



MANAGING A PEST CRISIS IN BC - ROLES

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FEBRUARY 8, 2017

Much of BC's Agriculture is characterized by:



High value, relatively small acreage

Over 200 horticulture crops

Intensive livestock operations in close proximity

Concentrated growing areas

Highly urbanized

Coastal ports

Mild climate

**= high risk for new pest
introductions**

AGRICULTURE VALUE IN BC

(SOURCE “FAST STATS 2009”):

Total farm land: 2.84 million Hectares (7 million acres)

Land in Crops (not pasture): 0.5 million Hectares (1.5 million acres)

about 20% is crops

and 80% is pasture

Our Diversity: A single B.C. nursery produces:

- 151 different genera,***
- 688 different species and cultivars***
- 2,579 different products***

VALUE OF BC AGRICULTURE

FROM 2011 'YEAR IN REVIEW':



Jobs (2008) 33,700

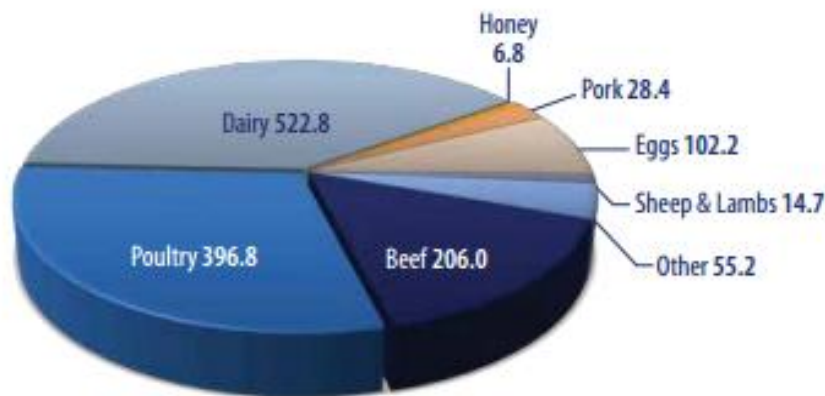
\$2.6 billion in farm cash receipts

- 50% is crops/hort/agr (food crops and non-food crops)
- 50% is livestock (poultry, dairy, beef, goats, sheep, pork, honey, others)

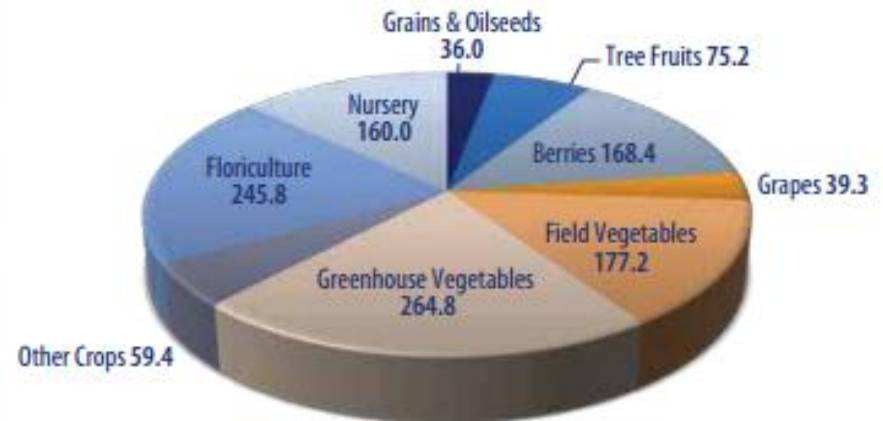
\$1.5 billion is exported (62%).

- Most to USA, but also Asia, Europe, others.

B.C. LIVESTOCK & POULTRY PRODUCTS
FARM-GATE VALUE (\$ MILLIONS)



B.C. CROPS
FARM-GATE VALUE (\$ MILLIONS)



HOW ARE PESTS MOVING?



