Crop Profile for Asparagus in Canada, 2024

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Preface

National crop profiles are developed by the Pest Management Centre of Agriculture and Agri-Food Canada (AAFC). The crop profiles provide baseline information on production and pest management practices and document growers' needs to address pest management gaps and issues for specific crops grown in Canada. This information is developed through extensive consultation with stakeholders and data collected from reporting provinces. Reporting provinces are selected based on their acreage of the target crop (>10 % of the national production) and provide qualitative data on pest occurrence and integrated pest management practices used by growers in those provinces. For asparagus production, the reporting provinces are Ontario and Quebec.

Information on pest issues and management practices is provided for information purposes only. For detailed information on growing asparagus, the reader is referred to provincial crop production guides and provincial ministry websites listed in the Resources Section at the end of this document. For guidance about crop protection products registered for pests on asparagus, the reader is referred to provincial crop production guides and Health Canada's Pesticide label database.

Every effort has been made to ensure that the information in this publication is complete and accurate. Agriculture and Agri-Food Canada does not assume liability for errors, omissions, or representations, expressed or implied, contained in any written or oral communication associated with this publication. Errors brought to the attention of the authors will be corrected in subsequent updates.

Agriculture and Agri-Food Canada gratefully acknowledges the contributions of provincial crop specialists, industry specialists and growers in the gathering of information for this publication.

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Crop Profile for Asparagus in Canada

Asparagus (*Asparagus officinalis*) is a member of the Asparagaceae family. It is a perennial, monocotyledonous plant grown for its tender green shoots (spears) that are harvested in the spring. This crop is highly prized for its delicate flavour and tender texture.

The cultivation of this crop dates back to 200 BC in the Mediterranean region. It was brought to North America by European settlers in the 1800's, and is now grown in most temperate regions of the world.

Asparagus breeding in Canada has progressed to the point where all cultivars grown in Ontario are male hybrids. These hybrids have replaced many open-pollinated varieties planted in Canada. The University of Guelph has developed and registered hybrids including: 'Guelph Millennium', registered in 2003; 'Guelph Evolution', 'Guelph Equinox' and 'Guelph Eclipse', registered in 2017; and 'Guelph Galaxy', registered in 2024. The new hybrids have an improved cold tolerance.

Crop Production

Industry Overview

Asparagus is best known as a fresh vegetable in the marketplace; however, this crop is also canned, frozen and pickled. A small amount of white asparagus is also produced for specialty markets; white asparagus is grown underground, either covered by a thick layer of soil or plastic, and does not produce chlorophyll.

In 2024, the total acreage of asparagus production in Canada was 2,494 hectares with a production of 10,747 metric tonnes and a farm gate value of $53.9 million (Table 1). Asparagus exports in 2024 were valued at $19.9 million while imports totalled $99.3 million (Table 1).

Table 1. General production information for asparagus in Canada, 2024

Canadian production	• 10,747 metric tonnes • 2,494 hectares Source: Statistics Canada. Table 32-10-0365-01 – Area, production and farm gate value of marketed vegetables (Accessed: 2025-05-22).
Farm gate value	• $53.9 Million Source: Statistics Canada. Table 32-10-0365-01 – Area, production and farm gate value of marketed vegetables (Accessed: 2025-05-22).
Exports	• $19.9 Million Source: Statistics Canada. Canadian International Merchandise Trade Web Application. 0709.20.00 — Asparagus, fresh or chilled (Accessed: 2025-05-22).
Imports	• $99.3 Million Source: Statistics Canada. Canadian International Merchandise Trade Web Application. 0709.20 — Asparagus, fresh or chilled (Accessed: 2025-05-22).

Production Regions

The largest producing provinces of asparagus in Canada are Ontario and Quebec, with 1,792 hectares (72 percent of national production) and 470 hectares (19 percent of national production), respectively (Table 2).

Table 2. Distribution of asparagus production in Canada, 2024[1]

Production Regions	Harvested Area (national percentage)	Marketed Production (national percentage)	Farm Gate Value (national percentage)
Ontario	1,792 hectares (72%)	8,123 metric tonnes (76%)	$40.1 Million (74%)
Quebec	470 hectares (19%)	1,845 metric tonnes (17%)	$8.71 Million (16%)
Canada	**2,494 hectares**	**10,747 metric tonnes**	**$53.9 Million**

[1]Source: Statistics Canada. Table 32-10-0365-01 – Area, production and farm gate value of marketed vegetables (Accessed: 2025-05-22).

Cultural Practices

Asparagus is best suited to soils that are deep, well-drained, porous and friable, such as a deep sandy-loam or muck soil in some provinces. An organic matter content of at least three percent is ideal. Heavy soils and stony ground are not suitable for growing asparagus as they can cause malformed spears. In addition, heavy soils usually lack sufficient porosity for good aeration and optimal water drainage; asparagus plants do not like 'wet feet' because excess moisture around the roots can exacerbate disease. Asparagus is very deep-rooted, with roots reaching depths of up to three metres. For this reason, it is important that planting sites not have a hard-pan or a plough layer that will interfere with root development. As asparagus is an early season crop, sites with good air circulation that are less prone to frost are preferable for planting. Producers can choose to plant asparagus seeds, transplants or one-year old crowns, although the planting of seedlings or crowns is more conducive to obtaining a uniform stand. Seedlings may be started in the greenhouse in the early spring and transplanted after 10 to 14 weeks of growth. Crowns are grown from seed sown into a nursery bed. Often, crowns are produced by asparagus growers who specialize in crown production. Planting is done as soon as possible in the spring after soil temperatures have reached 10 °C. Asparagus crowns are planted in furrows 15 to 30 cm deep. These furrows are gradually filled in as the asparagus plant becomes established. Asparagus plantations started with crowns may be harvested in the second year after planting in Ontario or in the third year in Quebec. Harvesting lasts up to 10 days in the second year and for six to eight weeks in the years following, depending on seasonal stressors (i.e., temperature, rainfall, irrigation, etc.). Plantations that are started with transplants will require an extra year to produce harvestable spears.

Both male and female clones of asparagus are available. Recent asparagus cultivars introduced from the University of Guelph Asparagus Breeding Program and from Rutgers University in New Jersey, USA, are male hybrid cultivars. Since male hybrids cannot produce seeds, there is no chance for 'volunteer' asparagus seedlings to develop and become weeds, later competing for

space, water and fertilizer. Male hybrids have been shown to be more productive than female hybrids, producing a higher percentage of #1 grade spears.

