Re-evaluation Decision RVD2021-08

Cyromazine and Its Associated End-use Products

Final Decision

(publié aussi en français)

16 December 2021

This document is published by the Health Canada Pest Management Regulatory Agency. For further information, please contact:

Publications
Pest Management Regulatory Agency
Health Canada
2720 Riverside Drive
A.L. 6607 D
Ottawa, Ontario K1A 0K9

Internet: canada.ca/pesticides
pmra.publications-arla@hc-sc.gc.ca
Facsimile: 613-736-3758
Information Service:
1-800-267-6315 or 613-736-3799
pmra.info-arla@hc-sc.gc.ca

Canada

ISSN: 1925-1017 (print)
1925-1025 (online)

Catalogue number: H113-28/2021-8E (print version)
H113-28/2021-8E-PDF (PDF version)

Table of Contents

Re-evaluation decision for cyromazine and associated end use products

Under the authority of the *Pest Control Products Act,* all registered pesticides must be re-evaluated by Health Canada's Pest Management Regulatory Agency (PMRA) to ensure that they continue to meet current health and environmental standards and continue to have value. The re-evaluation considers data and information from pesticide manufacturers, published scientific reports and other regulatory agencies, as well as comments received during public consultations. Health Canada applies internationally accepted risk assessment methods as well as current risk management approaches and policies.

Cyromazine is a systemic insecticide and insect growth regulator that is registered for commercial use for the control of a variety of pests on potatoes, greenhouse ornamentals, outdoor ornamentals, mushrooms, greenhouse vegetables, and field vegetables. Cyromazine is also registered for the importation of treated dry bulb and green onion seeds. Currently registered products containing cyromazine can be found in the Pesticide Label Search and in Appendix I. The Proposed Re-evaluation Decision PRVD2020-02, *Cyromazine and Its Associated End-use Products*,[1] containing the evaluation of cyromazine and proposed decision, underwent a 90 day consultation period ending on 5 May 2020. PRVD2020-02 proposed cancellation of all uses except planting of treated green onion seeds, and use on outdoor ornamentals not grown for cut flowers, and mushrooms; additional risk mitigation measures were proposed for these uses.

Health Canada received comments and information relating to the health and value assessments. Commenters are listed in Appendix II. These comments are summarized in Appendix III along with the responses by Health Canada. These comments and new data/information resulted in revisions to the occupational risk assessment (see Science evaluation update, and Appendix IV), and resulted in changes to the proposed re-evaluation decision as described in PRVD2020-02.

A reference list of information used as the basis for the proposed re-evaluation decision is included in PRVD2020-02, and further information used in the re-evaluation decision is listed in Appendix VI of this RVD. Therefore, the complete reference list of all information used in this final re-evaluation decision includes both the information set out in PRVD2020-02 and the information set out in Appendix VI herein.

This document presents the final re-evaluation decision[2] for the re-evaluation of cyromazine, including the required amendments (risk mitigation measures) to protect human health and the environment, as well as label amendments required to bring labels to current standards. All products containing cyromazine that are registered in Canada are subject to this re-evaluation decision.

[1] "Consultation statement" as required by subsection 28(2) of the *Pest Control Products Act*.

[2] "Decision statement" as required by subsection 28(5) of the *Pest Control Products Act*.

Re-evaluation decision for cyromazine

Health Canada has completed the re-evaluation of cyromazine. Under the authority of the *Pest Control Products Act*, Health Canada has determined that continued registration of products containing cyromazine is acceptable. An evaluation of available scientific information found that some uses of cyromazine products meet current standards for protection of human health and the environment and have acceptable value when used according to revised conditions of registration, which includes new mitigation measures.

The following uses of cyromazine are cancelled, since health risks were not shown to be acceptable when used according to the current conditions of registration or when additional mitigation is considered:

- Outdoor: Crop Group 4 (leafy vegetables except Brassica vegetables), Crop Group 5b (leafy brassica greens), celery, and outdoor ornamentals grown for cut flowers;
- Greenhouse: ornamentals grown for cut flowers.

Label amendments, as summarized below and listed in Appendix V, are required for the continued registration of the remaining uses.

Risk mitigation measures

Registered pesticide product labels include specific directions for use. Directions include risk mitigation measures to protect human health and the environment and must be followed by law. The required amendments, including any revised/updated label statements and/or mitigation measures as a result of the re-evaluation of cyromazine, are summarized below. Refer to Appendix V for details.

Human health

To protect workers and those entering treated areas from potential occupational exposure, the following risk-reduction measures are required for the continued registration of cyromazine in Canada:

- Cancelled uses to be removed from product labels:
    - Outdoor: Crop Group 4 (leafy vegetables except Brassica vegetables), Crop Group 5b (leafy brassica greens), celery, and outdoor ornamentals grown for cut flowers;
    - Greenhouse: ornamentals grown for cut flowers.

- For the following remaining uses, additional personal protective equipment (PPE), engineering controls, updated restricted-entry intervals (REIs), and/or reduction of the number of applications per crop cycle:
    - Outdoor: potatoes, outdoor ornamentals not grown for cut flowers;
    - Commercial planting: dry bulb onion seeds and green onion seeds;
    - Greenhouse: ornamentals not grown for cut flowers and lettuce;
    - Mushroom houses: mushrooms.

Environment

To protect the environment, the following measures are required:

- Standard environmental hazard statements to inform users of the potential toxic effects on birds and mammals (from cyromazine-treated seeds), beneficial insects, non-target terrestrial plants and aquatic organisms.
- As a precaution, the potential effects to bee reproduction and brood development will be indicated on the label. Best practices are recommended.
- To mitigate the potential exposure of cyromazine to non-target organisms, spray buffer zones are required to protect sensitive terrestrial and aquatic habitats from spray drift (3 metres).
- A statement is required on product labels to inform users that residues of cyromazine (melamine) have the potential to carry over to the next season and leach to groundwater.
- To reduce the potential for runoff of cyromazine to adjacent aquatic habitats, precautionary label statements for sites with characteristics that may be conducive to runoff and when heavy rain is forecasted are required.

Next steps

To comply with this decision, the required amendments (mitigation measures and label updates) must be implemented on all product labels no later than 24 months after the publication date of this decision document. Accordingly, both registrants and retailers will have up to 24 months from the date of this decision document to transition to selling the product with the newly amended labels. Similarly, users will also have the same 24-month period from the date of this decision document to transition to using the newly amended labels, which will be available on the Public Registry.

Refer to Appendix I for details on specific products impacted by this decision.

Other information

Any person may file a notice of objection[3] regarding this decision on cyromazine and its associated end-use products within 60 days from the date of publication of this Re-evaluation Decision. For more information regarding the basis for objecting (which must be based on scientific grounds), please refer to the Pesticides section of the Canada.ca website (Request a Reconsideration of Decision) or contact the PMRA's Pest Management Information Service by phone (1-800-267-6315) or by e-mail (pmra-info-arla@hc-sc.gc.ca).

The relevant confidential test data on which the decision is based (as referenced in PRVD2020-02 and in Appendix VI of this document) are available for public inspection, upon application, in the PMRA's Reading Room. For more information, please contact the PMRA's Pest Management Information Service.

[3] As per subsection 35(1) of the *Pest Control Products Act*.

Science evaluation update

Based on the comments and additional information received during consultation, Health Canada revised the human health risk assessment for workers.

1.0 Revised health risk assessment

1.1 Toxicology summary

Details of the toxicological assessment can be found in PRVD2020-02. No comments were received on the toxicology risk assessment during the consultation period. No changes were made to the toxicology assessment.

