by landscape pesticide users was examined. Of the 376 landscape licenses in 2018, 69 were public agencies, which represents 16% of the entire sector. A total of 45,573 kilograms of pesticide active ingredients were used by the entire landscape sector in 2018. Of the reported total of active ingredients used by the landscapers in 2018, 1,632 kilograms were used by licensed agencies. Therefore, public agencies represented 16% of the landscape license holders in the province but reported just under 4% of the pesticide active ingredients used in the landscape sector. These results suggest that public agencies licensed in the landscape sector use relatively less pesticide compared to the sector as a whole.

The majority of inspected public agencies indicated that herbicides were the most common type of pesticide used, followed by insecticides and fungicides. This was supported by the 2018 annual use data, which showed that most pesticide active ingredients used by licensed agencies in the landscape category were herbicides at 53%, followed by fungicides at 32%, and insecticides at 11%.

In 2018, the top active ingredients used by licensed public agencies in the landscape sector were chlorothalonil, glyphosate, and acetic acid. The top active ingredients used by the entire landscape sector in 2018 were chlorothalonil, mineral oil, and glyphosate. Compared to the entire landscape sector, public agencies landscapers used approximately 5% of the total chlorothalonil use and 8% of the total glyphosate use. This shows that public agencies licensed in the landscape sector use relatively low amounts of chlorothalonil and glyphosate compared to the rest of the landscape sector. Public agencies also used relatively high amounts of acetic acid, which is considered a natural and eco-friendly herbicide.

TRAINING AND EDUCATION

All landscape pesticide user licensees are required to have certified staff in the landscape category that have completed and passed an exam provided by the ministry. Once a pesticide certification is obtained, the ministry does not have any additional mandatory training requirements for licensees or applicators (figure 15). Additional training regarding the use of pesticides is the responsibility of licensees and their certified staff.

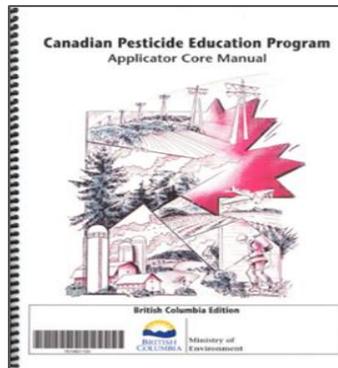


Figure 15. Licensed agencies are required to have certified applicators prior to applying pesticides.

The results of the audit showed that many inspected agencies provided pest management plans, standard operating procedures, and in-class or field training for staff that were beyond ministry requirements. Pest management plans, which are not required under the Regulation, were nonetheless written by 55% of inspected agencies, while 45% of agencies reported that in-class IPM training was provided for their staff. Field training was provided by all inspected agencies for staff and most commonly addressed public safety, use of spray equipment, and some of the IPM elements including pest identification and pest monitoring techniques.

Agency participation in professional/industry associations may have also contributed to better overall IPM programs, as pesticide regulatory information is commonly distributed through these various associations throughout the province.

RECOMMENDATIONS AND NEXT STEPS

From the results and conclusions of this audit, the ministry's Compliance Team is recommending that:

- an amendment to the IPM Regulation be considered to require licensees to clearly document each element of IPM for each pesticide use. This would allow more consistent verification of compliance by inspectors.
- public agencies continue to be inspected regularly in the future, however with the recognition that this sector is generally low risk. The results of this audit showed that many of the non-compliances identified in this sector were either of low risk to public health and the environment, and/or administrative in nature. Most agencies were able to set high standards for protecting public health and the environment by following comprehensive decision-making process prior to using pesticides. It is expected that future inspections of licensed agencies will result in higher compliance rates, as this audit has helped identify areas of non-compliance that can be easily corrected.

The Ministry of Environment & Climate Change Strategy will continue to conduct compliance inspections of licensed public agencies going forward, to ensure that all the regulatory requirements are being followed. Ministry staff will also continue to work with public agencies and landscape sector associations to promote compliance, the use of IPM, and the best pesticide use practices.

APPENDICES

Appendix A: List of inspected agencies and compliance determinations made under the IPMA and Regulation in 2019.

