Health Canada Santé Canada

Canada

Report on Pesticide Incidents for 2014

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Contents

Executive Summary

The Pest Management Regulatory Agency (PMRA) has been collecting pesticide incident reports since 2007. These incident reports are used to help identify and characterize potential risk to humans, domestic animals and the environment from the use of pesticides.

In 2014, 1884 incident reports were submitted to the PMRA. Domestic animal incidents were reported most frequently, followed by human and environment incidents. Most incidents involved minor effects.

The PMRA took several risk reduction measures as a result of the incident report data. In some cases, product labels were modified to clarify warning and first aid statements for consumers (for example, methomyl insecticidal scatter bait products, tetramethrin insecticide spray or fogging products, and d-phenothrin insecticidal shampoo for dogs). Label modifications were also made to commercial diquat products to strengthen warning and first aid statements for eye, skin, inhalation and oral exposure.

In other cases, risk reduction measures are reflected in changes to the use directions on product labels. For example, labels for products containing the new active ingredient beta-cyfluthrin will include an extended re-entry interval, and listing of potential adverse effects determined based on incident information. Additionally, new requirements were introduced for commercial applicators to provide information sheets when they treat homes or structures. Similarly, the directions for using a clip-on personal mosquito repellent product containing metofluthrin were modified to direct the user to only clip the device to areas below the waist and to only wear one device at a time. A precaution statement will also be added informing the user to avoid direct inhalation of the product vapours.

Incident reports also contributed to several proposed changes to the product Gramoxone Liquid Herbicide (Reg. No. 8661), which contains paraquat. Proposed risk mitigation measures include making the products restricted for use by licensed pesticide applicators, prohibiting non-labelled tank mix partners, reducing the concentration of paraquat in the end-use product, modifying packaging to have a built-in capacity to measure the product, and requiring applicators to wear additional protective equipment.

Incidents involving honeybees continue to be monitored very closely by the PMRA. The number and severity of honeybee incidents reported during the planting period were lower in 2014 than in previous years. Measures introduced for the 2014 planting season to reduce pollinator exposure to dust generated during planting of treated corn and soybean seed may have contributed to this reduction. These measures included: mandatory use of a dust-reducing seed flow lubricant, best management practices for safer seed planting, and enhanced warnings and advice on how to protect bees on pesticide and seed package labels. Each investigation included

evaluating hive health, collecting samples (dead bees, pollen and nectar) for pesticide residue analysis, and gathering as much information as possible about the bee yard management practices and the surrounding agriculture. The assessment of these incidents is ongoing.

Introduction

Health Canada regulates pesticides under the *Pest Control Products Act*, which is administered by the Pest Management Regulatory Agency (PMRA). Under the Act, the PMRA determines which pesticides can be registered for use in Canada through a series of detailed, science-based evaluations that assess a pesticide's potential risk to human health and the environment, and its value in relation to the intended use. Pesticides are registered by Health Canada if the risks to human health and the environment are determined to be acceptable and the product has value. Following the registration of pesticides, the PMRA continues to monitor their safety by collecting and evaluating reports of incidents that may be related to these products.

As of the end of 2014, more than 12 585 incident reports have been submitted to the PMRA since the Incident Reporting Program began in April 2007. This review summarizes the incident reports received from January 1 to December 31, 2014, and provides key details of the PMRA's evaluations.

Pesticide Incidents

A pesticide incident is any unintended effect to human health, domestic animal health or the environment resulting from exposure to a pesticide. A pesticide incident may also be a packaging failure that could result in human exposure or injury, excessive residues in food, or a scientific study that indicates a new hazard or increased risk.

Incidents are further classified by severity based on the criteria outlined in the Pest Control Products Incident Reporting Regulations. Human and domestic animal incidents are categorized as one of four severity levels: death, major, moderate and minor. Minor incidents include symptoms that are minimally bothersome and resolve rapidly without medical treatment (for example, coughing). Moderate incidents include symptoms that are more pronounced or prolonged than minor symptoms, and that may require some form of medical treatment. Major incidents include symptoms that could be life-threatening or result in chronic disability (for example, seizure). For environment incidents, there are three severity classifications: major, moderate and minor. These severity classifications are determined based on the type and number of organisms affected.

Reporting a Pesticide Incident

While manufacturers of pesticide products have a legal obligation to report all information that they receive about an incident that relates to their product(s), anyone can report a suspected pesticide incident to the PMRA, including the general public, farmers, medical professionals or other governmental organizations. The PMRA encourages the reporting of all pesticide incidents,

including incidents resulting from misuse of the pesticide, or incidents where the adverse effects that occurred were already indicated on the product label.