Pathway – any means that allows the entry or spread of a pest [FAO, 1995]



INVASIVE SPECIES, PATHWAYS AND TRADE

↑ ↑ **Volume** of trade

↓ ↓ **Transportation time**

↑ ↑ **Tourism & other travel**

↑ ↑ **Access to new markets:**
regional and international



~ 4200 vessels called on BC ports in 2009



- > 1440 non-native species have invaded Canada's forests, agricultural & aquatic systems
- Earliest record is codling moth in Ontario in 1635

PESTS REGULATED BY CANADA (FROM CANADIAN FOOD INSPECTION AGENCY'S WEBSITE)

243 organisms are listed

69 are insects and mites (28%)

The rest relate to plant disease (viruses, fungi, bacteria, nematodes) and molluscs.

“... And any other pests which pose a quarantine risk or are determined through risk assessment to be quarantine pests for Canada.”

“CFIA Regulated Pest List”

<http://www.inspection.gc.ca/plants/plant-pests-invasive-species/pests/regulated-pests/eng/1363317115207/1363317187811>

GOAL: TO LIMIT PEST INTRODUCTION **AND SLOW THE SPREAD**

How?

With suitable

- **Biosecurity programs,**
- **Movement restrictions, and**
- **Best Management / Integrated Pest Management programs**

These regulations and programs evolve over time, as

knowledge increases, and

as pests spread naturally or

adapt or

become non-issues

GENERAL BEST PRACTICES

- ✓ **Report new pests or suspected new pests**
- ✓ **Follow good biosecurity practices**
- ✓ **Start with clean stock, keep clean operations and equipment**
- ✓ **Follow relevant regulations**
- ✓ **Inquire if need more information**

ROLE OF BC MINISTRY OF AGRICULTURE



1. Partners with CFIA on pest issues of significance to BC
2. Provides BC perspective on pest issues and risk.
3. Outreach activities:
 1. share pest biology and relevant information
 2. aid growers in implementation of new IPM approaches and biosecurity
4. Some involvement with surveys, either support/help CFIA (i.e. Gypsy moth), or do our own (i.e. Swede midge, SWD).
5. Routine diagnostics, and passive surveillance (plant lab)
6. Some regulatory powers via BC Plant Protection Act

Plant Protection Act, RSBC 1996, Chapter 365 -



http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_96365_01

The BC Plant Protection Act provides for the **prevention of the spread of pests and diseases destructive to plants in British Columbia**, including allowing

- Inspection of suspect plants or produce
- Ordering control or destruction
- The authority to establish quarantine areas.

<http://www2.gov.bc.ca/gov/content/governments/organizational-structure/ministries-organizations/ministries/agriculture/ministry-of-agriculture-legislation/plant-protection-act>



B.C. Plant Protection Act

Act: [Plant Protection Act](#)

Regulations:

- [Bacterial Ring Rot Regulation](#)
- [Balsam Woolly Adelgid Regulation](#)
- [Blueberry Maggot Control Regulation](#)
- [Domestic Bacterial Ring Rot Regulation](#)
- [Golden Nematode Regulation](#)
- [Little Cherry Control Regulation](#)
- North American Gypsy Moth Eradication Regulation, 2015
- [Trellis Rust of Pear Control Regulation](#)

8 regulations,

3 for insects

PREVENTION:

On-farm Biosecurity:

Can be industry initiated, BC Agri supported/encouraged

Environmental Farm Plans

Voluntary Biosecurity Plan

(CFIA has new initiative on this)

Mandatory programs or enforcement (Q-pests)

Mandatory for export markets

Biosecurity Guidelines for Farm Visitors

Whether you are an occasional visitor to farms or an inspector or sales representative visiting many farms, be aware that visitors may inadvertently carry plant pests and diseases on their footwear, clothing and vehicles.