1.2 Dietary exposure and risk assessment

Details of the dietary assessment can be found in PRVD2020-02. No comments were received on the dietary risk assessment during the consultation period. No changes were made to the dietary assessment.

1.3 Occupational and non-occupational exposure and risk assessment

During the PRVD consultation period, additional information was received from registrants, user/grower groups, and other stakeholders regarding the use of cyromazine on potatoes, ornamentals, and dry bulb onion seeds. In addition, dust-off studies for the commercial planting of cyromazine-treated dry bulb onion seeds were received from one registrant. This information was incorporated into the revised assessment where applicable.

The updated occupational risks were shown to be acceptable for planting of treated dry bulb onion seeds, and uses on potatoes, greenhouse ornamentals not grown for cut flowers, and greenhouse lettuce; the use pattern changes and mitigation measures are outlined in Appendix IV. Similarly, the updated occupational risks were shown to be acceptable for the use of handheld airblast/mistblower on ornamentals (not grown for cut flowers) and greenhouse lettuce, provided additional personal protective equipment (PPE) is worn. This PPE consists of chemical-resistant coveralls with a chemical-resistant hood over long pants, long-sleeved shirt, chemical-resistant gloves and a respirator. Additionally, the postapplication risk assessment for potatoes was updated to include the differing rates for the two application timings. For all other scenarios, the risk assessment and conclusions have not changed from the previous assessment (PRVD2020-02).

Health Canada responses to specific comments can be found in Appendix III. Details of the revised occupational risk assessment are presented in Appendix IV.

2.0 Environmental risk assessment

Details of the environmental assessment can be found in PRVD2020-02. No comments were received on the environmental risk assessment during the consultation period. No changes were made to the environmental assessment.

3.0 Value assessment

Cyromazine is a systemic insect growth regulator. It works by contact action, interfering with molting and pupation, so that insects do not develop into adults. Cyromazine products are of value as it is the only active ingredient registered in Canada belonging to Insecticide Resistance Action Committee MoA group 17. Its unique mode of action lends itself to rotation with other insecticides to delay the development of resistance in susceptible fly pests.

To mitigate risks of concern, certain uses are cancelled. For these uses, there are alternatives registered for all site and pest combinations.

List of abbreviations

a.i.	active ingredient
ARTF	Agricultural Re-entry Task Force
ATPD	Area Treated Per Day
bw	body weight
CR	chemical-resistant
DFR	dislodgeable foliar residue
EUP	End-use Product
ha	hectare
HH AB/MB	Handheld Airblast/Mistblower
kg	kilogram(s)
L	litre(s)
LFC	Large Field Crops
mg	milligram(s)
MOE	margin of exposure
MPHW	Manually Pressurized Handwand
MPHG	Mechanically Pressurized Handgun
NIOSH	National Institute for Occupational Safety and Health
NOAEL	no observed adverse effect level
PHI	preharvest interval
PMRA	Pest Management Regulatory Agency
PPE	personal protective equipment
PRVD	Proposed Re-evaluation Decision
REI	restricted-entry interval
RVD	Re-evaluation Decision
Resp	respirator
TC	Transfer Coefficient
WP	Wettable Powder
WSP	Water Soluble Packaging
wt	weight

Appendix I Registered products containing cyromazine in Canada

Table 1 Registered products containing cyromazine in Canada requiring label amendments[1]

Registration number	Marketing class	Registrant	Product name	Formulation type	Active ingredient (%, g/L)
24464	Commercial	Syngenta Canada Inc.	Governor 75WP Insecticide	Wettable powder	Cyromazine 75%
24465	Commercial	Syngenta Canada Inc.	Citation 75WP Insecticide	Wettable powder	Cyromazine 75%
24463	Technical Grade Active Ingredient	Syngenta Canada Inc.	Cyromazine Technical	Dust	Cyromazine 97%
33584	Technical Grade Active Ingredient	Sharda Cropchem Limited	Sharda Cyromazine Technical	Dust	Cyromazine 99.57%
34272	Commercial	Sharda Cropchem Limited	Cyrus Insecticide	Wettable powder	Cyromazine 75%

[1]as of 5 November 2021, excluding discontinued products or products with a submission for discontinuation

Appendix II List of commenters to PRVD2020-02

List of commenters' affiliations for comments submitted in response to PRVD2020-02.

Category	Commenter
Registrant	Syngenta Canada Inc.
Agricultural/Growers Association	Canadian Potato Council
	Flowers Canada Growers
	Canadian Horticultural Council

Appendix III Comments and responses

Health Canada received four written comments during the public consultation for the cyromazine proposed re-evaluation decision. Commenters' affiliations are listed in Appendix II. These comments were considered during the final decision phase of this re-evaluation. Summarized comments and Health Canada's responses to them are provided below.

1.0 Comments related to the health risk assessment

1.1 Occupational exposure

Comments concerning the commercial planting assessment for cyromazine on treated, dry bulb onion seeds

Syngenta Canada Inc. submitted a comment stating that use of the Zietz (2007) study to estimate commercial planting exposure was overly conservative, since a) treated onion seeds are pelleted and would result in less worker exposure than the non-pelleted seeds used in the Zietz study; and b) the seed type in the Zietz study (corn) is not a good surrogate for onion seeds. Syngenta also submitted 3 dust-off studies to support their position.

Health Canada response:

The commercial planting exposure assessment was revisited by Health Canada in conjunction with the additional studies submitted during the consultation period. Dust-off studies conducted by Yott (2006)[4] and Ramachandran (2008)[5] tested a wide range of seeds including canola, soybean/dry edible bean, corn and wheat. These dust-off studies measured the relative dustiness of seeds in a specific test. As onion seeds were not included in these studies, they have limited utility in establishing the relative dustiness of the above-mentioned seeds to onion seeds. In the dust-off study conducted by Persson and Grguric (2020) the relative dustiness of pelleted and unpelleted treated onion seeds were compared. The study results indicated that pelleted, treated onion seeds are 30 times less dusty than unpelleted, treated onion seeds.

Health Canada considered results from the Persson and Grguric (2020) dust-off study qualitatively when revisiting the commercial planting exposure assessment, as the direct relationship between dustiness and exposure is not quantified. When considering the appropriate surrogate seed type for onion seeds, Health Canada considered the sizes and seed surface types of onion, corn and canola seeds. Corn seeds were used in the Zeitz (2007) study and canola seeds were used in the Dean (1990) study. Health Canada concluded that onion seeds are more similar in size to canola seeds than corn seeds. Furthermore, Health Canada noted that onion seeds have a rough/matt seed surface type, unlike the waxy seed surface type that corn seeds have. Corn seeds are among the dustiest seeds and it was agreed that onion seeds would produce less dust than corn seeds and the use of the Zeitz (2007) commercial planting study would likely overestimate exposure. Therefore, the Dean (1990) planting exposure study was considered more

[4] PMRA# 1077394; Yott, B. 2006. *Comparative Dust-Off Measurements of Corn Treated with DYNASTY 100FS vs APRON FL on Soybeans DIVEDEND 36FS on Wheat and HELIX Xtra on Canola. Syngenta Corp Protection Canada, Inc*. Report# 5.14-2. Unpublished.