Asparagus plantings can be productive for 15 to 20 years, so considerable care is taken in site preparation. Troublesome perennial weeds are eliminated prior to planting. Additions of significant amounts of organic matter are also important in preparing the site. Based on soil testing, fertility adjustments are done at this time and soil pH is adjusted through lime applications if necessary. The ideal pH range for asparagus is 6.5 to 6.8. Windbreaks can be established near new plantings to prevent soil erosion and sand blasting damage to the crop resulting from strong winds.

A schedule for cultural and pest management practices for growing asparagus in Canada is presented in Table 3.

Table 3. General asparagus production and pest management schedule in Canada

Activity	Action
April	
Plant Care	Mowing of old fern stubble with rotary or flail mower; Planting of crowns for new production.
Soil Care	Application of fertilizer based on soil analyses – broadcasting for narrow row spacing, banding for wider row spacing, disking for lime.
Disease Management	Incorporation or burning of mowed fern stubble to minimize disease risk.
Weed Management	Light disking prior to emergence of new shoots; Application of pre-emergent herbicides; Herbicide burndown of rye cover crop, if applicable.
May	
Harvest	Hand or machine-assisted harvest every one to three days, depending on weather; Hand harvest is required in Quebec and more often.
Insect and Mite Management	Application of insecticide to control asparagus beetles, if necessary.
Weed Management	Application of broad-spectrum herbicide burndown and residual applied pre-harvest (ON only).
June	
Harvest	Hand or machine-assisted harvest every two to three days; Hand harvest is required in Quebec more often, i.e., every day or every other day when weather is cooler.
Soil Care	Broadcast or band applications of nitrogen fertilizer immediately after harvest.
Disease Management	Fungicide applications to control asparagus rust after last harvest, if required.
Insect and Mite Management	Insecticide applications to control asparagus beetles and aphids, if necessary; in Quebec, insecticide is applied to control both asparagus beetle and spotted asparagus beetle, as needed.
Weed Management	Application of post-harvest burndown and residual herbicide after last harvest.
July	
Plant Care	Planting of crowns for new asparagus plantings.
Disease Management	Fungicide applications to control asparagus rust and purple spot or Stemphylium spot, if necessary.
Insect and Mite Management	Insecticide applications to control asparagus beetle or aphids, if necessary.
Weed Management	Hand hoeing, if necessary; in Quebec, local herbicide application or a light mechanical disking is done at the beginning of the month if row spacing is sufficiently wide to allow passage; Mow rye planted between rows, if needed.

…continued

Table 3. General asparagus production and pest management schedule in Canada (continued)

Activity	Action
August	
Disease Management	Fungicide applications to control asparagus rust and purple spot or Stemphylium spot, if necessary.
September	
Weed Management	Seeding of rye cover crops, in some operations.
October	
Plant Care	Clipping of ferns to 20 cm for overwintering, in some operations; if snow cover is light in the area, no need for clipping to promote snow accumulation (QC only).
November to December	
Plant Care	Mowing/ chopping of fern usually done mid- to late-November or early December (ON only).

Abiotic Factors Limiting Production

Frost Injury

Late spring frosts can damage early emerging spears resulting in yield loss. Affected spears develop a water-soaked appearance and become limp and furrowed as they thaw. The largest and most vigorous spears are the first to appear and if those are damaged by frost, a disproportionate amount of the yield can be lost. In addition, the development of new shoots by frost-injured crowns is often delayed. The removal of frost injured spears may reduce this delay but is an additional expense. An early fall frost can kill or severely injure the asparagus fern before the natural senescence process takes place. This reduces the movement of carbohydrates down to the crown. These carbohydrates are important for the overall survival of the plant and are especially critical for spear production the next season.

Excessive Heat

Extreme or unseasonably warm temperatures can bring on the asparagus growth too quickly for the usual harvest practices to keep pace. High temperatures in the spring may also shorten the harvest season, and can also reduce yield.

Wind Damage

Strong winds can cause newly emerged asparagus stems to curve. Asparagus spears will curve into the prevailing wind because of reduced cell growth on the exposed side. Severely affected spears are usually culled while other, less injured spears are sold as ‘seconds’ at a reduced price. Strong winds can also cause sand blasting, which creates wounds on the tender asparagus shoots that serve as points of entry for disease.

Hollow Stem

Hollow stem can be a problem under growing conditions that promote rapid spear growth, typically being more prevalent in younger plantings. It is recognized as a problem during the harvest season, as it impacts the quality and potentially the marketability of the asparagus spears.

Diseases

Key Issues

- The continued harmonization of pesticide registrations between Canada and the United States is very important to ensure Canadian growers remain competitive.

- There is a need for new conventional fungicides (with different modes of action than those currently registered) and non-conventional fungicides (e.g., biopesticides) for the control of a number of diseases of asparagus.

- There is a need for the development of diseases resistant/tolerant varieties through plant breeding.

- For provincial ratings of key disease occurrence, see Table 4.

Table 4. Occurrence of diseases in asparagus production in Canada[1,2]

Disease	Ontario	Quebec
Asparagus rust		
Fusarium crown and root rot		
Gray mold / Botrytis blight		
Phytophthora spear rot		
Purple spot / Stemphylium blight		
Virus, Asparagus 1		
Virus, Asparagus 2		
Virus, Cucumber mosaic		
Virus, Tobacco streak		
Widespread yearly occurrence with high pest pressure.		
Widespread yearly occurrence with moderate pest pressure OR localized yearly occurrence with high pest pressure OR widespread sporadic occurrence with high pest pressure.		
Widespread yearly occurrence with low pest pressure OR widespread sporadic occurrence with moderate pressure OR sporadic localized occurrence with high pest pressure.		
Localized yearly occurrence with low to moderate pest pressure OR widespread sporadic occurrence with low pest pressure OR localized sporadic occurrence with low to moderate pest pressure OR pest not of concern.		
Pest not present.		
Data not reported.		

[1]Source: Asparagus stakeholders in reporting provinces (Ontario, Quebec); the data reflect the 2022, 2023 and 2024 production years.
[2]Refer to Appendix 1 for a detailed explanation of colour coding of occurrence data.

