Strawberry Pests

Diseases & Insects (and a little about weeds)

DISEASES THAT AFFECT THE FRUIT

BOTRYTIS (GREY MOLD)

Symptoms / Damage

- Initially, rot is soft and light brown in colour
- Leaves, fruit, blossoms & blossom stalks covered with light gray growth
- Off-flavoured fruit
- May develop post-harvest

Botrytis (Gray Mould)

*Botrytis cinerea*

- Attacks various plant parts

Botrytis Fruit Rot - early

Botrytis Fruit Rot - late (Photo courtesy MAFRD)
**Botrytis Fruit Rot – ripe and immature fruit affected**

**Conditions Favouring Disease Development**
- Shade or dense foliage in the bed or row
- High humidity / Poor air circulation
- Extended periods of excessive moisture
- Cool spring & summer temperatures
- Lush, succulent growth or older tissues are more susceptible
- Factors that contribute to soft fruit
  - e.g. excessive N fertility during fruiting

**Management Strategies**
- Protective fungicide applications from bloom to harvest if conditions are cool, wet
  - Follow appropriate Pre-harvest Interval
  - Ensure good straw mulch barrier between berries & soil
  - Avoid bruising fruit

**POWDERY MILDEW**

**DISEASES THAT AFFECT THE FOLIAGE**

**Management Strategies**
- Remove infected berries from the field
- Remove decaying or diseased leaves & fruit
- Ensure fruit is harvested regularly
- Avoid over-fertilization with Nitrogen
**Powdery Mildew**

*Sphaerotheca macularis  
Podosphaera clandestina*

- Affects all above ground plant parts
- Can’t survive without host plant tissue

**Symptoms / Damage**

- Fine powdery white growth on leaf surfaces of lower leaves and on leaf undersides
- Leaves with purplish underside
- Leaves may be discoloured or stunted
- Infected leaves curl upwards

**Infected Raspberry Leaf**  
**Cleistothecia**

**Infected Raspberry Seeded Raspberries**
### Conditions Favouring Disease Development

- Poor air flow due to dense crop canopy
- Warm, dry days (inhibited by rainy, wet conditions)
  - 15 – 27°C
- Conditions of high humidity
- Develops in the spring and fall

### Management Strategies

- Remove infested crop debris, if incidence is low
- Ensure adequate air flow and ventilation within canopy
- Removal of any element that creates high humidity conditions
- Timely application of registered chemicals
- Avoid use of susceptible cultivars

### Common Leaf Spot

*Mycosphaerella fragariae*

- Most prevalent early in the season or in late summer
- Spread by rain, hands, tools or clothing when plants are wet

### Symptoms / Damage

- Symptoms vary by cultivar
- Purplish spots on leaves
- Centres become grey or white with reddish to purplish borders
- May cause black seed
- Other plant parts may be affected
- May cause black seed
**Conditions Favouring Disease Development**

- Susceptible cultivars/varieties
- Succulent growth, due to excessive fertility
- Handling during wet weather

**Management Strategies**

- Use clean planting stock for new plantings
- Use less susceptible cultivars, if possible
- Remove infected plants
- Chemical fungicide sprays

**Black Root Rot**

- Various pathogens
  - Rhizoctonia, Pythium, Idriella, Cylindrocarpon
- Combination of environmental factors & fungal pathogens

**Symptoms / Damage**

- Extensive death of feeder roots
- Deterioration & blackening of structural roots
- Declining plant vigour & productivity

**Conditions Favoring Disease Development**

- Winter injury
- Poorly drained soils
- Excessively acidic or alkaline soil conditions
- Damage from other soil fungi or from nematodes
Management Strategies

- Prevent plant stress
- Ensure sites are well drained & have suitable soil quality for plant growth

LEATHER ROT

Leather Rot

*Phytophthora cactorum*

- Can affect fruit at all stages

Symptoms / Damage

- May affect green through to mature fruit
- Fruit becomes dull or lifeless
  - Range from bleached to purple to near normal
- Fruit is discoloured internally
  - Fruit has a dry, leathery appearance
- Fruit does not develop fuzzy growth

Conditions Favouring Disease Development

- Poorly drained fields

Disease Management Strategies

- Ensure good soil drainage
- Remove infected plants
Other Diseases

INSECTS THAT AFFECT FRUIT

Tarnished Plant Bug

_Tarnished Plant Bug_ - adult

**Lygus lineolaris**
- A.K.A. Lygus Bug
- One of the most serious & widespread of strawberry pests
- Wide range of host plant species

Tarnished Plant Bug nymph
- Distinctive Triangle Marking
- Tarnished Plant Bug nymph & adult on fruit
- Tarnished Plant Bug adult (Photo: courtesy Alberta MAFRD)
Tarnished Plant Bug – adult on flowers