[5] PMRA# 1039816; Ramachandran, R, 2005. *Dust-off Measurements of Soybean and Dry Edible Seed Treated with CRUISER 5FS and CRUISER 350FS. Syngenta Corp Protection Canada, Inc.* Unpublished.

representative of exposure during handling, loading and planting of onion seeds treated with cyromazine. Since the Dean (1990) study was conducted with canola seeds, which have lower dust-off potential than corn or wheat/cereal, it was considered to be an appropriate surrogate for pelleted onion seeds. As the relative dustiness of onion seeds were not compared to canola seeds in the dust-off studies by Yott (2006) and Ramachandran (2008), there is uncertainty with the use of canola as a surrogate. However, exposure is not expected to be underestimated by the Dean (1990) study, particularly because the onion dust-off study conducted by Persson and Grguric (2020) showed that pelletization drastically reduced dust-off potential compared to non-pelleted seeds.

When considering the Dean (1990) study to calculate worker exposure during handling, loading and planting treated dry bulb onion seeds, risks were shown to be acceptable. Mitigation is required including personal protective equipment and use of a closed cab during planting. For planting treated green onion seeds, although in PRVD2020-02 risks were shown to be acceptable, the assessment was updated using the Dean (1990) study, and risks were shown to be acceptable. The results of the risk assessment can be found in Appendix IV, Table 4.

Comments concerning the postapplication risk assessment for cyromazine on potatoes

The Canadian Potato Council submitted a comment regarding the use of cyromazine on potatoes to control the Colorado potato beetle. They submitted survey data to show that the restricted-entry interval (REI) for roguing, which was considered unfeasible in the PRVD2020-02 postapplication risk assessment, would be acceptable.

Health Canada response:

In PRVD2020-02, Health Canada had proposed cancellation of the use of cyromazine on potatoes due to agronomically unfeasible REIs required to mitigate risk for postapplication workers.

In the submitted survey data, information was provided indicating that roguing would not occur during early season application of cyromazine (early first generation larvae), and that the two or three occurrences of roguing activities would happen well after the timing of the second application of cyromazine. This would make the 18-day REI cited in PRVD2020-02 agronomically feasible for roguing.

Since the Canadian Potato Council has stated that the 18-day REI for roguing is agronomically feasible and provided supporting information, use of cyromazine on potatoes will not be cancelled, as originally proposed in PRVD2020-02; and the REI for roguing will be added to product labels.

In addition, the postapplication risk assessment for potatoes was updated to include the differing rates for the two application timings. This results in a shorter REI for roguing of 14 days, which will be the REI added to the labels. The results of the postapplication assessment for potatoes is available in Appendix IV, Table 3.

Comments concerning the postapplication risk assessment for cyromazine on greenhouse ornamentals

Flowers Canada Growers submitted comments requesting Health Canada to consider changes to the use pattern for greenhouse ornamentals in order to allow continuing registration. This includes expanding the labelled REI, removal of application approaches that provide higher dermal exposure risk (foliar sprays) and limiting or reducing the number of permitted applications during a crop cycle. Use of PPE for postapplication workers was also proposed.

Health Canada response:

Of the possible changes to the use pattern suggested by Flowers Canada Growers, Health Canada considered limiting or reducing the number of permitted applications during a crop cycle.

At the current label rates for greenhouse ornamentals (not grown for cut flowers), the number of applications per crop cycle, which resulted in agronomically feasible REIs, were as follows:

- For leafminer control, at the labelled rate (higher rate 0.141 g/L), the number of permitted applications per crop cycle must be reduced from 6 to 2;
- For fungus gnat/shorefly control, at the label rate (0.099 g/L), the number of permitted applications per crop cycle must be reduced from 6 to 4.

With the reduction in number of applications, the updated REI for greenhouse ornamentals (not grown for cut flowers) is 12 hours for all activities.

For ornamentals in greenhouses and outdoors grown for cut flowers, reduction in the number of applications per crop cycle did not result in agronomically feasible REIs. Therefore, these uses will be cancelled as proposed in PRVD2020-02.

Regarding the use of PPE for postapplication workers, studies that are used currently to estimate postapplication worker exposure are based on workers wearing long-sleeved shirts, long pants, socks and footwear. It is also understood that many postapplication workers may wear gloves for their own personal comfort. However, there is no reliable data to indicate the degree of protection that various types of gloves may provide to postapplication workers, or conversely, the extent that gloves may enhance exposure under certain conditions.

Before Health Canada can estimate risk to workers wearing gloves, worker exposure studies comparable to those currently used by Health Canada are required. Studies that are currently used are discussed in the Regulatory Proposal PRO2014-14 Updated Agricultural Transfer Coefficients for Assessing Occupational Postapplication Exposure to Pesticides. Most, if not all, studies conducted by the Agricultural Re-entry Task Force (ARTF), submitted by registrants, or available in the scientific literature that are used to determine Health Canada's transfer coefficients (TCs) do not include gloves as a basis to estimate exposure. Gloves may have been worn in some of the studies; however, they were used as dosimeters to measure hand exposure without gloves, rather than exposure with protection from the gloves. While one limited study showed significant reduction in hand exposure when wearing gloves during tomato harvesting

(Rech et al., 1989)[6], a number of other available studies suggest that exposure may actually increase when gloves are worn (Brouwer, 2000[7]; Boman et al., 2005[8]; Garrigou et al., 2011[9]; Graves et al., 1995[10]; Keifer, 2000[11]; Rawson et al., 2005[12]). Health Canada is currently participating in a working group that includes grower and industry representatives. The purpose of the working group is to a) investigate the use of gloves as a risk mitigation option for postapplication workers in pesticide treated areas and b) to investigate more efficient ways to gather postapplication worker information to ensure that risk assessments are kept up-to-date in reflecting activities that occur in the field. The scope of this information gathering includes both agricultural crops and ornamentals. The role of Health Canada on this working group is to provide regulatory advice and direction for any proposals suggested by the working group to meet the project goals. Currently, the working group is considering conducting studies to estimate the degree of protection offered by chemical-resistant gloves while performing activities in various crops for the purpose of determining a default protection factor of gloves for postapplication workers. Based on the outcome of these studies, Health Canada may consider gloves as a mitigation measure for postapplication workers in the future. Presently, such data are not available.

2.0 Comments related to the value assessment

Comment on the value of greenhouse ornamentals

Flowers Canada commented on the impact the proposed cancellation of cyromazine would have on greenhouse ornamental production. The stakeholder indicated that having diverse crop protection tools available enable growers to produce high quality, blemish-free ornamentals. The stakeholder suggested exploring reducing the number of permitted applications per crop cycle as a way of mitigating occupational exposure.

6 Rech, C.; Bissell, S.; Margotich, S. 1989. Worker Exposure to Chlorothalonil Residues during the harvest of fresh market pole tomatoes. Report HS-1456. California Department of Food and Agriculture. June 19, 1989.

7 Brouwer, D.H., de Vreede, S.A.F., Meuling.,W.J.A., van Hemmen, J.J. 2000. Determination of the efficiency for pesticide exposure reduction with protective clothing: a field study using biological monitoring. Chapter 5 In: Assessment of Occupational Exposure to Pesticides in Dutch Bulb Culture and Glasshouse Horticulture. Doctoral Thesis of D.H. Brouwer. pp.158-179.

8 Boman, A., Estlander,T.,Wahlberg J.E., Maibach, H.I. 2005. Protective Gloves for Occupational Use Second edition. CRC Press LLC.

9 Garrigou, A., Baldi I.,Le Frious P., Anselm R., Vallier M. 2011. Ergonomic contribution to chemical risks prevention: an ergotoxicologcial investigation of the effectiveness of coverall against plant pest risk in viticulture. 42: 321-330.