Table 5. Adoption of integrated disease management practices for asparagus production in Canada[1]

Practice	Asparagus rust	Fusarium crown and root rot	Phytophthora spear rot	Purple spot / Stemphylium spot	Virus diseases
Avoidance:					
Varietal selection / use of resistant or tolerant varieties					
Planting / harvest date adjustment					
Rotation with non-host crops					
Choice of planting site					
Optimizing fertilization for balanced growth and to minimize stress					
Minimizing wounding and insect damage to limit infection sites					
Use of disease-free propagative materials (seed, cuttings, transplants)					
Prevention:					
Equipment sanitation					
Canopy management (thinning, pruning, row or plant spacing)					
Manipulating seeding / planting depth					
Irrigation management (timing, duration, amount) to minimize disease infection periods and manage plant growth					
Management of soil moisture (e.g., improvements in drainage, use of raised beds, hilling, mounds)					
End of season or pre-planting crop residue removal/management					
Pruning out / removal of infected material throughout the growing season					

…continued

Table 5. Adoption of integrated disease management practices for asparagus production in Canada[1] (continued)

Practice	Asparagus rust	Fusarium crown and root rot	Phytophthora spear rot	Purple spot / Stemphylium spot	Virus diseases
Removal of other hosts (weeds / volunteers / wild plants) in field and vicinity					
Monitoring:					
Scouting					
Maintaining records to track diseases					
Soil analysis for the presence of pathogens					
Weather monitoring for disease forecasting					
Use of precision agriculture technology (GPS, GIS) for data collection and mapping of diseases					
Decision making tools:					
Economic threshold					
Use of predictive model for management decisions					
Crop specialist recommendation or advisory bulletin					
Decision to treat based on observed disease symptoms					
Use of portable electronic devices in the field to access pathogen / disease identification / management information					
Suppression:					
Use of diverse product modes of action for resistance management					
Soil amendments and green manure soil incorporation as biofumigants to reduce pathogen inoculum					

…continued

Table 5. Adoption of integrated disease management practices for asparagus production in Canada[1] (continued)

Practice	Asparagus rust	Fusarium crown and root rot	Phytophthora spear rot	Purple spot / Stemphylium spot	Virus diseases
Use of non-conventional pesticides (e.g., biopesticides)					
Controlled atmosphere storage					
Targeted pesticide applications (e.g., banding, spot treatments, use of variable rate sprayers)					
Selection of pesticides that are soft on beneficial insects, pollinators and other non-target organisms					
This practice is used to manage this pest by at least some growers in the reporting provinces.					
This practice is not used by growers in the reporting provinces to manage this pest.					
This practice is not applicable for the management of this pest.					
Information regarding the practice for this pest is unknown.					

[1]Source: Asparagus stakeholders in reporting provinces (Ontario, Quebec); the data reflects the 2022, 2023 and 2024 production years.

Asparagus Rust (*Puccinia asparagi*)

Pest Information

Damage: The first symptoms of rust infections are slightly raised, light green spots on stems and foliage in early summer. The spots develop into spore-containing pustules that range from cream-coloured to reddish brown. Heavily infected plants die back prematurely in the fall, lose vigour and produce fewer spears the following spring. Spears are not directly affected as they are usually harvested before symptoms appear.

Life Cycle: Asparagus rust has a complex life cycle involving the production of multiple types of spores. The disease overwinters as teliospores in asparagus crop residues. The teliospores germinate in the spring and are wind-blown onto emerging shoots where they cause infection, typically on the lower portion of the fern stalks. The resulting lesions are cream-coloured pustules called aecia, which produce and release aeciospores. Aeciospores re-infect the asparagus fern under suitable moisture conditions. Later in the season, uredia blisters appear on asparagus stalks and on foliage. When the uredia blisters break open, they release rust-coloured urediospores that can repeatedly re-infect asparagus under suitable weather conditions. Late in the summer, black lesions form in the foliage that contain the overwintering teliospores.

Pest Management

Cultural Controls: Spacing plants and rows to facilitate drying of the foliage will reduce the duration of foliar wetness and rust infectivity periods. Monitoring for rust after spears are harvested in the spring will enable timely treatments that prevent the build-up of the disease in the field. The removal of crop debris by light disking of fields early in spring will help reduce the disease carry-over between seasons. Refer to Table 5 for practices used by growers in Canada to manage asparagus rust.

Resistant Cultivars: Although currently available varieties have variable tolerance to rust, none are completely resistant.

Issues for Asparagus Rust

1. Work towards the harmonization of pesticide registrations between Canada and the United States is very important to ensure Canadian growers remain competitive.
2. There is a need for new fungicides, including biofungicides, in new chemical families that are effective against asparagus rust and will help to prevent the development of pathogen resistance.
3. There is a need for the development of new monitoring methods, including the use of spore traps, to monitor rust in asparagus.
4. There is a need for the development of new bioclimatic models to forecast rusting.

Fusarium Crown and Root Rot (*Fusarium oxysporum* f. sp. *asparagi* and other *Fusarium* spp.)

Pest Information

Damage: Fusarium crown and root rot affects plants scattered randomly throughout a field. The disease causes a brown, soft rot of the roots, reddish elliptical lesions on stems at or below the soil surface and rot of crowns. Ferns may become stunted and wilted and develop yellow to brown discoloration. Affected plants produce fewer spears, and thereby have reduced yields, and eventually may die. The presence of the disease shortens the productive life of an asparagus field. New asparagus crowns planted into fields with a history of Fusarium may become stunted, yellowish and die.

Life Cycle: Fusarium crown and root rot is a soil-borne disease. *Fusarium* invades asparagus roots and crowns directly through root tips or wounds caused by tillage, harvesting knives, insect feeding or sand blasting. *Fusarium oxysporum* f. sp. *asparagi* can persist in the soil as chlamydospores (resting spores). Stresses caused by drought, high weed competition and over-harvesting can weaken a plant and predispose it to Fusarium crown and root rot infections.

Pest Management

Cultural Controls: Since *Fusarium* spp. are present in most soils, crown rot is almost impossible to avoid. However, maintaining vigorous plants through careful management, including the appropriate use of fertilizer and irrigation, preventing the over-harvesting of spears and generally avoiding stress on the crop, can minimize infection early in the life of asparagus crowns. Other disease management practices include minimizing stress by planting on appropriate sites, avoiding wounding by reducing tillage and avoiding soil compaction. As Fusarium can build-up in soils, fields that have not previously been planted to asparagus are best for new asparagus plantings and replanting asparagus in the same field for many years is not recommended. Refer to Table 5 for practices used by growers in Canada to manage Fusarium crown and root rot.

Resistant Cultivars: None available

Issues for Fusarium Crown and Root Rot

1. Research is needed to establish management practices (including fumigation) to reduce Fusarium levels and minimize the chances of Fusarium diseases “rebounding” once asparagus is replanted.
2. There is a need to develop integrated pest management approaches for the control of Fusarium crown and root rot.
3. There is a need for fungicides, including biofungicides, that provide effective control of Fusarium crown rot.

Gray Mold / Botrytis Blight (*Botrytis cinerea*)

Pest Information

Damage: Botrytis infections result in tan lesions with dark borders and yellow halos on asparagus foliage. Under warm, humid conditions and extended periods of foliar wetness, extensive blighting can develop. Crops with dense canopies and poor air circulation are more likely to develop severe disease symptoms. Newly emerged spears may become completely blighted, turning brown to black.