Pesticide manufacturers are required to report all incidents that occur in Canada and a subset of incidents that occur in the United States. This subset includes incidents classified as human death, human major and domestic animal death. As such, the number of American incidents reported to the PMRA does not reflect the total number of incidents that are reported to authorities in the United States.

Submitted pesticide incident reports are made available through the Health Canada website on the PMRA public registry (http://pr-rp.hc-sc.gc.ca/pi-ip/disclaimer-avertissement-eng.php).

The Use of Pesticide Incident Data

Health Canada's PMRA uses incident report data to identify hazards and characterize potential risks to humans, domestic animals and the environment from the use of pesticides. All incident reports that are received by the PMRA are evaluated. Priority is given to incidents that are serious in nature, that involve multiple people or animals, or that indicate a recurring problem.

Evaluations can vary in scope, depending on a variety of factors, such as the amount of information that is available and the complexity of the issue. Information from many different sources, such as scientific studies, poisoning data and pesticide sales data, are considered and integrated into the risk assessment process in order to help determine whether the pesticide could have caused the reported effects. If a risk to human or domestic animal health or the environment is identified, the PMRA takes action to help prevent future incidents from occurring. Risk management options vary and depend on the type of risk identified. Examples include revising pesticide label instructions and developing best practices for farmers. Incident data is also considered and incorporated into regulatory work that is done by the PMRA, supporting decisions being made about pesticide products.

There are limitations associated with reported incidents that must be taken into consideration. For example, the information provided in reports is usually unsubstantiated and often incomplete. The adverse effects that are reported may be related to non-pesticide factors and the reporting of a particular effect does not necessarily mean that it was caused by the pesticide. Conversely, pesticide incidents are under-reported and assumptions cannot be made if there is a lack of incidents reported for a specific pesticide.

Monitoring incidents for unanticipated effects or changes in a pesticide's risk profile is an ongoing process at the PMRA that may include re-assessing previous conclusions. In cases where mitigation strategies were adopted, the PMRA monitors the incident report data to determine if the actions were effective in managing the identified risk.

Incident Reports Received in 2014

General Analysis

The PMRA received 1884 incident reports in 2014. Of the reported incidents, 70% occurred in Canada, the remainder was the subset of reports from the United States. The order of frequency of reported incidents were: domestic animal (76%), human (14%), environment (6%), packaging failure (3%), and scientific study incidents (2%), respectively. Most of the incidents that occurred in Canada involved products that can be purchased and used by the general public in and around the home; incidents were also reported for commercial class products.

Summary of 2014 Human Incident Reports

The PMRA received 241 human incident reports in 2014 that involved 284 people. Some incidents involved more than one person. Nearly 90% of the human incidents occurred in Canada; in addition to Canadian incidents, the PMRA also receives American human incidents that are major in severity or that involve a death. Most human incidents were minor in severity. There were 29 incidents classified as death or major, six of which occurred in Canada; the remainder occurred in the United States. They are described in more detail below.

Overall, most incidents involved adults. Males and females were equally represented in the data. There were 21 children reported to have been affected by pesticide exposure, all but one of which reported minor symptoms.

For all human incidents received in 2014, the primary routes of exposure were dermal and inhalation. The length of exposure to a pesticide was often reported (50%) as unknown. When the duration was known, the majority of individuals reported being exposed for 15 minutes or less. Similarly, the duration of the symptoms was often unknown. When reported, more than half of the individuals stated that their symptoms lasted less than a day.

Skin symptoms such as itchy skin were most frequently reported. Gastrointestinal and nervous and muscular symptoms were also regularly reported and included symptoms such as nausea, headache or dizziness.

More than half of the incidents involved products that are used to control insects. The application of a product inside or outside the home, or as a personal insect repellent, was most often reported as the ways in which people were exposed to a pesticide.

Of the 29 incidents classified as major or death, 19 were considered to be unrelated to the reported pesticide exposure. In the other 10 cases, the PMRA determined that there was some likelihood of association of the symptoms with the reported exposure to the pesticide. Four of these incidents occurred in Canada, and six in the United States. One incident involved serious eye effects after diquat was accidentally splashed in the subject's eye. The review of this incident resulted in label amendments (see Section 2.2.2). There were two incidents that involved

exposure to paraquat. The first incident occurred following prolonged skin contact that resulted in 2nd and 3rd degree burns when a worker was accidently exposed while using the product. In the second incident, an individual died after accidentally drinking the product that was being stored in a beverage container. A full review of all paraquat incidents was conducted as part of a Special Review that was initiated based on a prohibition on the use of paraquat as a pesticide by the European Union and Sweden. See Section 2.2.5 for details of the review and mitigation measures.