10 Graves, CJ., Edwards, C., Marks R. 1995. The effects of protective occlusive gloves on stratum corneum barrier properties. Contact Derm 33: 183-187.

11 Keifer, M.C., 2000. Effectiveness of Interventions in Reducing Pesticide Overexposure and Poisonings. American Journal of Preventive Medicine. 18 (4S); 80-89.

12 Rawson, B.V., Cocker, J., Evans, P.G. Wheeler, J.P. and Akrill, P.M. 2005. Internal contamination of Gloves: routes and Consequences. Ann. Occup. Hyg. 49 (6): 535-541.

Health Canada response

Health Canada recognizes the value of cyromazine to the production of greenhouse ornamentals. Consideration of comments and new information resulted in a revision to the occupational and residential risk assessment, thereby permitting the continued application of cyromazine on greenhouse ornamentals not grown for cut flower production. Based on this, growers will retain the use of cyromazine to manage economically important insect pests on greenhouse ornamentals not grown for cut flower production. However, occupational risks of concern remain for greenhouse ornamentals that are grown for cut flower production, and therefore, cyromazine use on greenhouse ornamentals grown for cut flower production is cancelled.

Comments on the value of dry bulb onions

Comments from the Canadian Horticultural Council were received in response to the proposed cancellation of cyromazine on imported dry bulb onion seeds. The stakeholders indicated cyromazine was valued as one of the few effective alternatives to chlorpyrifos or neonicotinoids for management of onion maggot, one of the most damaging insect pests of onions in Canada.

Health Canada response

Health Canada recognizes the value of cyromazine to the production of dry bulb onions. With additional risk mitigation measures, the use of cyromazine on imported seed to manage onion maggot on dry bulb onion production is retained.

Comments on the value of potatoes

Comments from the Canadian Potato Council were received in response to the proposed cancellation of cyromazine on potatoes. The stakeholder indicated cyromazine was valued as an alternative tool to neonicotinoids, spinosyn and diamides for the management of Colorado potato beetle. The stakeholder also commented on the agronomic feasibility of the proposed restricted entry intervals.

Health Canada response

Health Canada recognizes the value of cyromazine to the production of potatoes. With additional risk mitigation measures the use of cyromazine to manage Colorado potato beetle on potatoes is retained.

Appendix IV Revised occupational exposure and risk assessments for cyromazine

Details for the revised risk assessment are included in this appendix. Refer to PRVD2020-02 for additional information.

Handheld airblast/mistblower mixer/loader/applicator

At the time the PRVD was completed, data were not available to assess handheld airblast/mistblower equipment. Since that time, data were submitted to Health Canada and these worker exposure studies (Testman 2015 and Thouvenin 2016) were used to conduct risk assessments for outdoor ornamentals (not grown for cut flowers), greenhouse ornamentals (not grown for cut flowers) and greenhouse lettuce.

Postapplication inputs

The postapplication risk assessment was updated to include the differing application rates and timing of application for potatoes, the updated greenhouse dissipation per day rate, and comments submitted during the PRVD2020-02 consultation period (see Appendix II and III for more details).

Commercial planting unit exposures

For the PRVD2020-02, the commercial planting assessment for treated onion seeds was completed using exposure estimates from the Zeitz (2007) study. Based on comments and submitted data during the PRVD2020-02 consultation period, the study from Dean (1990) was considered to be more appropriate to estimate worker exposure during handling, loading and planting treated onion seeds.

Occupational exposure and risk assessment

Assessments for uses that were proposed for cancellation in the PRVD and for which the risk assessments and risk conclusions did not change, are not included in this document. As noted above, risk assessments were revised for potatoes, ornamentals (outdoor and greenhouse), planting of onion seeds (dry bulb, green), and greenhouse lettuce. This resulted in the following changes:

- For potatoes, all REIs are now shorter. The REI for roguing is now 14 days, which is considered to be agronomically feasible. This use was proposed for cancellation in the PRVD, but is now acceptable for continued registration.
- For greenhouse ornamentals (not grown for cut flowers), postapplication worker risks were shown to be acceptable at the REI of 12 hours when the number of applications per season is reduced as follows:
    - For leafminer control at the labelled rate (0.141 g/L), the number of permitted applications per crop cycle must be reduced from 6 to 2.

  - For fungus gnat/shorefly control at the label rate (0.099 g/L), the number of permitted applications per crop cycle must be reduced from 6 to 4.

  This use was proposed for cancellation in the PRVD, but is now acceptable for continued registration.

- For ornamentals grown for cut flowers in greenhouses and outdoors, reducing the number of applications per crop cycle did not change the risk assessment outcomes. These uses of cyromazine will be cancelled as proposed in the PRVD.
- For greenhouse lettuce, postapplication risks were shown to be acceptable at the labelled rate, maximum number of permitted applications and with a 12-hour REI for all postapplication activities. This use was proposed for cancellation in the PRVD, but is now acceptable for continued registration.
- For commercial planting of imported, treated dry onion seeds and treated green onion seeds, risks were shown to be acceptable with additional PPE and using a closed cab during planting. The use on treated, dry onion seeds was proposed for cancellation in the PRVD, but is now acceptable for continued registration.
- The use of the handheld airblast/mistblower was shown to be of acceptable risk for greenhouse and outdoor ornamentals (not grown for cut flowers), and for greenhouse lettuce.

Table 4.1 is a summary of mitigation required as a result of the updated risk assessment.

The results of the updated occupational mixer/loader/applicator and postapplication assessments are summarized in Tables 4.2 and 4.3. The results of the updated commercial planting assessment is summarized in Table 4.4

Table 4.1 Occupational and residential assessment mitigation summary

Scenario		Mixer/Loader/Applicator	Postapplication
Use-site category	**Crop**	**Mitigation**	**Mitigation**
13/14	Potatoes	M/L; Mid-level PPE A: Mid-level PPE, Closed cab application over 50.9 kg a.i. handled per day	REI: Handset irrigation – 18 days Roguing – 14 days All other activities – 12 hours
10	Treated onion seeds	Baseline PPE Closed cab planting	N/A
6	Greenhouse ornamentals (not grown for cut flower production)	M/L; Mid-level PPE A; Max-level PPE + respirator for HH AB/MB application	Reducing # of applications (0.141 g/L) – 6→2 Reducing # of applications (0.099 g/L) – 6→4 REI – 12 hours for all activities (using reduced # apps)

Scenario		Mixer/Loader/Applicator	Postapplication
Use-site category	**Crop**	**Mitigation**	**Mitigation**
5	Mushroom house	M/L/A: Baseline PPE	Prohibit application on mushrooms directly
27	Outdoor ornamentals (not grown for cut flower production)	Handheld: M/L; Mid-level PPE A; Max-level PPE + respirator for HH AB/MB application Groundboom: M/L; Mid-level PPE A; Mid-level PPE with Open cab application Airblast: M/L; Mid-level PPE A; Mid-level PPE, Open cab application with CR Hat	REI – 12 hours for all activities
5	Greenhouse Lettuce	M/L: Mid-level PPE A; Max-level PPE + respirator for HH AB/MB application	REI – 12 hours for all activities

HH AB/MB = Handheld Airblast/Mistblower, PPE = Personal Protective Equipment, REI = Restricted-Entry Interval, M/L/A = Mixer/Loader/Applicator, CR = Chemical resistant
Baseline PPE = Long-sleeved shirt, long pants, chemical-resistant gloves, socks and shoes.
Mid-level PPE = Coveralls over long-sleeved shirt, long pants, chemical-resistant gloves, socks and shoes.
Max-level PPE = Chemical-resistant coveralls with a chemical-resistant hood over long-sleeved shirt, long pants, chemical-resistant gloves, socks, chemical-resistant footwear and a respirator.