Life Cycle: Botrytis has a broad host range and is a common invader of weakened or senescent plant tissues. Masses of grey-brown spores are produced in infected tissues and crop residue, and are carried on air currents to susceptible tissues where they cause new infections. *Botrytis* also produces resting bodies called sclerotia that enable the long-term survival of the fungus and give rise to conidia that perpetuate the disease.

Pest Management

Cultural Controls: The elimination of infected crop residue will reduce a source of the fungus in the spring. Minimizing stresses and injuries caused by other diseases and pests will help reduce the development of botrytis blight.

Resistant Cultivars: None identified.

Issues for Gray Mold / Botrytis Blight

None identified.

Phytophthora Spear Rot (*Phytophthora megasperma* f. sp. *glycinea* and *P. cryptogea*)

Pest Information

Damage: Spears affected by *Phytophthora* develop light brown lesions near the soil line. Affected spears become "hooked" as infected tissues cease to grow. Crown vigour and the productivity of an asparagus plant can be significantly reduced by *Phytophthora* infection.

Life Cycle: This disease is soil-borne and is more likely to develop under excessively wet conditions and in areas with heavy soils and poor drainage. The fungus persists in soil as oospores (thick-walled sexual spores). The oospores germinate to produce sporangia and motile zoospores which can infect root and crown tissues. Infection occurs through wounds such as those caused by sand blasting, insect damage and other physical injuries.

Pest Management

Cultural Controls: Avoid sites with poor drainage and heavy soils when establishing new plantings to reduce the potential for the development of Phytophthora spear rot. Minimizing stresses such as the depletion of carbohydrate reserves of the crown through over-harvesting, will help reduce the impact of the disease on the asparagus. Refer to Table 5 for practices used by growers in Canada to manage Phytophthora spear rot.

Resistant Cultivars: None identified.

Issues for Phytophthora Spear Rot

1. Phytophthora spear rot is difficult to diagnose in the field and may cause more yield reduction than currently recognized. Improved approaches to field diagnosis of Phytophthora spear rot are required.
2. There is a need for harmonized fungicide registrations between the United States and Canada for the control of Phytophthora spear rot to ensure Canadian growers have access to the same pest management options as their competitors.
3. There is a need for the development of practices to prevent phytophthora spear rot.

Purple Spot or Stemphylium Blight (*Pleospora herbarum*, anamorph *Stemphylium vesicarium*)

Pest Information

Damage: Purple spot can infect spears, stems and foliage of asparagus. When infected, small purple lesions one to two millimetres in diameter develop on the spear. If numerous, the spears will not be marketable. Light brown lesions with purple margins develop on the fern and if severe can cause defoliation and dieback. Severe defoliation can result in a weakening of the plant and reduce yield in the following season.

Life Cycle: This disease overwinters as pseudothecia (spore producing structures) on fern residue. Ascospores (sexual spores) are released during cool, moist weather during early spring and are dispersed by wind, often landing on the windward side of asparagus spears where they cause primary infections. Wounds caused by sand blasting are common infection sites, but infections may also occur through stomata and directly through the epidermis. The resulting lesions give rise to conidia (asexual spores) that cause new infections throughout the summer.

Pest Management

Cultural Controls: The removal or burying of crop residue will help reduce disease carry-over between seasons. The use of cover crops such as rye will help to reduce wounds due to sand-blasting, which are important infection sites. Reduced tillage systems are less prone to sand blasting so asparagus produced under these systems can have a lower incidence of Stemphylium blight. Refer to Table 5 for practices used by growers in Canada to manage purple spot.

Resistant Cultivars: None identified. More recent male hybrid cultivars may have less tolerance to Stemphylium blight.

Issues for Purple Spot

1. Studies are required to determine the impact of fungicides used for rust control on overall plant health and the development of purple spot.
2. Studies are required to establish an integrated approach to the control of purple spot.
3. There is the need for additional fungicides, including biofungicides, from new families to prevent and/or delay the development of resistance.
4. Monitoring methods, including the use of spore traps need to be developed to aid in the control of purple spot.
5. There is a need for harmonized fungicide registrations between the United States and Canada for the control of purple spot to ensure Canadian growers remain competitive.

Virus diseases: Asparagus Virus 1 (AV-1) and Asparagus Virus 2 (AV-2), Cucumber Mosaic Virus (CMV), Tobacco Streak Virus (TSV)

Pest Information

Damage: Viral infections in asparagus typically show minimal to no symptoms and require lab testing to verify. The AV-1 has little effect on growth, yield or longevity on its own, but it may increase asparagus susceptibility to other biotic and abiotic stresses. The AV-2 can cause decreased yield and reductions in spear diameter and number of spears in years following infection, ultimately shortening the productive life of asparagus. It also increases the susceptibility of asparagus to infection by *Fusarium*. Thus AV-2 is a major virus in asparagus and one of the main causes of asparagus decline. Combined infection by AV-1 and AV-2 is of greater concern than each on their own as these viruses have an additive effect on asparagus vigor and yield. The CMV does not produce any obvious symptoms in asparagus and TSV can cause minor stunting, chlorotic or brown streaks on spears and browning of needles but does not affect yield or spear quality. The CMV and TSV are not major concerns in asparagus on their own but can co-occur with AV-1 and/or AV-2 to cause greater reductions in vigor and yield. In some cases, it is unclear whether reported symptoms from viral infections are the cause of the virus itself or the result of increased susceptibility to other stressors or diseases.

Life Cycle: Asparagus is the only natural host of AV-1 and AV-2. The AV-1 is spread rapidly through non-persistent transmission by some aphid species and is not found in seed or pollen. Conversely, AV-2 is not spread by insects or nematodes, but rather from contamination of cutting knives and machinery by infected plants. The AV-2 can also be seed- and pollen-borne. The CMV infects over 1200 different plant species and is spread from infected to uninfected asparagus plants through non-persistent transmission by over 80 aphid species. There is no evidence of CMV being seed- or pollen-borne in asparagus but it is in some other plant hosts. Both AV-1 and CMV are considered non-persistent viruses, because they are not retained by leaf-feeding insects who transmit them. The TSV infects over 80 different plant species. It spreads from infected to uninfected asparagus plants via thrips-mediated pollen transfer but is not seed-borne.

Pest Management

Cultural Controls: Chemical control of aphid populations will not necessarily control the transmission of non-persistent viruses such as AV-1 or CMV. Planting virus-free seeds, transplants or crowns are good practices. Scouting for the presence of aphids in association with changes in plant vigour can be an indication of the presence of a viral infection. Harvest and mulch younger and virus-free fields first and clean knives and machinery between fields. Avoid planting in fields near older asparagus crops which may harbor infection. Refer to Table 5 for practices used by growers in Canada to manage virus diseases.