Public Agencies Inspected in 2019	Region	Compliance Determination
Corporation of the District of Oak Bay	Vancouver Island	Out
West Shore Parks and Recreation Society	Vancouver Island	Out
Town of Ladysmith	Vancouver Island	Out
City of Parksville	Vancouver Island	Out
City of Nanaimo (Parks Operations)	Vancouver Island	In
Town of Sidney	Vancouver Island	Out
City of Campbell River	Vancouver Island	Out
The University of Victoria	Vancouver Island	Out
The Corporation of the City of Victoria	Vancouver Island	Out
School District #75 (Mission)	Lower Mainland	Out
School District No. 34 (Abbotsford)	Lower Mainland	Out
Board of Education School District No. 33 (Chilliwack)	Lower Mainland	Out
District of Mission, Parks, Recreation & Culture Department	Lower Mainland	Out
Corporation of the Township of Langley	Lower Mainland	Out
The Corporation of the City of Langley (Parks Department)	Lower Mainland	Out
The University of British Columbia	Lower Mainland	Out
City of Abbotsford, Parks, Recreation & Culture	Lower Mainland	Out
University of British Columbia – Athletics and Recreation	Lower Mainland	Out
City of Surrey	Lower Mainland	Out
City of Chilliwack (Parks & Recreation Department)	Lower Mainland	Out
The Corporation of Delta, Parks Department	Lower Mainland	In
City of Coquitlam	Lower Mainland	In
City of Richmond Parks Department	Lower Mainland	Out
The Corporation of the District of Peachland	Southern Interior	Out
City of Kamloops	Southern Interior	In
Thompson Rivers University	Southern Interior	In
School District #67 (Okanagan Sakha)	Southern Interior	In
The District of Logan Lake	Southern Interior	Out
Corporation of the City of Penticton	Southern Interior	Out
District of Sicamous	Southern Interior	Out
Town of Osoyoos	Southern Interior	Out
Town of Oliver	Southern Interior	Out
City of Kelowna	Southern Interior	Out
City of West Kelowna	Southern Interior	In

Public Agencies Inspected in 2019	Region	Compliance Determination
Town of Golden	Kootenays	Out
District of Elkford	Kootenays	Out
District of Sparwood	Kootenays	Out
Corporation of the City of Cranbrook	Kootenays	Out
City of Quesnel	Cariboo	Out
City of Prince George	Omineca	In

Appendix B: Types and quantities of pesticide active ingredients used in 2018 by public agencies licensed in the landscape category.

Pesticide Active Ingredient	Pesticide Type	Quantity of Active Ingredient Used (Kgs)
Chlorothalonil	Fungicide	538
Glyphosate	Herbicide	487
Acetic Acid	Herbicide	127
Iprodione	Fungicide	83
Mineral Oil	Insecticide	59
Fosetyl-al	Fungicide	56
Dichlobenil	Herbicide	44
Mono- And Dipotassium Phosphite	Fungicide	42
2,4-d	Herbicide	39
Propiconazole	Fungicide	34
Mecoprop-p-dimethylammonium	Herbicide	16
Aminopyralid	Herbicide	15
Mcpa	Herbicide	12
Bacillus Thuringiensis Israelensis	Insecticide	10
Trifloxystrobin	Fungicide	10
Fludioxonil	Fungicide	10
Tebuconazole	Fungicide	6
Triclopyr-butotyl	Herbicide	6
Bacillus Subtilis	Fungicide	5
Amitrole	Herbicide	< 5
Triticonazole	Fungicide	< 5
Dicamba	Herbicide	< 5
Chlorantraniliprole	Insecticide	< 5
Metsulfuron-methyl	Herbicide	< 5
Fluazinam	Fungicide	< 5
Carbaryl	Insecticide	< 5
Lime Sulphur	Fungicide	< 5
Azoxystrobin	Fungicide	< 5
Pottassium Bicarbonate	Fungicide	< 5