Table 4.2 Updated mixer/loader/applicator exposure and risk assessment for agricultural scenarios.

Crop	Formulation	Scenario	Application Equipment	Max Rate (kg a.i./ha)	ATPD (ha/day)	Dermal Exposure[a] (mg/kg bw/day)	Inhalation Exposure[b] (mg/kg bw/day)	Dermal MOE[c]	Inhalation MOE[c]	Combined MOE[d]
Potatoes	WP WSP	Closed M/L Mid-level PPE; Open A Mid-level PPE	Groundboom Farmer LFC	0.27975	107	2.23E-03	6.96E-04	2240	7180	1710
		Closed M/L Mid-level PPE; Open A Mid-level PPE	Groundboom Custom LFC	0.27975	360	7.51E-03	2.34E-03	665	2140	507
		Closed M/L Mid-level PPE; Closed A Mid-level PPE			360	4.19E-03	3.02E-04	1190	16500	1110

Crop	Formulation	Scenario	Application Equipment	Max Rate (kg a.i./ha)	ATPD (ha/day)	Dermal Exposure[a] (mg/kg bw/day)	Inhalation Exposure[b] (mg/kg bw/day)	Dermal MOE[c]	Inhalation MOE[c]	Combined MOE[d]
Outdoor Ornamentals	WP WSP	Closed M/L Mid-level PPE; Open A Mid-level PPE	Groundboom Farmer/Custom Vegetables	0.141	26[e]	2.74E-04	8.52E-05	18300	58700	13900
		Closed M/L/A; Mid-level PPE	MPHW	0.141 g/L[f]	150 L/day	5.25E-05	1.19E-05	95300	418000	77600
		Closed M/L/A; Mid-level PPE	Backpack		150 L/day	1.85E-04	1.64E-05	27000	305000	24800
		Closed M/L/A; Mid-level PPE	MPHG		3800 L/day	4.44E-03	1.01E-03	1130	4940	917
		M/L: Closed M/L, Mid-level PPE; A: Max-level PPE + Respirator	HH AB/MB		150 L/day	2.32E-03	1.04E-03	2150	4800	1480
		Closed M/L Mid-level PPE; Open A, Mid-level PPE without CR hat	Airblast	0.141	20	3.24E-02	3.26E-04	154	15300	153
		Closed M/L Mid-level PPE; Open A, Mid-level PPE with CR hat				1.58E-03	3.26E-04	3170	15300	2620
Greenhouse Lettuce	WP WSP	Closed M/L/A, Mid-level PPE	MPHW	0.099 g/L[f]	150 L/day	3.68E-05	8.39E-06	136000	596000	111000
			Backpack		150 L/day	1.30E-04	1.15E-05	38400	434000	35300
			MPHG		3800 L/day	3.12E-03	7.10E-04	1600	7040	1310

Crop	Formulation	Scenario	Application Equipment	Max Rate (kg a.i./ha)	ATPD (ha/day)	Dermal Exposure[a] (mg/kg bw/day)	Inhalation Exposure[b] (mg/kg bw/day)	Dermal MOE[c]	Inhalation MOE[c]	Combined MOE[d]
		M/L: Closed M/L, Mid-level PPE; A: Max-level PPE + Respirator	HH AB/MB		150 L/day	1.63E-03	7.31E-04	3060	6840	2120
Greenhouse Ornamentals	WP WSP	Closed M/L, Mid-level PPE	MPHW	0.141 g/L[f]	150 L/day	5.25E-05	1.19E-05	95300	418000	77600
			Backpack		150 L/day	1.85E-04	1.64E-05	27000	305000	24800
			MPHG		3800 L/day	4.44E-03	1.01E-03	1130	4940	917
		M/L: Closed M/L, Mid-level PPE; A: Max-level PPE + Respirator	HH AB/MB		150 L/day	2.32E-03	1.04E-03	2150	4800	1480

ATPD = Area Treated Per Day, Max = maximum, MOE = Margin of Exposure, WP WSP = Wettable Powder in Water Soluble Packaging, M/L/A = Mix/Load/Apply, PPE = Personal Protective Equipment, MPHW = Manually Pressurized Handwand, MPHG = Mechanically Pressurized Handgun, LFC = Large Field Crop, CR = chemical-resistant, HH AB/MB = Handheld Airblast/Mistblower
Shaded Cells indicate target MOE not met.
Label PPE = Mid-level PPE = coveralls over long-sleeved shirt, long pants, socks and shoes, and CR gloves
Max-level PPE = CR coveralls with a CR hood over a long-sleeved shirt, long pants, socks and shoes, CR gloves, and a respirator
[a] Dermal exposure (mg/kg bw/day) = (dermal unit exposure x ATPD x maximum application rate x 27% dermal absorption)/80 kg body weight
[b] Inhalation exposure (mg/kg bw/day) = (inhalation unit exposure x ATPD x maximum application rate)/80 kg body weight
[c] Short-, Intermediate-, Long-Term: Based on a NOAEL of 5 mg/kg bw/day from an oral developmental toxicity study in rabbits. Target MOE=1000.
[d] Combined MOE = NOAEL/(EXP_{derm}+EXP_{inh}). Target MOE=1000.
[e] Groundboom application is expected to be over a small area for outdoor ornamentals
[f] Rate (g/L) = rate (g a.i./ha) / spray volume (L/ha)

Table 4.3 Updated postapplication exposure and risk assessment for agricultural scenarios

Use(s)	Max Rate (kg/ha)	No. Apps	Int (days)	Activity	TC (cm^2/hr)[a]	DFR Inputs			Day 0		REI (days)	Feasible (Y/N)
						Peak	Disp	DFR_0[b]	Exp[c]	MOE[d]		
Potato	1st app: 0.27975 2nd app: 0.1395	2	6	Irrigation (hand set)	1750	25%	10%	0.72	34.0	147	18	Y
				Roguing	1100				21.4	234	14	Y
				Scouting	210				4.08	1225	12 hours	Y
				Hand Weeding	70				1.36	3674	12 hours	Y
Outdoor Ornamentals (not grown for cut flowers)	0.141 (g/L)[e]	5	7	Irrigation (hand set)	1750	25%	10%	0.66	31.1	161	18	Y