The following are basic guidelines for farm visitors to prevent introduction and spread of plant pests:

Before the visit:

**From: BC Ministry of
Agriculture website**

- Pre-plan your visit
- Contact the farm in advance, know their concerns
- Know the nature of the facility
- Be aware of the important pests and diseases of the crops grown on the farm
- Visit farms with unique pest problems last
- If you observe pest or disease infestations in a farm, avoid same-day visits to similar farms
- Wear dark blue, green or brown coloured clothing which are less attractive to insects

During the visit

- Always carry a "Biosecurity Supply Kit" including:
 - Disposal overalls/sani-suits
 - Booties
 - Gloves
 - Disinfectants (see below)
 - Paper towels
 - Disposal bags
 - Spray-bottles
 - Spare clothing and foot ware
- Follow appropriate biosecurity procedures during farm visits

Farm Biosecurity Links

Learn more about on-farm biosecurity

- [National Farm-Level Biosecurity Planning Guide](#)
- [Grains and Oilseeds Biosecurity](#)
- [National Farm-Level Biosecurity Standard for Potato Growers](#)

Plant Health Laboratory

1767 Angus Campbell Road
Abbotsford, B.C. V3G 2M3

Phone: 604-556-3003
Toll free: 1-800-661-9903

E-mail: PAHB@gov.bc.ca

AgriService BC

Have a question? Call or email us.

Telephone: 1 888 221-7141

E-mail: AgriServiceBC@gov.bc.ca

Invasive Pests and Biosecurity

There are many non-native, invasive pests that threaten British Columbia's economy, including the agriculture and forest industries, and the environment. Prevention, early detection, and control or eradication of these pests is key to preventing their establishment in B.C.

What are non-native, invasive pests?

A pest is a harmful, noxious or troublesome organism. Pests include insects, weeds, plant pathogens (fungi, bacteria, viruses and nematodes), rodents, and other plant or animal pests.

A non-native pest (also known as alien species or exotic pests) are pests that are introduced to a country or region deliberately or by accident, outside of their natural habitat. If the new habitat is suitable, introduced pests can often survive, multiply and spread (becoming invasive). A lack of natural enemies in their new location is often an important factor allowing their population to increase unchecked.

What is a regulated pest?

A regulated or quarantine pest is a pest that is regulated at the federal, provincial or municipal level, to prevent its introduction or additional spread. Regulations may prohibit certain plants from being grown in control areas, may restrict the movement or transport of certain plants, products or soil between areas to prevent a pest from spreading, and may require property owners to control certain pests. Most federally regulated pests are not known to be present in Canada. Some regulated pests may be established in small areas that are under active control or eradication.

Damage caused by invasive pests

Pest Alerts

Pest Alerts highlight new and invasive plant pests of concern to agriculture in B.C. Early detection and identification of a new pest will greatly improve chances of eradicating the pest or slowing its spread and damage.

- [Apple Maggot - Pest Alert](#) (PDF)
- [Brown Marmorated Stink Bug - Pest Alert](#) (PDF)
- [Brown Marmorated Stink Bug Pest Alert Postcard](#) (PDF)
- [Grey Torix Moth - Pest Alert](#) (PDF)
- [Spotted Wing Drosophila \(Fruit Fly\) Pest Alert](#)
- [Balsam Woolly Adelgid](#) (PDF)
- [European Brown Garden Snail](#) (PDF)
- [Pacific Flat Headed Borer](#) (PDF)

Legislation and Regulation

Brown Marmorated Stink Bug

Damage:

Both adults and nymphs feed by inserting their mouthparts into the flesh of fruit or vegetables. Feeding punctures result in small dead areas on fruit, vegetables and leaves. Brown marmorated stink bugs can be a contamination issue for grapes because the presence of a few adults at crush can taint wine.



Brown marmorated stink bug damage to peppers, tomatoes and corn. Photo credit, Galen Dively, University of Maryland



Ministry of
Agriculture

Have you seen this bug?