Pesticide Active Ingredient	Pesticide Type	Quantity of Active Ingredient Used (kgs)
Pyraclostrobin	Fungicide	< 5
Trinexapac-ethyl	Plant Growth Regulator	< 1
Iron Hedta	Herbicide	< 1
Bromacil	Herbicide	< 1
Fluopyram	Fungicide	< 1
Flonicamid	Insecticide	< 1
Sulphur	Fungicide	< 1
Copper Sulphate Pentahydrate	Algaecide	< 1
Picloram	Herbicide	< 1
Daminozide	Plant Growth Regulator	< 1
Imidacloprid	Insecticide	< 1
Carfentrazone-ethyl	Herbicide	< 1
Thiophanate-methyl	Fungicide	< 1
Kinoprene	Insecticide	< 1
Sethoxydim	Herbicide	< 1
Mecoprop-p-potassium	Herbicide	< 1
Acephate	Insecticide	< 1
Beauveria Bassiana Strain Gha	Insecticide	< 1
Chlormequat Chloride	Plant Growth Regulator	< 1
Etridiazole	Fungicide	< 1
Bacillus Thuringiensis (Berliner) Ssp Kurstaki Strain Hd-1	Insecticide	< 1
Myclobutanil	Fungicide	< 1
Pyridaben	Insecticide	< 1
Metalaxyl-m And S-isomer	Fungicide	< 1
Spirotetramat	Insecticide	< 1
Spinosad	Insecticide	< 1
Acetamiprid	Insecticide	< 1
Abamectin	Insecticide	< 1
Bifenazate	Acaricide	< 1
Pyriproxyfen	Insecticide	< 1
Paclobutrazol	Plant Growth Regulator	< 1
Grand Total*		1,632 kg

*Agency run golf courses licensed in the landscape category were not included in this data set.

Appendix C: Types and quantities of pesticide active ingredients used in 2018 by all landscape licensees in British Columbia

Pesticide Active Ingredient	Pesticide Type	Quantity of Active Ingredient (kgs) Used
Chlorothalonil	Fungicide	11,575
Mineral Oil	Fungicide	11,179
Glyphosate	Herbicide	5,898
2,4-d	Herbicide	3,046
Iprodione	Fungicide	2,385
Mecoprop-p-dimethylammonium	Herbicide	1,466
Propiconazole	Fungicide	974
Fosetyl-al	Fungicide	709
Triclopyr-butotyl	Herbicide	527
Thiophanate-methyl	Fungicide	510
Spinetoram	Insecticide	439
Fludioxonil	Fungicide	434
Dichlobenil	Herbicide	390
Fluoxastrobin	Fungicide	359
Trifloxystrobin	Fungicide	356
Dicamba	Herbicide	319
Permethrin	Insecticide	224
Acetic Acid	Herbicide	213
Copper Hydroxide	Fungicide	211
Mono- And Dipotassium Phosphite	Fungicide	175
Diuron	Herbicide	144
Carbaryl	Insecticide	137
Triticonazole	Fungicide	132
Lime Sulphur	Fungicide	121

Pesticide Active Ingredient	Pesticide Type	Quantity of Active Ingredient (kgs) Used
Benzovindiflupyr	Fungicide	118
Trinexapac-ethyl	Plant Growth Regulator	117
Picloram	Herbicide	116
Tebuconazole	Fungicide	101
Azoxystrobin	Fungicide	96
Mecoprop propioic acid – dimethylamine (1:1)	Herbicide	93
Simazine	Herbicide	85
Hydrogen Peroxide	Fungicide	74
Acephate	Insecticide	54
Copper Oxychloride	Fungicide	53
Fluazinam	Fungicide	48
Diquat	Herbicide	38
Mecoprop-p-potassium	Herbicide	38
Mcpa	Herbicide	37
Bronopol	Slimicide	34
Chlorantraniliprole	Insecticide	31
Captan	Fungicide	29
Copper Sulphate	Fungicide	28
Imidacloprid	Insecticide	27
Sulphur	Fungicide	26
Aminopyralid	Herbicide	24
Mecoprop-p	Herbicide	24
Penthiopyrad	Fungicide	22
Bacillus Thuringiensis (Berliner) Ssp Kurstaki Strain Hd-1	Insecticide	20
Bacillus Thuringiensis Israelensis	Insecticide	20
Iron Hedta	Herbicide	19