Use(s)	Max Rate (kg/ha)	No. Apps	Int (days)	Activity	TC (cm^2/hr)[a]	DFR Inputs			Day 0		REI (days)	Feasible (Y/N)
						Peak	Disp	DFR_0[b]	Exp[c]	MOE[d]		
Outdoor Ornamentals (cut flowers)	0.141 (g/L)[e]	**1**	-	Disbudding, Hand Harvesting, Hand Pruning	4000	25%	10%	0.35	38.1	131	20	N
				Irrigation (handset)	1750				16.7	300	12	
				Container moving, pinching, plant support/staking, scouting, transplanting, hand weeding	230				4.1	2280	12 hours	
Greenhouse Lettuce	0.099 g/L[e]	4	7	All Activities	230	25%	2%	0.81	5.04	993	12 hours	Y
Greenhouse Ornamentals (Leafminer, not grown for cut flowers)	0.141 g/L[e]	6	7	All Activities	230	25%	2%	1.53	9.49	527	32	N
		2	7					0.66	4.09	1220	12 hours	Y
Greenhouse Ornamentals (Leafminer, cut flowers)	0.141 g/L[e]	**1**	-	Disbudding, Hand Harvesting, Hand Pruning	4000	25%	2%	0.35	38.1	131	101	N
				Irrigation (handset)	1750				16.7	300	60	
				Container moving, pinching, plant support/staking, scouting, transplanting, hand weeding	230				2.2	2280	12 hours	
Greenhouse Ornamentals (Fungus gnat/shore fly, not grown for cut flowers)	0.099 g/L[e]	6	7	All activities	230	25%	2%	1.07	6.67	750	15	N
		4	7					0.81	5.04	993	12 hours	Y
Greenhouse Ornamentals (Fungus gnat/shore fly, cut flowers)	0.099 g/L[e]	**1**	-	Disbudding, Hand Harvesting, Hand Pruning	4000	25%	2%	0.25	26.7	187	83	N
				Irrigation (handset)	1750				11.7	428	43	
				Container moving, pinching, plant support/staking, scouting, transplanting, hand weeding	230				1.5	3250	12 hours	

No. Apps = Number of Applications per Season, Int = Application Interval, TC = Transfer Coefficient, DFR = Dislogeable Foliar Residue, Peak = Peak DFR as Percent of Rate, Disp = Percent Dissipation per Day, DFR_0 = Day 0 DFR (ug/cm^2), Exp = Exposure (ug/kg bw/day), MOE = Margin of Exposure, REI = Restricted-Entry Interval

[a] The TC values are from PRO2014-02 . The TC value for maximum foliage density was considered as a worst-case scenario for the risk assessment.

[b] DFR_0 ($\mu g/cm^2$) = Dislodgeable residue (25%) × maximum application rate (kg a.i./ha) × 10 (conversation factor). DFR (multiple applications) = $DFR_{n-1} - (DFR_{n-1} \times$ Dissipation rate (10%/2%)) + DFR_0

[c] Dermal exposure (mg a.i./kg bw/day) = (DFR ($\mu g/cm^2$) × TC (cm^2/h) x work duration (8 hr) × Dermal Absorption (27%) × 0.001 (conversation factor))/ Body weight (80 kg)

[d] Short-, Intermediate-, Long-Term: Based on a NOAEL of 5 mg/kg bw/day from an oral developmental toxicity study in rabbits. Target MOE=1000.

[e] Rate (g/L) = rate (g a.i./ha) / spray volume (L/ha)

Table 4.4 Updated commercial planting exposure and risk assessment of cyromazine, planting treated seeds, onions

Crop	Formulation	Study	Scenario	Application Rate (g ai/kg seed)	Seeding Rate (kg seed/ha)	ATPD (ha/day)	Dermal MOE[a]	Inhalation MOE[a]	Combined MOE[b]
Onion Seeds, Dry	WSP	Dean, 1990[c], Canola	Loading/ Handling/ Planting	50	4	12.9[d]	1340	140000	1330
Onion Seeds, Green	WSP	Dean, 1990[c], Canola	Loading/ Handling/ Planting	50	7	0.4[e]	24900	2570000	24700

ATPD = Area Treated Per Day, MOE = Margin of Exposure, WSP = Water Soluble Packaging, M/L = Mix/Load, A = Apply, PPE = Personal Protective Equipment, CR = Chemical-Resistant

[a] Short-, Intermediate-, Long-Term: Based on a NOAEL of 5 mg/kg bw/day from an oral developmental toxicity study in rabbits. Target MOE=1000.

[b] Combined MOE = NOAEL/(EXP_{derm}+EXP_{inh}), Target MOE = 1000

[c] PPE and Engineering Controls: Long-sleeved shirt, long pants, socks and shoes, CR gloves, Open load, Closed cab planter

[d] 95th percentile of dry bulb onion farm size, STATS CAN Percentile Farm Size – 2016 Census of Agriculture

[e] 95th percentile of green onion farm size, STATS CAN Percentile Farm Size – 2016 Census of Agriculture

Appendix V Label amendments for products containing cyromazine

Information on approved labels of currently registered products should not be removed unless it contradicts the label statements provided below.

1.0 General label updates for all products

On the principal display panel, replace "GUARANTEE" with "ACTIVE INGREDIENT".

2.0 Label amendments for cyromazine technical products

Before the STORAGE section, **add** the title "ENVIRONMENTAL PRECAUTIONS" and the following statements:

> "TOXIC to aquatic organisms"
>
> "DO NOT discharge effluent containing this product into sewer systems, lakes, streams, ponds, estuaries, oceans or other waters."

3.0 Label amendments for commercial-class end-use products containing cyromazine

3.1 Cancelled uses

The following uses are cancelled and must be removed from product labels:

- Crop Group 4 (leafy vegetables except Brassica vegetables) not including greenhouse lettuce
- Celery
- Crop Group 5b (leafy Brassica greens)
- Outdoor and greenhouse ornamentals grown for cut flowers

3.2 General label statements

The following label update must be added to all commercial products that are packaged in water-soluble packages, unless equivalent information is already on the labels:

> "Water-Soluble Packages (WSPs) are designed to dissolve in water. Agitation may be used, if necessary, to help dissolve the WSP. Failure to follow handling and mixing instructions can increase your exposure to the pesticide products in WSPs.
>
> **Handling Instructions**
> Follow these steps when handling pesticide products in WSPs.
>
> 1. Mix in spray tank only.
> 2. Handle WSP(s) in a manner that protects package from breakage and/or unintended release of contents. If package is broken, put on a minimum of coveralls, chemical-resistant gloves, chemical-resistant footwear, and a NIOSH-approved N95 (minimum)

filtering facepiece respirator (dust mask) that is properly fit tested and then continue with mixing instructions.
3. Keep the WSP(s) in outer packaging until just before use.
4. Keep the WSP dry prior to adding to the spray tank.
5. Handle with dry gloves and according to the label instructions for PPE.
6. Keep WSP intact. Do not cut or puncture WSP.
7. Reseal the WSP outer packaging to protect any unused WSP(s).

Mixing Instructions

Follow the steps below when mixing this product, including if tank mixed with other pesticide products. If being tank mixed, the mixing directions 1 through 9 below take precedence over the mixing directions of the other tank mix products. All other directions for use of all tank mixed products should be followed provided they do not conflict. Do not tank mix this product with products that prohibit tank mixing or have conflicting mixing directions.

1. If a basket or strainer is present in the tank hatch, remove prior to adding the WSP to the tank.

2. Fill tank with water to approximately one-third to one-half of the desired final volume of spray.

3. Stop adding water and stop any agitation.

4. Place intact/unopened WSP(s) into the tank.

5. Do not spray water from a hose or fill pipe to break or dissolve the WSP(s).

6. Start mechanical and recirculation agitation from the bottom of tank without using any overhead recirculation, if possible. If overhead recirculation cannot be turned off, close the hatch before starting agitation.

7. Dissolving the WSP(s) may take up to 5 minutes or longer, depending on water temperature, water hardness and intensity of agitation.

8. Stop agitation before tank lid is opened.

9. Open the lid to the tank, exercising caution to avoid contact with dusts or spray mix, to verify that the WSPs have fully dissolved and the contents have been thoroughly mixed into the solution.

10. Do not add other allowed products or complete filling the tank until the bags have fully dissolved and pesticide is thoroughly mixed.