Of the remaining seven incidents classified as major or death, two were associated with the application of a product at home that resulted in serious allergic reactions. In both of these cases, the strength of the information was not considered sufficient to warrant regulatory action. Two incidents were due to the intentional ingestion of a pesticide. Another two incidents occurred following exposure during the application of commercial products, in which the individuals were not wearing appropriate personal protective equipment. In the final serious incident, a man died after ignoring signs and trespassing onto a tarp-covered property that had recently been fumigated with sulfuryl fluoride.

The evaluations of human incidents that led to actions being taken by the PMRA are summarised below. Documents are posted on the Health Canada website that outline proposed registration decisions (Consultations), and that communicate final regulatory decisions that have been made by Health Canada (Decisions and Updates).

Beta-Cyfluthrin

In support of the proposed registration of the new active ingredient beta-cyfluthrin and related end-use products, a review of all incidents was conducted. There were no incidents involving beta-cyfluthrin, as this active ingredient had yet to be registered. However, it is considered to be equivalent to cyfluthrin, which is registered. As such, incident reports involving cyfluthrin were evaluated in order to support the registration of beta-cyfluthrin. The incident review highlighted the potential for respiratory effects following re-entry into treated areas after the product had been applied. As a result, the PMRA lengthened the proposed re-entry interval and required that potential adverse effects be listed on the product label. Because commercial applicators may not always interact with occupants, it was also required that an information sheet be left at each treated home or structure, so that all occupants are aware of re-entry intervals, the need to ventilate, and potential adverse effects. These mitigation measures will be in place when the new products enter the Canadian market.

Diquat

An incident report was received that described the serious ocular effects that a person experienced after diquat, a commercial class product, had splashed in his eye (symptoms included ‘melting’ of the sclera and eyelid). The incident prompted a review of all human diquat incidents.

Many of the incidents occurred during the mixing, loading, or application of the product and involved dermal, ocular or inhalation exposure. In those incidents where exposure to the skin or eyes occurred, it was often reported that effects worsened over time if not treated immediately.

In one incident report, a man was treated with 100% oxygen following respiratory exposure to diquat. His symptoms worsened and, two weeks later, he was transferred to ICU with respiratory failure. Supplemental oxygen is contraindicated following respiratory exposure to diquat until the patient develops severe hypoxemia. The use of supplemental oxygen may have contributed to the worsening of his condition, according to published information on diquat exposures.

Due to the conclusions of this review, the labels of all products containing diquat are required to be modified by April 1, 2016 to improve clarity regarding the potential seriousness of ocular or dermal contact and the potential for delayed onset of symptoms, as well as the addition of a statement that oxygen supplementation is contraindicated unless the patient develops severe hypoxemia.

Methomyl

As part of the re-evaluation process, incidents involving the active ingredient methomyl were assessed. A high number of domestic animal deaths occurred after animals had access to granular bait used to control flies (known as scatter bait), and in many cases, the product had been used around the home. Although the majority of these deaths occurred in the United States, both Canadian and American labels indicate that the product is only to be used in and around agricultural buildings, and that it should only be applied to areas out of reach of domestic animals. Despite these statements being on Canadian labels, incidents did occur. As such, it was proposed that Canadian labels for scatter baits containing methomyl be modified in order to improve clarity. A separate warning statement with the following text: "THIS PRODUCT IS NOT TO BE USED INSIDE OR AROUND HOMES, OR ANY OTHER PLACE WHERE CHILDREN OR PETS ARE LIKELY TO BE PRESENT" is required.

Metofluthrin

An evaluation of incidents involving metofluthrin was conducted as part of a review of the product 'OFF! Clip-on Mosquito Repellent' (Reg. No. 30211). In the incident reports, there were 15 individuals who experienced minor or moderately severe symptoms. The commonly reported route of exposure was inhalation. As such, it has been proposed that the labels be modified to include statements to avoid direct inhalation of the product vapours, to only clip the device to areas below the waist, and to wear only one device at a time.

Paraquat

Incidents involving paraquat were considered as part of a Special Review of paraquat. Three main human hazards were identified from the incident reports: dermal exposure to paraquat resulted in severe effects, including second and third degree burns; accidental ingestion of paraquat from unmarked containers resulted in life-threatening or fatal outcomes; and accidental respiratory exposure occurred during application of paraquat products.