Reporting

This pest was detected in B.C. in 2016 and is present in Penticton, Chilliwack and Kitsilano. Growers, homeowners and businesses are asked to report any suspect brown marmorated stink bug to the B.C. Ministry of Agriculture offices or contacts below:

In the Southern Interior:

Susanna Acheampong
Ministry of Agriculture
Telephone: (250) 861-7681
Email: Susanna.Acheampong@gov.bc.ca

In the Lower Mainland:

Tracy Hueppelsheuser
Ministry of Agriculture
Telephone: (604) 556-3031
Email: Tracy.Hueppelsheuser@gov.bc.ca

Further Information:

Northeast IPM Center, Brown Marmorated
Stink Bug Information:
<http://www.stopbmsb.org/>

Updated November 2016

Prepared by:
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Kelowna, BC V1X 7G5
Phone: (250) 861-7681



Brown Marmorated Stink Bug
(Halyomorpha halys)



Ministry of
Agriculture

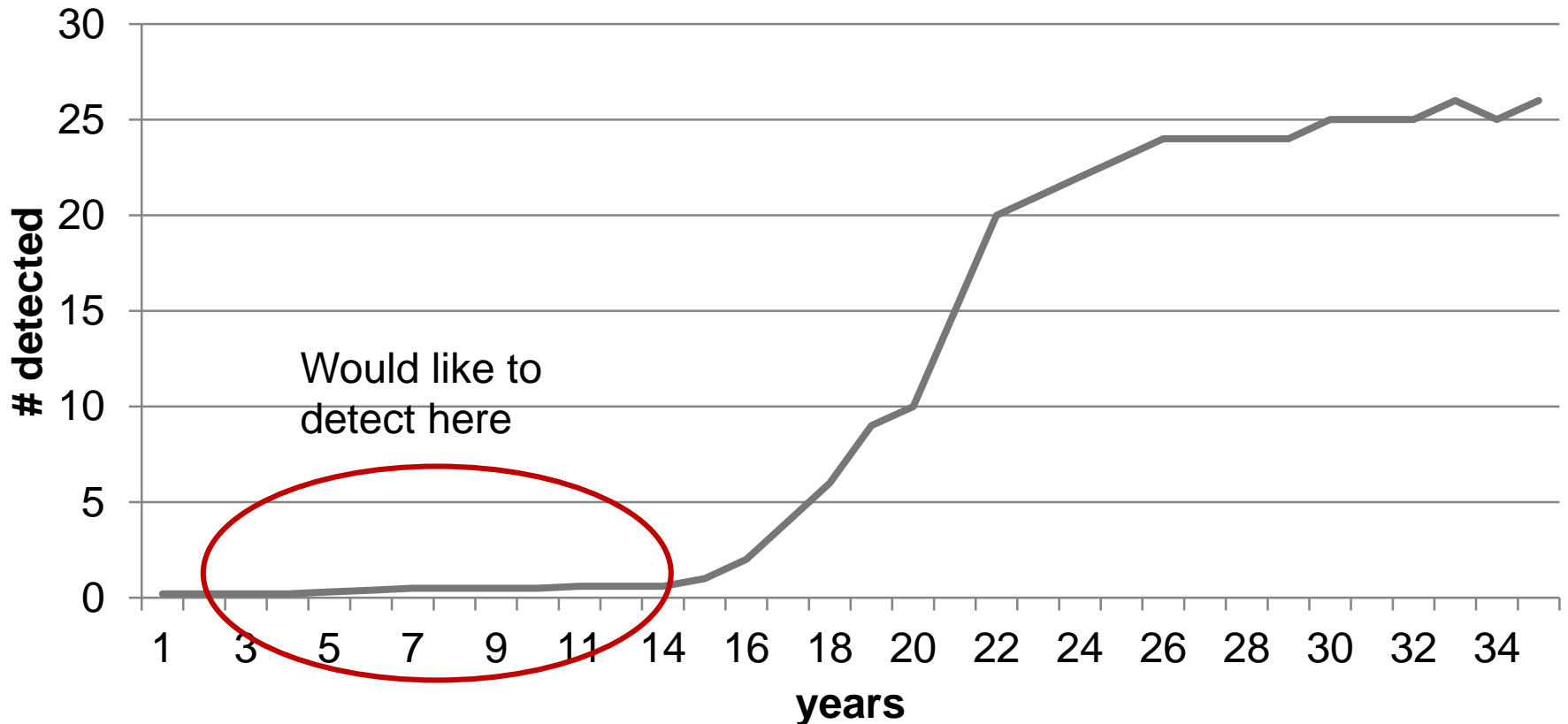
SOME BIOSECURITY LINKS ON CFIA WEBSITE:

- **Avian Biosecurity – Protect Poultry, Prevent Disease:**
<http://www.inspection.gc.ca/animals/terrestrial-animals/biosecurity/standards-and-principles/avian-biosecurity/eng/1344748344710/1344748451521>
- **Developing Your Biosecurity Plan: The National Voluntary Farm-Level Biosecurity Standard for the Fruit and Tree Nut Industries**
<http://www.inspection.gc.ca/plants/plant-pests-invasive-species/biosecurity/developing-your-biosecurity-plan/eng/1455923503770/1455923709067>
- **Producer Guide to the National Farm-Level Biosecurity Standard for Potato Growers; A Guide to Developing Your Farm Biosecurity Plan**
<http://www.inspection.gc.ca/plants/potatoes/guidance-documents/guide-to-developing-your-farm-biosecurity-plan/eng/1367841058884/1367841193074>

NEW INVASION:

***‘EARLY DETECTION’ IS BEST,
THEN A ‘RAPID RESPONSE’***

of organisms years after introduction



BRITISH COLUMBIA PLANT PROTECTION ADVISORY COUNCIL (BCPPAC)

Unique to BC. Formed in 1973

Role: provides a forum to discuss and address plant health and quarantine issues of concern to BC.

Authority: It does not have staff, or a budget; it has advisory abilities only.

Members: all agencies in BC involved in plant health (representatives are volunteers).

BCPPAC webpage is located on the BCAGRI website at:

<http://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/animals-and-crops/plant-health/invasive-pests-and-biosecurity/bcppac>

BRITISH COLUMBIA PLANT PROTECTION ADVISORY COUNCIL

Members:

Government Agencies:

**Federal and provincial agriculture, forestry, environment,
CFIA, Health Canada (PMRA).**

Industry Organizations:

Agriculture/horticulture and forestry

Academic Institutions:

BC universities

Regional Governments

City of Vancouver, Victoria

--anyone interested in plant health.....?

BCPPAC'S R.E.A.C.T. MANUAL

- Outlines steps to take during a 'plant health emergency' (i.e. new pest detection).
- Largely based on 'emergency response' concepts
- Encourages inter-agency cooperation
- Considered a *complementary guide* to any agency procedural manuals
- Guidelines for TACs (Technical Advisory Committees).

PLANT HEALTH EMERGENCY MANUAL

Second Edition
December, 2014



Regional Emergency Action & Containment Tool

**British Columbia Plant Protection Advisory
Council**

TECHNICAL ADVISORY COMMITTEE (TAC)

Technical, science staff consider pest information and make recommendations (for eradication, monitoring, management) to be passed onto appropriate agencies for action

- Examples of TACs for insects:
 - gypsy moth,
 - apple maggot,
 - Japanese beetle,
 - balsam woolly adelgid,
- Some are crop specific:
 - Tree fruit pests
 - Berry pests
- Several TACs for plant diseases, too

Gypsy moth



Japanese beetle



Apple maggot

GYPSY MOTH: ISSUE

Established in eastern N. Amer. since 1868

BIG risk: \$\$\$\$ economics and natural environment:

Attacks natural forests and urban trees, causes **severe defoliation**

Potential trade restrictions for products like Christmas trees, logs with bark, nursery plants, and challenges on transportation (trucks may need agricultural inspections).



GYPSY MOTH: A SUCCESS STORY IN DETECTION, COLLABORATION, COMMUNICATION, ERADICATION

No establishment in BC since the first detection in 1978 (39 years).

Several cooperating agencies in BC and Canada

Similar programs in western States, and to date no establishment.

Good detection system available, makes “early detection” possible



Gypsy Moth in British Columbia

The European gypsy moth (*Lymantria dispar*) was introduced from Europe to the northeastern U.S. in 1869. The North American strain of the moth was first seen in B.C. in 1978.

- [History of gypsy moths in B.C.](#)

Gypsy moths are defoliators, which means their caterpillars eat the leaves of trees and shrubs.