11. Once the WSP have fully dissolved and any other products have been added to the tank, resume filling the tank with water to the desired level, close the tank lid, and resume agitation.

12. Use the spray solution when mixing is complete.

13. Maintain agitation of the diluted pesticide mix during transport and application.

14. It is unlawful to use any registered pesticide, including WSPs, in a manner inconsistent with its label."

After the PRECAUTIONS section, Add the title "ENVIRONMENTAL PRECAUTIONS" and the following statements:

"TOXIC to non-target terrestrial plants."

"TOXIC to aquatic organisms."

"Toxic to certain beneficial arthropods (which may include predatory and parasitic insects, spiders, and mites). Minimize spray drift to reduce harmful effects on beneficial arthropods in habitats next to the application site such as hedgerows and woodland."

"Toxic to bees. Minimize spray drift to reduce harmful effects on bees in habitats close to the application site. Avoid application during the crop blooming period. If applications must be made during the crop blooming period, restrict applications to the evening when most bees are not foraging. Avoid applications when bees are foraging in the treatment area in ground cover containing blooming weeds. To further minimize exposure to pollinators, refer to the complete guidance "Protecting Pollinators during Pesticide Spraying – Best Management Practices" on the Canada.ca website (www.canada.ca/pollinators)."

"Toxic to small wild mammals."

"To reduce runoff from treated areas into aquatic habitats, avoid application to areas with a moderate to steep slope, compacted soil or clay."

"Avoid application when heavy rain is forecast."

"Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative strip between the treated area and the edge of the water body."

"The residues of cyromazine (melamine) are persistent and may carryover. It is recommended that any products containing cyromazine not be used in areas treated with this product during the previous season."

"This product demonstrates the properties and characteristics associated with chemicals detected in groundwater. The use of this product in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination."

Under PRECAUTIONS, **remove** the following statements:

"Apply only when the potential for drift to areas of human habitation or areas of human activity such as houses, cottages, schools and recreational areas is minimal. Take into consideration wind speed, wind direction, temperature, application equipment and sprayer settings."

"DO NOT apply during periods of dead calm. Avoid application of this product when winds are gusty."

"Avoid application when heavy rain is forecast."

"Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative strip between the treated area and the edge of the water body."

"To reduce runoff from treated areas into aquatic habitats, consider the characteristics and conditions of the site before treatment. Site characteristics and conditions that may lead to runoff include, but are not limited to: heavy rainfall, moderate to steep slope, bare soil, poorly draining soil (e.g., soils that are compacted, fine textured, or low in organic matter such as clay)."

"DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes."

"Avoid contamination of food and feed, domestic or irrigation water supplies, lakes, streams and ponds. Do not reuse bag; destroy when empty."

Under DIRECTIONS FOR USE:

Add:

"To protect pollinators, follow the instructions regarding bees in the Environmental Precautions section."

"As this product is not registered for the control of pests in aquatic systems, DO NOT use to control aquatic pests."

"DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes."

For ornamentals, excluding coniferous evergreens (pine, fir, juniper, spruce, arborvitae, hemlock, cypress, yew, live Christmas trees) include:

"Toxic to bee brood. DO NOT apply during the crop blooming period."

For all other crops on label:

"Toxic to bee brood. Avoid application during the crop blooming period. If applications must be made during the crop blooming period, restrict applications to evening when most bees are not foraging. When using managed bees for pollination services, DO NOT apply during the crop blooming period."

Replace:

"Do not apply by aircraft. Do not apply through any type of irrigation system" or "DO NOT APPLY BY AIR."

With:

"Do not apply by air."

Remove:

"This product demonstrates the properties and characteristics associated with chemicals detected in groundwater. The use of this product in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Do not apply within 15 metres of well-heads or aquatic systems, including marshes, ponds, ditches, streams, rivers and lakes. Do not mix, load or clean spray equipment within 30 metres of well-heads or aquatic systems."

Buffer zone related label statements required for all end-use products with uses other than seed treatment:

Add to ENVIRONMENTAL PRECAUTIONS:

"TOXIC to aquatic organisms and non-target terrestrial plants. Observe buffer zones specified under DIRECTIONS FOR USE."

Add to DIRECTIONS FOR USE:

"Field sprayer application: **DO NOT** apply during periods of dead calm. Avoid application of this product when winds are gusty. **DO NOT** apply with spray droplets smaller than the American Society of Agricultural Engineers (ASAE S572.1) medium classification. Boom height must be 60 cm or less above the crop or ground."

"Airblast application: **DO NOT** apply during periods of dead calm. Avoid application of this product when winds are gusty. **DO NOT** direct spray above plants to be treated. Turn off outward pointing nozzles at row ends and outer rows. **DO NOT** apply when wind speed is greater than 16 km/h at the application site as measured outside of the treatment area on the upwind side."

"Buffer zones:

Spot treatments using hand-held equipment do not require a buffer zone.

The buffer zones specified in the table below are required between the point of direct application and the closest downwind edge of sensitive terrestrial habitats (such as grasslands, forested areas, shelter belts, woodlots, hedgerows, riparian areas and shrublands), and sensitive freshwater habitats (such as lakes, rivers, sloughs, ponds, prairie potholes, creeks, marshes, streams, reservoirs and wetlands.

Method of application	**Crop**		**Buffer Zones (metres) Required for the Protection of:**		
			Freshwater Habitat of Depths:		**Terrestrial Habitat:**
			Less than 1 m	**Greater than 1 m**	
Field sprayer	All crops		1	1	1
Airblast	Outdoor ornamentals	Early growth Stage	3	1	2
		Late growth stage	2	1	1

For tank mixes, consult the labels of the tank-mix partners and observe the largest (most restrictive) buffer zone of the products involved in the tank mixture and apply using the coarsest spray (ASAE) category indicated on the labels for those tank mix partners.

The buffer zones for this product can be modified based on weather conditions and spray equipment configuration by accessing the Buffer Zone Calculator on the Pest Management Regulatory Agency web site."

Storage

Add the title STORAGE, and the following statement:

"Store this product away from food or feed."

"Store in a cool, dry area above freezing. Do not remove the water-soluble pouches from container except for immediate use."

Delete the entire "DECONTAMINATION AND DISPOSAL" section

Delete the entire "CONTAINER DISPOSAL" section

Add:

DISPOSAL

1. When all the water-soluble bags are used, make the empty outer package unsuitable for further use.
2. Dispose of the outer package in accordance with provincial requirements.
3. For information on disposal of unused, unwanted product, contact the manufacturer or the provincial regulatory agency. Contact the manufacturer and the provincial regulatory agency in case of a spill, and for clean-up of spills.

3.3 Label amendments specific to commercial products used on potatoes and imported, treated onion seeds.

General Label Improvements:

Under **PRECAUTIONS**, add the following statement:

"Apply only when the potential for drift beyond the area to be treated is minimal. Take into consideration wind speed, wind direction, temperature inversions, application equipment, and sprayer settings."

Personal Protective Equipment:

Personal protective equipment (PPE) label statements must be amended (or added) to include the following directions under **PRECAUTIONS**.

"Wear coveralls over a long-sleeved shirt, long pants, chemical-resistant gloves, socks and shoes during mixing, loading, application, clean-up and repair."

"When handling more than [50.9 kg a.i. to be reported in product equivalent value]***** per person per day, a closed cab tractor is required during application. Gloves are not required during application within a closed cab."

*****As indicated by the square brackets above, the active ingredient amount in this statement (that is, 50.9 kg a.i.) is to be converted into the corresponding amount of the product by the registrant.