Issues for Virus Diseases

1. A better understanding of virus vectors and their life cycles is needed.

Insects and Mites

Key Issues

- There is a need for lower-risk conventional and non-conventional insecticides, including biopesticides, to control a range of insect pests, such as common asparagus beetle, spotted asparagus beetle, asparagus leafminer and aphids.

- There is a need for additional products approved for organic production for the control of insects in asparagus.

- There is a need for conventional and non-conventional pesticides with short pre-harvest intervals for asparagus beetle, and pest control product that are pollinator-friendly (i.e., honey bees during asparagus flowering).

- Registration of additional modes of action for insecticides are required for increased control and/or suppression of all insect and mite pests, especially common asparagus beetle and aphids.

- There is a need for harmonization of pesticide registrations between Canada and the US to help Canadian asparagus growers remain competitive.

- For provincial ratings of key insect and mite pest occurrence, see Table 6.

Table 6. Occurrence of insect and mite pests in asparagus production in Canada[1,2]

Insect/Mite	Ontario	Quebec
Alfalfa plant bug		
Asparagus aphid		
Asparagus beetle, Common		
Asparagus beetle, Spotted		
Asparagus miner		
Cutworm, Darksided		
Cutworm, Sandhill		
Cutworm, Variegated		
Cutworm, White		
Japanese beetle		
Tarnished plant bug		
Widespread yearly occurrence with high pest pressure.		
Widespread yearly occurrence with moderate pest pressure OR localized yearly occurrence with high pest pressure OR widespread sporadic occurrence with high pest pressure.		
Widespread yearly occurrence with low pest pressure OR widespread sporadic occurrence with moderate pressure OR sporadic localized occurrence with high pest pressure.		
Localized yearly occurrence with low to moderate pest pressure OR widespread sporadic occurrence with low pest pressure OR localized sporadic occurrence with low to moderate pest pressure OR pest not of concern.		
Pest is present and of concern, however, little is known of its distribution, frequency and pressure.		
Pest not present.		

[1]Source: Asparagus stakeholders in reporting provinces (Ontario, Quebec); the data reflect the 2022, 2023 and 2024 production years.
[2]Refer to Appendix 1 for a detailed explanation of colour coding of occurrence data.

Table 7. Adoption of integrated insect and mite management practices for asparagus production in Canada[1]

Practice	Asparagus beetles	Asparagus aphid	Variegated cutworm and other cutworms	Tarnished plant bug	Asparagus miner
Avoidance:					
Varietal selection / use of resistant or tolerant varieties					
Planting / harvest date adjustment					
Rotation with non-host crops					
Choice of planting site					
Optimizing fertilization for balanced growth					
Minimizing wounding to reduce attractiveness to pests					
Reducing pest populations at field perimeters					
Use of physical barriers (e.g., mulches, netting, floating row covers)					
Use of pest-free propagative materials (seeds, cuttings, transplants)					
Prevention:					
Equipment sanitation					
Canopy management (e.g., thinning, pruning, row or plant spacing, etc.)					
Manipulating seeding / planting depth					
Irrigation management (timing, duration, amount) to manage plant growth					
Management of soil moisture (e.g., improvements to drainage, use of raised beds, hilling, mounds)					
End of season or pre-planting crop residue removal / management					

…continued

Table 7. Adoption of integrated insect and mite management practices for asparagus production in Canada[1] (continued)

Practice	Asparagus beetles	Asparagus aphid	Variegated cutworm and other cutworms	Tarnished plant bug	Asparagus miner
Pruning out / removal of infested material throughout the growing season					
Tillage / cultivation to expose soil insects					
Removal of other hosts (weeds / wild plants / volunteers) in the field and vicinity					
Monitoring:					
Scouting / trapping					
Maintaining records to track pests					
Soil analysis for pests					
Weather monitoring for degree day modelling					
Use of precision agriculture technology (GPS, GIS) for data collection and mapping of pests					
Decision making tools:					
Economic threshold					
Use of predictive model for management decisions					
Crop specialist recommendation or advisory bulletin					
Decision to treat based on observed presence of pest at susceptible stage of life cycle					
Use of portable electronic devices in the field to access pest identification / management information					
Suppression:					
Use of diverse pesticide modes of action for resistance management					

…continued

Table 7. Adoption of integrated insect and mite management practices for asparagus production in Canada[1] (continued)

Practice	Asparagus beetles	Asparagus aphid	Variegated cutworm and other cutworms	Tarnished plant bug	Asparagus miner
Soil amendments and green manure involving soil incorporation as biofumigants to reduce pest populations					
Use of non-conventional pest control products (e.g., biopesticides)					
Release of arthropod biological control agents					
Preservation or development of habitat to conserve or augment natural controls (e.g., preserve natural areas and hedgerows, adjust crop swathing height)					
Mating disruption through the use of pheromones					
Mating disruption through the release of sterile insects					
Trapping					
Targeted pesticide applications (e.g., banding, spot treatments, use of variable rate sprayers)					
Selection of pesticides that are soft on beneficial insects, pollinators and other non-target organisms					
Crop Specific Practices:					
Hand picking insects (eggs, larvae, pupae or adults) from plants					
This practice is used to manage this pest by at least some growers in the reporting provinces.					
This practice is not used by growers in the reporting province to manage this pest.					
This practice is not applicable for the management of this pest.					

[1]Source: Asparagus stakeholders in reporting provinces (Ontario, Quebec); the data reflects the 2022, 2023 and 2024 production years.

Alfalfa Plant Bug (*Adelphocoris lineolatus*)

Pest Information

Damage: Plant bugs have piercing and sucking mouth parts through which they suck plant juices. The alfalfa plant bug injects toxins into the plant while feeding, resulting in wrinkling and growth distortion of spears and even plant death under severe feeding pressure. Yield losses as high as 10 percent have been reported. Alfalfa plant bugs present in nearby alfalfa fields may migrate into asparagus plantings when the alfalfa fields are cut.

Life Cycle: Adult alfalfa plant bugs overwinter in plant debris. They emerge in mid-April to late-May and feed on asparagus spears. Eggs are laid on host plants including many weed species. Nymphs emerge 10 days later. There are two generations per year.

Pest Management

Cultural Controls: Good weed control in and around the asparagus planting will make the asparagus planting less attractive to plant bugs. Eliminating crop residue will reduce overwintering sites.

Resistant Cultivars: None identified.

Issues for Alfalfa Plant Bug

1. There is a need to develop an integrated approach, including new conventional and non-conventional pest control products to control alfalfa plant bug.