- [Biology and identification of gypsy moths](#)
- Learn to identify whether a caterpillar is [a gypsy moth caterpillar](#)

Once gypsy moths arrive in an area, they threaten extensive damage to the environment and economy. B.C.'s major trading partners may set quarantine and trade restrictions and restrict transportation for products like Christmas trees and logs with bark. For example, in 1999, in response to a gypsy moth infestation, the U.S. threatened to refuse shipments from B.C. nurseries without additional inspection certificates.

The gypsy moth threatens B.C. fruit producers. It will eat the leaves of fruit and hazelnut trees, and blueberry plants. Apple trees, in particular, are excellent hosts. But the insect has more than 300 known hosts, including native shade trees, the rare and endangered Garry oak and valuable ornamental trees.

Management

In B.C., the goal of gypsy moth management is "eradication" — to prevent populations from becoming established. Gypsy moths are not yet established in B.C. or in adjacent areas in Western Canada and the Western United States.

Canadian and U.S. agencies have striven to find and eradicate this invasive pest. As a result, while gypsy moth populations are found in B.C. every year, so far the insect has not become permanently established.

An established population is defined by the North American Plant Protection Organization as

Adult stages



Adult male gypsy moth



Adult female gypsy moth

What You Can Do

Review the [gypsy moth life stages](#). If you find any of these life stages, please

SPOTTED WING DROSOPHILA (SWD)

DROSOPHILA SUZUKII



- Regulation to prevent this pest is not useful. Host material (fruit) is so widely traded
 - **However,** Australia and New Zealand have regulations in place.
- Regulations that are more general, such as requirement **“to be free from contaminants...”** is somewhat useful to try to limit SWD spread.
- **Outreach Focus** has been area-wide survey, regular reporting out to industry (weekly in summer), 2-3 annual updates at events (BCAGRI, Industry)



SWEDE MIDGE

(CONTARINIA NASTURTII)



- Pest of cole crops, canola, brassicae crops and weeds
- Native to Europe, First detected in North America in Ontario broccoli in 2000
- CFIA and USDA initially regulated it (2000-2009)
- CFIA and USDA de-regulated 2009.

SWEDE MIDGE



- CFIA had implemented a certification program for cole crop transplant growers, for those who were within the quarantine zone.
- Now, with deregulation, that program is no longer required, and growers from infested areas can ship freely.

- There is no longer a 'regulation tool' to help prevent introduction into BC.

Damage to cole crop—
no heads



SWEDE MIDGE

Since 2009

BCAGRI, in cooperation with the BC cole crop industry, does surveys for Swede midge annually

So far BC remains free of this pest.



PREVENT SWEDE MIDGE FROM ENTERING BC:

Use clean transplants

Use local sources, or proven clean sources

Field sanitation and crop rotation

Control Brassicae weeds

Be on the look-out and report suspicious symptoms

Example of
Prevention messaging!



REGULATIONS AND MOVEMENT LIMITATIONS CAN SEEM LIKE A NUISANCE TO INDUSTRY

**But, consider the
'nuisance' and impacts
if pest becomes
established?**

**i.e. Control costs,
Yield limitations
Loss of markets**

***For example, see
Oregon's
assessment of
Japanese beetle***

“OREGON TRYING TO HEAD OFF INVASIVE JAPANESE BEETLES”

<http://bcinvasives.ca/news-events/recent-highlights/oregon-trying-to-head-off-invasive-japanese-beetles/>

- PORTLAND — Oregon has drawn a line at the Portland airport against the Japanese beetle, an invasive species that has been spreading across the country, feeding on turf, fruit trees, berries and hops.
- Thirty-two of the insects were trapped last year near Portland International Airport and eight this year, The Oregonian reports.
- About \$300,000 will be spent in Oregon this year to stop Japanese beetles, thought to have arrived in shipments from infested states.
- But the state estimates that if Japanese beetles go unchecked, the cost could be \$33 million per year from destroyed plants and decimated turf and from quarantine measures.
- The only other insect the state Agriculture Department worries about as much as the Japanese beetle is the gypsy moth, whose larvae eats through forests.