"When handling or planting treated seed wear long-sleeved shirt, long pants, chemical-resistant gloves, socks and shoes. Planting must be done using a closed cab system. Gloves are not required during application within a closed cab."

For labelled treated seed (Seed Tags):

For all cyromazine end-use products with treated seed uses, the following statements must be added to the seed tags:

> "Keep treated seed out of reach of children and animals."
>
> "When handling or planting treated seed wear long-sleeved shirt, long pants, chemical-resistant gloves, socks and shoes. Planting must be done using a closed cab system. Gloves are not required during application within a closed cab."

Restricted-Entry Intervals (REIs):

For labels with all agricultural uses (for example, application to field crops), the REI text under **PRECAUTIONS** on the label should be modified as follows:

Delete the following statement:

> "Do not re-enter treated areas until spray deposits have dried."

Add the following statement:

> "**DO NOT** enter or allow worker entry into treated areas during the intervals specified in the following table:"

The following table must be added to the label under **PRECAUTIONS.** Remove any crops from the table that are not registered on that specific product label or are cancelled as a result of the re-evaluation.

Restricted-Entry Intervals (REI):

Crop	Postapplication activity	REI and/or PHI
Potatoes	Irrigation (handset)	18 days
	Roguing	14 days
	Harvesting	14 days
	All other activities	12 hours
Dry bulb onions	Harvesting	100 days
Green onions	Harvesting	60 days

Under ENVIRONMENTAL PRECAUTIONS include the following:

> "Treated seed is toxic to birds and small mammals. Any spilled or exposed seeds must be incorporated into the soil or otherwise cleaned-up from the soil surface."

Add the title USE RESTRICTIONS above the following statement (currently under DIRECTIONS FOR USE):

> "All Seed Packaging Labels containing seed treated with "Product Name" must contain the following statements:"

Under USE RESTRICTIONS, **add** the following statement:

> "All containers or packages containing treated seed for sale or use in Canada must be labelled or tagged as follows: Toxic to birds and small mammals. Any spilled or exposed seeds must be incorporated into the soil or otherwise cleaned-up from the soil surface".

3.4 Label amendments specific to commercial products used on outdoor ornamentals (not grown for cut flowers), greenhouse ornamentals (not grown for cut flowers), greenhouse lettuce, and mushrooms.

The following statements apply to uses with continued registration.

General label improvements:

Under **PRECAUTIONS**, add the following statement:

> "Apply only when the potential for drift beyond the area to be treated is minimal. Take into consideration wind speed, wind direction, temperature inversions, application equipment, and sprayer settings."

Personal protective equipment:

Personal protective equipment (PPE) label statements must be amended (or added) to include the following directions under **PRECAUTIONS**.

> "Wear coveralls over a long-sleeved shirt, long pants, chemical-resistant gloves, socks and shoes during mixing, loading, application, clean-up and repair."
>
> "In addition, wear chemical-resistant head gear during open cab airblast application. Chemical-resistant headgear includes sou'wester hat, chemical resistant rain hat or large brimmed waterproof hat and hood with sufficient neck protection. Gloves are not required in a closed cab."
>
> "For application using handheld airblast/mistblower equipment, wear chemical-resistant coveralls with a chemical-resistant hood over long-sleeved shirt, long pants, chemical-resistant gloves, socks, chemical-resistant footwear and a respirator with a NIOSH-approved organic-vapour-removing cartridge with a prefilter approved for pesticides OR a NOSH-approved canister approved for pesticides."

"When treating mushroom house compost and casing, wear long-sleeved shirt, long pants, chemical-resistant gloves, socks and shoes during mixing, loading, application, clean-up and repair."

Also, under **PRECAUTIONS** include the following directions

"DO NOT use on ornamentals being grown for cut flowers."

"DO NOT APPLY directly to mushrooms. Make applications when there are no mushrooms above the substrate surface."

Restricted-Entry Intervals (REIs):

For labels with all agricultural uses (for example, application to field crops, ornamentals, and greenhouse crops), the REI text under **PRECAUTIONS** on the label should be modified as follows:

Delete the following statement:

"Do not re-enter treated areas within 12 hours following application."

Add the following statement:

"**DO NOT** enter or allow worker entry into treated areas during the intervals specified in the following table:"

The following table must be added to the label under **PRECAUTIONS.** Remove any crops from the table that are not registered on that specific product label or are cancelled as a result of the re-evaluation.

Restricted-Entry Intervals (REI):

Crop	Postapplication Activity	REI and/or PHI
Outdoor ornamentals (not grown for cut flowers)	Handset/hand line irrigation related activities involving foliar contact	18 days
	All other activities	12 hours
Greenhouse ornamentals (not grown for cut flowers)	All activities	12 hours
Greenhouse Lettuce	Harvesting	14 days
	All other activities	12 hours
Mushrooms	Harvesting	14 days

Directions for use:

In the application rate tables, under the Greenhouse Ornamentals spray schedule, the number of applications for greenhouse ornamentals must be reduced. For LEAFMINER, the number of maximum applications must be changed from 6 applications to 2 applications per crop cycle, with 7 days between applications. For FUNGUS GNATS and SHOREFLIES, the number of maximum applications must be changed from 6 applications to 4 applications, with 7 days between applications.

Under ENVIRONMENTAL PRECAUTIONS include the following:

> "DO NOT allow releases, effluent or runoff from mushroom houses containing this product to enter lakes, streams, ponds or other waters."

For greenhouse uses include the following:

> "Toxic to bees (brood) and other beneficial arthropods (which may include predatory and parasitic insects, spiders, and mites). May harm bees and other beneficial arthropods, including those used in greenhouse production. Avoid application when bees or other beneficial arthropods are in the treatment area."

Appendix VI References considered following publication of PRVD2020-02

Note that the following includes only references that were not previously considered in PRVD2020-02.

A. Information considered in the updated occupational and non-occupational assessment

List of studies/information submitted by registrant

PMRA document number	Title
3116392	2020, Cyromazine – Assessment of Unit Exposure Values for Dust-off Study. DACO: 5.14.
3116393	2020, Laboratory Dust-off Measurements and Analysis of Onion Seed Treated with FarMore® FI500 Onion Seed Treatment. DACO: 5.15.

Additional information considered

Published information

PMRA document number	Reference
2847175	Thouvenin, I., Bouneb, F., Mercier, T. (2016). Operator dermal exposure and individual protection provided by personal protective equipment during application using a backpack sprayer in vineyards. Journal of Consumer Protection and Food Safety. Vol 11, Pg. 325-336. 30 August 2016. Published.
2905452	Testman, R.J. 2015. An Observational Study for the Determination of Air Concentration in the Applicator's Breathing Zone and Deposition of Pyrethrins, Piperonyl Butoxide and MGK 264 from the Use of a ULV Fogger in Various Commercial Applications. Golden Pacific Laboratories. GPL Report No. 110392. Non-Dietary Exposure Task Force (NDETF). Mar.30, 2015.

Unpublished information

PMRA document number	Reference
2873196	Thouvenin, I., et al. (2015). Determination of operator dermal exposure and protective factors provided by personal protective equipment during foliar application using backpack sprayer in vineyards. ANSES. STAPHYT study No. ChR-15-19603, 10 July 2015. Unpublished.
1039216	Dean, V.C.. 1990. Exposures of Workers to Isofenphos during Planting of Oftanol Treated Canola Seed. Mobay Corporation. Kansas City, USA. Lab Report # 99799. January 20, 1990.