Aphids: Asparagus Aphid (*Brachycorynella asparagi*) and other species

Pest Information

Damage: Asparagus aphids are sap-sucking insects that feed on asparagus ferns. During feeding, they inject a toxin, causing the ferns to develop bushy, distorted growth called "witches brooms". Feeding weakens the plants resulting in the production of numerous thin spears, yield losses the following season and eventual death of the plant under heavy infestations. Seedlings and newly established fields are more susceptible to injury. Some aphids may also be vectors of virus diseases.

Life Cycle: The asparagus aphid overwinters as eggs on asparagus residue. Females hatch from the eggs and produce female nymphs which mature and give rise to subsequent generations of female aphids. Aphid populations build up quickly as aphids give birth to live young. The build-up of aphid populations is favoured by hot and dry weather. A generation of winged males is produced in the late summer and early fall. Following mating, females lay overwintering eggs, completing the cycle.

Pest Management

Cultural Controls: Lady bird beetles and other natural predators normally control aphid populations; however, they may not provide complete control under hot, dry conditions that favour aphid population build-up. It is important to scout fields regularly throughout the growing season as aphid numbers can increase rapidly. To monitor for aphids, which are difficult to detect visually on the plant, ferns may be shaken over a light-coloured surface. Burning old ferns will destroy overwintering eggs. The elimination of crop residue in the fall will reduce the overwintering aphid population. Refer to Table 7 for practices used by growers to manage asparagus aphid.

Resistant Cultivars: None identified.

Issues for Aphids

1. There is a need for conventional and non-conventional insecticides, including biopesticides, for the control of aphids.

Asparagus Beetles: Common Asparagus Beetle (*Crioceris asparagi*) and Spotted Asparagus Beetle (*Crioceris duodecimpunctata*)

Pest Information

Damage: Adults of both species and the larvae of the common asparagus beetle cause feeding injury on both ferns and spears. Feeding on spears can result in misshapen spears. Feeding on the ferns can reduce the vigour of the asparagus plant. Severe defoliation can occur and potentially cause reduced yields in subsequent crops. Eggs laid on the spears in the early spring are unsightly and can result in the spears being culled. Larvae of the spotted asparagus beetle feed only on berries, reducing seed production.

Life Cycle: In the early spring, the adults begin to feed and lay eggs on newly emerged asparagus spears. The eggs hatch in one to two weeks and larvae feed for three to four weeks. Pupation occurs at, or just below the soil surface. New adults emerge in late July and give rise to a second generation, which matures by September and overwinters in crop residues.

Pest Management

Cultural Controls: Allowing a row of asparagus to produce ferns early in the season has been shown to function in an 'attract and kill' approach for asparagus beetles. With beetles concentrated on the row of more mature plants, the individual row can be sprayed, reducing numbers of beetles in the rest of the field during harvest. Natural predators can contribute to keeping the population of asparagus beetles in check. Refer to Table 7 for practices used by growers to manage asparagus beetles.

Resistant Cultivars: None available.

Issues for Asparagus Beetles

1. Additional information is required on the application method and timing of insecticides for effective control of asparagus beetles.
2. Studies are needed to develop a degree day prediction model for common asparagus beetle.
3. Biopesticides are needed for management of asparagus beetle.

Asparagus Miner (*Ophiomyia simplex*)

Pest Information

Damage: Asparagus miners feed just under the epidermis of asparagus stems. Feeding injury is apparent as twisting mines at stem bases. Plants less than five years old are preferred hosts. Although serious plant injury does not usually occur, the insect is known to spread Fusarium diseases.

Life Cycle: In early June, adults lay eggs beneath the epidermis of asparagus stems. Adult flies are short-lived. The eggs hatch and the first generation larvae feed until mid-July. Following pupation (in crop residues or soil), adult flies emerge and lay the second generation of eggs in late July or August. Second generation pupae overwinter and adults emerge in the spring.

Pest Management

Cultural Controls: The removal of crop residues in the fall eliminates potential overwintering sites for asparagus miner. Refer to Table 7 for practices used by growers to manage asparagus miner.

Resistant Cultivars: None available.

Issues for Asparagus Miner

1. Asparagus miner occurrence continues to increase in Quebec. Studies are required to determine the impact of asparagus miner on crop growth and vigour, and to establish an economic threshold.

Cutworms: Dark-sided Cutworm (*Euxoa messoria*), Sandhill Cutworm (*E. detersa*), Variegated Cutworm (*Peridroma saucia*), White Cutworm (*E. scandens*)

Pest Information

Damage: Cutworms feed on the growing tips of asparagus spears. Damaged spears are culled, reducing yield. Damage is more severe in early spring when spear growth is slow and there are fewer spears.

Life Cycle: Cutworms may overwinter as eggs, larvae or pupae (depending on species and location) or adult moths may be blown northward from the United States in the spring. The overwintered larvae resume feeding mostly at night in the spring and feed until early June before they pupate in the soil. Cutworm moths lay eggs from about late June until mid-August. The eggs hatch and the larvae feed on asparagus and a variety of weeds.

Pest Management

Cultural Controls: Control is needed if damage to spears by cutworms exceeds five percent as observed in field or on grading line. Controlling weeds in the fall or spring will make the asparagus planting less attractive as an egg-laying site. Refer to Table 7 for practices used by growers to manage cutworms.

Resistant Cultivars: None identified.

Issues for Cutworms

1. there is a need to identify what species of cutworms are present in asparagus fields in Ontario and Quebec, and to learn more about their life cycle.

Japanese Beetle (*Popillia japonica*)

Pest Information

Damage: Japanese beetle adults are generalist feeders that attack over 300 different plant species. Feeding damage by the Japanese beetle is hard to distinguish from common asparagus beetle feeding. Adults aggregate on ferns to mate and feed. Feeding damage to ferns can reduce the vigour of the asparagus plant.

Life Cycle: The Japanese beetle has a one-year life cycle. Adult beetles emerge from the soil in early summer, feed on plant foliage and mate and lay eggs in the soil. Following egg hatch, the larvae, known as white grubs, feed on plant roots in the upper 10 to 12 cm of soil. The larvae continue to feed on plant roots into the fall, overwinter and resume feeding the following spring.

Pest Management

Cultural Controls: Monitoring for adult Japanese beetles and beetle damage can be done by visual inspection of ferns in July through August. Pheromone traps can be used to help determine when adults begin flying but visual inspections are more practical for monitoring in-crop populations. There are no thresholds established and adults are very active, continuously on the move.

Resistant Cultivars: None available.

Issues for Japanese Beetle

1. Japanese beetle prevalence continues to increase in Ontario and Quebec. Studies are required to determine the impact of Japanese beetles on crop growth and vigour and to establish an economic threshold.