William Fountain, University of Kentucky, Bugwood.org
5388354



Japanese beetle larva
Photo courtesy Agriculture & Agri-Food Canada



Japanese beetle

Photo Credit: E. Bradford Walker, Vermont Department of Fish and Recreation. Image 4836022. Forestry Images.org/. February 2008
<http://www.forestryimages.org/>

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- But the state estimates that if Japanese beetles go unchecked, the cost could be \$33 million per year from destroyed plants and decimated turf and from quarantine measures.

Cost to manage JB as an established pest will be 110 times higher than annual eradication cost

William Fountain, University of Kentucky, Bugwood.org

5388354

Japanese beetle larva

Photo courtesy Agriculture & Agri-Food Canada

Photo Credit: E. Bradford Walker, Vermont Department of Forestry and Recreation. Image 4836022. Forestry Images.org. February 2008
<http://www.forestryimages.org/>.

EUROPEAN CORN BORER, *OSTRINIA NUBILALIS*

Introduced into Massachusetts in 1917.

Not present in BC, is a regulated pest

Not present in western USA

**At least 200 hosts, highly adaptable insect;
costly to manage each year**

- Major pest of corn
- Potatoes in PEI
- Sweet peppers, peas, beans, apples, tomato, onion, small grains

**CFIA and BCAGRI collaborated to monitor with
pheromone traps in corn fields in 2015, and found
NONE**



EUROPEAN CORN BORER

Regulations have helped keep this pest out of BC

No movement of risky plant parts allowed into BC

D-96-08: Import and Domestic Movement Requirements, *Sorghum* spp.

[Share this page](#)

Effective Date: July 30, 2014
(6th Revision)

D-95-28: Plant Protection Import and Domestic Movement Requirements for Corn (*Zea mays*)

[Share this page](#)

Effective Date: July 30, 2014
(5th Revision)

Subject

This directive outlines the phytosanitary import and domestic movement requirements for corn (*Zea mays*).

This revision was made to provide a link to the list of "[Pests Regulated by Canada](#)" as well as to add pests from this list that could potentially be associated with the commodities covered under this directive.

CEREAL LEAF BEETLE: SOMETIMES B.C. HAS IT AND THE BUYER DOESN'T

- USDA and CFIA no longer regulate this pest (2008)-it is established in B.C.
- California still regulates it
 - Requirement for treating (fumigation, holding grain for 30 days) during July 1-Nov 30.

B.C. cereal grain growers need to follow California's requirements if they want to ship into that market



Figure 5. Larval Feeding Damage



Figure 6. Severe Larval Feeding Damage



<http://www.farms.com/field-guide/pests/cereal-leaf-beetle.aspx>

WESTERN CORN ROOTWORM *DIABROTICA VIRGIFERA*

- Newly detected in Fraser Valley 2016 in corn
- The most destructive pest of corn in eastern USA:
 - ***“Billion dollar Bug”***
- Native to North/South America
- Likely got here by natural spread
- CFIA not involved at all;
- **Outreach, and pest management recommendations are being done by BCAGRI and industry**



Photo: J. Kalisch, University of Nebraska

**BRING UNKNOWN OR SUSPECTED NEW INSECT
AND MITE SAMPLES TO:
B.C. PLANT HEALTH LABORATORY**



Plant and Animal Health Branch
B.C. Ministry of Agriculture
Abbotsford Agriculture Centre
1767 Angus Campbell Road
Abbotsford, BC V3G 2M3

8:30 A.M. to 4.30 P.M. Monday to Friday
Call Toll Free: 1-800-661-9903

If you have questions, please contact:

Tracy Hueppelsheuser

1-888-2121-7141 or 604-556-3001

Tracy.Hueppelsheuser@gov.bc.ca

CONCLUSIONS:

- Each pest situation is unique and requires different specific responses
- However, much of the process/roles remain the same.
- The **partnerships, communication, research, surveys and reporting**, are all critical to collectively preventing and managing new pest risks to agriculture in BC and Canada.