Many mitigation measures are being implemented with the intent of reducing potential risk to human health. Paraquat products will be restricted so that they can only be used by licensed pesticide applicators. Information about hazards, seriousness of health effects, and first aid treatment are being added to the product label. Additional personal protective equipment will be required for applicators during mixing, loading, application, clean-up and repair, including the use of chemical-resistant coveralls and a respirator. The tank mixing of Gramoxone Liquid

Herbicide with non-labelled pest control products will be prohibited. The concentration of paraquat in the product will be reduced to lower the potential for serious health effects following accidental exposure. Modified packaging with a built-in capacity to measure the required volume will be required for the end-use product. In addition, a stewardship program including measures to inform vendors and users about new mitigation measures and to reduce the risk of accidental exposure will be implemented. Further details regarding these mitigation measures can be found on the Health Canada website (Re-evaluation Note REV2015-14, Special Review Decision: Paraquat).

Tetramethrin

Incidents involving tetramethrin were reviewed to support the re-evaluation of this active ingredient. The review encompassed 59 human subjects and 44 domestic animal incidents. Most incidents were minor in severity and involved the normal use of sprays or foggers in or around the home. The human incident data indicated a potential issue with incidental inhalation and dermal exposure to domestic class insecticide sprays, even when these products were used according to label directions. In the review of domestic animal incidents, contact with a treated area following the application of an insecticide spray indoors was identified as a potential issue. The label will be revised to provide consistency across common products, update label statements and minimize unnecessary human and domestic animal exposure.

Summary of 2014 Domestic Animal Incident Reports

In 2014, the PMRA received 1503 domestic animal incident reports. Incidents that occurred in Canada made up 70% of all domestic animal incidents and most involved dogs and cats that were exposed to pesticides registered for use on animals for the control of fleas and ticks, with some incidents involving other insecticides registered for use either inside or outside the home. Farm animals such as cows and horses were frequently reported in incidents involving herbicides and fungicides that were used on agricultural sites located outdoors. Ingestion was another route of exposure that was commonly reported in domestic animal incidents. An analysis of incidents associated with dermally applied products for the control of fleas and ticks is currently ongoing.

Symptoms reported in incidents varied depending on the type of pesticide to which the animal was exposed. Skin effects such as itchy skin were commonly reported in incidents involving dermally applied products. With other types of products, gastrointestinal effects such as vomiting were commonly reported, as well as more general symptoms like lethargy and abnormal behaviour.

One evaluation of domestic animal incidents in 2014 led to actions being taken by the PMRA. This review is summarised in section 2.3.1.

D-Phenothrin

Incident reporting information was incorporated into the evaluation of a new shampoo product proposed for use on dogs for the control of fleas and ticks. Since the product was not yet registered for use in Canada, incident report data from the United States was used. Over 200 incident reports from the United States indicated at least moderate severity in dogs from

exposure to similar shampoo products. There was an indication from the American data that young and/or small dogs may be more frequently affected following use of this shampoo. As a result, a statement was added to the product label warning users to exercise caution when applying the product to younger or smaller animals, as they may be more sensitive to adverse effects from the shampoo.

Summary of 2014 Environment Incident Reports

Environment incidents involving pollinators continued to be reported to the PMRA in 2014. These incidents are discussed in section 2.4.1. All of the environmental incidents that did not involve honey bees were minor in nature. Most of these incidents involved herbaceous plant damage, in particular, effects to lawn or grass as a result of application of an herbicide.

Honey bees

In 2012 and 2013, the PMRA received numerous reports of honeybee mortality incidents. These incidents occurred mainly in intense corn growing regions of Ontario, with fewer reports from corn growing regions of Quebec and Manitoba. A vast amount of information was evaluated: information collected through beekeeper questionnaires, symptom observations, samples collected for pesticide residue analysis, Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) bee health inspections, and surveys of detailed agricultural practice information surrounding affected bee yards. The weight of evidence indicated that exposure to dust generated during the planting of neonicotinoid treated corn and soybean seed contributed to bee mortalities in 2012 and 2013.

In response to these incidents, the PMRA announced the following measures to reduce pollinator exposure to dust generated during the planting of treated corn and soybean seed:

- The New 2014 Requirement when using Treated Corn / Soybean Seed of a dust-reducing seed flow lubricant.
- Best Management Practices for Protecting Pollinators during Pesticide Spraying and an update on best practices for Pollinator Protection and Responsible Use of Treated Seed.
- Enhanced warnings and directions on pesticide and seed package labels on how to protect bees.