Tarnished Plant Bug (*Lygus lineolaris*)

Pest Information

Damage: Tarnished plant bugs feed on a wide variety of ornamental and vegetable plants by means of piercing and sucking mouth parts. Tarnished plant bugs cause tip dieback injury to the asparagus fern and to newly emerged spears. Injury is caused by the feeding of both adults and nymphs.

Life Cycle: Tarnished plant bugs overwinter as adults in sheltered sites. Adults become active in mid to late April with the onset of warm weather and begin to feed and lay eggs on a variety of hosts. Following egg hatch, nymphs feed and develop through five instars, before becoming adults. There are at least two generations per year, with the 1st generation appearing about two months after the over-wintering adults become active.

Pest Management

Cultural Controls: Good weed control in and around the asparagus planting will make the asparagus planting less attractive to plant bugs. Eliminating crop debris will reduce overwintering sites. Refer to Table 7 for practices used by growers to manage plant bugs.

Resistant Cultivars: None identified.

Issues for Tarnished Plant Bug

1. There is a need to develop an integrated approach, including new conventional and non-conventional pest control products to control tarnished plant bug.

Weeds

Key Issues

- There is a need for herbicides with short pre-harvest intervals for the control of annual grasses, perennial broadleaf weeds and horsetail at harvest. An example of a specific product needed is dicamba for the management of horse nettle, fleabane and nightshade, etc.

- There is a need for herbicides for the control of both annual and perennial weeds during the growing season. As well as herbicides with residual activity to rotate with Dual.

- The residual effect of herbicides over several asparagus production seasons is unknown. More research is needed to determine the impact of repeated residual herbicide applications on crop growth.

- There is a need for organically accepted herbicides for use in organic asparagus production systems.

- There is a need for registered herbicides for fall applied long-lasting residual control post-fern mowing, or spring applied long-lasting residual control pre-emergence.

- Registration of additional modes of action for herbicides are required for increased control and/or suppression of all weed species.

- There is a need for harmonization of pesticide registrations between Canada and the US to help Canadian asparagus growers remain competitive.

- For provincial ratings of key weed occurrence, see Table 8.

Table 8. Occurrence of weeds in asparagus production in Canada[1,2]

Weeds	Ontario	Quebec
Annual broadleaf weeds		
Annual grasses		
Perennial broadleaf weeds		
Perennial grasses		
Widespread yearly occurrence with high pest pressure.		
Widespread yearly occurrence with moderate pest pressure OR localized yearly occurrence with high pest pressure OR widespread sporadic occurrence with high pest pressure.		

[1]Source: Asparagus stakeholders in reporting provinces (Ontario, Quebec); the data reflect the 2022, 2023 and 2024 production years.
[2]Refer to Appendix 1 for a detailed explanation of colour coding of occurrence data.

Table 9. Adoption of integrated weed management practices for asparagus production in Canada[1]

Practice	Annual broadleaf weeds	Annual grass weeds	Perennial broadleaf weeds	Perennial grass weeds
Avoidance:				
Varietal selection / use of competitive varieties				
Planting / harvest date adjustment				
Crop rotation				
Choice of planting site				
Optimizing fertilization for balanced growth and to minimize stress				
Use of weed-free propagative materials (seed, cuttings, transplants)				
No till or low disturbance seeding to minimize weed seed germination				
Use of physical barriers (e.g., mulches)				
Prevention:				
Equipment sanitation				
Canopy management (e.g., thinning, pruning, row or plant spacing)				
Manipulating seeding / planting depth				
Irrigation management (timing, duration, amount) to minimize disease infection periods and manage plant growth				
Management of soil moisture (e.g., improvements in drainage, use of raised beds, hilling, mounds)				
Weed management in non-crop lands				
Monitoring:				
Scouting / field inspection				
Maintaining records of weed incidence including herbicide resistant weeds				
Use of precision agriculture technology (GPS, GIS) for data collection and mapping of diseases				

…continued

Table 9. Adoption of integrated weed management practices for asparagus production in Canada[1] (continued)

Practice	Annual broadleaf weeds	Annual grass weeds	Perennial broadleaf weeds	Perennial grass weeds
Decision making tools:				
Economic threshold				
Crop specialist recommendation or advisory bulletin				
Decision to treat based on observed presence of weed at susceptible stage of development				
Decision to treat based on observed crop damage				
Use of portable electronic devices in the field to access weed identification / management information				
Suppression:				
Use of diverse herbicide modes of action for resistance management				
Soil amendments and green manure soil incorporation as biofumigants to reduce weed populations				
Use of non-conventional pesticides (e.g., biopesticides)				
Release of arthropod biological control agents				
Mechanical weed control (cultivation / tillage)				
Manual weed control (e.g., hand pulling, hoeing, flaming)				
Use of stale seedbed approach				
Targeted pesticide applications (e.g., banding, spot treatments, use of variable rate sprayers)				
Selection of herbicides that are soft on beneficial insects, pollinators and other non-target organisms				
Crop specific practices:				
Use of cover crops (inter-row; fall rye)				

This practice is used to manage this pest by at least some growers in the reporting provinces.

This practice is not used by growers in the reporting provinces to manage this pest.

This practice is not applicable for the management of this pest.

[1]Source: Asparagus stakeholders in reporting provinces (Ontario, Quebec); the data reflects the 2022, 2023 and 2024 production years.

All Weeds

Pest Information

Damage: Weeds compete with asparagus for light, water and nutrients. High weed populations during the establishment of a new asparagus field can result in weak and non-uniform stands. Weeds may also impact yields of future harvests. In established crops, competition from perennial weeds can reduce the vigour of the planting. Annual weed problems may develop during the spring and early summer in the absence of a crop canopy and interfere with harvest operations. High populations of persistent perennial weeds, particularly field bindweed (*Convolvulus arvensis*) may require the removal of the asparagus planting.

Life Cycle: Annual weeds – Annual weeds complete their life cycle from seed germination through vegetative growth and flowering to seed production, in one year. Annual weeds produce large numbers of seeds that can remain viable in the soil for many years, germinating when conditions are suitable. Summer annuals germinate in the spring and die before the onset of winter. Winter annuals germinate in the fall and overwinter in a vegetative state, flower in the spring, form seeds and then die. Perennial weeds – Perennial weeds are plants that live for many years. They spread by means of seeds, vegetative structures and the expansion of various types of root systems.