Tarnished Plant Bug – adult on fruit

Tarnished Plant Bug damage on fruit – damaged seeds

Symptoms / Damage

- Feeding by nymphs
  - Nubbins or deformed fruit
  - Apical seediness
- Adult feeding
  - CATFACING

NOTE: Catfacing can be caused by other factors, producing identical symptoms

Monitoring

- Scout the field perimeter in new fields or entire established fields
- Survey the field from pre-bloom until green fruit stage
- Tap plants or shake fruit clusters over a non-metallic pie plate
- Count the number of nymphs per 100 clusters
- Economic threshold = 1 nymph per inflorescence (strawberries)

Catfaced berries – caused by a range of factors

Catfaced berries – caused by a range of factors
Management Strategies
- Careful monitoring of TPB populations
- Remove weeds (especially leguminous species)
- Ensure alternate host crops are not planted too close to field / orchards (e.g. alfalfa)
- Timely application of registered chemicals

INSECTS THAT AFFECT ROOTS

ROOT WEEVILS

Life Cycle
- All female
- Unable to fly
- Active at night
- Adults emerge in early July
- Females deposit eggs in late July near host plant crowns
- Eggs hatch & larvae burrow into soil to feed on roots
- Overwinter as larvae near host plant roots
- Pupate in spring
- 1 generation per year

Root Weevils
- Various species
- Wide host range
**Symptoms / Damage**

- Leaves may be **notched or ragged** (feeding damage)
- Stunting of plants
- Leaves may turn red & fruit can be small & seedy
- Wilting & plant death may occur in drought conditions

**Monitoring**

- Scout the field margins initially, as adults will walk in
- Monitor fields in July or August for leaf notching
- If notching is observed, return at night to find adults on the leaves with a flashlight
- Examine crowns of weak plants for injury

**Management Strategies**

- Do not maintain long rotations
- Ensure fields are isolated from wild plants, which harbour weevils
- Chemical controls can be effective

**INSECTS THAT AFFECT CROWNS OR STEMS**

**CUTWORMS**

- Various species (depends on location)
- Voracious caterpillars
  - Feed at night
  - Do not leave slime trails
  - Overwinter in various stages

**Cutworms**

- Larvae feed on stalks or bore into crowns
- Plants may be cut off at the soil surface
- Some leaf or fruit feeding may occur
- Types of damage depend on the timing of the larval life cycle
- Damage will be higher in older plantings
Cutworms

INSECTS THAT AFFECT BUDS / FLOWERS

BUD / CLIPPER WEEVIL

Life Cycle

- Adults overwinter in fencerows & shelterbelts
- Emerge in early spring (when 16°C) to feed on available plants
- Females lay eggs in holes in flower bud
- Move down the stem & clip flower stem
- Larvae develop within bud (3-4 weeks)
- Adults from larvae, feed briefly & overwinter
- 1 generation per year

Clipper Weevil damage
(Photograph: MAFRD)

Clipper Weevil larva
(Photograph: MAFRD)

Clipper Weevil adult
(Photograph: MAFRD)

Anthonomus signatus

Clipper Weevil damage
(Photograph: MAFRD)
Symptoms / Damage / Monitoring

- **Obvious symptom** = Clipped flower buds
- Monitor fields in May when flower buds begin to develop
- Sample 0.6 m of row in 5 locations in each field 2 times per week from pre-bloom onwards
- Economic threshold = 13-20 clipped buds per metre of row

Management Strategies

- Minimize the amount of trash in & around fields during mid to late summer
- Separate new plantings from infested plantings
- Tillage of old fields immediately after harvest will reduce clipper populations by harming pupal stage

Other Insects

- **Aphids**
  - Various stages
  - Black mould growing on aphid honeydew

- **Mites**
  - Two-spotted Spider Mites
  - Mite damaged leaves
  - Spider Mite-damaged strawberry

Leafrollers

Leafroller damage (Photo Courtesy MAFRD)

Garden Tortoise larva (Photo Courtesy MAFRD)

Thrips

Thrips - adult (Photo Courtesy MAFRD)

Thrips “Bronzing” & Bract Necrosis (Photo Courtesy MAFRD)

Spittle Bugs

Spittle Bug frothy mass (Photo Courtesy MAFRD)

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Slugs

Leafhoppers

Impact of Weeds

- Competition
  - Reduced crop survival / vigour (especially in establishment years)
  - Reduced yields
- Alternate hosts for disease & insect pests
- Negative customer perception
  - Sloppy appearance
  - Poorly managed operation

WEEDS

Weed Management Strategies

- Control weeds before planting (1-2 year)
- Manage weeds as best as you can in early establishment
- Plastic mulch
- Manage the between-row spaces

Weed Management Strategies

- For established plantings - Registered chemicals are effective & available
  - Chemical applications must be carefully timed to avoid damaging plants
PEST MANAGEMENT REGULATORY AGENCY (PMRA) E-LABEL SEARCH

http://pr-rp.hc-sc.gc.ca/ls-re/index-eng.php

QUESTIONS???

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