Before the 2014 planting season began, the PMRA, OMAFRA, the Canadian Seed Trade Association, CropLife Canada, and pesticide registrants collaborated to help ensure risk mitigation measures were communicated to growers across Canada and that the dust-reducing lubricant was readily available. This outreach campaign was successful. Seed dealers and retailers verified that the new lubricant, seed tags, labels and best management practices were provided to growers when they purchased treated seed, and sales and distribution data suggest the fluency agent was used extensively.

With these measures in place, the number and severity of incidents reported in 2014 during planting were lower than in 2012 and 2013, with a 70 percent reduction in incidents during planting in 2014 compared to 2013. However, the following factors related to the very wet, cold spring in south-western Ontario may also have contributed to the decrease:

- An extended time period for corn planting in 2014 as opposed to the more usual intensive planting over a short time-period in 2012 and 2013.
- Changes in timing of bee foraging activity and available forage relative to timing of corn planting.

In 2012, the majority of incidents reported were acute bee mortality incidents occurring around the time of corn and soybean planting. In 2013 and 2014, the PMRA received an increase in incident reports of poorly performing hives later in the season. At this time, it is unclear what factors may be responsible for these reports. It may be that beekeepers have become more vigilant in reporting unusual symptoms observed in their colonies, as well as more aware of the process of reporting these issues to the PMRA and OMAFRA. In 2013, some of the colonies affected later in the season had pesticide residues present in the hives; however, some colonies did not have any measurable residues, making it difficult to determine whether or not pesticides were a contributing factor to the effects reported. It is also unclear how widespread these effects may be because a small number of beekeepers account for the majority of reported colony effects.

As in 2012 and 2013, each incident reported in 2014 was investigated through a collaborative effort between the PMRA, Health Canada's Regions and Programs Bureau, and the provinces. Each investigation included evaluating hive health, collecting samples (dead bees, pollen and nectar) for pesticide residue analysis, and gathering as much information as possible about the bee yard management practices and the surrounding agriculture. The assessment of these incidents is ongoing, and the samples collected are being analysed for pesticide residues and bee viruses. An update on the honey bee incidents to date can be found on the PMRA website (Update on Neonicotinoid Pesticides and Bee Health).

The evaluation of bee mortalities in Canada continues to be a priority for the PMRA.

Summary of 2014 Packaging Failure Incident Reports

There were 54 packaging failure incidents reported to the PMRA in 2014. Pressurized products and spray bottles were reported most frequently in packaging failure incidents. There were no packaging failure incidents that resulted in injury. Assessment of the packaging failure incidents did not identify any significant issues.

Other Activities

In 2013, an incident was reported in which several people experienced symptoms after their office was treated with a pesticide. This incident was described in the 2013 Report on Pesticide Incidents. At the time of the incident, it was reported that a product containing the active ingredient pyrethrins had been used in the office. The incident was investigated by Health Canada and analyses of samples taken from the office confirmed that the product used had actually contained the active ingredient chlorpyrifos. The pest control company was fined for the misuse of an insecticide containing chlorpyrifos.

Conclusions

The majority of Canadian pesticide incident reports received in 2014 were minor in nature. Most incidents involved products that can be used by the general public, although some serious incidents were associated with products that are commercial class only (i.e., not for use by the general public). As with previous years, most incidents occurred during the application of a pesticide product to an animal, or in or around the home.

Pesticide incident reports are used to identify unforeseen risks to humans, domestic animals or to the environment. Such risks are sometimes identified from a single incident report, but are more often identified during the evaluation of a group of incidents. Some risks may require significant mitigation while others may require minor changes to a product registration. In 2014, there were several measures taken by the PMRA as a consequence of evaluations of pesticide incident data.

Incident reports are an essential element of post market monitoring. Under the Incident Reporting Regulations, the PMRA will continue to collect and analyse incident report information to identify and characterize potential risk to humans, domestic animals, and the environment from the use of pesticides.

How to Report Pesticide Incidents

There are two ways to report pesticide incidents:

1. Contact the pesticide company using the information on the product label. They are required by law to report all incidents related to their products to Health Canada.

2. Go to http://www.healthcanada.gc.ca/pesticideincident and fill out one of the forms under the section called "How to report a pesticide incident." If you have any questions about the forms, or need help filling them out, please call Health Canada at 1-800-267-6315 (within Canada) or 1-613-736-3799 (outside of Canada), or send an email to PMRA-incident-ARLA@hc-sc.gc.ca.

More information is available at: www.healthcanada.gc.ca/pesticideincident.