Pest Management

Cultural Controls: Due to the perennial nature of asparagus, it is important to select planting sites with low populations of annual and perennial weeds or to implement weed management practices in the years prior to planting. Cultural practices that result in a uniform and vigorous stand of asparagus will minimize problems due to weeds. The introduction of seeds and perennial, vegetative reproductive structures carried on equipment or in planting materials must be avoided. In young crops, light cultivation between rows and hand removal help reduce annual weed problems. Weed populations are continually monitored throughout the lifespan of the crop. Perennial weeds tend to become more problematic as the crop ages and may require physical removal. Tillage early in the year may be used to remove stubble left from the previous year and to eliminate overwintering and newly germinating weeds. Hand hoeing may be used to control annual grasses. A rye cover crop seeded into the asparagus crop in the fall and "burned-off" with herbicide in the spring, will serve to kill winter annual weeds and reduce the germination of summer annual weeds. Tillage is not generally used where a rye cover crop is planted. In organic production, mechanical weed control, including hand hoeing, is the primary means of weed management. Refer to Table 9 for practices used by growers to manage weeds.

Issues for Weeds

1. There is a need for new herbicides for the control of annual grasses and annual broadleaf weeds during harvest.
2. Problems due to herbicide-resistant annual weeds are increasing. There is a need for new herbicides with different modes of action to manage weeds in asparagus.

3. Herbicides for the control of perennial grasses are needed.
4. Herbicides for the control of bindweed are needed.
5. Some perennial weeds are only suppressed by herbicides registered for asparagus (i.e., coltsfoot, horsetail). There is a need for the development of effective controls for these weeds.

Resources

Integrated pest management / integrated crop management resources for asparagus production in Canada

British Columbia Agriculture. Asparagus production guide. https://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/agriservice-bc/production-guides/vegetables/asparagus

CABI. BioProtection Portal. https://bioprotectionportal.com/

Quebec Reference Centre for Agriculture and Agri-Food. https://www.craaq.qc.ca/en/

Health Canada. Pesticides and Pest Management. http://www.hc-sc.gc.ca/cps-spc/pest/index-eng.php

Manitoba Agriculture. Vegetable Crops. Production Information on Vegetable Crops – Asparagus. https://www.gov.mb.ca/agriculture/crops/crop-management/pubs/bmz00s01p.pdf

Ontario Ministry of Agriculture, Food and Agribusiness. Publication 839: Guide to Vegetable Production in Ontario. https://www.ontario.ca/files/2024-02/omafra-guide-to-vegetable-production-in-ontario-en-2024-02-15.pdf

Ontario Ministry of Agriculture, Food and Agribusiness. Ontario Crop Protection Hub. https://cropprotectionhub.omafra.gov.on.ca/

Provincial Contacts

Province	Ministry	Crop Specialist	Minor Use Coordinator
British Columbia	British Columbia Ministry of Agriculture and Seafood https://www2.gov.bc.ca/gov/content/industry/agriculture-seafood	Karina Sakalauskas Karina.Sakalauskas@gov.bc.ca	Caroline Bédard Caroline.Bedard@gov.bc.ca
Ontario	Ontario Ministry of Agriculture, Food and Agribusiness https://www.ontario.ca/page/ministry-agriculture-food-and-agribusiness	Elaine Roddy elaine.roddy@ontario.ca	Joshua Mosiondz joshua.mosiondz@ontario.ca
Quebec	Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec (in French only) https://www.mapaq.gouv.qc.ca/fr/Pages/Accueil.aspx	Mélissa Gagnon melissa.gagnon@mapaq.gouv.qc.ca	Mathieu Coté mathieu.cote@mapaq.gouv.qc.ca

Provincial and National Vegetable Grower Organizations

Asparagus Growers of Ontario: https://ontarioasparagus.ca/

Association des producteurs maraîchers du Québec (in French only): https://apmquebec.com/

Fruit and Vegetable Growers of Canada: https://fvgc.ca

Canadian Organic Growers: https://www.cog.ca/

Ontario Fruit and Vegetable Growers Association: http://www.ofvga.org

Appendix 1

Definition of terms and colour coding for pest occurrence table of the crop profiles.

Information on the occurrence of disease and insect and mite pests in each reporting province is provided in Tables 4, 6 and 8 of the crop profile, respectively. The colour coding of the cells in these tables is based on three pieces of information, namely pest distribution, frequency and pressure in each province as presented in the following chart.

<table>
<tr><th>Presence</th><th colspan="4">Occurrence information</th><th>Colour Code</th></tr>
<tr><td rowspan="11">Present</td><td rowspan="9">Data available</td><td>Frequency</td><td>Distribution</td><td>Pressure</td><td></td></tr>
<tr><td rowspan="5">**Yearly** - Pest is present 2 or more years out of 3 in a given region of the province.</td><td rowspan="3">**Widespread** - The pest population is generally distributed throughout crop growing regions of the province. In a given year, outbreaks may occur in any region.</td><td>**High** - If present, potential for spread and crop loss is high and controls must be implemented even for small populations.</td><td>Red</td></tr>
<tr><td>**Moderate** - If present, potential for spread and crop loss is moderate: pest situation must be monitored and controls may be implemented.</td><td>Orange</td></tr>
<tr><td>**Low** - If present, the pest causes low or negligible crop damage and controls need not be implemented.</td><td>Yellow</td></tr>
<tr><td rowspan="3">**Localized** - The pest is established as localized populations and is found only in scattered or limited areas of the province.</td><td>**High** - see above</td><td>Orange</td></tr>
<tr><td>**Moderate** - see above</td><td>White</td></tr>
<tr><td>**Low** - see above</td><td>White</td></tr>
<tr><td rowspan="6">**Sporadic** - Pest is present 1 year out of 3 in a given region of the province.</td><td rowspan="3">**Widespread** - as above</td><td>**High** - see above</td><td>Orange</td></tr>
<tr><td>**Moderate** - see above</td><td>Yellow</td></tr>
<tr><td>**Low** - see above</td><td>White</td></tr>
<tr><td rowspan="3">**Localized** - as above</td><td>**High** - see above</td><td>Yellow</td></tr>
<tr><td>**Moderate** -see above</td><td>White</td></tr>
<tr><td>**Low** - see above</td><td>White</td></tr>
<tr><td rowspan="2">Data not available</td><td colspan="3">**Not of concern**: The pest is present in commercial crop growing areas of the province but is causing no significant damage. Little is known about its population distribution and frequency in this province; however, it is not of concern.</td><td>White</td></tr>
<tr><td colspan="3">**Is of concern**: The pest is present in commercial crop growing areas of the province. Little is known about its population distribution and frequency of outbreaks in this province and due to its potential to cause economic damage, is of concern.</td><td>Blue</td></tr>
<tr><td>Not present</td><td colspan="4">The pest is not present in commercial crop growing areas of the province, to the best of your knowledge.</td><td>Black</td></tr>
<tr><td>Data not reported</td><td colspan="4">Information on the pest in this province is unknown. No data is being reported for this pest.</td><td>Gray</td></tr>
</table>

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