Pesticide Active Ingredient	Pesticide Type	Quantity of Active Ingredient (kgs) Used
Imazapyr	Herbicide	17
Bacillus Subtilis (strain Qst 713)	Fungicide	16
Metconazole	Fungicide	16
Amitrole	Herbicide	15
Deltamethrin	Insecticide	15
Ferbam	Fungicide	14
Tribenuron-methyl	Herbicide	14
Malathion	Insecticide	14
Carfentrazone-ethyl	Herbicide	11
Pyraclostrobin	Fungicide	11
Propamocarb Hydrochloride	Fungicide	11
Polyoxin D Zinc Salt	Fungicide	11
cyantraniliprole	Insecticide	< 10
Mancozeb	Fungicide	< 10
Fluopyram	Fungicide	< 10
Piperonyl Butoxide	Insecticide	< 10
Pottassium Bicarbonate	Fungicide	< 10
Phosmet	Insecticide	< 10
Mandestrobin	Fungicide	< 5
Myclobutanil	Fungicide	< 5
Indaziflam	Herbicide	< 5
Aminocyclopyrachlor	Herbicide	< 5
Chlorsulfuron	Herbicide	< 5
Metalaxyl-m And S-isomer	Fungicide	< 5
Spinosad	Insecticide	< 5
Metsulfuron-methyl	Herbicide	< 5

Pesticide Active Ingredient	Pesticide Type	Quantity of Active Ingredient (kgs) Used
Thiacloprid	Insecticide	< 5
Fenbutatin Oxide	Acaricide	< 5
Acetamiprid	Insecticide	< 5
triclopyr	Herbicide	< 5
Spirotetramat	Insecticide	< 5
Novaluron	Insecticide	< 5
Canola Oil	Fungicide, Insecticide	< 5
Chlorthal-dimethyl	Herbicide	< 5
Pyroxasulfone	Herbicide	< 5
Clopyralid	Herbicide	< 5
Flumioxazin	Herbicide	< 5
Cinerin I- Cinerin li- Jasmolin I-Jasmolin li- Pyrethrin I And Pyrethrin li	Insecticide	< 5
Clothianidin	Insecticide	< 5
Imazethapyr	Herbicide	< 1
Diflufenzopyr	Herbicide	< 1
Dimethoate	Insecticide	< 1
Bromacil	Herbicide	< 1
Methoxyfenozide	Insecticide	< 1
Flonicamid	Insecticide	< 1
Daminozide	Plant Growth Regulator	< 1
Vinclozolin	Fungicide	< 1
Coniothyrium Minitans Strain Con/m/91-08	Fungicide	< 1
Copper Sulphate Pentahydrate	Algaecide	< 1
Octylbicyclo Heptene Dicarboximide	Insecticide	< 1
Pyridaben	Insecticide	< 1
Kinoprene	Insecticide	< 1

Pesticide Active Ingredient	Pesticide Type	Quantity of Active Ingredient (kgs) Used
Spiromesifen	Insecticide	< 1
Sethoxydim	Herbicide	< 1
Chlormequat Chloride	Plant Growth Regulator	< 1
Beauveria Bassiana Strain Gha	Insecticide	< 1
Cyfluthrin	Insecticide	< 1
Bifenazate	Acaricide	< 1
Cyprodinil	Fungicide	< 1
Quinoxyfen	Fungicide	< 1
Etridiazole	Fungicide	< 1
Triforine	Fungicide	< 1
Boscalid	Fungicide	< 1
Iron	Herbicide	< 1
Lambda-cyhalothrin	Insecticide	< 1
Trichoderma Harzianum Rifai strain T22	Fungicide	< 1
Fenpyroximate	Insecticide	< 1
Disodium Octaborate Tetrahydrate	Insecticide	< 1
Abamectin	Insecticide	< 1
Thiamethoxam	Insecticide	< 1
Extract of Reynoutria sachalinensis	fungicide	< 1
Pyriproxyfen	Insecticide	< 1
Bendiocarb	Insecticide	< 1
Boracic Acid	Insecticide	< 1
Paclobutrazol	Plant Growth Regulator	< 1
Trichoderma Harzianum Strain Krl-ag2	Fungicide	< 1
Grand Total		43,573 kg